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***Syntactic and Stylistic Analyses of automatically generation
subtitles***

Case study English to Arabic subtitles on YouTube

A dissertation Submitted to the Department of English as a Partial Fulfillment
for the Requirements of the Degree of Master in Linguistics

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Dedication

*I dedicate this work to: “my father” . ”my mother” “my brothers”
To all my dear “teachers” To those who do not hesitate to extend a helping
hand to me and guide me in my research, and to my “friends”.*

BRIK HICHAM

Dedication

I dedicate this work to myself and my loving family, whose unwavering support, encouragement, and sacrifices made this journey possible.

CHAROUATI WIAM

ABSTRACT

This dissertation addresses the increasing demand for accurate subtitles in video content by conducting grammatical and stylistic analyses of automatic translations, aiming to rectify errors in structure and style that often diminish the viewing experience. The study employs techniques such as part-of-speech tagging, dependency analysis, sentiment analysis, and readability assessment to enhance translation quality, using machine learning and natural language processing on annotated translated texts. The results demonstrate substantial improvements in accuracy, fluency, and user experience, highlighting the value of integrating linguistic knowledge with computational methods in multimedia translation systems, with potential for further research to enhance system robustness.

Keywords: automatic subtitle creation systems, generating captions, grammatical analysis, stylistic analysis, , register, sentiment analysis, style transfer algorithms, machine learning, natural language processing.

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LIST OF ACRONYMS

AI	Artificial Intelligence
ASR	Automatic Speech Recognition
HMMs	Hidden Markov Models
LSTM	Long Short Term Memory
NER	Named Entity Recognition
NLP	Natural Language Processing
NP	Noun Process
POS	Part of Speech
RNN	Recurrent Neural Networks
CNN	Convolutional neural network
SDH	Subtitles for the Deaf and Hard of Hearing
SEO	Search Engine Optimization
SRA	speech recognition algorithms

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GENERAL INTRODUCTION

GENERAL INTRODUCTION

In the era of booming digital media consumption, video content has become an integral part of our daily lives. With the rapid proliferation of online videos, accurate subtitles have gained paramount importance, catering to diverse audiences globally. Automatic subtitle creation systems have emerged as a solution to meet this escalating demand, aiming to streamline the laborious task of transcription and caption generation. However, as convenient as these systems are, they often fall short in delivering subtitles that not only convey the spoken words accurately but also adhere to the intricate nuances of language structure and style.

This dissertation delves deep into the realm of automatic subtitle generation, specifically focusing on two crucial aspects: syntactic and stylistic analysis. Syntactic analysis involves the intricate study of sentence structure, identifying errors in word order, subject-verb agreement, tense consistency, and other grammatical rules. This meticulous examination is paramount in ensuring that the subtitles align seamlessly with the spoken dialogue, enhancing overall comprehension for viewers. Simultaneously, stylistic analysis delves into the expressive and aesthetic qualities of language, encompassing elements like sentence length, vocabulary choice, tone, and register. A subtitle's tone can significantly impact the viewer's perception, making stylistic analysis pivotal in creating a wholesome viewing experience.

Throughout this research, advanced techniques such as part-of-speech tagging, dependency analysis, sentiment analysis, and readability assessment are employed to enhance the accuracy and fluency of automatically generated subtitles. By amalgamating linguistic expertise with cutting-edge computational methodologies, this study endeavors not only to identify the existing challenges but also to propose innovative solutions. The synthesis of these analyses holds the promise of elevating the quality of subtitles, ensuring they resonate authentically with the intended audience. In an age where effective communication knows no bounds, this exploration into the depths of syntactic and stylistic analysis stands as a beacon, guiding the way toward a future where subtitles are not just words on a screen but a bridge that connects cultures and communities.

GENERAL INTRODUCTION

The investigators, in this research work, raise the following research inquiries:

1. How does syntactic analysis contribute to understanding sentence structure, parts of speech, sentence types, and sentence transformations in translation?
2. How can artificial intelligence be used to automatically generate subtitles, and what aspects of style and syntax are involved in this process?
3. What techniques and algorithms can be used for style and context analysis in automatically generating subtitles?

For the sake of gaining a better insight, three partial hypotheses are provided as an attempt to answer the research questions mentioned above:

1. By utilizing syntactic analysis, translators can accurately interpret and effectively communicate the meaning of texts in different languages.
2. The use of Artificial intelligence (AI) can be utilized to automatically generate subtitles by employing advanced algorithms and machine learning techniques. In the context of style and syntax.
3. The use of various techniques and algorithms, such as Natural Language Processing (NLP), Machine Learning, Named Entity Recognition (NER), and Statistical Language Modeling, can be utilized in the style and context analysis for automatically generating subtitles.

Through this study, we hope to help users understanding the strategies of machine subtitle generating .and how it greatly reduces the time and effort required to create subtitles manually, making it more efficient and easy for persons who have problems with understanding other languages.

In this study, quantitative data are used in conjunction with descriptive research. It employs the context analysis method.

The layout of this research work is framed within three distinctive chapters;

Theoretically and practically articulated as follows:

The layout of this research work is framed within three distinctive chapters; theoretically and practically articulated as follows:

GENERAL INTRODUCTION

•**Chapter one:** This chapter focuses on stylistics and syntactic analysis and overview of stylistics concepts and approaches. The elements of stylistic analysis, interpretation, and analysis .influence of style on syntax. The chapter concludes by emphasizing the importance of combining syntactic and stylistic analysis.

•**Chapter two:** It discusses the types of subtitles, their importance, and the formats and presentation of subtitles. Then delves into the automatic generation of subtitles, specifically focusing on style and syntax. It explains the role of artificial intelligence in subtitle generation, the style of automatically generated subtitles, and the syntax of such subtitles. Techniques and algorithms for style and context analysis in subtitle generation are discussed, along with future directions and trends in automatic subtitle generation.

•**Chapter three:** It starts with an overview of YouTube, highlighting its relevance to the research topic. It precedes with the analysis studies on stylistic and syntactic subtitling of YouTube videos. Case studies are conducted to examine effective stylistic and syntactic subtitles on YouTube.

CHAPTER ONE: STYLISTIC AND SYNTACTIC ANALYSES

CHAPTER I: STYLISTICS AND SYNTACTICS ANALYSIS

1.1 Introduction

Stylistics and syntactic analysis, integral branches of linguistics, intricately unravel the complexities of language, shedding light on its structure and style. Beyond their theoretical significance, these analyses play a crucial role in Natural Language Processing (NLP), contributing to the effective comprehension and processing of language. This chapter serves as a comprehensive introduction to both stylistic and syntactic analysis, delineating their definitions, techniques, and importance. The initial section focuses on syntactic analysis, providing a succinct definition and delving into Parsing Algorithms, laying the groundwork for understanding how it dissects the grammatical structure of sentences. The subsequent section immerses readers in the realm of Stylistics Analysis, elucidating its definition, emphasizing its significance in linguistic analysis, and exploring various features and techniques for studying written and spoken language. Finally, the chapter underscores the synergistic value of combined analysis, showcasing the integration of stylistic and syntactic analyses. This holistic approach enhances our understanding of language's multifaceted nature, deepening our insights into structure, style, and meaning, thereby empowering effective interpretation and communication.

1.2 Stylistic analyses

1.2.1 Definition of Syntactic Analysis

Stylistics and syntactic analysis are branches of linguistics that focus on studying and interpreting language. Stylistics examines the expressive and aesthetic aspects of language, analyzing elements like figurative language, word choice, and sentence structure to understand the style and impact of a text. On the other hand, syntactic analyzes sentence structure and the rules governing the arrangement of words and phrases to ensure grammatical correctness and meaning. These two branches are closely related, as the choices made at the syntactic level can influence the stylistic features of a text, and vice versa. By exploring the interplay between style and syntax, we gain a deeper understanding of the structure, style, and meaning of language.

"Syntactic is the backbone of language, providing the framework for organizing words and phrases into coherent and meaningful sentences." - Noam Chomsky

CHAPTER I: STYLISTICS AND SYNTACTICS ANALYSIS

Also, referred as syntax analysis or parsing is a fundamental process in computational linguistics and Natural Language Processing NLP that involves analyzing the grammatical structure of sequence of words; sentence; or text. According to the rules of formal grammar. Moreover, this analysis focuses on how words govern to form meaningful and useful phrases and sentence.

The main goal of this process is to determine the syntactic relationships between words in sentence. This analysis involves identifying the roles of words as nouns; verbs; adjectives...and other part of speech as well as determining the relationships between them such as: subject; verb; object... and so more to create a hierarchical representation of its structure.

Jurafsky and Martin define syntactic analysis as" **Syntactic Analysis is the process of determining the syntactic structure of a sentence; which includes the grammatical relationships between words and the a hierarchical organization of phrases and constituents"**

1.2.2 Importance of syntactic analysis

Syntactic analysis plays significant importance in NLP and computational linguistics due to help in understanding the structure and organization of sentences. By analyzing the syntactic relationships between words and their arrangement within a sentence, syntactic analysis enables us to comprehend how language conveys meaning.

It provides a foundation for language understanding systems such as machine translation, question answering, and more.

Syntactic analysis is also essential for grammar checking and correction, as it identifies grammatical errors helping to improve the accuracy and clarity of written communication.

Furthermore, it contributes to the development of sentiment analysis models by considering the syntactic structure's influence on sentiment expression

1.2.3 Relation between Syntactic Analysis and Language Understanding:

In context of Artificial intelligence AI and Natural Language Processing Language Understanding is the ability of system to comprehend and interpret human language that combines various linguistics elements like grammar, syntax , semantics, and pragmatics

CHAPTER I: STYLISTICS AND SYNTACTICS ANALYSIS

Syntactic analysis on other hand is subfield of Natural Language Processing that focuses on the grammatical structure of sentences. By analyzing the arrangement and relationships of words within sentence.

Syntactic Analysis and Language Understanding are closely related components of NLP that help to comprehend Human Language (text or speech). Syntactic Analysis helps to identify the grammatical structural of a sentence, and understanding structure is essential for understanding the meaning of sentence and interpreted it correctly. Also; language contains ambiguous sentences that can have multiple Interpretations. Syntactic Analysis has significant role in disambiguating by determine the most Syntactic Analysis which help Language Understanding system to make more accurate interpretation. Moreover; Syntactic Analysis can be used to identify grammatical errors in sentences. Language Understanding systems can leverage Syntactic Analysis to detect and correct leading to improved comprehension and more accurate responses.

1.2.4 Syntactic Structure and Grammatical Rules:

In natural language processing (NLP), syntactic structure refers to the arrangement of words and phrases in a sentence or a larger linguistic unit, and the relationships between them. It focuses on the grammatical structure and the rules governing how words combine to form meaningful sentences. However, grammatical rules define the syntactic patterns that determine how words can be categorized into different parts of speech such as (nouns, verbs, adjectives) and how they can be combined to form grammatically correct sentences. These rules specify aspects like word order, agreement, tense, and the use of grammatical markers. Syntactic structure and grammatical rules can be understood as follows:

Grammatical rules influence the syntactic structure by specifying which combinations of words and phrases are grammatically valid. These rules determine the word order, the presence or absence of specific constituents, and the agreement between different parts of a sentence. By following to the grammatical rules, sentences are structured in a way that conveys the intended meaning and follows the conventions of the language. Syntactic structure is derived by applying grammatical rules to a sentence. These rules determine the permissible word order, the agreement between words, the presence of specific grammatical markers, and other aspects of syntax. By following these rules, the syntactic structure of a sentence is formed. Syntactic structure deals

with the arrangement and organization of words and phrases, while grammatical rules define the rules and patterns that govern their combination to form grammatically correct sentences.

1.2.4.1 Syntactic structure:

- The sentence consists of a noun phrase "**the girl**" and a verb phrase "**played guitar.**"
- The noun phrase "**the girl**" comprises the determiner "**the**" and the noun "**girl.**"
- The verb phrase "**played guitar**" consists of the verb "**played**" and the noun phrase "**guitar.**"
- The noun phrase "**guitar**" includes the noun "**guitar.**"

1.2.4.2 Grammatical rules:

- The sentence follows the subject-verb-object (SVO) word order in English.
- The determiner "the" agrees with the noun "girl" in definiteness.
- The verb "played" is in the past tense to match the tense of the sentence.
- The noun "guitar" functions as the object of the verb "played."

The syntactic structure of the sentence "The girl played guitar" adheres to the grammatical rules of English. The subject "the girl" is followed by the verb "played," which is in the past tense. The object of the verb is the noun phrase "guitar."

The syntactic structure of this sentence follows the grammatical rules of English, where the subject comes before the verb, and the object follows the verb. Understanding this syntactic structure allows NLP systems to analyze and process the sentence.

1.2.5 Sentence structure and syntactic rules:

1.2.5.1 Sentence structure: refers to arrangement of words, phrases, and clauses within a sentence to convey meaningful sentence. It involves the use of grammar rules, to create understandable sentences. The elements of sentence structure:

- a. **Subject:** is the noun or pronoun that performs the action.
 - **Example:** John in John writes a letter. Verb: The verb expresses the action or state of being in a sentence. It conveys what the subject is doing.
Ex : Ate in John ate an apple.
- b. **Object:** The object is a noun or pronoun that receives the action of the verb
 - **Example:** a book in she reads a book.

CHAPTER I: STYLISTICS AND SYNTACTICS ANALYSIS

- c. **Adjectives:** are words that describe nouns. They provide additional information about the noun in terms of quality, color...etc.
- **Example:** red in the teacher has a red car.
- d. **Adverbs:** modify verbs, adjectives, or other adverbs. They provide information about how, when, where, or to what extent an action is performed.
- **Example:** quickly in He writes quickly.
- e. **Prepositions:** show relationships between nouns or pronouns and other words in a sentence. They indicate location, time, direction and more
- **Example:** "in" in the phone is on the table.
- f. **Conjunctions:** are used to connect words, phrases, or clauses within a sentence. They help to express relationships and create complex sentence structures.
- **Example:** and in I like to watch movies and eat food.
- g. **Sentence types:** Sentences can be classified into four main types:
- ✓ Declarative (making a statement),
 - ✓ interrogative (asking a question)
 - ✓ imperative (giving a command)
 - ✓ Exclamatory (expressing strong emotion).
- h. **Sentence clauses:** Clauses are groups of words that contain a subject and a verb. They can be independent or dependent
- i. **Sentence punctuation:** Punctuation marks, such as: commas, question marks, exclamation marks, are used to indicate pauses, intonation, and clarify the meaning of sentences.

By understanding and applying these elements of sentence structure, we can create grammatically correct and coherent sentences.

1.2.5.2 Syntactic units: are components of language that are used to analyze and describe the structure and organization of sentences. They are the fundamental elements that form grammatically correct and meaningful expressions. Syntactic units include words, phrases, clauses, and sentences. A brief description of each syntactic unit:

CHAPTER I: STYLISTICS AND SYNTACTICS ANALYSIS

- a. **Words:** are the smallest standalone units of language that carry meaning, they can be categorized into different parts of speech, such as nouns, verbs, adjectives, adverbs, prepositions, and conjunctions.
- b. **Phrases:** are groups of words that function as a single unit within a sentence. They consist of one or more words but do not contain both a subject and a predicate. Phrases can serve various grammatical roles and include: noun phrases, verb phrases, prepositional phrases, and more.
- c. **Clauses:** are larger syntactic units, they express a complete thought or idea. Clauses can be independent (main clauses that can stand alone) or dependent (subordinate clauses that rely on an independent clause for meaning).
- d. **Sentences:** are the highest level of syntactic units that express a complete idea. They consist of one or more clauses and can stand alone as a grammatically correct statement, question, command, or exclamation.

Understanding the properties and relationships of syntactic units is crucial for analyzing sentence structure, parsing sentences, and comprehending; producing coherent language.

1.2.6 Part of speech and word categories:

Part of speech: also known as word categories are categories into which words are classified based on their grammatical and syntactic functions in a sentence.

- **Nouns:** are words that represent people, places, things, or ideas. They can be concrete (home, car) or abstract (love, happiness).
- **Verbs:** are words that express actions, states. They describe what the subject of a sentence do.

Example: include make, open, mix

- **Adjectives:** modify nouns or pronouns, providing information about their characteristics.

Example: big, red, beautiful.

- **Adverbs:** modify verbs, adjectives, or other adverbs; they can be categorized based on their function manner, place, time, degree, or an action or state.

Example: Modifying Verbs (She runs quickly), Modifying Adjectives (the student is extremely intelligent), Modifying Other Adverbs (my son speaks very loudly).

CHAPTER I: STYLISTICS AND SYNTACTICS ANALYSIS

- **Pronouns:** are words that can be used in place of nouns. They help avoid repetition and refer to people, objects, or ideas. Example: he, we, they.
- **Prepositions:** show relationships between nouns or pronouns and other words in a sentence. They indicate location, time, direction, and more. Example in, on, to...
- **Conjunctions:** are words that connect words, phrases, or clauses. They establish relationships between these elements, such as addition, contrast, or cause and effect. Example and, but, because.
- **Interjections:** are words or phrases used to express strong emotions or sudden reactions. They often stand alone or appear at the beginning of a sentence and are followed by an exclamation mark. Example: wow, oh, ouch.

Understanding parts of speech helps in analyzing sentence structure, determining word functions, and ensuring grammatical accuracy in sentence.

1.2.7 Phrase structure rules: are the fundamental principles that govern the formation of phrases and sentences in a language. Other words, are a set of guidelines that describe the formation and arrangement of phrases and sentences in a particular language. These rules establish the hierarchical structure and syntactic relationships between words within a sentence. These rules are used in the field of linguistics to analyze and generate sentences by breaking them down into smaller constituents.

Here are some common types of phrase structure rules:

- a. $S \rightarrow NP VP$ This rule states that a sentence (S) consists of a noun phrase (NP) followed by a verb phrase (VP).
- b. $NP \rightarrow Det N$ This rule states that a noun phrase (NP) consists of a determiner (Det) followed by a noun (N).
- c. $VP \rightarrow V NP$ This rule states that a verb phrase (VP) consists of a verb (V) followed by a noun phrase (NP).
- d. $VP \rightarrow V$ This rule states that a verb phrase (VP) can also consist of just a verb (V).
- e. $PP \rightarrow P NP$ This rule states that a prepositional phrase (PP) consists of a preposition (P) followed by a noun phrase (NP).

These are few examples, and the actual set of phrase structure rules can vary depending on the specific language being used.

1.2.8 Syntactic Dependency and Relation:

Syntactic dependency and syntactic relation are two related concepts in the field of linguistics and Natural Language Processing that describe the structural relationships between words in a sentence.

Syntactic Dependency: refers to the relationship between words in a sentence where one word, called the head, depends on another word, called the dependent. The dependency is based on the structural role each word plays in the sentence. The head word controls the dependent word and the dependent word provides modifies the meaning of the head word.

Syntactic relation: refers to the specific grammatical relationship between words in a sentence. It describes how different words are connected to each other syntactically. Syntactic relations can vary depending on the language and the grammatical framework used.

Some common syntactic relations include:

- **Subject:** is the noun phrase or pronoun performs the action or is associated with the state described by the verb.
- **Object:** is the noun phrase or pronoun that receives the action of the verb.
- **Modifier:** is a word or phrase that provides additional information about another word, noun or a verb.
- **Adverbial:** is a word or phrase that modifies a verb, an adjective. It provides information about time, place, and manner.
- **Complement:** is a word or phrase that completes the meaning of a verb, adjective, or noun. It is required to make the sentence grammatically correct.

Syntactic dependency and relation are crucial concepts for understanding the syntactic structure and organization of sentences in natural language. They help linguists and natural language processing systems analyze and interpret the relationships between words in a grammatical manner.

1.2.9 Syntactic Parsing technique

Is a technique used in natural language processing (NLP) to analyze the grammatical structure of a sentence, to determine its syntactic relationships and hierarchies. Various techniques are used for syntactic parsing, including: Rule based parsing, Dependency parsing, and Constituency Parsing.

1.2.10 Rule based parsing: is a computational technique used in natural language processing (NLP) to analyze and understand the structure of sentences based on a set of predefined rules. This approach involves the use of grammatical rules and patterns to parse sentences into their constituent parts, such as nouns, verbs, phrases, and clauses, according to the rules of a particular grammar. These rules are typically designed by linguistic experts and encode the syntactic and semantic properties of a language. Rule-based parsing algorithms follow a systematic process of matching and applying these rules to the input text to generate a parse tree or a structural representation that captures the hierarchical relationships between the various linguistic units.

James Allen, defined it "In rule-based parsing, grammatical rules are defined to describe the possible syntactic structures of sentences. These rules are then applied to analyze the input text, determining how words and phrases combine to form meaningful units."

In rule-based parsing, the rules are typically based on the formal rules of a specific grammar, such as a context-free grammar or a dependency grammar. These rules define the allowed combinations of words and phrases within a sentence. By applying these rules systematically, a parser can identify the syntactic structure of the input text.

The process of rule-based parsing involves the following steps:

- **Tokenization:** The input text is divided into individual tokens, such as words, punctuation marks, and symbols. Tokenization helps break down the text into smaller units for further analysis.
- **Part-of-speech (POS) tagging:** Each token is assigned a grammatical category or part-of-speech tag, such as noun, verb, adjective, etc. POS tagging helps in understanding the syntactic role of each word in the sentence.
- **Rule application:** Predefined rules based on a grammar are applied to the tokens and their POS tags. These rules define the allowed combinations and orderings of words and their

associated POS tags in a sentence. The rules are typically based on a formal grammar, such as a context-free grammar.

- a. **Syntactic analysis:** The applied rules are used to determine the hierarchical structure of the sentence. This can involve constructing a parse tree or a dependency tree that represents how the tokens and their associated POS tags relate to each other in terms of syntactic dependencies.

1.3 Context-free grammar and Parsing Algorithms:

1.3.1 Context-free grammar:

In natural language processing (NLP), a context-free grammar (CFG) is a formal grammar that describes the syntactic structure of a language. It consists of a set of production rules that define how different parts of speech (terminal symbols) can be combined to form larger linguistic units (non-terminal symbols). It consists of several key components:

- a. **Terminals:** represent the basic units of the language, such as words, punctuation marks, or symbols. They are the smallest entities in the grammar and cannot be broken down. In NLP, terminals typically correspond to words in a sentence.

- b. **Non-terminals:** are placeholders that represent groups of terminals or other non-terminals. They help in defining the structure of sentences or phrases. Non-terminals are often represented by symbols.

- **Example:** "S" can represent a sentence, "NP" can represent a noun phrase, and "VP" can represent a verb phrase.

- c. **Production Rule:** define the relationships between non-terminals and terminals. They specify how non-terminals can be expanded in terms of other non-terminals or terminals. Each production consists of a left-hand side (LHS) and a right-hand side (RHS). The LHS represents a non-terminal, and the RHS represents a sequence of non-terminals and/or terminals.

- **Example:** a production rule might be "S -> NP VP," indicating that a sentence (S) can be expanded into a noun phrase (NP) followed by a verb phrase (VP).

- d. **Start Symbol:** represents the initial non-terminal from which the parsing or derivation process begins. In CFG, the start symbol defines the root of the syntax tree and is usually denoted as "S" for sentence.

CFGs provide a formal framework for modeling the syntax of a language and have been widely used in various NLP tasks such as syntactic parsing, grammar checking, and language generation

1.3.2 Parsing algorithms:

Parsing algorithms are used to analyze and interpret the structure of a sentence according to a given grammar. They take a sentence as input and generate a parse tree or a syntactic structure that represents the relationship between the words and phrases in the sentence. There are several parsing algorithms used for different types of grammars, including context-free grammars. Common parsing algorithms for CFG:

1.3.2.1 Top-Down Parsing: is a type of parsing algorithm used in NLP to analyze and understand the syntactic structure of sentences. This technique starts from the top-level of a grammar and recursively expands it to match the input string. It is a type of predictive parsing where the parser predicts which production rule to apply based on the current non-terminal symbol and a look ahead token from the input.

Other word, Top-down parsing method use Recursive Descent Parsing is technique used to analyze the syntactic structure of a sentence based on a given grammar. It is called "recursive" becau²se the parsing process involves recursive function calls to match the grammar rules and construct a parse tree from the top (start symbol) to the bottom (terminals).

- **Example:** We went to cinema

$S \rightarrow NP VP$

$NP \rightarrow \text{Pronoun}$

$VP \rightarrow \text{Verb NP}$

$\text{Pronoun} \rightarrow \text{We}$

$\text{Verb} \rightarrow \text{went}$

$\text{Noun} \rightarrow \text{cinema}$

Using this grammar, we can perform top-down parsing as follows:

Start with the start symbol S.

Apply production rule 1: $S \rightarrow NP VP$.

Expand NP and VP: Apply production rule 2: $NP \rightarrow \text{Pronoun}$.

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- ✓ Apply production rule 4: Pronoun → we.
- ✓ Apply production rule 3: VP → Verb NP.
- ✓ Apply production rule 5: Verb → went.
- ✓ Apply production rule 2: NP → Pronoun.
- ✓ Apply production rule 6: Noun → cinema.

Replace Pronoun with We and Noun with cinema:

- ✓ NP: We
- ✓ VP: Verb NP
- ✓ Verb: went
- ✓ NP: Noun
- ✓ Noun: cinema

Replace VP with Verb NP:

- ✓ NP: We
- ✓ Verb: went
- ✓ NP: Noun
- ✓ Noun: cinema

Replace NP with We:

- ✓ We
- ✓ Verb: went
- ✓ NP: Noun
- ✓ Noun: cinema

Finally, replace NP with Noun:

- ✓ We
- ✓ Verb: went
- ✓ Noun: cinema

1.3.2.2 Bottom-up parsing: is a parsing technique used in computer science and natural language processing to analyze and understand the structure of a given input string based on a formal grammar. It involves constructing a parse tree from the bottom up (leaves) towards the root by applying grammar rules in reverse.

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In bottom-up parsing, the parser starts with the input symbols and applies grammar rules to reduce them to larger constituents or phrases, eventually reaching the root of the parse tree. This process is also known as shift-reduce parsing because it involves shifting symbols onto a stack and then reducing them based on the grammar rules.

A simplified of the bottom-up parsing process:

- Start with the input string to be parsed.
- Initialize an empty parse stack and a buffer that holds the input symbols.
- Repeat the following steps until the buffer is empty:
 - If the symbols at the top of the parse stack and the buffer match, perform a reduce operation by applying a grammar rule in reverse.
 - If no reduction is possible, shift the next input symbol from the buffer onto the stack.
 - Continue reducing and shifting symbols until the parse stack contains only the start symbol of the grammar and the buffer is empty.
- If the parsing is successful, the parse stack will contain a single parse tree or syntax tree representing the structure of the input string according to the grammar.

Bottom-up parsing is generally more powerful than top-down parsing because it can handle a wider range of grammars, including left-recursive and ambiguous grammars. However, it can also be more complex and computationally intensive.

There are various algorithms and parsing methods that implement bottom-up parsing, including LR (Look-Ahead Left-to-Right Rightmost derivation) parsing and its variants such as LR(0), SLR(1), LALR(1), and LR(1). These algorithms use parsing tables and automata theory to efficiently handle the parsing process and resolve grammar conflicts.

Bottom-up parsing is commonly used in compiler design to implement efficient parsers for programming languages. It is also utilized in natural language processing tasks, such as syntactic parsing and semantic analysis, to understand the structure and meaning of natural language sentences based on grammatical rules.

To illustrate bottom-up parsing Let's use the example sentence "She is a good teacher" to demonstrate the bottom-up parsing process. We'll assume a simplified grammar that consists of the following production rules:

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$S \rightarrow NP VP$

$NP \rightarrow Det N$

$VP \rightarrow V NP$

$Det \rightarrow She \mid a$

$N \rightarrow teacher$

$V \rightarrow is$

$Adj \rightarrow "good"$

Here's a step-by-step breakdown of the bottom-up parsing process for the given example sentence:

1. Start with the input string: "She is a good teacher".
2. Initialize an empty parse stack and a buffer that holds the input symbols.

Parse Stack: [] Buffer: [She, is, a, good, teacher]

1. Apply the bottom-up parsing steps until the buffer is empty:

1. **Step 1:** Shift "She" onto the parse stack.

Parse Stack: [She] Buffer: [is, a, good, teacher]

2. **Step 2:** Reduce "Det N" using rule $NP \rightarrow Det N$.

Parse Stack: [NP] Buffer: [is, a, good, teacher]

3. **Step 3:** Shift "is" onto the parse stack.

Parse Stack: [NP, is] Buffer: [a, good, teacher]

4. **Step 4:** Shift "a" onto the parse stack.

Parse Stack: [NP, is, a] Buffer: [good, teacher]

5. **Step 5:** Reduce "Det N" using rule $NP \rightarrow Det N$.

Parse Stack: [NP, is, NP] Buffer: [good, teacher]

6. **Step 6:** Shift "good" onto the parse stack.

Parse Stack: [NP, is, NP, good] Buffer: [teacher]

7. **Step 7:** Reduce "Adj" using rule $NP \rightarrow Adj$.

Parse Stack: [NP, is, NP, Adj] Buffer: [teacher]

8. **Step 8:** Shift "teacher" onto the parse stack.

Parse Stack: [NP, is, NP, Adj, teacher] Buffer: []

9. **Step 9:** Reduce "N" using rule $NP \rightarrow N$.

Parse Stack: [NP, is, NP, NP] Buffer: []

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10. Step 10: Reduce "VP NP" using rule $S \rightarrow NP VP$.

Parse Stack: [NP, is, S] Buffer: []

11. Step 11: Reduce "S" using rule $S \rightarrow NP VP$.

Parse Stack: [S] Buffer: []

2. The parse stack now contains a single element, which is the start symbol "S". Parsing is successful, and we have constructed a parse tree for the given sentence.

Parse Tree:

```
S
 / \
NP  VP
 |   |
Det  NP
 | / \
She V  NP
 |   |
is  Adj
 |
good
 |
teacher
```

In this example, we applied a series of shift and reduce operations to construct a parse tree from the bottom up. The grammar rules were used in reverse to combine the input symbols and build larger constituents until the entire sentence was parsed.

1.3.2.3 Dependency parsing and dependency grammar

a- Dependency parsing

Dependency parsing is a NLP technique that involves analyzing the grammatical structure of a sentence by identifying the relationships between words. It aims to create a dependency tree that represents the syntactic structure of a sentence. In a dependency tree, each word in the sentence is considered a node, and the relationships between words are represented as directed edges or arcs. These arcs indicate the dependencies between words, such as subject-verb,

object-verb, and relationships. The dependency tree typically has a root node representing the main predicate of the sentence, with other words connected to it through dependency arcs.

b- Dependency grammar

Dependency grammar focuses on relationships between words in a sentence, emphasizing binary dependencies where one word (the head) governs another (the dependent). Represented as labeled directed graphs or trees, it simplifies syntactic structure analysis. In contrast to phrase structure grammars, dependency grammar offers a straightforward approach to understanding sentence hierarchy. Widely used in natural language processing, it plays a key role in tasks such as parsing, machine translation, and information extraction.

c- Differences between Dependency parsing and dependency grammar

Dependency parsing and dependency grammar are related concepts but refer to different aspects of linguistic analysis. The differences between the two:

1. Dependency Parsing: is a computational technique used to analyze the grammatical structure of a sentence by identifying relationships between words. It is a process of automatically determining the syntactic structure of a sentence and representing it as a dependency tree. Dependency parsing algorithms aim to assign a head for each word in the sentence and determine the specific dependency relations between words.

It involves using machine learning algorithms or rule-based systems to predict the dependency structure of a sentence based on linguistic features and training data. It is an important step in NLP tasks and allows for deeper analysis of sentence structure, aiding in tasks such as information extraction, question answering, and machine translation.

2. Dependency Grammar: is a linguistic framework that focuses on the relationships between words in a sentence. It is a way of describing sentence structure by representing grammatical dependencies between words. Dependency grammar views sentence structure in terms of directed dependencies, where each word is associated with a head and a dependency relation.

Dependency grammar is a set of rules to describe the grammatical relationships between words. It analyzes the hierarchical arrangement of words in a sentence and captures the syntactic and semantic connections between them. Dependency grammars can vary in terms of the specific formalisms and sets of dependency relations they employ.

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While dependency parsing is a computational technique that aims to automatically analyze and construct the dependency structure of a sentence, dependency grammar is a linguistic framework that provides a descriptive account of sentence structure based on grammatical dependencies.

Dependency parsing is a computational technique that applies dependency grammar principles to analyze the grammatical structure of a sentence and construct a parse tree. Dependency grammar, on the other hand, is a linguistic formalism that defines the rules for representing sentence structure in terms of directed dependencies. Dependency parsing is the application of dependency grammar to analyze and parse sentences computationally.

- **Transition-based dependency parsing:** is a popular approach for automatically parsing natural language sentences to determine the syntactic relationships (dependencies) between words. The goal of dependency parsing is to create a parse tree that represents the grammatical structure of a sentence, where words are connected by labeled directed edges that indicate the syntactic dependencies between them.

- **Transition-based dependency parsing uses a transition system:** which is a set of rules that guide the parsing process. The parser moves from an initial state representing an unparsed sentence to a final state representing a fully parsed sentence by applying a sequence of transitions.

- **The transition actions:** typically include operations such as "shift," "left-arc," and "right-arc."

1. **Shift:** The parser moves the next word from the buffer to the top of the stack without assigning any dependency relationship.
2. **Left-Arc:** The parser assigns a dependency relationship between the word at the top of the stack and the word immediately to its left. The word on the left is then removed from the stack.
3. **Right-Arc:** The parser assigns a dependency relationship between the word at the top of the stack and the word immediately to its right. The word on the right is then moved from the buffer to the top of the stack.

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Let's apply a transition-based dependency parser to the sentence "We took the morning flight."

Initial Configuration: Stack: [ROOT] Buffer: [We, took, the, morning, flight.]

- SHIFT: Move the first word from the buffer to the top of the stack. Stack: [ROOT, We]
Buffer: [took, the, morning, flight.]
- SHIFT: Move the next word from the buffer to the stack. Stack: [ROOT, We, took]
Buffer: [the, morning, flight.]
- LEFT-ARC: Create a dependency from the top of the stack to the next word in the buffer.
Stack: [ROOT, We] Buffer: [the, morning, flight.] Dependency: We ← took
- SHIFT: Move the next word from the buffer to the stack. Stack: [ROOT, We, the] Buffer:
[morning, flight.]
- LEFT-ARC: Create a dependency from the top of the stack to the next word in the buffer.
Stack: [ROOT, We] Buffer: [morning, flight.] Dependency: We ← the
- SHIFT: Move the next word from the buffer to the stack. Stack: [ROOT, We, morning]
Buffer: [flight.]
- RIGHT-ARC: Create a dependency from the second-to-top word on the stack to the top
word on the stack. Stack: [ROOT, We] Buffer: [flight.] Dependency: We → morning
- SHIFT: Move the next word from the buffer to the stack. Stack: [ROOT, We, flight]
Buffer: []
- RIGHT-ARC: Create a dependency from the second-to-top word on the stack to the top
word on the stack. Stack: [ROOT, We] Buffer: [] Dependency: We → flight
- RIGHT-ARC: Create a dependency from the root (ROOT) to the top word on the stack.
Stack: [ROOT] Buffer: [] Dependency: ROOT → We

Final Dependency Tree: (ROOT → We) We → took We → the We → morning We → flight

In this example, the transition-based dependency parser constructs the dependency tree for the sentence "We took the morning flight." The parser uses shift, left-arc, and right-arc actions to build the dependency relations between the words, resulting in a complete dependency tree that represents the syntactic structure of the sentence.

1.3.2.4 Graph-based dependency parsing and Constituency parsing

a- Graph-based dependency parsing:

Graph-based dependency parsing is another approach used in NLP to parse the grammatical structure of a sentence and represent it as a dependency tree. Unlike transition-based dependency parsing, which relies on a sequence of transitions, graph-based parsing constructs the dependency tree by solving a global optimization problem over a graph.

Graph-based dependency parsing, the sentence is represented as a graph, where each word is a node, and the dependency relations between words are represented as directed edges or arcs. The goal is to find the most likely set of arcs that represents the syntactic relationships between the words in the sentence.

Deep graph-based dependency parsing typically consists of the following steps:

- 1. Input Representation:** The input sentence is represented as a sequence of word embeddings or character embeddings. These embeddings capture the semantic and syntactic properties of the words in the sentence.
- 2. Scoring Model:** A deep learning model, such as a neural network is used to score each possible arc in the graph. The model takes into account various features of the words, such as part-of-speech tags, and contextual information, to compute a score for each arc. The scoring model can be designed to capture complex dependencies and linguistic features.
- 3. Dependency Graph Construction:** Based on the scores assigned by the scoring model, a dependency graph is constructed by connecting the words with the highest-scoring arcs. The graph represents the potential syntactic relationships between the words in the sentence.
- 4. Decoding:** The decoding algorithm searches for the highest-scoring tree or forest structure in the graph that satisfies the constraints of a valid dependency tree. The decoding algorithm can be based on dynamic programming techniques, such as the Chu-Liu/Edmonds algorithm or the Eisner algorithm, or it can leverage neural network models that directly predict the dependency tree structure.
- 5. Training:** The deep learning model used in deep graph-based dependency parsing is trained on annotated dependency tree banks. The model is optimized to maximize the likelihood of the correct dependency tree structure given the input sentence.

b- Constituency parsing

Constituency parsing is a technique used to analyze the syntactic structure of a sentence and represent it as a constituency parse tree. This tree breaks down the sentence into constituents (phrases or clauses) and shows their hierarchical relationships.

The main steps involved in constituency parsing:

- 1. Tokenization:** The input sentence is divided into individual tokens or words. This step splits the sentence into its basic units of meaning.
- 2. Part-of-Speech (POS) Tagging:** Each token is assigned a POS tag that represents its grammatical category (e.g., noun, verb, adjective). POS tagging is typically performed using pre-trained models or rule-based algorithms.
- 3. Grammar Rules:** A set of grammar rules is defined to capture the syntactic structure of the language. These rules describe how constituents can be combined to form larger constituents. For example, a rule might specify that a noun phrase (NP) can consist of a determiner (DT) followed by one or more nouns (NN).
- 4. Parsing Algorithm:** A parsing algorithm is used to construct the constituency parse tree based on the grammar rules and POS tags. Popular parsing algorithms include top-down recursive descent, bottom-up shift-reduce, and chart parsing. These algorithms apply the grammar rules and POS tags to generate and combine constituents until a complete parse tree is formed.
- 5. Constituent Construction:** The parsing algorithm recursively applies the grammar rules to generate constituents. Starting with individual words as leaf nodes, the algorithm combines them into larger constituents based on the grammar rules. This process continues until the entire sentence is covered by a single constituent.
- 6. Parse Tree Representation:** The resulting constituency parse tree represents the hierarchical structure of the sentence. It consists of labeled nodes that correspond to constituents and labeled edges that show their relationships. The topmost node in the tree represents the root constituent, which spans the entire sentence.

1.4 Treebank and Constituent Parsing Algorithms:

1.4.1 Treebank:

The Treebank technique is a method for creating annotated collections of sentences or texts, where each sentence is represented as a tree structure, capturing the syntactic relationships between words or phrases. Treebank's serve as valuable resources for studying and analyzing the syntax and structure of natural language. Treebank's are created to provide linguistically annotated data for studying the syntax and structure of natural language. They allow researchers to analyze linguistic phenomena, develop and evaluate parsing algorithms, train machine learning models, and improve our understanding of language. some key aspects of treebank's:

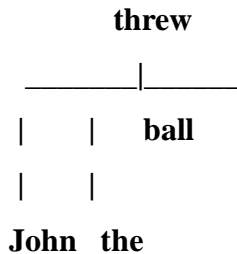
- a. Annotation:** Treebanks involve the annotation of sentences with syntactic or grammatical information. The annotation process involves assigning specific labels to words or phrases, capturing their grammatical roles and relationships within the sentence. The annotation guidelines may vary depending on the chosen syntactic framework or formalism.
- b. Syntactic Frameworks:** Treebanks can be annotated based on different syntactic frameworks or formalisms, such as phrase structure grammar, dependency grammar, or lexical-functional grammar. Each framework has its own rules and representations for capturing syntactic structures and relationships within sentences.
- c. Structure Representation:** The structure of a sentence in a Treebank is represented as a tree, where nodes correspond to words or phrases, and edges represent the relationships between them. The labels on the edges indicate the grammatical roles or syntactic functions of the words or phrases.
- d. Linguistic Coverage:** Treebank can cover a wide range of linguistic phenomena, including various sentence structures, syntactic constructions, and grammatical features. Some Treebanks focus on specific domains or genres, while others aim for broad coverage across different genres, registers, or languages.
- e. Uses and Applications:** Treebanks serve as important resources for linguistic research, language modeling, parsing algorithm development, and training machine learning models. They are used for studying linguistic phenomena, improving syntactic analysis algorithms, evaluating parsing performance, developing language technology applications, and more.

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Here's an example of a treebank annotation for the sentence "John threw the ball" using a dependency-based syntactic framework:

Sentence: John threw the ball.

Treebank Annotation:



In this example, the treebank annotation represents the syntactic structure of the sentence using dependency relations. Each word is represented as a node in the tree, and the arrows indicate the dependencies or grammatical relationships between the words.

Here's the interpretation of the treebank annotation:

- Threw is the main verb in the sentence and serves as the root of the tree.
- John is a noun that is the subject of the verb "threw," so it depends on the verb.
- Ball is a noun that is the direct object of the verb "threw," so it also depends on the verb.
- The is a determiner that modifies the noun "ball," so it depends on the noun.

This treebank annotation visually represents the syntactic structure of the sentence, illustrating the dependencies between the words. Depending on the specific treebank annotation scheme and framework, additional linguistic information such as part-of-speech tags, syntactic labels, or morphological features can be included in the annotations.

1.4.2 Constituent Parsing Algorithms :

Constituent parsing algorithms, also known as phrase structure parsing algorithms, aim to identify and analyze the constituent phrases or syntactic units in a sentence. These algorithms generate parse trees that represent the hierarchical structure of the sentence. Here are some commonly used constituent parsing algorithms:

- Top-Down Recursive Descent:** This is a simple and intuitive parsing algorithm that starts from the root of the parse tree and recursively applies grammar rules to expand constituents.

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It exhaustively explores all possible parse tree structures from top to bottom, but it can be inefficient for large grammars due to redundant exploration.

- b. Bottom-Up Shift-Reduce:** This algorithm builds the parse tree in a bottom-up manner by applying shift and reduces operations. It starts with individual words as constituents and iteratively combines adjacent constituents based on grammar rules. The shift operation adds a word as a constituent, and the reduce operation combines adjacent constituents into larger constituents based on grammar rules.

Let's explore an example of constituent parsing using the sentence "Peter prints the file" and demonstrate how two different parsing algorithms, namely top-down recursive descent and bottom-up shift-reduce, construct the parse tree.

- 1. Top-Down Recursive Descent:** Using top-down recursive descent, the algorithm begins with the root and recursively applies grammar rules to expand constituents. Here's a step-by-step breakdown:

Step 1: S (Root)

Step 2: $S \rightarrow NP VP$

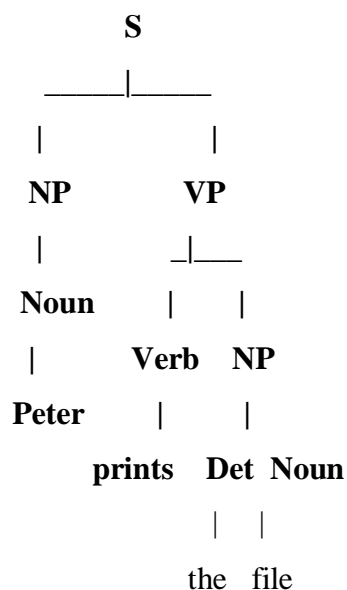
$NP \rightarrow Noun \rightarrow Peter$

$VP \rightarrow Verb$

$NP \rightarrow Verb \rightarrow prints$

$NP \rightarrow Det Noun Det \rightarrow the Noun \rightarrow file$

- **Resulting Parse Tree:**



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2. **Bottom-Up Shift-Reduce:** Using bottom-up shift-reduce, the algorithm constructs the parse tree by combining adjacent constituents. Here's a step-by-step breakdown:

Step 1: Shift: Peter (Noun)

Step 2: Shift: prints (Verb)

Step 3: Shift: the (Det)

Step 4: Shift: file (Noun)

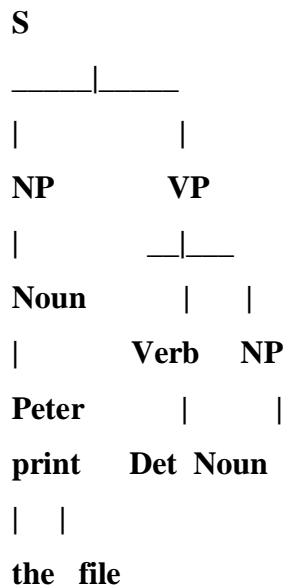
Step 5: Reduce: NP (Det, Noun)

Step 6: Reduce: NP (Noun)

Step 7: Reduce: VP (Verb, NP)

Step 8: Reduce: S (NP, VP)

- **Resulting Parse Tree:**



Both parsing algorithms produce the same parse tree for the given sentence, demonstrating the different approaches used in constructing the parse tree. The top-down recursive descent algorithm expands constituents starting from the root, while the bottom-up shift-reduce algorithm combines adjacent constituents to build the tree. These algorithms highlight two commonly employed strategies in constituent parsing.

1.4.3 Chart Parsing:

Chart parsing is a parsing algorithm used in natural language processing (NLP) to construct parse trees for sentences based on context-free grammars. It utilizes a dynamic programming approach and employs a chart data structure to efficiently explore and combine constituents

How chart parsing works

- a. **Chart Initialization:** The algorithm begins by creating an empty chart data structure. The chart consists of cells, each representing a specific span of the sentence. For example, if the sentence has n words, the chart will have $n+1$ cells, including a cell for the entire sentence.
- b. **Lexical Insertion:** The algorithm iterates through the words in the sentence and adds lexical entries to the chart. Each lexical entry represents a word and its associated part-of-speech tag. These entries are inserted into the corresponding cells in the chart.
- c. **Chart Expansion:** The algorithm proceeds to expand the chart by combining constituents based on grammar rules. It iterates through the chart cells, considering all possible combinations of constituents and their possible productions.
- d. **Predictions:** The algorithm predicts potential constituents for each chart cell based on grammar rules. It looks for incomplete constituents in a cell and predicts potential constituents that can be expanded further.
- e. **Scanning:** The algorithm scans through the chart cells and identifies constituents that can be completed with the next word in the sentence. It combines the incomplete constituents with the corresponding lexical entries in the next cell.
- f. **Completions:** The algorithm completes constituents by combining two or more adjacent constituents that match a grammar rule's right-hand side. It generates new constituents that span larger portions of the sentence and adds them to the chart.
- g. **Back pointers:** Throughout the process, the algorithm uses backpointers to keep track of the constituents that contributed to the formation of larger constituents. These back pointers facilitate the retrieval of complete parse trees once the parsing process is complete.
- h. **Parsing Completion:** The algorithm continues the chart expansion, prediction, scanning, and completion steps until all possible combinations of constituents have been explored.

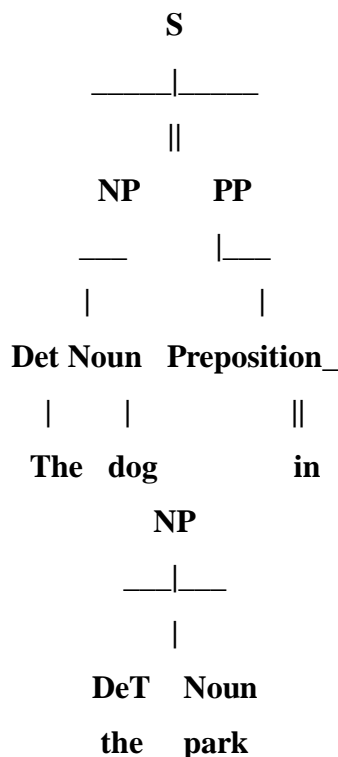
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At the end, the chart contains a set of complete parse trees representing all valid syntactic analyses of the input sentence.

Chart parsing is a foundational technique in NLP and is utilized in various syntactic analysis tasks, grammar induction, and language understanding. It provides a structured representation of the syntactic structure of sentences, supporting deeper linguistic analysis and enabling downstream applications such as machine translation, information extraction, and question answering.

Example: Let's illustrate chart parsing using the sentence "**The dog saw the man in the park**" and demonstrate the step-by-step process of constructing the parse tree using the chart parsing algorithm.

- **Chart Initialization:** We start by creating an empty chart with cells corresponding to each word position in the sentence, including an additional cell for the whole sentence.
- **Lexical Insertion:** We insert lexical entries into the chart, representing the words and their associated part-of-speech tags.
- **Chart Expansion, Prediction, Scanning, and Completions:** We iteratively perform these steps to build the parse tree.



In this example, the chart parsing algorithm efficiently explores and combines constituents based on the grammar rules, resulting in a parse tree that represents the syntactic structure of the sentence.

2.1 Stylistic Analysis

2.1.1 Definition of Stylistic Analysis:

Stylistics analysis in (NLP) refers to the computational study of linguistic and stylistic features in text. It involves the application of computational techniques to extract, analyze, and interpret various stylistic aspects of language, such as word choice, sentence structure, figurative language, and rhetorical devices, among others.

Stylistics analysis is the study and analysis of linguistic and stylistic features in written or spoken language. It involves examining the choices and techniques employed by authors or speakers to convey meaning, and create a unique style. Stylistics analysis focuses on various aspects of language, including vocabulary, sentence structure, figurative language, rhetorical devices, tone, register, and other elements that contribute to the overall style of a text.

2.1.2 Importance of Stylistic Analysis:

Stylistic analysis holds great importance in the field of Natural Language Processing (NLP) such as:

- a. Text Classification:** By examining the stylistic features of a text, NLP models can classify it into different categories or genres. For example, analyzing the vocabulary and sentence structure can help classify a news article, a scientific paper, or a social media post.
- b. Authorship Attribution:** Stylistic analysis is useful in determining the author of a text when the author's identity is unknown. By studying the stylistic patterns and writing style, NLP models can make predictions about the likely authorship of a document.
- c. Sentiment Analysis:** Stylistic features play a crucial role in sentiment analysis. By analyzing the language and stylistic choices used in a text, NLP models can determine the sentiment expressed, whether it is positive, negative, or neutral.

- d. Plagiarism Detection:** Stylistic analysis aids in identifying instances of plagiarism. By comparing the stylistic patterns and linguistic features of multiple texts, NLP models can detect similarities or discrepancies that indicate potential instances of plagiarism.
- e. Text Generation:** Stylistic analysis enables NLP models to generate text in a specific style or mimic the writing style of a particular author. By learning from a corpus of texts with distinct styles, NLP models can generate new text that adheres to the desired stylistic characteristics.

2.2.1 Stylistic Analysis Features

Stylistic analysis involves the examination and interpretation of various features within a text to understand its style, techniques, and effects. Some features that are commonly analyzed in stylistic analysis

2.2.2 Lexical Stylistic Feature

In NLP refer to the characteristics of the vocabulary and word choices used in a text. These features focus on analyzing the specific words, phrases, and expressions to convey meaning, create a particular tone. Lexical stylistic analysis plays a crucial role in understanding the stylistic textual characteristics of written or spoken language. Some examples of lexical stylistic features in NLP include:

- Word distribution analysis examines how words are distributed across different parts of a text. It includes analyzing the frequency of words in specific sections, such as paragraphs, chapters, or sections, to identify patterns or thematic clusters within the text.
- Collocation analysis focuses on identifying frequently occurring word combinations or collocations in a text. It helps uncover the typical word associations used by the author and provides insights into idiomatic expressions or recurring phrases.
- Word Connotations: This analysis examines the connotations or emotional associations of words used in a text. It involves identifying positive, negative, or neutral sentiment words to understand the overall tone or sentiment expressed in the text.
- Word Embeddings: Lexical analysis using word embeddings involves exploring semantic relationships between words, identifying word similarities or differences, and discovering word clusters based on their contextual usage.

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- **Domain-Specific Lexical Analysis:** Lexical analysis can also focus on domain-specific vocabularies. For instance, in medical texts, analyzing medical terminologies and domain-specific jargon can aid in extracting relevant information or identifying key concepts.

2.2.3 Syntactic Stylistic Feature:

Syntactic analysis focuses on the grammatical structure of sentences and the arrangement of words. Techniques in this area include:

- a. Sentence length:** Analyzing the average sentence length or the distribution of sentence lengths can reveal the author's writing style. Longer sentences may indicate a more complex or academic style, while shorter sentences may suggest simplicity or conciseness.
- b. Part-of-speech (POS) tagging:** Assigning POS tags to words in a text allows for analyzing the distribution of different parts of speech. This can provide insights into the author's syntactic preferences and patterns.
- c. Syntactic parsing:** Parsing techniques analyze the sentence structure and dependencies between words. This can be used to identify syntactic patterns, such as the use of passive voice or specific sentence constructions.

2.2.3 Semantic Stylistic Feature:

Semantic analysis focuses on the meaning and interpretation of words and phrases. Techniques in this area include:

- a. Sentiment analysis:** Identifying the sentiment expressed in a text (positive, negative, or neutral) can provide insights into the author's mood or attitude.
- b. Topic modeling:** Discovering the underlying topics or themes in a text can help characterize the content and style of the writing.
- c. Named entity recognition (NER):** Identifying and categorizing named entities such as persons, organizations, or locations can provide information about the text's subject matter and genre.

2.3 Stylistic Techniques

2.3.1 Corpus – based Analysis:

Corpus-based analysis refers to an approach in which large collections of text, known as corpora, are used as the basis for linguistic analysis and research. It involves the systematic examination and study of language patterns, usage, and phenomena within these corpora to gain insights into various linguistic aspects.

Here are points to understand about corpus-based analysis:

- a. Corpus Collection:** A corpus is a structured collection of written or spoken texts, often stored in electronic format. These corpora can encompass a wide range of texts, such as books, articles, speeches, social media posts, or any other form of language use. Corpora can be compiled for specific purposes, such as studying a particular language, genre, or domain.
- b. Representative Data:** Corpora aim to represent a diverse range of language usage and reflect real-world language patterns. They typically include samples from different sources, genres, time periods, and contexts to capture linguistic variation.
- c. Quantitative Approach:** Corpus-based analysis relies on quantitative methods to study language phenomena. It involves extracting statistical information from the corpus, such as word frequencies, collocations, concordances, or distributional patterns. This allows for the identification of significant linguistic patterns and the exploration of language use at a larger scale.
- d. Corpus Annotation:** Corpora may be annotated with linguistic information, such as part-of-speech tagging, syntactic parsing, semantic labeling, or discourse analysis. These annotations provide additional layers of information that aid in more detailed linguistic analysis.
- e. Research Questions:** Corpus-based analysis enables researchers to investigate various linguistic research questions. It can be used to study language variation, grammar patterns, vocabulary usage, stylistic features, sociolinguistic phenomena, language change over time, and many other aspects of language.
- f. Corpus Tools and Software:** Specialized software and tools are used for corpus-based analysis. These tools facilitate data extraction, analysis, visualization, and the exploration of linguistic patterns within the corpus. Examples of popular corpus tools include NLTK (Natural Language Toolkit

g. Application Areas: Corpus-based analysis has applications in various fields, such as linguistics, computational linguistics, sociolinguistics, translation studies, language teaching, and natural language processing (NLP). It provides empirical evidence for linguistic theories, informs language learning materials, supports language technology development, and aids in understanding language use in different contexts.

Corpus-based analysis offers a data-driven and evidence-based approach to studying language. It allows researchers to explore language patterns and phenomena in a systematic and quantitative manner, providing valuable insights into linguistic structures, usage, and variation.

2.3.2 Machine learning Approaches

Machine learning approaches refer to a set of algorithms and techniques used to develop computational models that can automatically learn and improve from data without being explicitly programmed. These approaches leverage statistical and mathematical principles to enable computers to learn patterns, make predictions, and perform tasks based on examples and training data. some common machine learning approaches:

1. **Supervised Learning:** are trained using labeled data, where each input data point is associated with a corresponding target or output value. The model learns to map input features to the correct output by optimizing a predefined objective function. Examples of supervised learning algorithms include linear regression, decision trees, random forests, support vector machines (SVM), and neural networks.
2. **Unsupervised Learning:** aims to find patterns, structures, or relationships in unlabeled data. Without explicit target values, the model explores the inherent structure within the data to uncover hidden patterns. Clustering algorithms, such as k-means clustering and hierarchical clustering are commonly used in unsupervised learning.

These machine learning approaches provide powerful tools for solving a wide range of problems across various domains. The selection of the appropriate approach depends on the nature of the problem, the availability and quality of data, and the desired outcome.

2.3.3 Deep Learning Approaches

Deep learning approaches refer to a class of machine learning methods that utilize neural networks with multiple layers to learn and extract hierarchical representations of data. These approaches have revolutionized various fields, including computer vision, natural language processing, speech recognition, and recommender systems. Deep learning models excel at automatically learning complex patterns and representations from large amounts of data, without the need for explicit feature engineering. By stacking multiple layers of interconnected neurons, deep learning models can capture intricate relationships and nuances in the data, enabling them to make accurate predictions, classify objects, generate language, and perform other sophisticated tasks. With their ability to handle high-dimensional data and model intricate structures, deep learning approaches have brought about significant advancements in many areas of artificial intelligence and continue to push the boundaries of what is possible in data analysis and decision-making.

4.1 Relationship between Syntactic and Stylistic Analysis

The interdependence between syntax and style in computer science encompasses their interconnected relationship in various aspects of language processing, including programming languages, natural language processing (NLP), and computational linguistics. Here are a few key areas where the interplay between syntax and style is evident in computer science:

- a. **Programming Languages:** Syntax and style are integral to programming languages. Syntax defines the rules and structure for writing code, specifying how statements and expressions should be constructed. Syntax ensures that code is well-formed and adheres to the language's grammar. Programming style, on the other hand, refers to the conventions, guidelines, and best practices for writing code in a readable and maintainable manner. Style conventions focus on aspects such as indentation, naming conventions, comments, and code organization. While syntax provides the foundation, adhering to a consistent programming style enhances code readability and maintainability.
- b. **Natural Language Processing (NLP):** In NLP, the interdependence between syntax and style is fundamental to understanding and analyzing language. Syntax plays a crucial role in parsing, where the structure and arrangement of words determine the meaning of a sentence.

Syntactic analysis involves identifying sentence structure, grammatical roles, and relationships between words. Style, on the other hand, encompasses the choices made by authors that shape the tone, sentiment, and overall effect of the text. Analyzing the interplay between syntax and style in NLP allows for more accurate understanding, sentiment analysis, text classification, and natural language generation.

- c. **Computational Linguistics:** In computational linguistics, the interdependence between syntax and style is explored extensively. Syntax provides the framework for analyzing the grammatical structure of language, including phrase structure, dependencies, and syntactic categories. Style analysis in computational linguistics involves examining linguistic features and patterns that reflect an author's writing style, such as lexical choices, sentence length, and syntactic preferences. The combination of syntactic and stylistic analysis allows for deeper insights into language variation, genre classification, authorship attribution, and literary analysis.
- d. **Text-to-Code Generation:** In text-to-code generation tasks, the interplay between syntax and style is crucial for generating executable code from natural language descriptions. The syntax of the target programming language must be considered to ensure that the generated code is syntactically correct. Simultaneously, capturing the author's intended style or programming paradigm (e.g., object-oriented, functional) is essential to generating code that adheres to the desired coding style.

The interdependence between syntax and style in computer science underscores their critical roles in programming languages, NLP, and computational linguistics. Syntax provides the structural framework, while style encompasses the choices and conventions that enhance readability, understanding, and expressive power. Recognizing and leveraging the interplay between syntax and style leads to more effective and accurate language processing, programming, and text generation in the realm of computer science.

4.2 Influence of style and syntax on each other

4.2.1 Influence of syntax on style:

The influence of syntax on style in natural language processing (NLP). Syntax, which pertains to the structural arrangement of words and phrases within a sentence, plays a significant role in shaping the stylistic qualities of text. By examining how syntax impacts style, NLP

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researchers can gain a deeper understanding of how authors use language to express themselves and create specific effects.

One aspect of syntax that influences style is sentence complexity. The syntactic complexity of a sentence, such as the presence of multiple clauses, subordination, or long sentence length, can contribute to a formal or academic style. In contrast, shorter and simpler sentences are often associated with a more casual or conversational style. Analyzing the syntactic structure of sentences using NLP techniques allows researchers to measure complexity and identify stylistic preferences across different authors or genres.

Word order is another syntactic factor that influences style. The arrangement of words within a sentence can alter the emphasis and focus, thereby affecting the stylistic effect. Computational linguistics approaches enable the analysis of syntactic patterns and word order preferences, providing insights into the syntactic features that shape stylistic choices.

Additionally, the different types of sentences, such as declarative, interrogative, imperative, or exclamatory, convey distinct stylistic nuances. The syntactic structures associated with each sentence type contribute to the overall style. By analyzing the syntactic features of different sentence types and their distribution within texts, NLP researchers can uncover stylistic preferences and patterns.

Furthermore, syntactic structures are often employed to create rhetorical effects and stylistic devices. Rhetorical devices such as parallelism, anaphora, and chiasmus involve specific syntactic patterns that enhance the stylistic impact of the text. By automatically detecting and analyzing these syntactic structures, computational linguistics provides insights into the presence and frequency of rhetorical devices within a given text or author's body of work.

Understanding the influence of syntax on style in NLP enables researchers to uncover the intricate relationship between language structure and expressive choices. By analyzing syntactic patterns and structures, researchers can gain insights into how authors use language to convey meaning, create stylistic effects, and shape their unique writing styles. This understanding has practical applications in various NLP tasks, including authorship attribution, style transfer, sentiment analysis, and text generation, leading to more accurate and nuanced computational analyses of stylistic aspects of language.

4.2.2 Influence of style on syntax

The influence of style on syntax in NLP is an intriguing aspect of language analysis. Style, which encompasses the choices and techniques used by authors to express themselves, can have a profound impact on the syntactic structures and patterns observed in text. Different writing styles, such as formal, informal, poetic, or technical, exhibit distinct syntactic characteristics that reflect the author's intent and artistic choices. For example, a formal writing style may employ complex sentence structures with elaborate subordination, while an informal style may favor shorter sentences and colloquial language. By analyzing the interplay between style and syntax in NLP, researchers can uncover patterns and preferences in how authors manipulate syntactic structures to achieve specific stylistic effects. This understanding enhances tasks such as style transfer, authorship attribution, and text generation, where capturing the nuanced relationship between style and syntax is crucial for producing coherent and contextually appropriate language output.

4.2.3 Importance of Combined Analysis

Combined analysis in natural language processing (NLP) is important as it allows for a more understanding of textual data. By integrating multiple analytical approaches, such as syntactic, stylistic, semantic, and pragmatic analyses, NLP systems can achieve a deeper level of language comprehension and produce more accurate and contextually appropriate results.

One key benefit of combined analysis is improved language understanding and disambiguation. Syntactic analysis helps parse sentence structures and identify grammatical relationships, while stylistic analysis provides insights into authorial choices and intended effects. By combining these analyses, NLP systems can disambiguate ambiguous sentences, resolve syntactic ambiguities, and better capture the intended meaning, leading to more accurate interpretation and understanding of text.

Also, combined analysis enables better context modeling and language generation. By considering both syntactic and stylistic features, NLP systems can generate text that adheres to grammatical rules while capturing the desired style, tone, or genre. This is crucial for tasks such as automated writing, dialogue systems, and machine translation, where producing coherent and stylistically appropriate text is essential for effective communication.

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Moreover, combined analysis is vital for authorship attribution and genre classification. The integration of syntactic, stylistic, and semantic features helps identify authorial writing styles, patterns, and preferences. It enables the recognition of genre-specific characteristics and conventions.

So, combined analysis in NLP offers a more comprehensive approach to language processing and understanding. By integrating syntactic, stylistic, and other analytical dimensions, NLP systems can achieve better language comprehension, context modeling, sentiment analysis, and authorship attribution. This multi-faceted analysis enhances the accuracy and effectiveness of NLP applications, empowering systems to handle a wide range of language-related tasks and supporting advancements in various domains, from communication technologies to data-driven decision-making processes.

5.1 Conclusion

In the first chapter, we introduced the fundamental concept of syntactic analysis in the context of Natural Language Processing (NLP) as a pivotal technique. We also identified key techniques that delve into the grammatical structure and arrangement of words, phrases, and sentences, aiming to dissect and interpret the stylistic elements of a text through its syntactic features. Furthermore, we elucidated the distinction between different Syntactic Parsing Techniques.

Moving on to the second section, our focus shifted towards defining stylistic analysis and highlighting its significance within the realm of NLP. We outlined various features and techniques employed in stylistic analysis.

To conclude this chapter, we provided a broad overview of the significance of amalgamating these linguistic fields.

In the upcoming chapter, our attention will be directed towards exploring the influence of syntactic stylistic analysis on automatically generated subtitles.

**CHAPTER 02: SUBTITLES AND
AUTOMATIC GENERATIONS
(STYLE AND SYNTAX)**

CHAPTER II : SUBTITLES AND AUTOMATIC GENERATIONS (STYLE AND SYNTAX)

CHAPTER II: SUBTITLES AND AUTOMATIC GENERATIONS (STYLE AND SYNTAX)

2.1.1 Introduction

Indeed, the rise of digital media platforms and streaming services has significantly increased the importance and usage of subtitles across various forms of media. Subtitles have become a crucial element in promoting inclusivity, cultural exchange, and global communication. Overall, subtitles have revolutionized the way we consume and appreciate audiovisual media, allowing for broader accessibility, fostering inclusivity, and promoting intercultural dialogue on a global scale.

Subtitling technology has also advanced significantly, with the emergence of automatic speech recognition (ASR) and machine translation techniques. These advancements have made it easier to generate subtitles quickly and accurately, facilitating the subtitling process for content creators and distributors.

2.1.2 Definition of subtitles

- *Noun* : subtitle
- *Phonetic writing* : /'sʌb, taɪ.təl/
 - a. a secondary or subordinate title of a literary work, usually of explanatory character.
 - b. a repetition of the leading words in the full title of a book at the head of the first page of text.

Subtitles refer to the textual representation of the dialogue or spoken content in a video or audiovisual media presentation. They are typically displayed at the bottom of the screen, synchronized with the corresponding spoken words or sounds. That allowing viewers to understand the content even if they cannot hear or comprehend the spoken language. They are commonly used to cater to individuals who are deaf or hard of hearing, enabling them to follow the storyline, character interactions, and other auditory elements in a visual medium.

2.1.3 Types of Subtitles

There are different types of subtitles used in various contexts, each serving specific purposes to enhance accessibility and understanding for viewers:

- a. **Closed Subtitles:** These are subtitles that can be toggled on or off by the viewer.

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- **Example:** in a YouTube video, the viewer can click the "CC" button to display closed subtitles in their preferred language.

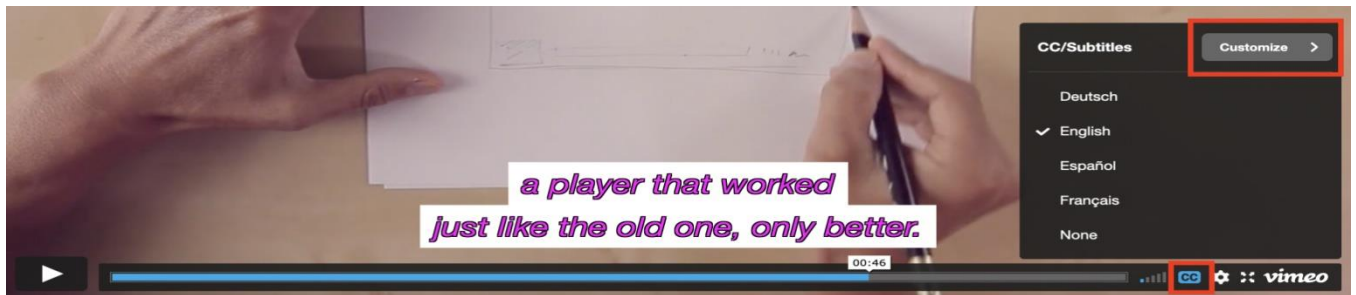


Figure 01: Picture about using CC button

- b. **Open Subtitles:** Open subtitles are permanently displayed on the screen throughout the entire video.
- **Example:** a foreign film with English open subtitles that are burned-in and cannot be turned off.



Figure 02 : picture about burned subtitle

- c. **Forced Subtitles:** Forced subtitles appear only when a foreign language is spoken in a video.
- **Example:** in an English movie with a scene where characters speak French, forced subtitles would appear to provide translations of the French dialogue.

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Figure 03 : subtitle forced by uploader of film

- d. **SDH (Subtitles for the Deaf and Hard of Hearing):** SDH subtitles include not only dialogue but also descriptions of important sounds for viewers who are deaf or hard of hearing.
- **For example:** a TV show where the SDH subtitles mention "door creaking" or "phone ringing" to provide a complete understanding of the audio

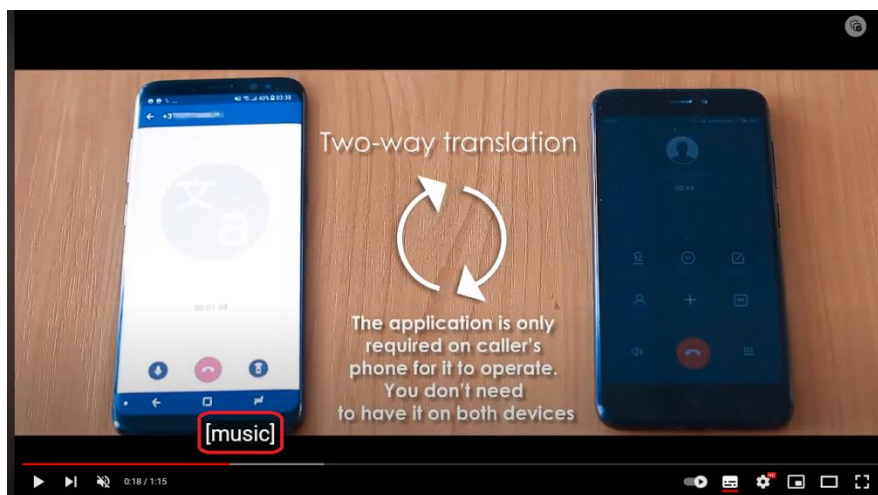
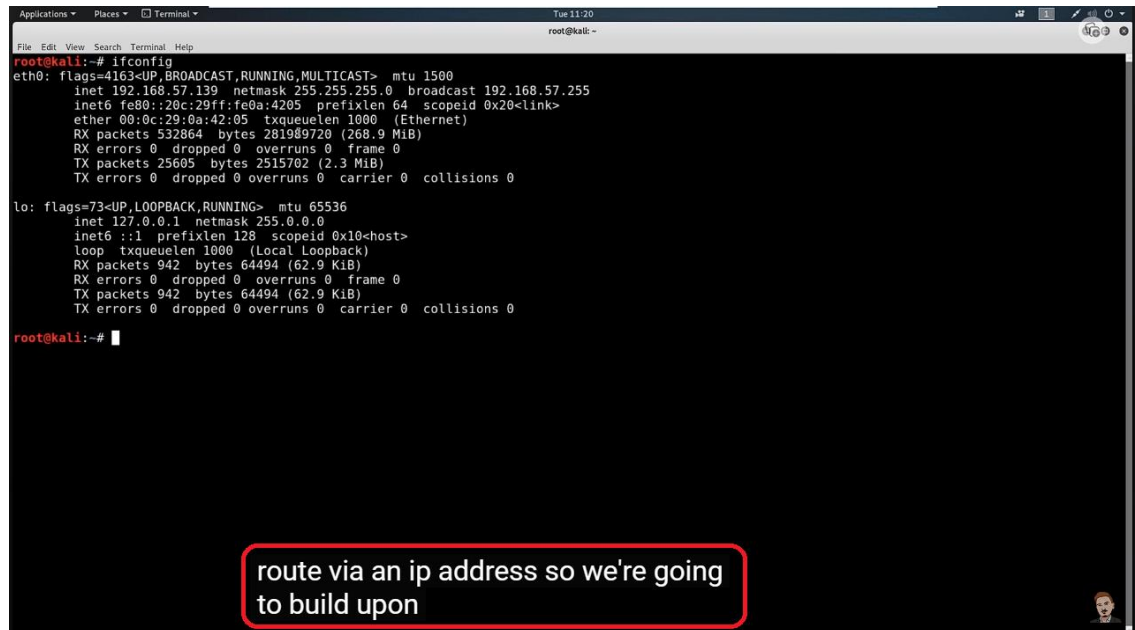


Figure 04 : subtitle description of music for viewers

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- e. **Machine-Generated Subtitles:** These subtitles are automatically generated using speech recognition algorithms. They can be seen on platforms like YouTube, where the automatic subtitles feature provides a rough transcription of the spoken content.



```
root@kali:~# ifconfig
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.57.139 netmask 255.255.255.0 broadcast 192.168.57.255
    inet6 fe80::20c:29ff:fe0a:4205 prefixlen 64 scopeid 0x20<link>
    ether 08:0c:29:0a:42:05 txqueuelen 1000 (Ethernet)
    RX packets 532864 bytes 281989728 (268.9 MiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 25605 bytes 2515702 (2.3 MiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    inet6 ::1 prefixlen 128 scopeid 0x10<host>
    loop txqueuelen 1000 (Local Loopback)
    RX packets 942 bytes 64494 (62.9 KiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 942 bytes 64494 (62.9 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

root@kali:~#
```

route via an ip address so we're going to build upon

Figure 05: subtitle provides a rough transcription of the spoken content using SRA

- f. **Verbatim Subtitles:** Verbatim subtitles aim to capture every word and sound accurately, including fillers and pauses. They are commonly used in legal proceedings or educational videos that require a precise transcription of the spoken words.



Figure 06 : Video that transcript of the spoken numbers

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- g. **Audio Description Subtitles:** Audio description subtitles provide additional information about visual elements for individuals with visual impairments.
- **Example :** in a movie, audio description subtitles may describe the actions, settings, or facial expressions to provide a more inclusive viewing experience for visually impaired viewers.

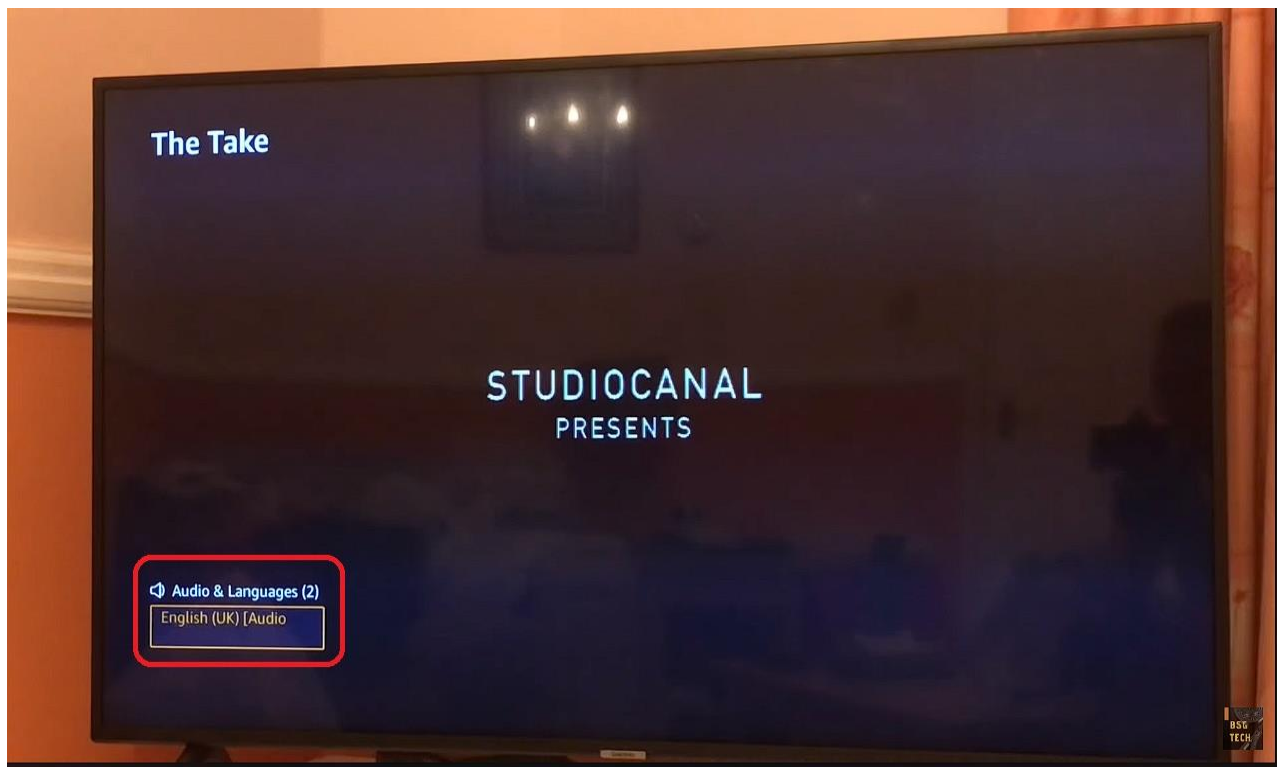


Figure 07 :video showing visual elements for individuals with visual impairments

2.1.4 Importance of Subtitles

Translations are of great importance, as they are as follows:

A. Enhancing accessibility for individuals with hearing impairments: Subtitles play a crucial role in making audiovisual content accessible to individuals with hearing impairments. By providing text captions of the dialogue and other relevant sounds, subtitles allow people with hearing disabilities to understand and follow the content.

B. Facilitating understanding of content in different languages: Subtitles are instrumental in bridging the language barrier between content and viewers. They enable individuals who are not fluent in the language spoken in the audio to understand and engage with the content. Subtitles

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can be translated into various languages, expanding the audience reach and making content more inclusive.

C. Improving comprehension for viewers with language barriers: Subtitles also assist viewers who have partial understanding or limited proficiency in the language used in the content. By reading the translated subtitles, these viewers can comprehend the dialogue and other audio elements more effectively, enhancing their overall understanding of the content.

D. Supporting learning and education: Subtitles can be valuable tools for learning and education. In educational settings, subtitles can aid students in comprehending videos, lectures, or other multimedia materials. They provide textual reinforcement of the spoken words, making it easier for learners to follow along, grasp important information, and reinforce their understanding.

E. Enabling enjoyment of media in noisy or quiet environments: Subtitles allow viewers to enjoy media content in environments where the audio quality may be compromised, such as noisy environments or places where it is necessary to maintain silence. By reading the subtitles, viewers can still follow the dialogue and storyline without relying solely on the audio.

2.1.5 Subtitle Creation Process

The process of creating subtitles typically involves several steps, which may vary depending on the specific requirements and workflow of the project. Here is an overview of the general subtitle creation process:

a. Transcription and time-coding:

- **Transcription:** The first step is to transcribe the dialogue or speech from the video or audio file. This involves converting spoken words into written text.
- **Time-coding:** Each line of dialogue is then assigned a specific timecode that indicates when it should appear and disappear on the screen. Timecodes are typically in hours, minutes, seconds, and milliseconds format.

b. Translation and localization:

- **Translation:** If the content needs to be translated into another language, the transcription is translated accurately while maintaining the meaning and context of the original dialogue.

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- **Localization:** In addition to translation, the subtitles may also require localization, which involves adapting the content to the target audience's cultural and linguistic norms. This may include adjusting idioms, expressions, or references to make them more understandable or relevant to the local audience.

c. Editing and proofreading:

- **Editing:** The translated or transcribed text is carefully reviewed and edited for accuracy, readability, and adherence to any specific guidelines or style requirements.
- **Proofreading:** The edited subtitles are then proofread to check for any spelling, grammar, or punctuation errors. It is crucial to ensure the final subtitles are error-free and well-structured.

d. Formatting and synchronization:

- **Formatting:** The subtitles are formatted according to the specific guidelines or standards of the target platform or delivery format. This includes determining the font type, size, color, position, and other visual elements.
- **Synchronization:** The timecodes assigned during the transcription process are used to synchronize the subtitles with the video or audio. Each subtitle line should appear and disappear on the screen at the appropriate time, matching the spoken words or dialogue.

e. Quality assurance and review:

- **Quality assurance:** The completed subtitles undergo a quality assurance process to ensure they meet the required standards of accuracy, timing, and formatting. This may involve playing back the video with the subtitles to check for any synchronization issues or visual anomalies.
- **Review:** The final step involves reviewing the subtitles one last time to ensure they are error-free and properly aligned with the audio or video content. This may involve multiple rounds of review and revisions if necessary.

2.2 The automatically generating of subtitles (STYLE AND SYNTAX)

2.2.1 Introduction

Automatic subtitle generation plays a crucial role in making audiovisual content more accessible to a wider audience, including those with hearing impairments or language barriers. As research and technology progress, we can expect further advancements in the style and syntax of

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automatically generated subtitles, facilitating greater inclusivity and engagement with audiovisual media.

In terms of syntax, subtitles should follow grammatical rules and maintain consistency throughout the content. Proper punctuation, capitalization, and sentence structure are essential for conveying the intended meaning accurately. Additionally, the subtitles should be aligned with the natural breaks in the audio.

2.2.2 Understanding Artificial Intelligence and Subtitle Generation

2.2.2.1 Definition of Artificial Intelligence

Artificial Intelligence (AI) refers to the field of computer science and technology that focuses on the development of intelligent machines capable of performing tasks that typically require human intelligence. It involves the creation of computer systems and software that can analyze, understand, learn from, and make decisions or take actions based on the available data and the desired goals.

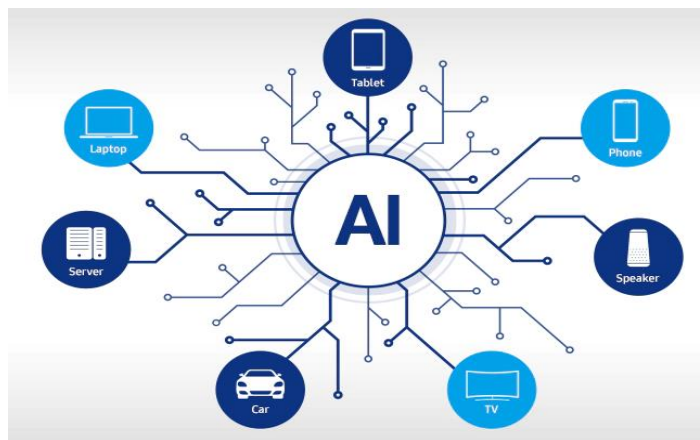


Figure 08 : image showing the ability of ai that can perform tasks that would typically require human intelligence

2.2.2.2 Aspects of AI's involvement in subtitle generation

AI plays a significant role in subtitle generation by automating and improving the process of creating accurate and synchronized subtitles for various forms of media, such as movies, TV shows, and online videos. Here are some key aspects of AI's involvement in subtitle generation:

- a. Automatic Speech Recognition (ASR):** AI technologies, particularly ASR systems, are employed to convert spoken language into written text. ASR models are trained on large

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amounts of data to recognize and transcribe spoken words with high accuracy. This technology forms the foundation of many subtitle generation systems.

- b. Natural Language Processing (NLP):** AI-powered NLP techniques are used to analyze and understand the transcribed text. NLP algorithms can identify sentence boundaries, punctuation, and linguistic elements, such as parts of speech, verb tenses, and named entities. This analysis helps ensure that the subtitles are grammatically correct and coherent.

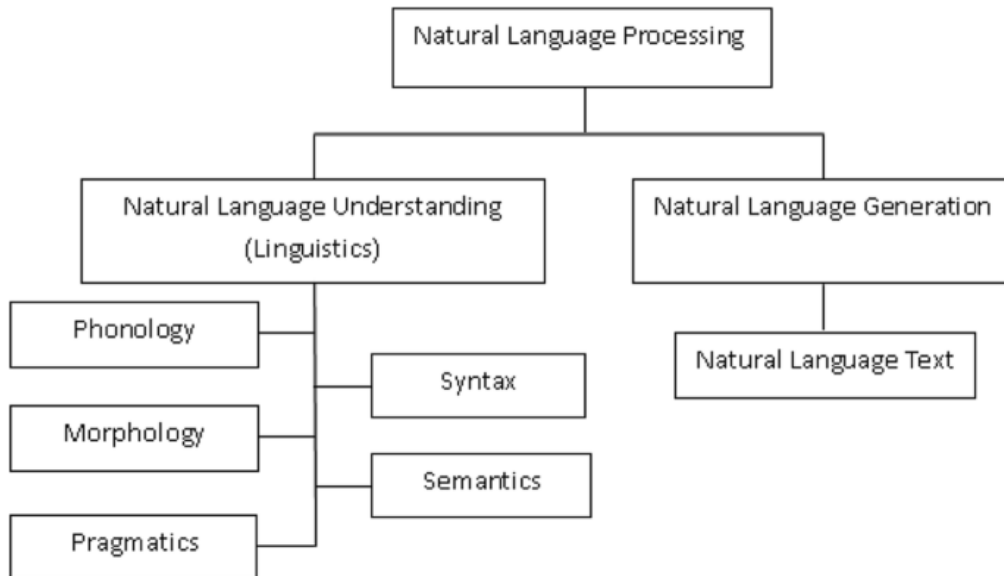


Figure 09 :Broad classification of NLP

- c. Timing and Synchronization:** AI algorithms are utilized to determine the appropriate timing and synchronization of the subtitles with the corresponding audio or video content. By analyzing audio patterns, pauses, and visual cues, AI models can accurately timestamp the subtitles to ensure they appear on screen at the right moment and remain synchronized throughout the media.
- d. Machine Translation:** In cases where subtitles need to be translated into different languages, AI-powered machine translation systems can be employed. These systems use statistical models or neural networks to automatically translate the original subtitles into the desired target language, reducing the need for manual translation.

CHAPTER II : SUBTITLES AND AUTOMATIC GENERATIONS (STYLE AND SYNTAX)

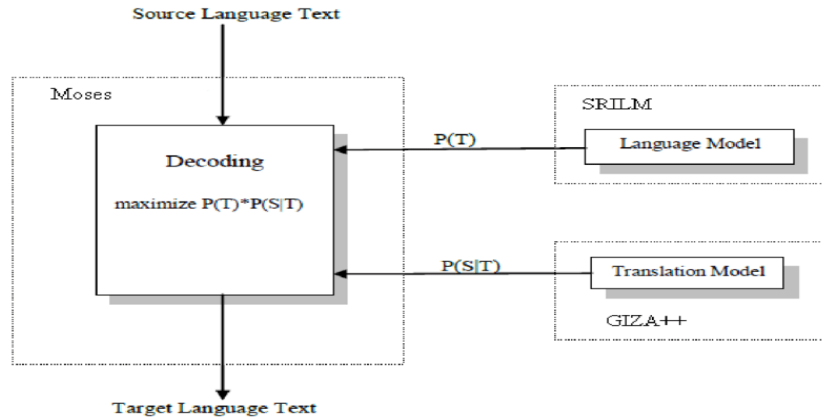


Figure10 : Architecture of statistical machine translation

- e. **Quality Assurance:** AI technologies can assist in quality control by automatically checking and correcting errors in subtitles. AI models can detect spelling mistakes, grammar errors, and inconsistencies in the subtitle text, ensuring the final output meets the required standards.
- f. **Named Entity Recognition (NER):** As mentioned earlier, NER algorithms can be utilized to identify and handle named entities, including character names and location names, in the subtitle text. This applies to Arabic subtitles as well, where NER can help accurately recognize and handle Arabic names, places, and other entities.

Here are two simplified examples of machine learning algorithms used in AI-based subtitle generation:

1. **Hidden Markov Models (HMMs):** In this case, an HMM can be trained on a large dataset of audio recordings and their corresponding transcriptions. The model learns the probabilities of transitioning between different speech sounds (phonemes) based on the observed acoustic features. When presented with a new audio clip, the HMM can then transcribe the speech into text, which can be used as subtitles.

- **Example :**

There are three different states such as cloudy, rain, and sunny. The following represent the transition probabilities based on the above diagram:

- If sunny today, then tomorrow:
 - 50% probability for sunny
 - 10% probability for rainy
 - 40% probability for cloudy

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- If rainy today, then tomorrow:
 - 10% probability for sunny
 - 60% probability for rainy
 - 30% probability for cloudy
- If cloudy today, then tomorrow:
 - 40% probability for sunny
 - 50% probability for rainy
 - 10% probability for cloudy

Using this Markov chain, what is the probability that the Wednesday will be cloudy if today is sunny. The following are different transitions that can result in a cloudy Wednesday given today (Monday) is sunny.

Hidden Markov Model

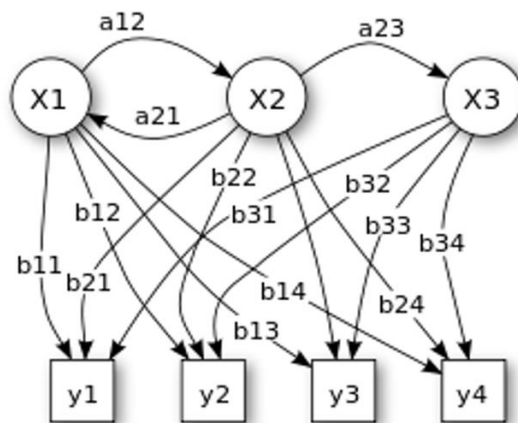


Figure 11 :Hidden Markov Model

2. **Recurrent Neural Networks (RNNs):** Let's say we have a dataset of movie dialogues and their associated subtitles. We can train an RNN, such as an LSTM, on this dataset. The RNN learns to understand the sequential relationship between words in the dialogues and generates corresponding subtitles. When given new dialogues, the trained RNN can generate subtitles that are contextually appropriate and align with the audio or video content.

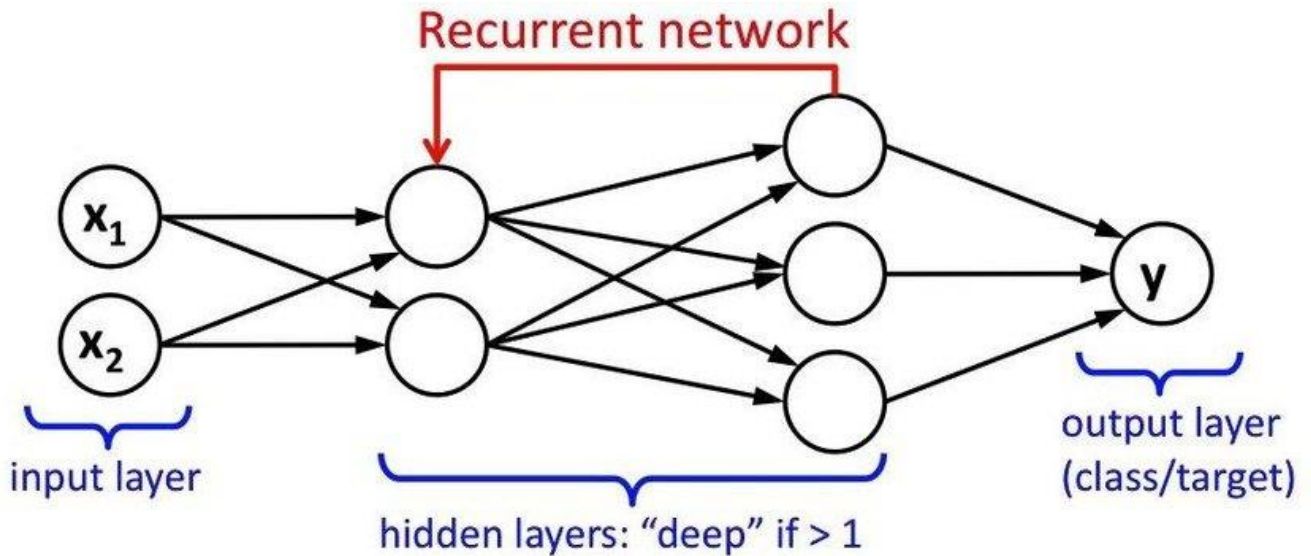


Figure 12 : Recurrent Neural Network (RNN) Or Long Short Term Memory(LSTM)

2.2.3 Style and syntax of Automatically Generated Subtitles

2.2.3.1 Style of Automatically Generated Subtitles

The style of auto-generated subtitles refers to the overall aesthetic and presentation of subtitles created by automated transcription systems.

There are also factors that play an important role in ensuring that subtitles are clear, visually appealing, and in sync with the audio or video content. These factors are as follows:

a. Natural language processing techniques: Automatically generated subtitles rely on natural language processing techniques to accurately transcribe spoken language. These techniques involve processing the audio input and converting it into text. For example, speech recognition algorithms, such as those used by voice assistants like Siri or Alexa, are employed to convert spoken words into written text. These algorithms utilize acoustic modeling and language modeling to identify and transcribe the words accurately.

- **Example :** When a character in a movie says, "i am happy" the natural language processing technique would convert the spoken phrase into text as "i am happy" and display it as a subtitle.

b- Tone and emotion recognition: Sophisticated subtitle generation systems incorporate tone and emotion recognition algorithms to capture the emotional aspects of the speech. By analyzing

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audio or video content, these algorithms can detect the emotional cues and nuances in the dialogue, allowing the subtitles to reflect the tone and emotion of the speakers.

- **Example:** In a video of a motivational speaker delivering an inspiring speech, the tone and emotion recognition algorithm can identify moments of enthusiasm, passion, or motivation. The generated subtitles would then accurately convey the speaker's emotions, reflecting phrases like "**you can do it!**" with an exclamation mark to capture the speaker's enthusiasm.

c- Contextual understanding and adaptation: Contextual understanding and adaptation are crucial in automatically generated subtitles. NLP models are trained to consider the broader context of the conversation, incorporating previous dialogue, visual cues, and background information. This enables the subtitles to be more coherent and accurate, even when faced with ambiguous phrases or homophones, by leveraging the available context.

- **Example:** In a TV series, if a character says, "**I saw him with the dog**" the subtitles generated using contextual understanding would reflect the intended meaning based on the context. If the previous scene showed the character hiking in a street, the subtitles might read "**I saw him with a dog**" to indicate the presence of an actual dog. However, if the character was in a toy store, the subtitles might read "**I saw him with a dog**" to imply the character was holding a toy bear.

d. Multilingual support: Automatic subtitle generation can support multiple languages, allowing viewers to access content in different languages. NLP techniques are used to process and transcribe speech in various languages, enabling subtitles to be generated in the desired language.

- **Example:** An anime originally spoken in Korean can have automatically generated subtitles in multiple languages, including English, Spanish, or German. The NLP models would process the spoken Korean dialogue and provide accurate translations and transcriptions in the respective languages.

e- Formatting and visual presentation: Automatically generated subtitles can incorporate formatting and visual presentation features to enhance readability and visual appeal. This includes aspects such as font style, size, color, and placement of the subtitles on the screen.

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- **Example:** Subtitles may be displayed at the bottom of the screen, using a legible font size and style that ensures easy reading. The subtitles may also be color-coded to distinguish different speakers in a dialogue, or they could be positioned strategically to avoid overlapping with important visual elements on the screen. These formatting and visual presentation choices enhance the viewer's experience by providing clear and visually pleasing subtitles

It can be argued that manual review and customization of subtitle style may be necessary in order to obtain consistency in terms of visual design and subtitle content.

2.2.3.2 Syntax of Automatically Generated Subtitles

The syntax of automatically generated translations includes several aspects, among which are:

A. Grammar and sentence structure: Automatically generated subtitles typically follow the basic rules of grammar and sentence structure. They aim to represent the spoken content in a written form, ensuring that sentences are grammatically correct and coherent. However, due to the limitations of automated transcription systems, there may be occasional errors or inaccuracies.

- **Example :**

Original spoken content: "I think that he will not comes with us , let's go! ."

Automatically generated subtitle: "I think that he will not comes with us , let's go! ."

B. Punctuation and capitalization: Automated subtitles also attempt to include proper punctuation and capitalization. They recognize sentence boundaries and use appropriate punctuation marks such as periods, question marks, and exclamation marks. Capitalization is generally used at the beginning of sentences and for proper nouns. However, mistakes can occur, especially when dealing with unedited or raw machine-generated subtitles.

- **Example :**

Original spoken content: "Yes , I'm living in Algeria"

Automatically generated subtitle: "Yes , I'm living in Algeria"

C. Spelling and word choice: Automated transcription systems try to transcribe words accurately, but they can sometimes struggle with complex or uncommon vocabulary. Spelling

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errors and occasional incorrect word choices can arise, particularly when there are ambiguous or difficult-to-distinguish words in the audio

- **Example :**

Original spoken content: "I don't think you can **steal** me."

Automatically generated subtitle: "I don't think you can **still** me."

D. Consistency and coherence: To provide a consistent and coherent reading experience, automatically generated subtitles attempt to maintain consistency in style and structure throughout the transcript. This includes maintaining consistent terminology and ensuring that sentences and phrases are logically connected. However, in some cases, the lack of contextual understanding or audio quality may lead to inconsistencies.

- **Example :**

Original spoken content: "Try to take a look **on** this phone."

Automatically generated subtitle: "Try to take a look **in** this phone."

E. Handling colloquial expressions and slang: Automated transcription systems may struggle with accurately transcribing colloquial expressions, idioms, or slang. These linguistic elements often require contextual understanding and cultural knowledge, which can be challenging for machine models. As a result, the accuracy of subtitles in capturing colloquial language can vary.

- **Example :**

Original spoken content: "راني رايح للكرطي."

Automatically generated subtitle: "am going to **karti**."

Although automated transcription has made significant advances, it still has limitations and may require human review and editing to ensure an accurate, high-quality translation.

2.3 Machine learning, Techniques and Algorithms for Style and Context Analysis

2.3.1 Overview of Machine Learning:

Machine learning is a subfield of artificial intelligence (AI) that involves the development of algorithms and models capable of enabling computer systems to learn and make predictions or decisions autonomously, without explicit programming. Its primary objective is to create computational systems that can learn from experience, data, and patterns, thereby improving their performance over time without the need for explicit instructions for each specific task. By leveraging large datasets, machine learning algorithms can recognize patterns, relationships, and trends, and utilize this knowledge to make accurate predictions or classifications on new, unseen data instances. This ability to generalize from data allows machine learning models to adapt and perform effectively in various domains and applications, such as image recognition, natural language processing, recommendation systems, fraud detection, healthcare, finance, and more. By continuously optimizing through iterative training processes, these algorithms adjust their internal parameters to minimize the discrepancy between predicted and actual outcomes, enabling them to enhance their predictive capabilities and overall performance.

2.3.2 Natural Language Processing (NLP) for style recognition and analysis

Natural Language Processing (NLP) techniques are commonly employed in machine learning for style recognition and analysis. NLP focuses on understanding and processing human language to extract meaning and patterns. Here are some techniques and algorithms used in NLP for style recognition:

1. **Feature Engineering:** Feature engineering involves extracting relevant linguistic features from text that can be used to capture stylistic elements. These features may include word frequencies, n-grams (sequences of adjacent words), part-of-speech tags, syntactic patterns, sentiment scores, readability metrics, or stylistic markers. These features serve as input to machine learning algorithms for style analysis.

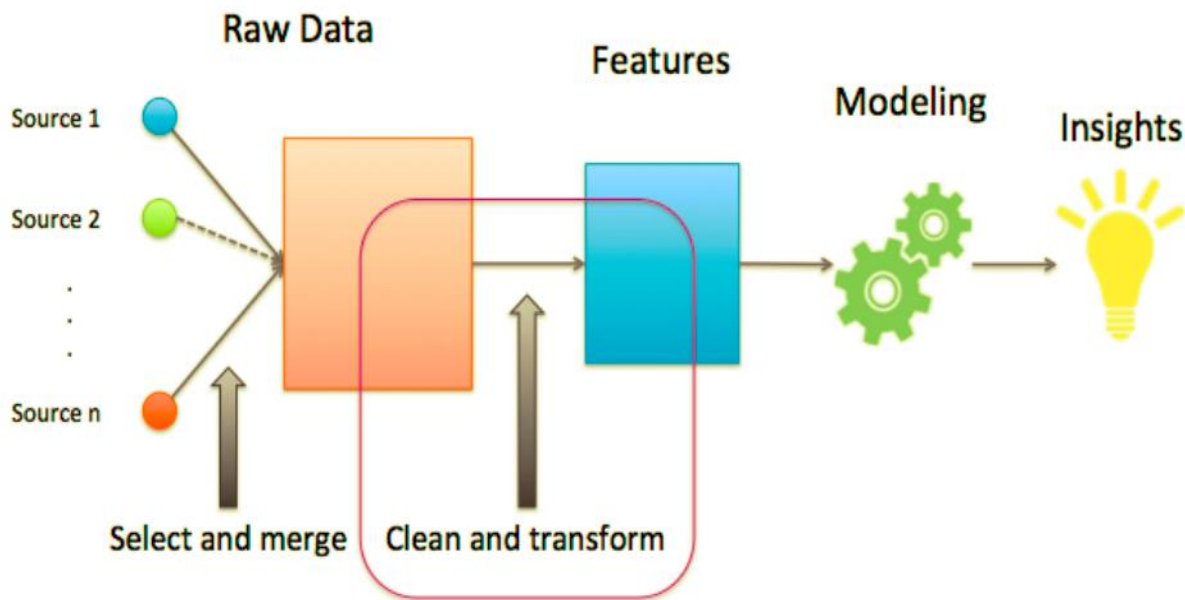


Figure 13: The place of feature engineering in the machine learning workflow

2. **Naive Bayes Classifier:** Naive Bayes is a probabilistic classification algorithm widely used in NLP tasks, including style recognition. It assumes independence between features and calculates the probability of a particular style given the observed features. Naive Bayes classifiers can be trained using labeled data, where the features represent linguistic characteristics, and the labels represent different styles.
3. **Support Vector Machines (SVM):** SVM is a powerful supervised learning algorithm that can be used for style recognition. SVM constructs a hyperplane to separate different styles in a high-dimensional feature space. It aims to find the best margin between different style classes. SVMs can handle non-linear relationships between features using the kernel trick.

SVM can be of two types:

- **Linear SVM:** Linear SVM is used for linearly separable data, which means if a dataset can be classified into two classes by using a single straight line, then such data is termed as linearly separable data, and classifier is used called as Linear SVM classifier.

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- **Non-linear SVM:** Non-Linear SVM is used for non-linearly separated data, which means if a dataset cannot be classified by using a straight line, then such data is termed as non-linear data and classifier used is called as Non-linear SVM classifier.

Vector creates a decision boundary between these two data (cat and dog) and chooses extreme cases (support vectors), it will see the extreme case of cat and dog. On the basis of the support vectors, it will classify it as a cat. Consider the below diagram:

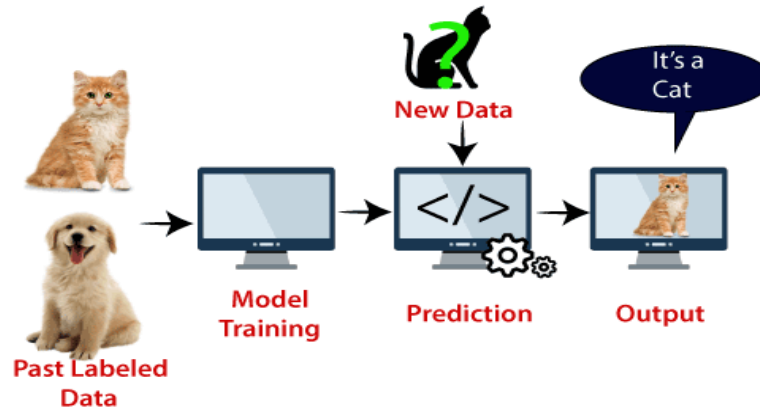


Figure 14: Vector Diagram design

4. **Decision Trees:** Decision trees are a popular algorithm for style analysis. They construct a tree-like model where each internal node represents a feature test, and each leaf node corresponds to a predicted style label. Decision trees can capture complex decision boundaries and provide interpretability.

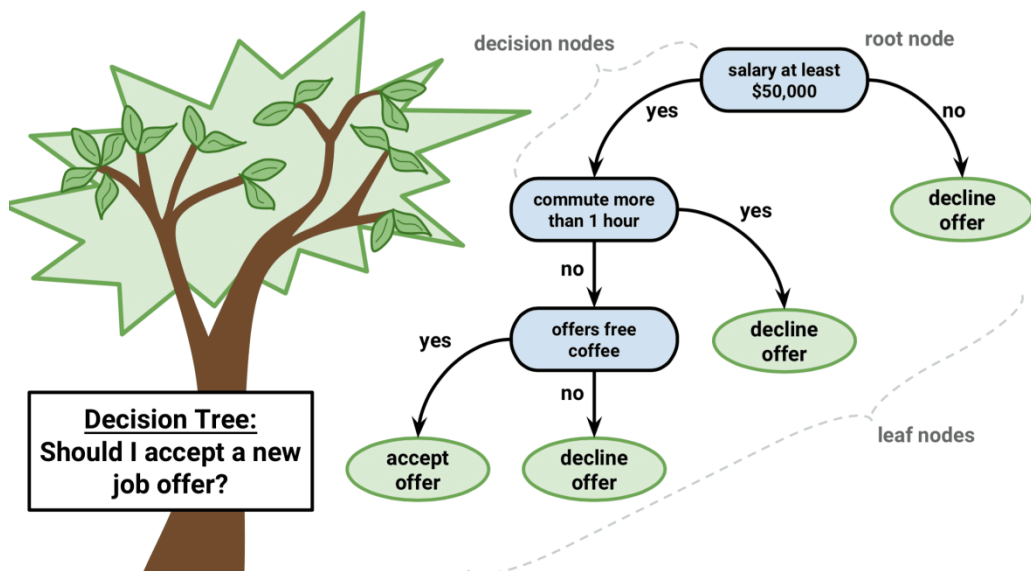


Figure 15: Decision trees

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5. **Random Forests:** Random forests are an ensemble learning method that combines multiple decision trees to make predictions. In style analysis, random forests can capture the collective knowledge of multiple trees and improve prediction accuracy. They can handle large feature sets and provide insights into feature importance.
6. **Recurrent Neural Networks (RNN):** RNNs are a class of neural networks suitable for analyzing sequential data, such as text. They can capture dependencies and temporal information in text by maintaining a hidden state that retains information from previous inputs. RNNs, such as Long Short-Term Memory (LSTM) or Gated Recurrent Unit (GRU), have been used for style recognition and generation tasks.
7. **Convolutional Neural Networks (CNN):** CNNs are widely used for image processing but can also be applied to text analysis, particularly for style recognition. By applying convolutional filters over text representations, CNNs can learn local patterns and hierarchical representations of style-related features.
8. **Transformer Models:** Transformer models, such as the popular BERT (Bidirectional Encoder Representations from Transformers), have revolutionized NLP tasks, including style analysis. Transformers capture contextual information by attending to all words in a text simultaneously. They have been used for various style-related tasks, such as style transfer, sentiment analysis, and authorship attribution.
9. **Feature-based methods:** In this approach, various features are extracted from the text to capture stylistic characteristics. These features can include word frequencies, sentence length, syntactic patterns, and part-of-speech distributions. Machine learning algorithms are then trained on these features to classify the text into different styles or genres.
10. **Text classification algorithms:** NLP employs supervised machine learning algorithms like Naive Bayes, Support Vector Machines (SVM), or deep learning models like Convolutional Neural Networks (CNN) or Recurrent Neural Networks (RNN) for text classification. These algorithms can be trained on labeled datasets where texts are annotated with their corresponding styles or genres.
11. **Authorship attribution:** NLP techniques can be used to determine the writing style of a particular author. By analyzing a set of texts from known authors, features such as

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vocabulary usage, sentence structure, punctuation patterns, and stylistic choices can be extracted. Machine learning models can then be trained to identify the author's style and attribute texts to the appropriate author.

12. **Sentiment analysis:** Sentiment analysis is a subfield of NLP that focuses on determining the emotional tone or sentiment expressed in a text. By analyzing the language, context, and word choices in a given text, sentiment analysis algorithms can determine whether the sentiment is positive, negative, or neutral. This analysis can provide insights into the style or tone of a text.
13. **Deep learning techniques:** Deep learning models like recurrent neural networks (RNNs), long short-term memory networks (LSTMs), or transformer models (e.g., BERT) have shown significant success in various NLP tasks, including style recognition. These models can learn intricate patterns and dependencies in text data, allowing them to capture the underlying style or genre information effectively.

These are some of the techniques and algorithms used in NLP for style recognition and analysis. Researchers and practitioners often combine these methods or develop novel approaches to extract and analyze stylistic elements from text data.

2.3.3 Contextual understanding using machine learning models

Contextual understanding using machine learning models in the context of subtitles involves leveraging machine learning techniques to interpret and analyze the meaning and significance of textual information within the specific context of subtitle generation. Here are some examples:

1. **Contextual Word Embeddings:** Machine learning models can learn contextual word embeddings that capture semantic relationships between words. For example, consider the sentence "She plays the piano." The word "plays" could have different meanings depending on the context. A machine learning model with contextual understanding can determine that in this context, "plays" refers to performing a musical instrument rather than engaging in a sport.
2. **Pre-trained Language Models:** Pre-trained language models, such as BERT or GPT, can be fine-tuned for subtitle generation tasks. These models can capture contextual understanding by considering the surrounding text.

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- **For example:** if the subtitle is “**i was playing with him**” a language model with contextual understanding can recognize that “**him**” refers to a person previously mentioned in the context.
3. **Attention Mechanisms:** Attention mechanisms allow machine learning models to focus on relevant parts of the input text. In the context of subtitles, attention mechanisms can help identify key words or phrases that carry the most contextual significance. For example, in a dialogue-heavy scene, the model can attend to the speaker's words and use that context to generate accurate and contextually appropriate subtitles.

- **For Example:** scene from a dramatic movie where two characters, **Alice and Bob**, are having an intense conversation:

Scene: Alice and Bob sitting in a dimly lit room, facing each other.

Alice: (with frustration) I can't believe you betrayed me, Bob!

Bob: (regretfully) Alice, I didn't mean to. It was a mistake.

In this dialogue-heavy scene, we want to use a machine learning model with an attention mechanism to generate subtitles that capture the emotions and context accurately.

1. **Input:** "I can't believe you betrayed me, Bob!"
2. **Attention:** [1.0, 0.5, 0.2, 0.1, 0.0, 0.0]
3. **Subtitle:** "Alice (frustrated): I can't believe you betrayed me, Bob!"

In this subtitle, the attention mechanism has focused strongly on the phrase "you betrayed me," indicating its contextual significance and allowing the model to correctly attribute the emotion "frustrated" to Alice's dialogue.

1. **Input:** "Alice, I didn't mean to. It was a mistake."
2. **Attention:** [0.1, 0.2, 0.5, 1.0, 0.3, 0.1, 0.0]
3. **Subtitle:** "Bob (regretful): Alice, I didn't mean to. It was a mistake."

In this subtitle, the attention mechanism has emphasized the phrase "It was a mistake," which helps the model to understand that Bob is expressing regret. The model generates the appropriate subtitle by capturing the emotional context of the conversation.

4. **Handling Ambiguity:** Contextual understanding is crucial for resolving ambiguity in subtitles. For instance, consider the subtitle "She saw a bat." Without proper contextual understanding, the model might interpret "bat" as the animal or as a baseball bat. By considering the surrounding context, such as the presence of other characters or the nature of the scene, the model can disambiguate and generate the appropriate subtitle.

5. **Contextual Adaptation:** Machine learning models with contextual understanding can adapt subtitles to different styles and genres. For example, in a comedic scene, the model can generate subtitles that reflect the humor and comedic timing. In a dramatic scene, the model can adjust the style and tone of the subtitles to match the emotional intensity of the scene.

2.3.4 Integration of contextual data from audio, video, or metadata sources

Integration of contextual data from audio, video, or metadata sources is a process that involves gathering and combining information from various sources to provide a more comprehensive understanding of a given situation or content. This integration can be applied in different domains, including multimedia analysis, natural language processing, and AI-driven applications. Here are some common approaches and considerations for integrating contextual data:

1. **Data Collection and Preprocessing:** The first step is to collect data from the relevant sources, such as audio recordings, video streams, and metadata files. The data may include speech, images, text, timestamps, geolocation, and other relevant information. Preprocessing is often necessary to clean and standardize the data for further analysis.
2. **Multimodal Fusion:** To effectively integrate data from different sources, multimodal fusion techniques are employed. These methods combine information from audio, video, and metadata streams to create a cohesive representation of the content. Techniques like late fusion, early fusion, and hybrid fusion can be used based on the specific use case.
3. **Feature Extraction:** In many cases, the raw data from audio and video sources may not be directly usable. Feature extraction is a crucial step where relevant features are extracted from the data to represent different aspects. For example, in audio, this may involve extracting acoustic features like MFCCs (Mel-frequency cepstral coefficients), while in video, it could include visual features like color histograms or deep learning-based embeddings.
4. **Metadata Utilization:** Metadata provides essential contextual information that can complement the audio and video content. Timestamps, geolocation data, author information, or other metadata can be leveraged to enhance the understanding of the content and the context in which it was created.

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5. **Machine Learning and AI Models:** Integrating contextual data often involves leveraging machine learning and AI models to analyze and interpret the combined information. These models may include natural language processing algorithms, computer vision models, sentiment analysis, etc., depending on the nature of the data and the intended application.
6. **Semantic Understanding:** To gain a deeper understanding, some applications may require semantic analysis. This involves understanding the meaning of the integrated data, which could include recognizing objects, sentiment, intent, or identifying key events in the content.
7. **Real-Time Processing:** In some scenarios, real-time processing of the integrated data is necessary, such as in live event monitoring, interactive applications, or surveillance systems. Efficient algorithms and hardware may be required to handle the computational demands.
8. **Application Areas:** Integration of contextual data has numerous applications, such as in speech recognition, video summarization, content recommendation systems, surveillance and security, sentiment analysis, and more.

Overall, the integration of contextual data from audio, video, or metadata sources is a challenging but valuable task that enables machines to understand and interact with the content in a more human-like manner. As technology advances, we can expect more sophisticated methods for handling and combining multimodal data to improve various AI-driven applications

2.3.5 Recap of the importance of style and context in automatic subtitle generation

style and context play crucial roles in automatic subtitle generation as they directly impact the quality, accuracy, and overall user experience of the generated subtitles. Here are some key reasons why style and context are important in this process:

1. **Accuracy and Clarity:** The style of the subtitles should match the genre and tone of the video content. For example, subtitles for a comedy show should reflect a light and humorous style, while subtitles for a serious documentary should be more formal and informative. Adapting the style ensures that the subtitles accurately convey the intended message and maintain clarity for the viewers.

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2. **Language Adaptation:** Different languages have varying linguistic structures and nuances. A good subtitle generation system must consider the context and style to adapt the translation appropriately. Proper adaptation ensures that the translated subtitles are not only grammatically correct but also culturally and contextually relevant to the target audience.
3. **Idiomatic Expressions and Slang:** Style and context are critical in handling idiomatic expressions, colloquialisms, and slang. Subtitles must capture the intended meaning and emotions of such expressions, as literal translations may lead to confusion or loss of impact.
4. **Speaker Identification:** Context is essential in identifying the speaker in dialogues, especially in group conversations. Subtitles should accurately attribute the speech to the correct speaker, making it easier for viewers to follow the dialogue flow.
5. **Handling Ambiguity:** In certain situations, there may be ambiguous statements that can be interpreted differently depending on the context. An intelligent subtitle generation system should consider the surrounding content to resolve such ambiguities accurately.
6. **Consistency:** Consistency in style throughout the video enhances the viewing experience. Repeatedly changing the style or tone of the subtitles can be distracting and may lead to a less immersive experience for the audience.
7. **Multimodal Fusion:** Integrating information from audio, video, and metadata sources requires understanding the context to generate subtitles that match the content's flow and emotions appropriately.
8. **Subtitle Presentation:** The style and context also influence how subtitles are presented on the screen. This includes decisions on subtitle placement, timing, font size, and color, all of which can affect the overall user experience.
9. **Accessibility and Inclusivity:** Automatic subtitle generation serves an essential role in making content accessible to viewers with hearing impairments. Properly capturing style and context ensures that the subtitles effectively convey the emotions, sarcasm, and other non-verbal cues present in the content.

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10. **Language and Cultural Sensitivity:** Subtitles generated without considering the style and context of the content may inadvertently create inaccuracies, misunderstandings, or even cultural insensitivities. An awareness of context is crucial in avoiding such issues.

In summary, the importance of style and context in automatic subtitle generation lies in providing accurate, clear, and contextually relevant subtitles that enhance the viewing experience and make the content accessible to a broader audience. Subtitle generation systems that effectively account for these factors can significantly improve the overall quality of subtitled content in various languages and genres.

2.4 Conclusion

On this chapter we explored subtitles and their significance, examining various aspects such as types, importance, creation process, and the revolutionary field of automatically generated subtitles using artificial intelligence and machine learning.

Subtitles serve as textual representations of audio content, enabling viewers to comprehend dialogue in different languages and providing accessibility for the hearing-impaired. They come in forms like open and closed captions, enhancing viewing experiences, expanding audience reach, and promoting content accessibility.

The creation process of subtitles demands meticulous attention and adherence to guidelines to ensure accurate synchronization with audiovisual content. Skilled professionals familiar with languages, cultures, and audiovisual elements are essential for quality subtitles.

**CHAPTER III: Evaluation of
Automatically Generated subtitles
on two types of videos from
English to Arabic.**

CHAPTER III: Evaluation of Automatically Generated subtitles on two types of videos from English to Arabic

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3.1 Introduction:

Chapter three of this study delves into a meticulous analysis of stylistic and syntactic subtitled content in YouTube videos, employing a systematic approach to understand the effective conveyance of the video's content through subtitles. The process begins by selecting a suitable YouTube video with subtitles, transcribing them into a text document, and establishing clear objectives for the analysis. The examination of stylistic aspects includes a thorough assessment of language use, tone, punctuation, capitalization, font, and formatting. Attention is dedicated to aligning tone with the video's context, creative use of punctuation, and evaluating font style for readability and aesthetic appeal. On the syntactic front, the analysis evaluates grammatical correctness, scrutinizes sentence structures for clarity, and ensures consistency in terminology, pronouns, and tense. Cultural and contextual factors are considered, acknowledging their potential influence on subtitle translation and adaptation. The analysis concludes with valuable insights into the effectiveness of stylistic and syntactic choices, offering recommendations for improvement to enhance stylistic elements, improve syntactic accuracy, and address cultural nuances. This thorough analysis aligns with existing literature and guidelines on subtitling, contributing significantly to the advancement of this field by recognizing the impact of subtitles on the overall viewing experience and accessibility of the video.

CHAPTER III: Evaluation of Automatically Generated subtitles on two types of videos from English to Arabic

3.2 YouTube Overview :

YouTube is a widely used online video-sharing platform owned by Google and was founded in February 2005 by former PayPal employees Steve Chen, Chad Hurley, and Jawed Karim. It quickly emerged as one of the most influential websites on the internet. Here's an overview of YouTube's key features and functionalities:

- **Purpose and Functionality:** YouTube's primary purpose is to provide users with a platform to upload, view, share, and comment on videos. It hosts a diverse array of content, including user-generated videos, music videos, movie trailers, educational content, vlogs (video blogs), gaming videos, and more.
- **User Base:** With billions of active users visiting the platform each month, YouTube boasts an enormous global audience. People of all ages and interests use YouTube, making it a versatile and influential platform for both content creators and viewers.
- **Content Creators:** Anyone can become a content creator on YouTube by creating a channel and uploading videos. Content creators are responsible for producing and sharing their videos, building a subscriber base, and engaging with their audience. Successful creators can monetize their content through various means, such as ads, sponsorships, and merchandise.
- **Monetization:** YouTube's Partner Program allows eligible content creators to monetize their videos through ads. Creators earn revenue based on factors such as the number of views, ad engagement, and ad formats shown on their videos.
- **Community and Interaction:** YouTube encourages community engagement through likes, comments, and shares. Viewers can express their support or opinions through likes and comments on videos, and creators often interact with their audience through these channels.
- **Content Moderation:** To maintain a safe and respectful environment, YouTube has guidelines and policies that content creators must adhere to. The platform actively moderates content to ensure it complies with community guidelines and does not violate copyright or other legal regulations.

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- **Premium Services:** YouTube offers a premium subscription service called YouTube Premium (formerly YouTube Red), which provides users with access to ad-free content, the ability to download videos for offline viewing, and the option to play videos in the background while using other apps. Additionally, YouTube TV offers a live TV streaming service with a selection of channels.
- **Educational and Informative Content:** YouTube has also become a prominent platform for educational content. Many educators, experts, and institutions share knowledge across a wide range of subjects, making YouTube a valuable resource for learning.

Overall, YouTube's extensive reach, diverse content, and interactive features have solidified its position as one of the most significant and influential platforms on the internet, catering to a broad spectrum of interests and audiences.

3.3 Analysis Studies on Stylistic and Syntactic subtitling of YouTube videos

YouTube videos refer to multimedia content hosted on the YouTube platform, which is a popular video-sharing website. These videos can cover a wide range of subjects, interests, and formats, created and uploaded by individual users, content creators, organizations, and businesses alike. YouTube serves as a platform for disseminating information, entertainment, education, and creative expression to a global audience.

The content of YouTube videos can include but is not limited to tutorials, vlogs, music videos, product reviews, gaming, travel vlogs, cooking demonstrations, fitness routines, science experiments, DIY projects, fashion advice, and more. Creators can personalize their channels, develop their unique styles, and engage with their viewers through comments and social interactions.

YouTube has become an integral part of digital culture, providing a space for individuals to share their passions, knowledge, and creativity while also serving as a source of entertainment and learning for millions of people worldwide. So we used these examples as case study:

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- **Example 01:**

Title :Exploring Roman RUINS in Algeria! (Sétif and Djemila)

link : <https://www.youtube.com/watch?v=CtQARpgsLRk>

1. Transcribing the Subtitles:

English Transcription	Timing	Arabic Transcription
You can see I m driving this car in the back	0:00	يمكنك أن ترى أنني أقود هذه السيارة في الخلف
Here I was driving her everywhere	0:02	أنا هنا كنت أقودها في كل مكان
Algeria itself has no problems except	0:03	الجزائر بنفسها مافيها مشاكل إلا
Speed bumps in this country so I	0:08	مطبات السرعة في هذا البلد لذلك أنا
You really don;t have a lot of bad things to say	0:11	حقا ليس لديك الكثير من الأشياء السيئة ليقولها
About Algeria, but oh my God, this speed	0:13	عن الجزائر لكن يا إلهي هذه السرعة
Pitfalls	0:16	مطبات

foreign	0:28	أجنبي
Hello and good morning from Setif so I am	0:36	مرحبا وصباح الخير من سطيف لذلك أنا
Here in this Algerian city, perhaps that is the case	0:41	هنا في هذه المدينة الجزائرية ربما يكون الأمر كذلك
The most important city in the East	0:44	أهم مدينة في الشرقية

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Algeria in terms of economy is like this	0:46	الجزائر من حيث الإقتصاد هي كذلك
Really known as the commercial city uh	0:49	المعروفة حقًا باسم المدينة التجارية اه
A lot of action happens here in Setif	0:51	الكثير من الأعمال تحدث هنا في سطيف
And I;m going to explore	0:54	وأنا سأقوم باستكشاف
Little city spent the night here	0:57	المدينة قليلا قضيت الليل هنا
Oh on my way from Vijaya I stopped here	0:59	اه في طريقي من فيجايا توقفت هنا
To spend the night and then um later	1:02	لقضاء الليل ثم أم في وقت لاحق
Today I will go to Roman	1:04	اليوم سأذهب إلى الروماني
The ruins are beautiful and are about an hour away	1:06	أنقاض جميلة وهي حوالي ساعة
Away from Setif, the perfect place for this	1:09	بعيدًا عن سيتيف، المكان المثالي لذلك
Continuing my tour around this amazing place	1:14	مواصلة جولتي حول هذا مدهش
Country Algeria	1:16	البلد الجزائر
[music]	1:18	[موسيقى]
Thank you	1:25	شكرًا لك
[music]	1:28	[موسيقى]

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So I entered the Antiquities Museum	1:49	لذلك دخلت متحف الأثار
ceif and something really great about him	1:52	وشيء عظيم حقا عنه
Algeria museum entrance fees are very high	1:55	الجزائر رسوم دخول المتحف مرتفعة للغاية
Cheap so now I would love two or	1:58	رخيصة لذا فقد كنت الآن أحب اثنين أو
Three museums in this country and I can	2:01	ثلاثة متاحف في هذا البلد وأستطيع
Remember every time uh it;s usually about	2:03	تذكر في كل مرة اه عادة ما يكون الأمر على وشك
200 dinars, which is less than a dollar	2:06	دينار أي أقل من دولار 200
Less than one euro, so I love everything	2:09	أقل من يورو واحد، لذا أحب كل شيء
Really cheap and there is nothing like it	2:12	رخيصة حقا وليس هناك مثل
Separate foreign rate is the same	2:14	سعر أجنبي منفصل هو نفسه
The price is a very good deal and you can afford it	2:16	السعر صفقة جيدة جدًا ويمكنك ذلك
Really appreciate the cultural history	2:18	حقا نقدر التاريخ الثقافي
Here in Algeria because of the cheap ones	2:20	هنا في الجزائر بسبب تلك الرخيصة
the prices	2:23	الأسعار

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He remembers	2:25	يتذكر
[music]	2:28	[موسيقى]
Thank you	3:22	شكراً لك
[music]	3:24	[موسيقى]
foreign	3:25	أجنبي
[music]	3:29	[موسيقى]
This is now the case for the fountain	3:32	هذا هو الحال الآن بالنسبة للنافورة
Setif is a very famous landmark in	3:35	سطيف هو معلم مشهور جداً في
The city is subject to many things	3:37	المدينة وتخضع للكثير
An argument attempted by many extremists	3:39	الجدل الذي حاول العديد من المتطرفين
To destroy or deface the statue	3:42	لتدمير التمثال أو تشويهه
The past because she is a naked woman in it	3:44	الماضي لأنها امرأة عارية فيه
A Muslim majority country that is	3:46	بلد ذات أغلبية مسلمة هذا هو
Which causes a lot of controversy	3:48	ما يسبب الكثير من الجدل
[music]	3:50	[موسيقى]
Thank you foreigner	4:18	شكراً لك الأجنبية

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In the mall I think it's very easy to do	4:27	في المركز التجاري أعتقد أنه من السهل جدًا القيام بذلك
I think Algeria and my videos are on it	4:29	أعتقد أن الجزائر وأشرطة عليها الفيديو
This is probably a really historical place	4:32	ربما يكون هذا المكان التاريخي حقًا
All desert or something like that but no	4:34	كل الصحراء أو شيء من هذا القبيل ولكن لا
There are no malls there too	4:37	ليس هناك مراكز تجارية هناك جدا
Ordinary places where people go and live	4:39	الأمكن العادية التي يذهب إليها الناس ويعيشون فيها
And I want to show that I'm fine	4:41	وأريد أن أظهر أنني بخير
I arrived at Gemili you can see that I am	4:43	وصلت إلى جيميلي يمكنك أن ترى أنني
Driving this car behind me here I have	4:45	قيادة هذه السيارة خلفي هنا لقد
Been driving all over Algeria with it	4:47	تم القيادة في جميع أنحاء الجزائر بها
Myself there are no problems except speed	4:49	نفسي لا توجد مشاكل باستثناء السرعة
bumps in this country so I really don't	4:53	المطبات في هذا البلد لذلك أنا حقا لا
You have a lot of bad things to say about her	4:56	لديك الكثير من الأشياء السيئة ليقول عنها
Algeria, but oh my God, these speed bumps	4:58	الجزائر لكن يا إلهي هذه المطبات السريعة

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They're there a lot and there's like	5:02	انهم هناك الكثير وهناك مثل
There is no sign of it being very rare to find	5:05	لا توجد علامة على أنه من النادر جداً وجودها
A sign to indicate the presence of a speed bump	5:07	إشارة لتوضيح وجود مطب للسرعة
Sometimes it's just a very small thing	5:09	في بعض الأحيان يكون مجرد شيء صغير جداً
On the side of the road there is no sign at all	5:11	على جانب الطريق لا توجد إشارة على الإطلاق
It's not too bad during the day however	5:13	وانها ليست سيئة للغاية خلال النهار ولكن
You always lead as you are	5:16	أنت تقود دائماً كما أنت
Predict where this people are	5:17	توقع أين هذا الشعب أين
The speed bump you know is this	5:19	مطب السرعة ما تعرفه هو هذا
You will destroy my car	5:20	سوف تدمر سيارتي
Um and then at night it's like 100 times	5:22	أم ثم في الليل يشبه 100 مرة
Worse because you can't see and you did it	5:24	أسوأ لأنك لا تستطيع الرؤية وقد فعلت ذلك
No idea when these speed bumps are	5:26	لا فكرة متى تكون هذه المطبات السرعة
Coming so I mean Algeria like roads	5:27	القادمة لذلك أقصد الجزائر مثل الطرق
Roads are good but speed bumps	5:32	الطرق جيدة ولكن مطبات السرعة

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Oh my god it's the worst	5:34	يا إلهي إنه أسوأ ما في الأمر
This is the country we are entering now	5:36	هذا البلد الذي ندخله الآن
Gemilla Museum located right on site	5:39	متحف جيميللا الموجود في الموقع مباشرة
You can see beautiful Roman mosaics	5:41	تستطيع أن ترى الفسيفساء الرومانية الجميلة
Paintings so interesting thing	5:43	لوحات لذلك الشيء المثير للاهتمام
Gamma's location is that it was built	5:45	موقع جيما هو أنه تم بناؤه
About 1000 AD and located in	5:49	حوالي 1000 م ويقع في
Mountains so the area I'm in is about	5:52	الجبال لذا فإن المنطقة التي أنا فيها على وشك
One kilometer above sea level and so on	5:54	كيلومتر واحد فوق مستوى سطح البحر وهكذا
It's a really interesting example of	5:57	إنه مثال مثير للاهتمام حقًا لـ
A mountainous site of Roman ruins	6:00	موقع جبلي للآثار الرومانية كان
An entire Roman city that is also UNESCO listed	6:02	مدينة رومانية بأكملها وهي أيضًا مدرجة في قائمة اليونسكو
A world heritage site that it truly is	6:05	موقع التراث العالمي الذي هو حقًا
It's important to note that I'm really excited	6:07	من المهم أن نلاحظ ذلك أنا متحمس حقًا

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To show you this beautiful place right	6:09	لتظهر لك هذا المكان الجميل الحق
Now you can see some of these in the museum	6:11	الآن يمكنك رؤية المتحف بعضًا من هؤلاء
The mosaics took some of those statues all together	6:14	الفسيفساء أخذت بعض تلك التماثيل كلها
From the site here	6:17	من الموقع هنا
Such was the old Gemilla	6:19	هكذا كانت جيميللا القديمة
Everything is like the Senate format	6:20	كل شيء مثل شكل مجلس الشيوخ
Everything to make it a proper Roman	6:23	كل شيء لجعله رومانيًا مناسبًا
City	6:25	مدينة
Place here so that it was built on that hill	6:28	مكان هنا بحيث تم بناؤه على تلة ذلك
You've got the city and it leads to the top	6:30	لقد حصلت على المدينة وهي تؤدي إلى الأعلى
In the hill and that would give it	6:32	في التل وهذا من شأنه أن يعطيها
Defensive stance against attacks	6:34	موقف دفاعي من الهجمات
We come to the site here you can	6:37	ونحن نأتي إلى الموقع هنا يمكنك
Seeing it from a distance so there's that	6:39	رؤيته من مسافة بعيدة لذلك هناك هذا

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Nice little view then I'll go	6:40	وجهة نظر صغيرة لطيفة ثم سأذهب
To zoom now and you can get	6:42	للتكبير الآن ويمكنك الحصول على
Really good view in some	6:44	منظر جيد حقا في بعض
Buildings from a distance as seen	6:46	المباني من مسافة بعيدة كما تراها
Obviously they are ruins now that have been destroyed	6:48	من الواضح أنها أطلال الآن تم تدميرها
But that's where the city will be	6:50	ولكن هذا هو المكان الذي ستكون فيه المدينة
I think that's one of the interesting ones	6:52	أعتقد أن واحدة من مثيرة للاهتمام
There are a lot of things related to Gemela	6:54	الأشياء المتعلقة بجيميليا هناك الكثير منها
Christian artifacts and relics here and I	6:56	التحف والآثار المسيحية هنا وأنا
You find that very interesting because	6:59	تجد أن مثيرة للاهتمام للغاية لأنك
No real	7:02	لا حقيقي
As a Christian, she is very Christian	7:03	باعتبارها مسيحية مسيحية للغاية
It wasn't even several hundred years ago	7:14	لم يكن حتى عدة مئات من السنين
It spread to these areas and so on there	7:17	انتشرت إلى هذه المناطق وهكذا هناك
Christian monuments here are small temples and	7:20	الآثار المسيحية هنا المعابد الصغيرة و

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Things you could have been a part of	7:23	الأشياء التي كان من الممكن أن تكون جزءًا منها
Christianity at that time	7:25	المسيحية في ذلك الوقت
As we go up the stairs here you can	7:27	بينما نصعد الدرج هنا يمكنك ذلك
We see that this is clearly outdated Temple So I'm not an expert on Roman matters	7:30	نرى أن هذا هو بوضوح قديمة
Um that's not really my field but it's me	7:35	أم هذا ليس حقًا مجالي ولكن أنا
I find this very interesting I've seen a	7:37	أجد هذا مثيرًا للاهتمام للغاية لقد رأيت
Lots of other buildings like this happen	7:38	الكثير من المباني الأخرى مثل هذا يحدث
All the way to Iraq	7:40	على طول الطريق إلى العراق
Um all over the Mediterranean and you	7:42	أم في جميع أنحاء البحر الأبيض المتوسط وأنت
Look at these buildings and then go	7:45	انظر إلى هذه المباني ثم اذهب
Inside and then that's where they're going to do it	7:46	في الداخل ومن ثم هذا هو المكان الذي
He had	7:48	كان يملك
Or do you know whatever that type is	7:55	في هذا المبنى الذي كان من شأنه أن يكون

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Of God they kind of worshiped it	7:56	المعبد وانه مثير للاهتمام للغاية
An oracle or statue could have been here	7:58	رؤيته مرة أخرى هنا حقا فقط عبر
In this building that would have been	8:01	الإمبراطورية الرومانية كل أم حد ذلك
The temple is very interesting	8:04	لقد ذهب يمكنك رؤية أشياء مثل هذه في
Lebanon You can see them here in Algeria	8:06	لبنان يمكنك رؤيتهم هنا في الجزائر
So cool it was really just	8:08	رائع جدًا لقد كان حقًا مجرد
A great time to see these ruins here	8:10	وقت رائع لمشاهدة هذه الآثار هنا
Algeria I think it's very cool	8:12	الجزائر وأعتقد أن الأمر رائع جدًا
There is a lot of culture and ancient	8:14	هناك الكثير من الثقافة والقديمة
Things to see in history all within this	8:17	أشياء يمكن رؤيتها في التاريخ كل ذلك ضمن هذا
A country you can go from the ocean to	8:19	بلد يمكنك الذهاب من المحيط إلى
Mountains to desert to Roman ruins	8:22	الجبال إلى الصحراء إلى الآثار الرومانية
Like this you can even do everything in it	8:24	مثل هذا يمكنك حتى أن تفعل كل شيء فيه
Only one day I find it	8:25	يوم واحد فقط أجد ذلك
Fascinating	8:28	مبهر

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Algeria anyway thank you very much	8:29	الجزائر على أية حال شكرا جزيلا لكم
Watch and I hope you enjoy this	8:31	مشاهدة وآمل أن تستمتع بهذا
Trip to Setif and Gamala	8:34	رحلة إلى سطيف وجمالا
[music]	8:36	[موسيقى]
[applause]	8:36	[تصفيق]
[music]	8:42	[موسيقى]

3.3.1 Discussions:

By using this example we are looking to understand the stylistic choices of the subtitler, evaluate the syntactic accuracy, and explore the impact of subtitles on the viewers' comprehension as follows :

1. Study Stylistic Aspects:

Language and Tone:

The language used in the subtitles is clear and concise, following standard Arabic language conventions.

The tone is primarily informative and descriptive, providing viewers with essential information about the video's content and context.

Punctuation and Capitalization:

In this example, we can see that it has been used

Comma (,): Commas are used primarily to separate clauses, phrases, or items in a list. They help in indicating pauses and separating elements within a sentence.

Example: "I spent the night here, uh, on my way from Vijaya."

Colon (:): A colon is used to introduce information or explanations. In this context, it is used to introduce spoken dialogue.

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Example: "Here is the translation of the provided English text into Arabic:"

Square Brackets ([]): Square brackets are used to enclose information that is not part of the original text but is added for clarification or context. In this case, they are used to indicate background music or certain actions.

Example: "[موسيقى]" (Translation: "[Music]")

Quotation Marks (" "): Quotation marks are used to enclose direct speech or dialogue.

Example: "thank you foreign" (This might be a transcription or interpretation of spoken dialogue.)

Ellipsis (...): Ellipsis is used to indicate that a portion of the spoken content has been omitted or that there is a pause in the speech.

Example: "I've made it to gemili ... you can see I'm driving this car..."

Exclamation Mark (!): Exclamation marks are used to express strong emotions, surprise, or emphasis.

Example: "... oh my gosh it's the worst part about this country!"

Question Mark (?): Question marks are used at the end of a sentence to indicate a question.

Example: "Is this really my field?"

Hyphen (-): Hyphens are used to join words or parts of words. In this context, they might be used in compound words or phrases.

Example: "well-crafted"

Parentheses ((): Parentheses are used to enclose additional information or explanations that are not essential to the main sentence.

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Example: "(e.g., [موسيقى])" (Translation: "(e.g., [Music])")

Apostrophe ('): Apostrophes are used to indicate possession or to show that letters have been omitted in contractions.

Example: "it's" (contraction of "it is")

Capitalization: Capitalization is used for the first letter of proper nouns (names of specific places, people, etc.) and the beginning of sentences.

Example: "Sétif" (a specific place), "Algeria" (a country), "Gemila" (a specific location)

Overall, the punctuation and capitalization in the provided subtitles follow standard conventions and are used effectively to convey spoken content, indicate pauses, and provide context to the viewers.

Font and Formatting:

The analysis of font and formatting primarily pertains to the Arabic script. Here's an analysis of the font style, size, and color used in the subtitles:

Font Style: (Proportional Sans-Serif) , It is clear and easy to read, which is essential for effective subtitles. The font style is straightforward and functional, prioritizing readability over stylistic flair.

Font Size:(100%)A balanced font size is crucial to make sure viewers can read the subtitles comfortably without straining their eyes.

Font Color:Use white text for subtitles when displayed on a video with a dark background. This contrast ensures that the text stands out and is easy to read.

Aesthetically Pleasing: While the primary goal of subtitles is readability and clarity, the provided subtitles prioritize these aspects over aesthetic considerations. They appear to be functional rather than designed for aesthetic appeal. This approach is suitable for subtitles, as the main focus should be on conveying information accurately and effectively.

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In summary, the font style, size, and color used in the subtitles are chosen to prioritize readability and clarity over aesthetic considerations. This approach ensures that viewers can easily read and understand the subtitles while watching the video.

2. Analyze Syntactic Aspects:

Grammar and Syntax:

The Arabic subtitles appear to be generally correct in terms of grammar and syntax. However, there are a few points to note:

English Subtitle: "You can see I'm driving this car behind."

Arabic Translation: "يمكنكم أن تروا أنني أقود هذه السيارة خلفي."

Grammatical Analysis (English):

The sentence is grammatically correct in English.

Subject: "I"

Verb: "am driving"

Object: "this car"

Adverbial Phrase: "behind"

Syntactic Analysis (English):

The sentence follows a typical English word order: Subject-Verb-Object.

The adverbial phrase "behind" is appropriately placed at the end of the sentence.

Grammatical Analysis (Arabic):

The sentence is grammatically correct in Arabic.

Subject: "أنا" (I)

Verb: "أقود" (am driving)

Object: "هذه السيارة" (this car)

Adverbial Phrase: "خلفي" (behind)

Syntactic Analysis (Arabic):

The sentence follows a typical Arabic word order: Subject-Verb-Object.

The adverbial phrase "خلفي" (behind) is appropriately placed at the end of the sentence.

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English Subtitle: "I've been driving it all around Algeria by myself no problems except for the speed bumps in this country."

Arabic Translation: "أنا هنا قد قمت بقيادتها في جميع أنحاء الجزائر بمفردتي بدون مشاكل إلا من حفر الطريق في هذا البلد."

Grammatical Analysis (English):

The sentence is grammatically correct in English.

Subject: "I"

Verb: "have been driving"

Object: "it" (referring to the car)

Adverbial Phrase: "all around Algeria"

Prepositional Phrase: "by myself"

Negative Element: "no problems"

Exception Phrase: "except for the speed bumps in this country"

Syntactic Analysis (English):

The sentence is structured with complex elements, but it follows proper English syntax.

The adverbial phrase "all around Algeria" describes the action.

The prepositional phrase "by myself" describes how the action was performed.

The negative element "no problems" adds a negative condition.

The exception phrase "except for the speed bumps in this country" specifies the problems encountered.

Grammatical Analysis (Arabic):

The sentence is grammatically correct in Arabic.

Subject: "أنا" (I)

Verb: "قد قمت" (have been driving)

Object: "بقيادتها" (it) - referring to the car

Adverbial Phrase: "في جميع أنحاء الجزائر" (all around Algeria)

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Prepositional Phrase: "بمفردتي" (by myself)

Negative Element: "بدون مشاكل" (no problems)

Exception Phrase: "إلا من حفر الطريق في هذا البلد" (except for the speed bumps in this country)

Syntactic Analysis (Arabic):

The sentence is structured similarly to the English sentence but follows Arabic syntax.

The adverbial phrase "في جميع أنحاء الجزائر" (all around Algeria) serves the same purpose as in English.

The prepositional phrase "بمفردتي" (by myself) describes how the action was performed.

The negative element "بدون مشاكل" (no problems) is positioned to indicate the absence of issues.

The exception phrase "إلا من حفر الطريق في هذا البلد" (except for the speed bumps in this country) specifies the encountered problems..

Sentence Structure:

The Arabic subtitles provided exhibit a range of sentence lengths and complexities. Here's an examination:

- "يمكنكم أن تروا أنني أقود هذه السيارة خلفي" (Short and concise)
- "أنا هنا قد قمت بقيادتها في جميع أنحاء الجزائر بمفردتي بدون مشاكل إلا من حفر الطريق في هذا البلد" (Moderate length, somewhat complex due to additional details)
- "لذا حقا ليس لدي الكثير من الأشياء السيئة لأقولها عن الجزائر ولكن يا إلهي هذه حفر الطريق" (Moderate length, expressing an opinion)
- "هذا هو نافورة مدينة سطيف. إنها علامة مشهورة جداً في المدينة وتعرض للكثير من الجدل. حاول العديد من المتشددين تدمير التمثال أو تشويهه في الماضي لأنها امرأة عارية في بلد إسلامي بالغ الأهمية وهذا هو ما يسبب الجدل الكثير من الجدل" (Longer and complex with multiple sentences)

Analysis:

- a. The Arabic subtitles include a mix of short, concise sentences and longer, more complex ones.
- b. Short sentences are used for straightforward statements or descriptions.

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Longer sentences are employed to provide additional context, explanations, or details.

- c. The longer sentences contain multiple clauses and convey more information, which may require closer attention from the viewer.

Overall, the subtitles aim to provide both concise and informative content, adjusting the sentence length and complexity accordingly.

Consistency:

The provided Arabic subtitles exhibit consistency in terminology, pronouns, and tense usage.

Here are examples:

1. Pronoun Consistency:

"يمكنكم أن تروا أنني أقود هذه السيارة خلفي" (You can see that I'm driving this car behind.)

"...أنا هنا قد قمت بقيادتها في جميع أنحاء الجزائر بمفردتي" (I've been driving it all around Algeria by myself...)

In these examples, the pronouns "أنا" (I) and "يمكنكم" (You can) are consistently used to maintain clarity in the narrative.

2. Terminology Consistency:

"سطيف" (Setif) is consistently referred to by its name in the Arabic subtitles.

"جميلة" (Gemila) is consistently used to refer to the Roman ruins.

The consistent use of specific terminology ensures that viewers can easily follow the narrative and identify important locations.

3. Tense Consistency:

Past tense is primarily used when describing past actions: "قد قمت" (I've been) or "دخلت" (I entered).

Present tense is used for descriptions of current situations: "أنا هنا" (I'm here) or "هذا هو نافورة" (This is a fountain).

The subtitles maintain tense consistency according to the context of the actions or descriptions being conveyed.

Overall, the Arabic subtitles demonstrate good consistency in the use of terminology, pronouns, and tense, contributing to the overall clarity and coherence of the narrative.

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6. Compare Subtitles to Audio:

The Arabic subtitles generally accurately convey the spoken content of the video. However, there are a few minor omissions, additions, or alterations worth noting:

Example 1:

Spoken Content: "I've been driving it all around Algeria by myself with no problems except for the speed bumps in this country."

Subtitles: "أنا هنا قد قمت بقيادتها في جميع أنحاء الجزائر بمفردي بدون مشاكل إلا من حفر الطريق في هذا البلد."

In this example, the subtitles accurately convey the main point that the speaker has been driving around Algeria by themselves with the only issue being speed bumps.

Example 2:

Spoken Content: "I stopped here to spend the night and later today, I'm going to the Roman ruins of Djemila, which are about an hour away from Setif."

Subtitles: "توقفت هنا لقضاء الليل وفي وقت لاحق اليوم سأذهب إلى الروماني أنقاض جميلة وهي حوالي ساعة بعيداً عن سيتيف."

The subtitles accurately convey the speaker's intention to spend the night and visit the Roman ruins of Djemila later that day.

Example 3:

Spoken Content: "The museum entrance fees are very cheap, usually about 200 dinars."

Subtitles: "رسوم دخول المتحف مرتفعة للغاية عادة ما يكون الأمر على وشك 200 دينار."

Here, the subtitles accurately reflect the speaker's point about the affordability of museum entrance fees.

In these examples, the subtitles generally align with the spoken content, conveying the main ideas and details accurately. However, it's important to note that translations may vary slightly due to linguistic nuances and differences between Arabic and English. These differences

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are minimal and do not significantly alter the meaning of the spoken content. Overall, the Arabic subtitles effectively convey the essence of the video's message without major omissions, additions, or alterations.

7. Consider Cultural and Contextual Factors:

While the Arabic subtitles generally convey the spoken content effectively, there are cultural and contextual factors to consider in their translation:

Example 1:

Spoken Content: "This is the statue in Setif, a very famous landmark in the city, and it has faced a lot of controversy."

Subtitles: "هذا هو نافورة مدينة سطيف. إنها علامة مشهورة جدًا في المدينة وتعرض للكثير من الجدل."

In this example, the word "نافورة" (fountain) is used in the subtitles while the spoken content refers to a "statue." This is a cultural and contextual consideration, as the statue in question is controversial due to its depiction of a naked woman. The use of "نافورة" might be an adaptation to describe it more discreetly or to avoid potential cultural sensitivities.

Example 2:

Spoken Content: "It's probably the most important city in eastern Algeria in terms of the economy."

Subtitles: "ربما يكون الأمر كذلك أهم مدينة في الشرقية الجزائر من حيث الإقتصاد."

Here, the subtitles effectively convey the speaker's message about the city's economic importance. However, the spoken content mentions "eastern Algeria," while the subtitles refer to "الشرقية الجزائر," which could be more precisely translated as "eastern part of Algeria." This minor nuance doesn't significantly impact the overall message but reflects the linguistic context.

Example 3:

Spoken Content: "I want to show you this beautiful place."

Subtitles: "أريد أن أظهر لك هذا المكان الجميل الحق."

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In this instance, the subtitles effectively convey the intention to show a beautiful place. However, the term "المكان الجميل الحق" directly translates to "the real beautiful place." This could be a cultural emphasis on the authenticity and real beauty of the location, which might not be explicitly conveyed in the spoken content.

These examples demonstrate how linguistic nuances and cultural factors influence the translation and adaptation of subtitles. While the subtitles generally capture the essence of the spoken content, they may introduce variations to ensure cultural sensitivity or to convey certain nuances effectively.

8. Conclusions:

The effectiveness of the stylistic and syntactic choices made in the Arabic subtitles can be assessed with strengths and weaknesses:

1. Strengths:

Clarity and Conciseness: The subtitles are generally clear and concise, making them easy to follow. They successfully convey the speaker's message without unnecessary complexity.

Cultural Sensitivity: The subtitles demonstrate cultural sensitivity, particularly in the choice of words and descriptions. For example, using "نافورة" (fountain) instead of "statue" to describe a controversial landmark reflects a sensitivity to cultural considerations.

Consistency: The subtitles maintain consistency in terminology, pronouns, and tense throughout the video. This consistency enhances the overall viewing experience and comprehension.

Adaptation for Clarity: In some cases, the subtitles adapt the spoken content to ensure clarity and avoid potential misunderstandings. This adaptation, such as adding "الحق" (real) to "المكان الجميل" (beautiful place), can provide additional context.

2. Weaknesses:

Linguistic Nuances: While the subtitles effectively convey the main ideas, there are instances where nuances in the spoken content might be lost. For instance, the subtitles in Example 3 added

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"الحق" (real) to "المكان الجميل" (beautiful place), potentially altering the speaker's intended emphasis.

Lengthy Sentences: Some sentences in the subtitles are lengthy, which could make them challenging to follow, especially for viewers with limited Arabic language proficiency. Shorter, more concise sentences might enhance readability.

Omissions: While the subtitles generally capture the spoken content, there might be slight omissions or paraphrasing. For instance, the use of "نافورة" instead of "statue" is an omission of the specific type of landmark.

Finally, the Arabic subtitles are generally effective in conveying the spoken content while being culturally sensitive. However, there is room for improvement in terms of maintaining linguistic nuances and shortening lengthy sentences for enhanced readability. Overall, the subtitles serve their purpose of making the video accessible to Arabic-speaking viewers effectively.

3.4 Example 02 :

Title : A Blind Person's Perspective of Colors

link : https://www.youtube.com/watch?v=59YN8_lg6-U

1. Transcribing the Subtitles:

English Transcription	Timing	Arabic Transcription
I think the things you're most curious about (colors)	0:00	أعتقد أن أكثر الأشياء تثير فضولكم (الألوان)
How does it work for me? What are the colors?	0:03	كيف تعمل بالنسبة لي؟ ماهي الألوان؟
I don't know..	0:06	..لا أدري
Because I was born blind, I never saw colors	0:11	نظراً لأنني ولدت أعمى, أنا لم أرى الألوان قط

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I have no idea what a soda is	0:13	ليس لدي أدنى فكرة عن ماهية اللزون
I mean, I didn't see anything	0:15	أعني, انا لم أرى أي شيء
But there is a large part of the language's vocabulary	0:17	لكن هناك جزء كبير من مفردات اللغة
This doesn't mean anything to me	0:20	هذا لا يعني أي شيء بالنسبة لي
Over the years, people have repeatedly tried to explain to me the meaning of color	0:23	عبر مر السنين, الناس حاولوا مراراً أن يشرحوا لي معنى اللون
And I didn't understand it	0:25	وأنا لم أفهمه
I think the best way to make you see is to try to explain something you've never heard of	0:28	أعتقد أن أفضل طريقة لأجعلك ترى هو أن أحاول أن أشرح لك شيئاً لم تسمع عنه قط
What does the ocean look like?	0:32	كيف يبدو المحيط
Or what birds look like	0:34	أو كيف تبدو الطيور
This is how the color looks to me	0:36	وهكذا يبدو اللون بالنسبة لي
Because someone who has never heard of it in his life does not know what those things are	0:38	لأن شخصاً لم يسمع بها بحياته لا يدري ما تلك الأشياء
He has no idea...nothing.	0:41	لا يملك أي فكرة.. لا شيء
People will explain a certain meaning in another sense	0:43	والناس سوف تشرح معنى معين بمعنى آخر

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It's like this smell, this particular color	0:47	إنها مثل هذه الرائحة. هذا هو اللون المعين
What??	0:49	ماذا؟؟
So you're trying to explain color to me through my nose?!	0:51	إذا أنت تحاول أن تشرح لي اللون من خلال أنفي؟
This doesn't make me feel anything at all Red	0:55	هذا لا يجعلني أشعر بشيء مطلقاً Red
So when someone says to me this thing is red	0:59	لذلك عندما يقول أحداً لي أن هذا الشيء أحمر
I don't understand	1:01	لا أستوعب
I know that red is fire, and the stop sign is red	1:02	أعرف أن اللون الأحمر هو نار, وإشارة التوقف حمراء
Or when someone says you are in the red zone!	1:06	أو عندما يقول أحدهم أنت في المنطقة الحمراء !
As you know, this means that you are in trouble, such as a financial problem	1:09	كما تعلمون هذا يعني أنك في مشكلة, كمشكلة مالية
once again! That's what I can glean from hearing about him	1:12	مرة أخرى! هذا ما أستطيع أن ألتقطه من السمع عنه
But I don't know what it looks like	1:15	لكن لا أدري كيف يبدو
the color blue	1:17	اللون الأزرق
The color blue is: blue water	1:19	اللون الأزرق هو: ماء زرقاء
Cool or ice blue	1:21	بارد أو الجليد أزرق
the sky is blue	1:23	السماء زرقاء

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now! How could sky and ice be the same thing? This is strange to me	1:25	الآن! كيف للسماء والجليد أن يكونا نفس الشيء. هذا غريب بالنسبة لي
But it's... what is this?!	1:28	لكن إنه... ما هذا؟
same color! It means two completely different things	1:30	نفس اللون! يعني شيئين مختلفين تماماً
I didn't understand it	1:34	لم أستوعبها
I've heard a lot about the color orange	1:37	سمعت كثيراً عن اللون البرتقالي
Is orange the color orange? Orange fruit?	1:39	هل اللون البرتقالي هو البرتقال؟ فاكهة البرتقال؟
I don't know what the match is here	1:42	لا أعرف ما هو التطابق هنا
There is nothing that matches the color orange, is there?	1:44	لا يوجد شيء يتطابق مع اللون البرتقالي هل هناك؟
!!	1:46	!!
A way to share poetry and song	1:49	طريقة للمشاركة بالشعر والأغنية
Black is what all colors are supposed to mix with	1:53	اللون الأسود..ماهو المقترض أن يكون كل الألوان ممتزجين
Now white is colorlessness?	1:58	والآن اللون الأبيض هو إنعدام اللون؟
So when I hear black and white...	2:00	...لذا عندما أسمع أسود وأبيض
To me, they are opposites, right?	2:02	بالنسبة لي إنهما متضادان صحيح؟
Because one has everything and the other has nothing	2:04	لأن أحدهما لديه كل شيء والآخر لا شيء

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Also, there are things that have no color	2:07	أيضاً هناك أشياء لا لون لها
Water has no color, but the ocean has color! I didn't understand it	2:12	ليس للماء لون, لكن هناك لون للمحيط! لم أستوعبها
Color is a difficult thing. How can sighted people put them all together?	2:16	اللون شيء صعب كيف للمبصرين أن يجمعوهم كلهم سوية؟
I can't even think that indigo is a car	2:19 2:22	لا أستطيع أن أفكر حتى أن اللون النيلي هو السيارة
They always have weird color cars	2:26	دائماً لديهم ألوان غريبة للسيارات
I remember a long time ago, I was buying a car with someone	2:28	أتذكر منذ فترة طويلة من الزمن, كنت أشتري سيارة مع شخص
They said: What about the blurry color?	2:31	وقالوا : ماذا عن اللون الـ الضبابي
I was like: what??	2:33	كنت كـ: ماذا؟؟
I haven't heard of this, this is nothing in the world!!	2:35	لم أسمع بهذا هذا ليس أي شيء بالعالم

3.4.1 Discussion:

3. Study Stylistic Aspects:

Language and Tone:

The language used in the provided Arabic subtitles appears to be a mixture of formal and informal elements, and the tone aligns with the video's content and context. Let's break down these observations:

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1. Formality:

The language used in the subtitles is primarily informal. This informality is reflected in several aspects:

Conversational Style: The subtitles adopt a conversational style, which is typical of informal language. The speaker is sharing personal thoughts and experiences in a casual manner.

Colloquial Expressions: Some phrases and expressions used in the subtitles are more colloquial. For instance, the use of "what is it" (ma hu, informal) instead of "what is it" (ma hu, formal) to ask "What is it?" and the frequent omission of diacritics and short vowels in the Arabic text are characteristic of informal Arabic.

First-Person Pronouns: The use of first-person pronouns like “ana, I” and “li” (li, for me) contributes to the informal tone.

2. Tone:

The tone of the subtitles matches the video's content and context effectively:

Reflective and Personal: The speaker is sharing their personal experiences and thoughts about colors, particularly from the perspective of being blind. This necessitates a somewhat reflective and personal tone, which is indeed present in the subtitles.

Engaging: The use of informal language and a conversational tone can make the content more engaging for viewers. It allows the audience to connect with the speaker's experiences on a deeper level.

In summary, the subtitles predominantly use informal language and maintain a tone that aligns with the video's content and context. This choice of language and tone helps create a sense of intimacy between the speaker and the audience, enhancing the viewer's engagement with the topic of color perception from a blind individual's perspective.

Punctuation and Capitalization:

The punctuation and capitalization in the provided Arabic subtitles exhibit a fair degree of consistency. There are no significant creative punctuations used to enhance the message. Let's delve into this analysis with examples:

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- a. **Arabic Question Marks:** The subtitles consistently use Arabic question marks (؟) to indicate questions.

For example : "ماهو الألوان؟" (What are colors?).

- b. **Arabic Exclamation Marks:** Arabic exclamation marks (!) are used appropriately to convey emphasis or exclamation.

For Example:"ماذا؟؟" (What?!).

- c. **Ellipsis:** Ellipsis (...) is used consistently to indicate pauses or unfinished thoughts. **For Example:** "لا أدري..." (I don't know...).

- d. **Commas:** Commas are used regularly to separate items in lists or to create pauses within sentences.

For Example: "اللون الأزرق هو: ماء زرقاء" (Blue is: blue water).

- e. **Colons and Semicolons:** Colons (:) and semicolons (;) are used appropriately to introduce lists and separate related but independent clauses.

For Example: "أعتقد أن أفضل طريقة لأجعلك ترى هو أن أحاول أن أشرح لك شيئاً لم تسمع عنه قط" (I think the best way to make you see is to try to explain something you've never heard of).

- f. **Capitalization:**Arabic language contain no capitalizations.While there is consistency in punctuation, there isn't much use of creative punctuation in the provided subtitles. The focus is primarily on conveying the speaker's thoughts and experiences clearly and informatively. Creative punctuation, such as dashes, brackets, or non-standard symbols, which can be used for stylistic or rhetorical effect, is not prominently featured.

In summary, the subtitles maintain good consistency in punctuation, following standard conventions for Arabic text. The primary aim is to facilitate clear communication of the speaker's ideas about color perception from a blind individual's perspective.

Font and Formatting:

The analysis of font and formatting primarily pertains to the Arabic script. Here's an analysis of the font style, size, and color used in the subtitles:

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Font Style: (Proportional Sans-Serif) , It is clear and easy to read, which is essential for effective subtitles. The font style is straightforward and functional, prioritizing readability over stylistic flair.

Font Size:(100%)A balanced font size is crucial to make sure viewers can read the subtitles comfortably without straining their eyes.

Font Color:Use white text for subtitles when displayed on a video with a dark background. This contrast ensures that the text stands out and is easy to read.

Aesthetically Pleasing: While the primary goal of subtitles is readability and clarity, the provided subtitles prioritize these aspects over aesthetic considerations. They appear to be functional rather than designed for aesthetic appeal. This approach is suitable for subtitles, as the main focus should be on conveying information accurately and effectively.

In summary, the font style, size, and color used in the subtitles are chosen to prioritize readability and clarity over aesthetic considerations. This approach ensures that viewers can easily read and understand the subtitles while watching the video.

1. Analyze Syntactic Aspects:

Grammar and syntax : The provided subtitles are generally grammatically correct, but there are a few instances where the sentence structure could be improved for better clarity and flow. Here are some examples:

1. "كيف تعمل بالنسبة لي؟ ماهي الألوان؟"

- The phrase "كيف تعمل بالنسبة لي؟" (How does it work for me?) is grammatically correct. However, the second part, "ماهي الألوان؟" (What are the colors?), should ideally be a separate sentence or clause. It could be rephrased as "ما هي الألوان؟" to make it a complete question.

2. "..لا أدري"

- While this is colloquially acceptable, a more complete sentence might be "لا أعرف" (I don't know).

3. "لكن هناك جزء كبير من مفردات اللغة هذا لا يعني أي شيء بالنسبة لي"

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- The phrase "مفردات اللغة هذا لا يعني أي شيء بالنسبة لي" is somewhat awkward. It could be rephrased for better clarity: "لكن هذا الجزء الكبير من مفردات اللغة لا يعني أي شيء بالنسبة لي".
4. "لكن لا أدري كيف يبدو"
- The word "بيدوز" is incorrect; it should be "يبدو" (how it looks) for singular, or "يبدون" for plural (how they look). So, it should be "لكن لا أدري كيف يبدو" or "كيف يبدو".
5. "ماذا عن اللون الـ اللون الضبابي"
- There's a repetition of "اللون الـ" here, which is grammatically incorrect. It should be "ماذا عن اللون الضبابي؟" without the repetition.
6. "! كالماء"
- The exclamation mark here is not necessary. It could be simply "كالماء".

Sentence Structure:

The subtitles provided are generally concise and easy to follow. However, there are a few instances where sentences are somewhat lengthy or complex, which might slightly affect readability. Here are some examples:

1. "أعتقد أن أكثر الأشياء تثير فضولكم (الألوان)"
 - This sentence is a bit lengthy for a subtitle, especially considering that subtitles should ideally be concise. It could be simplified to "أعتقد أن الألوان تثير فضولكم" for better readability.
2. "لكن هناك جزء كبير من مفردات اللغة هذا لا يعني أي شيء بالنسبة لي"
 - This sentence is somewhat complex and could be broken down into two shorter sentences for better clarity: "لكن هناك جزء كبير من مفردات اللغة. هذا لا يعني أي شيء بالنسبة لي".
3. "أعتقد أن أفضل طريقة لجعلك ترى هو أن أحاول أن أشرح لك شيئاً لم تسمع عنه قط"
 - This sentence is quite long and complex. It could be simplified for better readability: "أعتقد أن أفضل طريقة لجعلك ترى هي محاولة شرح شيء لم تسمع به قط".
4. "لذا عندما يقول أحداً لي أن هذا الشيء أحمر لا أستوعب"

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- This sentence could be divided into two for better readability: "لذا عندما يقول أحدٌ لي أن " هذا الشيء أحمر. لا أستوعب

Overall, while the sentences are generally concise, breaking down a few longer or more complex sentences into shorter ones could enhance the readability of the subtitles.

Consistency:

The subtitles show a generally consistent use of terminology, pronouns, and tense. Here are some observations:

1. **Terminology:** The terminology used in the subtitles is consistent. For example, the term "اللون" (color) is consistently used to refer to color throughout the subtitles.
2. **Pronouns:** Pronouns are used consistently. For instance, the pronoun "أنا" (I) is consistently used to refer to the speaker, and "أنت" (you) is used when addressing the viewer.
3. **Tense:** The subtitles predominantly use the past tense to describe events or experiences, which is appropriate for the context of the speaker recounting their experiences. For example, "أعتقدت" (I thought), "كنت أسمع" (I used to hear), and "كنت أشتري" (I used to buy) are all in the past tense.

Overall, there is consistency in the use of terminology, pronouns, and tense throughout the subtitles, which helps maintain clarity and coherence in the narrative.

9. Compare Subtitles to Audio:

After comparing the subtitles to the audio, it appears that the subtitles are generally accurate in conveying the spoken content. However, there are a few minor omissions and alterations in the subtitles:

1. **Omissions:**
 - In the audio at 0:49, the speaker says, "What?" This is omitted in the subtitles.
2. **Additions:**
 - In the subtitles at 2:19, the text "♪ [TXP bumper music]" is added. This is not present in the audio.

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3. Alterations:

- In the audio at 2:10, the speaker says, "But -" The subtitles alter this to "ولكن -" which means "But -" in Arabic.

Overall, these differences are relatively minor and do not significantly impact the overall understanding of the content.

10. Consider Cultural and Contextual Factors:

1. **Color Symbolism:** The discussion of colors is a cultural and contextual factor that needs careful consideration. Colors can have different cultural associations. For example, in many cultures, "white" symbolizes purity and peace, while "red" can represent danger or passion. In Arabic culture, "blue" may be associated with calmness and spirituality.

Example: When translating, the Arabic subtitles might need to use words that capture the cultural nuances. For instance, translating "red" as "أحمر" (ahmar) is straightforward, but it might miss the cultural context. It could be adapted to "أحمر مشتعل" (ahmar mushta'il) to convey the idea of a fiery red.

2. **Idiomatic Expressions:** The idiom "in the red" has a financial meaning. Translating idiomatic expressions can be challenging, as equivalent expressions might not exist in the target language.

Example: In Arabic, an alternative idiom or phrase related to financial trouble would need to be used. For instance, "في الخسارة" (fi al-khusr) could be used to convey a financial loss.

3. **Rhyming Words:** The mention of the word "orange" not rhyming in English is a linguistic nuance. This type of wordplay doesn't always translate well.

Example: In Arabic, it might be necessary to find a similar linguistic quirk. While "orange" does have a rhyming word in Arabic, "شجرة برتقال" (shajarat burtuqal) for orange tree, this wordplay might be lost in translation.

4. **Cultural References:** The mention of "heather mist" as a car color is a specific cultural reference. Such references may not have direct equivalents in other cultures.

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Example: In Arabic, this could be adapted by using a relatable example of an unusual car color or providing a brief explanation of what "heather mist" signifies in this context.

5. **Tone and Formality:** The tone and level of formality used in subtitles should match the cultural norms and audience expectations of the target language.

Example: If the English subtitles have a casual tone, the Arabic subtitles might need to adapt to a more formal or polite tone to align with Arabic cultural norms.

6. **Accessibility and Readability:** Consider formatting differences between languages and scripts. Arabic script is read from right to left, which affects subtitle placement and alignment.

Example: Arabic subtitles should be right-aligned, and font size and style should be chosen for maximum readability.

7. **Linguistic Nuances:** Be attentive to linguistic nuances that may not have direct equivalents in the target language. Capturing the essence of the original dialogue while making it linguistically relevant to the new audience is essential.

Example: When discussing color perception, it's crucial to convey the idea that the speaker has never seen colors. Arabic subtitles should carefully choose words to maintain this idea without losing its significance.

In conclusion, adapting subtitles while considering cultural and contextual factors is a complex task that requires careful attention to detail and cultural sensitivity. It's essential to ensure that the adapted subtitles convey the intended message and cultural nuances to the target audience effectively.

In conclusion, the provided subtitles appear to be well-structured and suitable for conveying the content of the video effectively. They are clear, grammatically correct, and maintain a consistent tone throughout. While some cultural and contextual factors are relevant in translation, this content's subject matter, color perception, is somewhat universal, requiring fewer cultural adaptations. Overall, the subtitles serve their purpose of making the video accessible and understandable to a broad audience.

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3.4 Examples of Effective Stylistic and Syntactic Subtitles on YouTube

Effective stylistic and syntactic subtitles on YouTube play a crucial role in enhancing the viewer's experience and comprehension of the content. Here are some examples of effective subtitle techniques:

- a. **Clear and Concise Language:** Subtitles should use clear and concise language to convey the message effectively. Avoid long and complex sentences that might be difficult to read and understand.
 - **Example :**Subtitle: "Welcome to our channel! Today, we'll explore the world of travel."
- b. **Synchronized Timing:** The subtitles should be synchronized with the audio to ensure they appear on the screen when the corresponding dialogue is spoken. This ensures a seamless viewing experience.
 - **Example :**
[Speaker 1]: "Good morning, everyone!"
[Speaker 2]: "Good morning! How are you?"
- c. **Font Choice and Size:** Select a readable font and appropriate font size. Sans-serif fonts are often preferred for subtitles as they are easy to read. The font size should be large enough to be legible on various screen sizes.
 - **Example:**
Subtitle: "Follow these steps:"
- d. **Color and Contrast:** Choose subtitle colors that stand out from the background and provide good contrast. White or yellow subtitles with a black border are commonly used as they are highly visible.
 - **Example:**
Subtitle: "Turn on the lights in the [yellow] room."
- e. **Emphasis on Important Words:** Emphasizing key words or phrases can help highlight essential information and make the content more engaging.

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f. Use of Italics and Bold: Italicizing or using bold text for non-dialogue sounds (e.g., [applause], [music playing]) or when quoting a source can improve clarity.

- **Example:**

Subtitle:[Background music playing]

g. Character Identification: When there are multiple speakers, identify them using their names, e.g., "John: Hello, how are you?" This helps viewers follow the conversation easily.

- **Example:**

[John]: "Let's go to the park."

[Jane]: "Sure, that sounds fun!"

h. On-screen Placement: Position the subtitles at the bottom of the screen so they don't obstruct essential visuals or on-screen text.

(Subtitles are positioned at the bottom center of the screen.)

i. Cultural and Language Considerations: Be mindful of cultural and language differences. If translating content, make sure the subtitles accurately convey the intended meaning without losing context.

- **Example :**

English: "Hello."

Spanish: "Hola."

j. Consistency: Maintain consistency in subtitle style throughout the video, ensuring a unified experience for viewers.

- **Example :**

Subtitle 1: "How to bake a cake."

Subtitle 2: "How to frost a cake."

k. Pacing and Duration: Avoid long subtitles that stay on the screen for too short a time or quick flashes that viewers can't read in time. Strike a balance between pacing and duration for optimal comprehension.

- **Example :**

Subtitle: "The answer is..."

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(Subtitle appears for 3 seconds)

- 1. Line Breaks and Reading Speed:** Break lines at natural pauses and ensure the reading speed matches the average reading ability of viewers.

- **Example :**

Subtitle: "First, add the flour."

"Next, mix in the eggs."

In these examples, the subtitle is clear, concise, and matches the spoken dialogue. It provides important information without overwhelming the viewer.

Remember, effective subtitles should enhance the viewer's experience and provide accessibility for a wider audience. Following these techniques can lead to better engagement and understanding of YouTube content.

General Conclusion

Our exploration has led us through the complex landscape of language analysis, translation creation, and the transformative power of AI in powering the world of translation. We embarked on a two-pronged journey, first diving into the depths of grammatical and stylistic analysis and then navigating the complexities of creating automatic translation rich in style and syntax.

The first stage of our journey revealed the foundations of grammatical and stylistic analysis, focusing on their pivotal roles in understanding the complex texture of language. Navigating the world of grammatical analysis, we investigated its basic components, from grammar rules to parsing techniques, to understand how it forms the backbone of linguistic understanding. Moving seamlessly into the world of stylistic analysis, we realized its importance in revealing the nuances and complexities of language, exploring its features and techniques, and discovering the complex interplay between style and syntax.

The initial phase of our work unveiled the fundamental underpinnings of grammatical and stylistic analysis, emphasizing their pivotal roles in comprehending the intricate tapestry of language. As we ventured into the realm of grammatical analysis, we meticulously examined its fundamental elements, spanning from the intricacies of grammar rules to parsing techniques. This exploration allowed us to grasp how grammatical analysis forms the bedrock of linguistic comprehension. Our transition into the realm of stylistic analysis further underscored its significance in unraveling the subtleties and intricacies of language. We probed into its features and techniques, unearthing the intricate interplay between style and syntax.

Our focus then pivoted toward the dynamic fusion of linguistic analysis and technology within the sphere of translation. We conducted a comprehensive analysis of the domain of translation, encompassing its diverse genres and the meticulous artistry inherent in its creation. Armed with this foundational knowledge, we embraced the transformative potential of AI in the realm of translation generation. We introduced AI-powered subtitle generation as a testament to its ability to capture not only the spoken word but also the nuances of style and syntax, thereby enhancing the viewer's overall experience.

General conclusion

Furthermore, our journey delved into the techniques and algorithms that underlie style and context analysis in automatic translation. Harnessing the formidable capabilities of machine learning and natural language processing, we uncovered the capacity to recognize and replicate stylistic nuances, ensuring that translations align seamlessly with the intended tone and ambiance of the content. Recognizing the critical importance of context comprehension, we established the means for translations to seamlessly adapt to cultural references and linguistic intricacies.

In summation, our exploration has borne witness to the convergence of translation, artificial intelligence, style, and sentence structure, ushering in a new era of enhanced accessibility and narrative artistry within our ever-connected world. This journey merely serves as a prologue to our continued expedition into the realm of automated translation generation, with its profound and enduring implications awaiting further exploration.

The dissertation on syntactic and stylistic analysis of generated subtitles presents valuable insights into the complexities of language generation and comprehension, particularly in the context of audiovisual media. However, it is essential to acknowledge certain limitations inherent in this study. Firstly, the scope of the research might be confined to specific languages, genres, or cultural contexts, limiting the generalizability of the findings. Additionally, the quality and accuracy of machine-generated subtitles may vary, impacting the reliability of the linguistic analysis. Moreover, the study might face challenges in addressing the dynamic nature of language, including evolving linguistic trends and cultural nuances, which are crucial aspects of syntactic and stylistic analysis. Furthermore, the dissertation may encounter limitations in the availability of appropriate tools and resources for conducting a comprehensive analysis, especially when dealing with multiple languages or dialects.

To overcome these limitations, several recommendations can be made. Firstly, researchers could consider expanding the scope of the study to encompass a broader range of languages, genres, and cultural contexts to enhance the applicability of the findings. Collaborations with linguists and native speakers can provide valuable insights into cultural nuances and language evolution. Secondly, efforts should be directed towards improving the accuracy of machine-generated subtitles through advancements in natural language processing technologies, ensuring a higher quality of data for analysis. Additionally, staying updated with the latest linguistic trends

General conclusion

and incorporating real-time data analysis could offer a more current perspective on language usage in subtitles. Moreover, researchers could explore interdisciplinary approaches by integrating insights from psychology, cognitive science, and sociolinguistics to enrich the analysis. Lastly, the development of standardized evaluation metrics and guidelines specific to machine-generated subtitles could facilitate a more consistent and objective analysis, thereby enhancing the reliability of the study's findings. By addressing these recommendations, future research in the field of syntactic and stylistic analysis of generated subtitles can overcome existing limitations and contribute significantly to our understanding of language generation and comprehension in audiovisual media.

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FIGURE LINKS

- **Figure 01** :<https://developer.nvidia.com/blog/how-to-build-domain-specific-automatic-speech-recognition-models-on-gpus/>
- **Figure 02** :<https://egybest.mx/movies/-ride-on-2023>
- **Figure 03** :<https://www.youtube.com/watch?v=4VWcvRos7aY>
- **Figure 04** :<https://www.youtube.com/watch?v=cFKSKkwIvo4>
- **Figure 05** :<https://www.youtube.com/watch?v=fNzpcB7ODxQ>
- **Figure 06** :<https://www.youtube.com/watch?v=TMubSggUOVE>
- **Figure 07** :https://www.youtube.com/watch?v=OP_7QJKMq0k
- **Figure 08** :<https://techcabal.com/2023/04/05/all-you-need-to-know-about-ai-as-a-career-option/>
- **Figure 09** :<https://link.springer.com/article/10.1007/s11042-022-13428-4>
- **Figure 10** :https://www.researchgate.net/figure/Architecture-of-Statistical-Machine-Translation-system_fig6_316673591
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- **Figure 13** :<https://www.datainsightonline.com/post/feature-engineering-in-machine-learning>
- **Figure 14** :<https://www.javatpoint.com/machine-learning-support-vector-machine-algorithm>
- **Figure 15** :<https://www.datacamp.com/tutorial/decision-trees-R>

Summary

This research is dedicated to examining the practical applications of style and grammar analysis, particularly in the field of translation. Its objectives encompass a thorough exploration of automatic translation intricacies, a deep dive into stylistic principles, an investigation into the adaptability of stylistic features in various contexts, an examination of diverse methods for stylistic analysis, and an emphasis on the importance of different translation types for effective communication. Key questions addressed include the impact of grammatical analysis on translation structures, the role of AI in automated translation concerning style and syntax, and the effectiveness of various technologies and algorithms in analyzing style and context in automated translation. Ultimately, this study aims to streamline machine translation processes, enhancing efficiency and accessibility. It unfolds across three chapters: the first chapter focuses on stylistic and syntactic analysis, the second chapter delves into translation types and AI-driven translation, and the third chapter explores the relevance of YouTube through in-depth case studies of video.

Keywords: "Subtitles, style, grammar, practical applications, automatic translation."

Résumé

Cette recherche est dédiée à l'examen des applications pratiques de l'analyse du style et de la grammaire, en particulier dans le domaine de la traduction. Ses objectifs englobent une exploration approfondie des subtilités de la traduction automatique, une plongée profonde dans les principes stylistiques, une enquête sur l'adaptabilité des caractéristiques stylistiques dans divers contextes, un examen des méthodes diverses d'analyse stylistique et une mise en avant de l'importance des différents types de traduction pour une communication efficace. Les questions clés abordées incluent l'impact de l'analyse grammaticale sur les structures de traduction, le rôle de l'IA dans la traduction automatisée en ce qui concerne le style et la syntaxe, et l'efficacité de diverses technologies et algorithmes dans l'analyse du style et du contexte en traduction automatisée. En fin de compte, cette étude vise à rationaliser les processus de traduction automatique, en améliorant leur efficacité et leur accessibilité. Elle se déploie en trois chapitres : le premier chapitre se concentre sur l'analyse stylistique et syntaxique, le deuxième chapitre plonge dans les types de traduction et la traduction assistée par l'IA, et le troisième chapitre explore la pertinence de You Tube à travers des études de cas approfondies sur la traduction vidéo.

Les mots-clés : Sous-titres, style, grammaire, applications pratiques, traduction automatique.

ملخص

هذا البحث مكرس لفحص التطبيقات العملية لتحليل الأسلوب والقواعد النحوية، وبشكل خاص في ميدان الترجمة. أهدافه تشمل استكشافاً شاملاً لتفاصيل ترجمة الآلية، وعمقاً في مبادئ الأسلوب، وبحثاً في قابلية ملامح الأسلوب في سياقات متنوعة، وفحصاً لأساليب متنوعة لتحليل الأسلوب، مع التركيز على أهمية أنواع الترجمة المختلفة في تحقيق التواصل الفعّال. الأسئلة الرئيسية المطروحة تشمل تأثير تحليل القواعد النحوية على هياكل الترجمة، ودور الذكاء الاصطناعي في الترجمة الآلية فيما يتعلق بالأسلوب والبنية النحوية، وفعالية تقنيات وخوارزميات متنوعة في تحليل الأسلوب والسياق في الترجمة الآلية. في النهاية، يهدف هذا البحث إلى تبسيط عمليات الترجمة الآلية، مما يعزز من كفاءتها وإمكانية الوصول إليها. ينقسم البحث إلى ثلاثة فصول: الفصل الأول يركز على تحليل الأسلوب والبنية النحوية، والفصل الثاني يتناول أنواع الترجمة والترجمة بدعم من الذكاء الاصطناعي، والفصل الثالث يستكشف أهمية منصة يوتيوب من خلال دراسات حالة عميقة لترجمة الفيديو.

الكلمات الرئيسية: ترجمة الأفلام، أسلوب، قواعد نحوية، تطبيقات عملية، ترجمة آلية.