



Vidyavardhini's College of Engineering & Technology

Department of Computer Science and Engineering (Data Science)

Experiment No.1
Study various applications of NLP and Formulate the Problem Statement for Mini Project based on chosen real world NLP applications
Date of Performance:
Date of Submission:



Aim: Study various applications of NLP and Formulate the Problem Statement for Mini Project based on chosen real world NLP applications.

Objective: Understand the different applications of NLP and their techniques by reading and critiquing IEEE/ACM/Springer papers.

Theory:

1. Machine Translation

Machine translation is a process of converting the text from one language to the other automatically without or minimal human intervention.

2. Text Summarization

Condensing a lengthy text into a manageable length while maintaining the essential informational components and the meaning of the content is known as summarization. Since manually summarising material requires a lot of time and is generally difficult, automating the process is becoming more and more popular, which is a major driving force behind academic research.

Text summarization has significant uses in a variety of NLP-related activities, including text classification, question answering, summarising legal texts, summarising news, and creating headlines. Additionally, these systems can incorporate the creation of summaries as a middle step, which aids in shortening the text.

The quantity of text data from many sources has multiplied in the big data era. This substantial body of writing is a priceless repository of data and expertise that must be skillfully condensed in order to be of any use. A thorough investigation of NLP for automatic text summarization has been necessitated by the increase in the availability of documents. Automatic text summarising is the process of creating a succinct, fluid summary without the assistance of a human while maintaining the original text's meaning.



3. Sentiment Analysis

Sentiment analysis, often known as opinion mining, is a technique used in natural language processing (NLP) to determine the emotional undertone of a document. This is a common method used by organisations to identify and group ideas regarding a certain good, service, or concept. Text is mined for sentiment and subjective information using data mining, machine learning, and artificial intelligence (AI).

Opinion mining can extract the subject, opinion holder, and polarity (or the degree of positivity and negative) from text in addition to identifying sentiment. Additionally, other scopes, including document, paragraph, sentence, and sub-sentence levels, can be used for sentiment analysis.

Businesses must comprehend people's emotions since consumers can now communicate their views and feelings more freely than ever before. Brands are able to listen carefully to their customers and customise their products and services to match their demands by automatically evaluating customer input, from survey replies to social media chats.

4. Information Retrieval

A software programme that deals with the organisation, storage, retrieval, and evaluation of information from document repositories, particularly textual information, is known as information retrieval (IR). The system helps users locate the data they need, but it does not clearly return the questions' answers. It provides information about the presence and placement of papers that may contain the necessary data. Relevant documents are those that meet the needs of the user. Only relevant documents will be pulled up by the ideal IR system.

5. Question Answering System (QAS)

Building systems that automatically respond to questions presented by humans in natural language is the focus of the computer science topic of question answering (QA), which falls under the umbrella of information retrieval and natural language processing (NLP).



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Auto Recommendation Text Entry

Abstract

This report introduces an innovative Auto Recommendation Text Entry system, a software solution developed using Python and PyQt. The primary objective of this system is to enhance text input processes by providing users with real-time word suggestions. The Auto Recommendation Text Entry system features a user-friendly graphical interface and leverages a predefined word dictionary to facilitate Natural Language Processing (NLP) tasks. This report delves into the methodologies employed in creating the system, its core features, and its potential applications in improving user efficiency and accuracy in text-based tasks.



Methodologies

1. Graphical User Interface (GUI)

The Auto Recommendation Text Entry system is built upon PyQt, a Python library for creating GUI applications. Key components of the GUI include:

- **Background Image** : A visually appealing background image sets the tone for the application.
- **Title Label** : A prominent title label clearly communicates the system's purpose and functionality.
- **Input Field** : The input field allows users to type text, accompanied by a "Clear" button for quick input clearance.
- **Word Suggestions** : Real-time word suggestions appear in a dropdown as users type, drawing from a predefined dictionary.
- **Console** : A text console is available for displaying messages or results, with a "Clear Console" button for clearing its content.
- **Separator Line** : A visual separator distinguishes different sections of the GUI.



2. Word Suggestions

The core functionality of the Auto Recommendation Text Entry system is generating word suggestions dynamically. This process involves the following steps:

- **Dictionary Load** : The system loads a word dictionary from a file (e.g., "dictionary.txt"), serving as the basis for generating suggestions.
- **Text Change Event** : The system continuously monitors changes in the input field, triggering the update of word suggestions as users type or delete characters.
- **Filtering** : Word suggestions are filtered based on the text entered in the input field, supporting case-insensitive matching to ensure a flexible user experience.
- **Model Update** : A QStandardItemModel manages the suggestions, and the completer is updated with the filtered suggestions, allowing users to select from the dropdown.
- **Clear Input and Console** : The system provides user-friendly options to clear the input field and console content for a smoother workflow.



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Conclusion

The Auto Recommendation Text Entry system is a valuable tool for users involved in NLP tasks or any context requiring text input. Developed with Python and PyQt, it seamlessly integrates a user-friendly GUI that provides real-time word suggestions, thereby reducing typing errors and improving input efficiency. The system's word suggestions are dynamically updated based on user input and maintain case insensitivity. This system can find applications in a wide range of NLP tasks, making it a valuable addition to text processing tools.