

Enhancing Cable News Network Comprehension: Text Rank Integrated Natural Language Processing Summary Algorithm

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Abstract: In the online news space, timely content delivery has become essential due to the unavoidable information overload. This study investigates the use of Python-based text summarizing techniques on news sites, promoting the combination of Natural Language Processing approaches with the Text Rank summarization algorithm. The primary objective is to deliver automatic news article summaries while preserving pertinent information, this is confirmed by means of experimental testing. This study uses the Text Rank technique on a news platform to enhance summaries' readability and information absorption capacity. To test the Text Rank algorithm's capacity to provide enlightening summaries, two news stories from the Cable News Network were chosen for the experiment. The word "Trump" obtained the highest score of 16.52 when sentence scores were calculated using the Text Rank algorithm. "Former" came in second with a score of 1.95, "McCarthy" was third with a score of 1.31, and "President" and "Republican" were each awarded a score of 1.03. Furthermore, the terms "CNN" and "Establishment" received scores of 0.79 and 0.58, respectively, for "DeSantis" and "Endorsements." Reader accessibility and convenience can be improved by using a news summary algorithm on a Python-based platform to swiftly retrieve important information. This research emphasizes the critical role that summary algorithm technology plays in enabling efficient and easily accessible information consumption in the digital age, in addition to creating automated tools for news summaries.

Keywords: Natural Language Processing; Summarization; Critical Information; Algorithm; News Platform

INTRODUCTION

In a time where information is readily available from a wide range of sources, particularly online news platforms, organizing vast amounts of knowledge is getting harder as technology develops. This makes it challenging to provide information in a way that readers will understand more quickly. In this scenario, text shortening technology—which makes use of Python computer language's natural language processing (NLP) (Hindarto, 2023) techniques—is crucial. In the world of online news media, the two most important factors are reader attention and time limits. One issue in and of itself is the short comprehension span of readers for lengthy content. Thus, a method that can convey crucial information succinctly while preserving the news's core idea is required. The purpose of this study is to use the Python programming language to implement the summary method on a news platform.

Thus, the primary goal of this research is to make sure that Python programming language-based summary algorithms are integrated as effectively as possible into online news source systems. The value of summary algorithms resides not only in their capacity to reduce comprehension gaps among readers but also in their ability to effectively communicate all significant plot points without detracting from the core idea of the work. Online news is being used more and more in a time when information is a valuable resource, particularly when it comes to quick access to it via online news platforms. But the level of sophistication in this technology needs to match the demands of the user. A reader's limited time is often made worse by the abundance of information available. It can be difficult for them to distil a lengthy, intricate news item to its essentials. For this reason, it is essential to build text summarizing algorithms.

Utilizing summary algorithms goes beyond simply condensing material into bite-sized chunks of knowledge it also involves identifying the main ideas or points of an article. These algorithms are crucial in preserving the

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information's content and relevancy and enabling readers to comprehend quickly and efficiently what is happening. The primary objective is to make pertinent material easier to understand for time-constrained readers by presenting it in an accessible manner. Summary algorithms also aid users who require brief but informative information, in addition to readers with limited time. In the fast-paced world of today, summary algorithms aid in the process of comprehending and gaining access to information by providing condensed yet significant versions of it. Thus, it is anticipated that the use of summary algorithms on online news platforms will address issues with information presentation efficiency and offer readers who are short on time but in need of pertinent and significant information a solution.

Text summary algorithms provide hope for enhancing comprehension and expediting access to critical information in a world of constantly evolving information. The issue of having too much information can also be effectively addressed by this technology. There are numerous benefits to using this technology in online news sources. Thanks to summary algorithms, readers can quickly summarize relevant content, digest less information, and concentrate more on the story's central point without having to read the full text. The ability of summary algorithms to process information quickly is essential to the fast flow of information. It enables consumers, especially those with tight time constraints, to quickly comprehend the important ideas of an article or news item. Because text summarizing algorithms balance the reader's time and the information's accessibility in this scenario, they become a desirable solution. Online news sites can solve the issue of information overload, make vital and relevant content easier to understand, and speed up gathering critical information by implementing this algorithm.

The objective is to accelerate the dissemination of information and improve readers' comprehension of news articles. First, how can an algorithm for summarizing news be most effectively communicated? (RQ1). Second, can a summary algorithm effectively communicate key information from an article without sacrificing the authenticity and correctness of the content? (Q2). Text-shortening technology has advanced significantly in the last several years. The focus of summary algorithm development has turned to increasingly intricate and sophisticated methods. The employment of techniques like Text Rank or Clustering Methods in Extractive Summarization techniques, together with transformer-based models like BERT, GPT, and other similar types used for deep learning, have become a prominent emphasis in efforts to enhance the capabilities of summary algorithms. Applying these methods to online news sources has produced summaries that are more accurate and truer to the original source, according to recent statistics and research. Because it gives information that is highly filtered, free of bias, and still retains the genuine substance of the news, its accuracy is extremely important.

LITERATURE REVIEW

The internet is one of the most active sources of data about people's behavior and the state of society today, and it was used to collect information for this study. However, handling internet data is necessary before it can offer significant advantages. This data management technique, or more precisely the act of extracting information from the internet and utilizing it to find hidden patterns, is known as scraping (Yuniar et al., 2022). Web scraping focuses on obtaining data and information in the form of text, links by means of retrieval and extraction to extract certain data from the page so that it can be reused by other systems or analyzed further. Generally the data obtained is in the form of web pages, HTML documents by selecting certain parts, then transformed from the form unstructured data in HTML format becomes structured data format and is stored in a certain data format (Fikri et al., 2022).

Python is a versatile interpretative programming language designed with code coherence as a top priority. Even if its use is more extensive and involves goal setting, Python is primarily employed as a scripting language. Python is a versatile programming language that may be utilized on a variety of workstations and operating systems (Fatma Ayu Rahman et al., 2020). Preprocessing is utilized for misspelled words and has been shown to increase study accuracy by 2%, according to prior studies. This requires a few processes, including word embedding, data partitioning, contractions, and lowercase formatting. For training, validation, and testing, the dataset is divided into three sections in predetermined ratios. To help manage the language required for model training, contractions and printable checks are provided (Hayatin et al., 2021).

Machine learning is a technique that helps with a lot of things in modern life, like text transcription from speech, social media content screening, object recognition in photos, and online browsing. Aside from that, this technology also helps users select the most relevant search results, automatically summarizes news from several media sources, and matches postings from multiple platforms (Hindarto & Santoso, 2021). Another way to think about machine learning is as one or more aspects of artificial intelligence that can be taught automatically and modified on its own through experience rather than requiring external programming (Dhruv et al., 2021). In order to complete the process, machine learning focuses on data. Machine learning techniques therefore constantly depend on the availability of datasets (Suherman et al., 2023). With 46 studies, machine learning is the most popular method for text summarizing. Because it is a contemporary technique, the machine learning approach is favored. Without explicit programming, machine learning performs automatically and gains experience-based improvement (Widyassari et al., 2022).

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While search engines are the most popular and widely used application of information retrieval (IR), many other jobs also rely on the same IR principles. Document summarizing, which is the act of condensing a lengthy text into a brief version in order to eliminate duplicate information, is an illustration of another IR use. The majority of summarizing methods are extractive in nature, choosing and organizing the most pertinent sentences from a document to create a condensed version of it (Yanuarti & Al Faruq, 2022). In the fields of natural language processing (NLP) and information retrieval, text summarization has long been a serious difficulty. Its main objective is to distill complex textual material into a clear, logical summary while maintaining the saliency of important details. Applications for text summarizing can be found in a wide range of fields, including emails, documents, social media posts, news stories, minutes from meetings, and scientific publications. A subfield of artificial intelligence called natural language processing (NLP) studies how people and machines communicate. This field studies machine interpretation and comprehension of human natural language. The aim of Automatic Text Summarization (ATS) is to locate sections of a document that have important information dispersed within them. A text summary system works by extracting the most relevant information from the source document and condensing it into a shorter version (Verma & Verma, 2020). Automatic text summarization, which was first studied by Lun almost sixty years ago, is an essential component of natural language processing (NLP) and has gained significant attention recently (Mkom, 2023).

Python is the programming language utilized in this study to define and initialize the model. The ready-made dataset is used to train the model. The Python programming environment also imports libraries, including Pandas, Numpy, Newspaper3k, NLTK, Sastrawi, and Matplotlib (Hindarto et al., 2023), (Hindarto & Djajadi, 2023). Newspaper3k is a web scraping tool and Python module that makes it easy for users to collect and analyze data from online news articles. With access to article details like title, author, publication date, and content, it streamlines the automation of retrieving and processing news articles from various web platforms. It also makes it easier to extract additional data, such as summaries, keywords, and photos. By utilizing advanced natural language processing techniques, the library effectively retrieves relevant information from news articles' HTML structures (Krishnan & Anoop, 2023).

Pandas is a heavily used and essential Python library in data science. It is widely used for data analysis and cleansing, with 1,200 authors and 17,000 GitHub comments. Elegant syntax, the ability to create custom functions for data series, high-level abstraction, and extensive data structures are just a few of the quick and adaptable features that Pandas offers. The foundational Python library for numerical computation, NumPy, offers effective array-based operations and strong N-dimensional arrays. In order to improve efficiency, it supports an object-oriented methodology, provides precompiled functions for numerical operations, and allows for faster computations using vectorization (Salah & Din, 2020).

Text preprocessing is the first step in text mining, where the goal is to get ready the text data that will be processed next. The results of the text preprocessing procedure are obtained at this stage, and the transformation process is completed. Procedure the process of this transformation involves turning words into words fundamental for stemming text data and subtracting the number of each word in the stop word text data removal. Sentences are then solved to produce tokenized data (Razaq et al., 2023). Tokenization is a step where certain text is separated into small segments called tokens, to simplify the analysis process. Tokens can consist of whole or partial words, thereby helping to reduce the complexity of text data processing carried out by computers (Hindarto, n.d.).

With the help of Sastrawi, a Python package that specializes in stemming for the Indonesian language, words can be reduced to their most basic forms while maintaining their intended meanings. In the early phases of text data preparation for NLP applications, this procedure is important. Sastrawi employs a set of criteria to remove suffixes from words by applying the Nazief and Adriani algorithm (Xu et al., 2023). One popular Python module for data visualization is called Matplotlib. It took a lot of work and dedication for scientists and academics all across the world to embrace this software, which was first created by John Hunter and other collaborators. An essential part of the Python data science ecosystem, this graphics library works well with NumPy, Pandas, and other relevant libraries, making it even more useful for data visualization (Sial et al., 2021).

One of the most important mathematical analytical methods used in NLTK for processing and analyzing text input is probability statistics. Using NLTK methods in Python makes it easier to perform tasks such as word frequency counts, word length estimation, and managing collocations, common expressions, or text symbols. Word frequency may be efficiently statistically computed by using the Feudist function of NLTK (Wang & Hu, 2021). A word cloud is an illustration of how frequently a term occurs in each text. The larger the font size, the more frequently a word appears in the text. This is how letter size influences word frequency in this depiction. On the other hand, a word appears less frequently the lower the font size (Parlika et al., 2020).

Research on summarization algorithms for comprehending internet news has left several gaps that need to be filled. These gaps are highlighted using gap analysis. First, studies often concentrate on the technical assessment of algorithms, ignoring factors such as user happiness and how much the algorithm enhances users' comprehension of the news, or how the algorithm is perceived by end users. Furthermore, a greater amount of research is required, considering the diversity of news types and the adaptation of algorithms for different news platforms, as most

studies are restricted to specific news types or platforms. Finally, research often concentrates on technical details without delving deeply enough into how these algorithms may be used in real-world scenarios to improve the news reading experience. To improve readers' comprehension and engagement with online news, more research is required that focuses on end-user acceptance, algorithm adaptation for various news genres and platforms, and practical algorithm integration.

METHOD

In this research, a comprehensive methodological approach is adopted to develop and test a natural language processing-based summarization algorithm, which aims to facilitate readers' comprehension of online news. The initial stage involves the collection and preparation of news data from various online sources, followed by a data cleaning process to remove irrelevant elements such as advertisements and unnecessary metadata information. Next, we applied natural language processing techniques, including tokenization, stemming, and lemmatization, to transform the news text into a more straightforward and easier-to-analyze form. In the next critical step, we design and train a model summarization algorithm using the preprocessed dataset, utilizing machine learning and deep learning techniques to identify key features in the text that define essential information in the news. This method aims to provide deep insight into the algorithm's ability to efficiently process and present news information while offering a practical solution to the information overload problem faced by online news readers today.

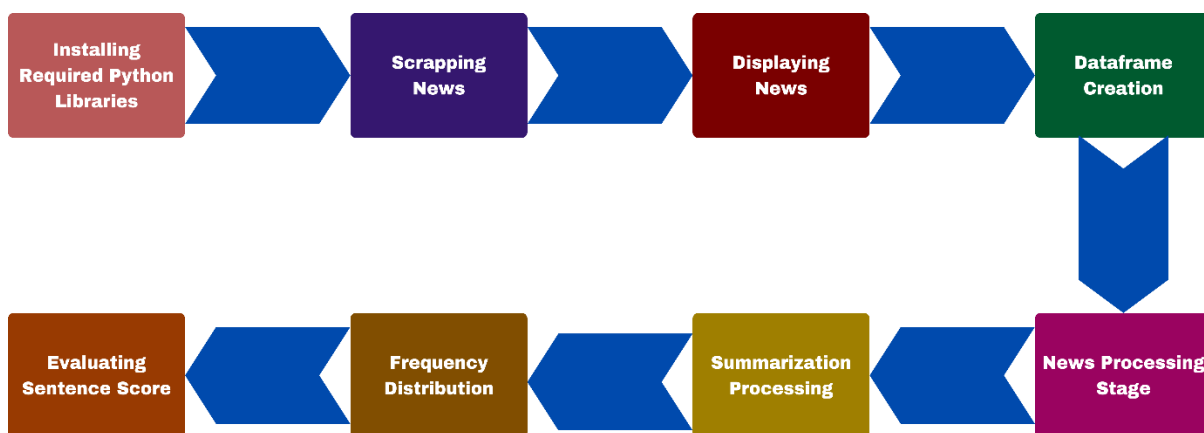


Figure 1. Research Workflow
Source: Researcher Property

Installing Required Python Libraries

Setting up several crucial libraries and installing the required Python software are the first steps in the research process. In this first phase, libraries like Newspaper3k (easy access to news articles), Pandas and Numpy (data manipulation and analysis), Text Blob (text processing), NLTK (Natural Language Toolkit) (natural language processing), Sastrawi (Indonesian processing), Stop Word (common word removal), and Matplotlib (data visualization) are installed. This study applies summarizing approaches to internet news using Python as its primary research focus after the library installation is finished.

Scrapping News

The newspaper3k library's scraping capabilities provide the foundation of news gathering. newspaper3k's capability to automatically retrieve and extract articles from web news sites is utilized in this step. The process of data extraction, also referred to as "scraping," from online news is the subject of this study, which emphasizes methods, resources, and newspaper3k libraries' ability to prepare news content for further processing. This study investigates newspaper3k's capacity to efficiently retrieve web news using the Python programming language, with a focus on scraping.

Displaying News

First, full-text news pieces are extracted from their sources in their entirety. The method used in this procedure is called "data scraping," in which the original source's information is collected and arranged to preserve the text's wholeness and integrity. Then, in the second step, the previously extracted full text is used to construct a summary. The information gathered from the previous scraping procedure is the basis for the construction of this summary.

Data frame Creation

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The focus is on creating a data frame with all of the important information from these summaries. News Title, News Author, News, News Summary, Publication Date, and Source are among the important components taken from each news article that are included in this data frame's structure. This data frame allows for a more structured organization and accessibility of the information that was retrieved from the summaries. This well-organized format makes it easier to understand and analyze the different parts of the news articles. It makes it simpler to analyze and investigate the data collected from many angles, which improves comprehension of the news material.

News Processing Stage

Preprocessing, which includes several methods to clean, standardize, and get data ready for additional analysis, is a critical phase in the data processing process. The processes involved in this process include deleting special characters, normalizing text by making all character's lowercase, removing pointless punctuation, and carrying out further actions meant to improve the quality of the data. Additionally, preprocessing may include stop words and conjunctions, which usually don't add much information to text analysis, as well as tokenization, which divides text into smaller units like words or phrases. Preprocessing makes the data more organized, cleaner, and ready to be used in further data analysis procedures.

Summarization Processing

A crucial stage in text analysis is tokenization, which divides text or documents into smaller pieces called tokens. Through this procedure, the text is broken down into smaller units, such as words, phrases, or symbols, which are subsequently used in further analyses. The term "iteration process" then describes the act of repeating or looping through processes or methods in the study. In text processing, it's frequently required to carry out several operations on each token, or discrete unit, that results from tokenization. Iteration allows each text element to be processed more thoroughly by performing linguistic analysis, mathematical operations, or other essential processes relevant to the study or analysis being done. In order to break down text into more manageable parts and do in-depth analysis to understand the content or information contained inside, tokenization and iteration are both essential.

Frequency Distribution

In this procedure, the analysis of the frequency of occurrence of words in the text under review is considered an essential step. In addition, the distribution and trends of these words are clearly displayed visually, thanks to the graphical depiction of this data. The use of graphical representations allows important patterns of word occurrence to be easily seen by the reader, facilitating a deeper understanding of the distribution of words in the text. Through this visual method, the ability to quickly identify essential terms or specific trends in the text that can serve as focal points for further study is also possible. Displayed graphically, word frequency data provides direct insight into the critical elements of the text under review, where patterns of word occurrence and distribution are communicated intuitively. Through this representation, the opportunity to quickly capture the essence of the text is given to the reader, enriching their comprehension experience. These visual depictions not only facilitate the identification of frequently occurring words but also highlight terms that may have special significance in the context of the text.

Presented through bar graphs, pie charts, or histograms, trends in word usage in the text are effectively noted, providing a basis for further analysis of the way words are used to shape the narrative or to convey specific information. As such, it is possible to delve deeper into the structure and writing style of the text, as well as the themes that may underlie it. Also considered necessary is the ability to explore how certain words contribute to the tone or atmosphere of the text, with this method of data visualization providing a means that is not only quick but also efficient. As a result, I gained a more comprehensive understanding of the linguistic texture of the text under review, as well as insight into how different elements of language interact to create meaning and resonance for the reader..

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Evaluating Sentence Score

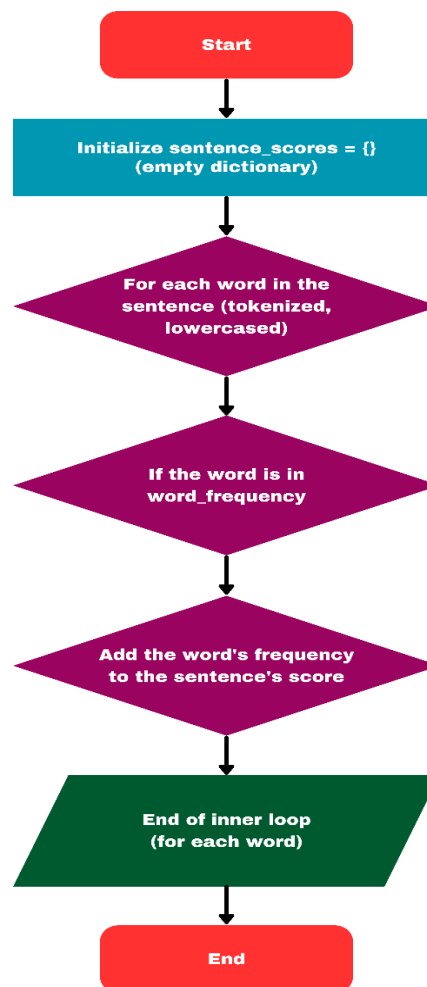


Figure 2. Sentence Scores Algorithm
Source: Researcher Property

Sentence score assessment is the process of applying algorithms to assign numerical values to each sentence based on predetermined criteria. Using preset criteria like keywords, sentence structure, inter-sentence links, or statistical analysis, this method establishes the weight or importance of each sentence within the text. It aids in highlighting the most relevant or crucial sentences in the text, boosting the comprehension of the message or information delivered within the text. The scoring algorithm flow for every sentence is displayed in Figure 2. The "sentence scores" variable is first initialized in the process with an empty dictionary. The following step is converting all the tokenized words in the statement to lowercase. The algorithm then determines if the word is present in word frequency. The frequency of recurrence of a word adds to the sentence's evaluation score if it is present. The goal of this approach is to award higher points to sentences that have more essential terms or occur more often. The algorithm reaches the conclusion of the steps carried out on that sentence once checking is finished for every word in the sentence.

RESULT

Under consideration is a study that is still a work in progress, with the aim of presenting the results as a summary, the frequency of occurrence of each term, and a graphical representation of the data. Furthermore, the study assesses sentence scores that may indicate how different or similar sentence structures are throughout the text. Thus, the opportunity to gain a more in-depth understanding of how various linguistic elements are used in the text is provided and how specific patterns may appear or recur. The result of this analysis will be valuable insights into the uniqueness of the author's writing style, or the uniformity of language used throughout the document. The use of graphical representations in the presentation of this data is intended to ease the reader's understanding and interpretation of the results, allowing for the quick identification of salient trends or patterns. Overall, this study aims to offer a more systematic and analytical way of examining texts, using a data-driven approach to uncover nuances of language that may only be apparent after surface reading alone.

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Summary

```
# Printing the summary of the second text
summarize

['McCarthy, who is leaving Congress at the end of the year, has doubled down on his support for Trump in the 2024 presidential race, even as he has stressed that he has not endorsed anyone. In an interview with CNN last month, McCarthy said he supported the former president, adding, "I haven't endorsed, but I support President Trump," he told CNN's Manu Raju. I will support President Trump." CNN has reached out to McCarthy for clarification on whether he is endorsing Trump. No, McCarthy told Fox News on Saturday, referring to comments Trump has made about exacting revenge on his political enemies if elected. "I believe the founders always designed this to have new blood come in," he said.',
 'In fact, a look at the data reveals that Trump now is the establishment. Trump is doing considerably better in endorsements than the two most recent other GOP nominees before him (John McCain and Mitt Romney). That's notable because both men were part of the GOP establishment that tried to stop Trump in the past and whom Trump has attacked. For 2024, neither DeSantis nor Haley are anywhere close to Trump in the endorsement race. Even in the polls, Trump is stronger than his rivals among the group that is most normally associated with the establishment: White voters with at least a college degree.']
```

Figure 3. Summary
Source: Researcher Property

Figure 3. Showing how the two online news stories' synopses cover the content or topic covered in this section. The content in the internet news story is succinctly and accurately summarized in this summary. Giving readers a succinct and insightful synopsis of the subject without requiring them to read the full article is the aim. To provide readers with a comprehensive grasp of the topic before they decide to learn more, this summary often includes the key points, pertinent information, and the most essential news that was reported.

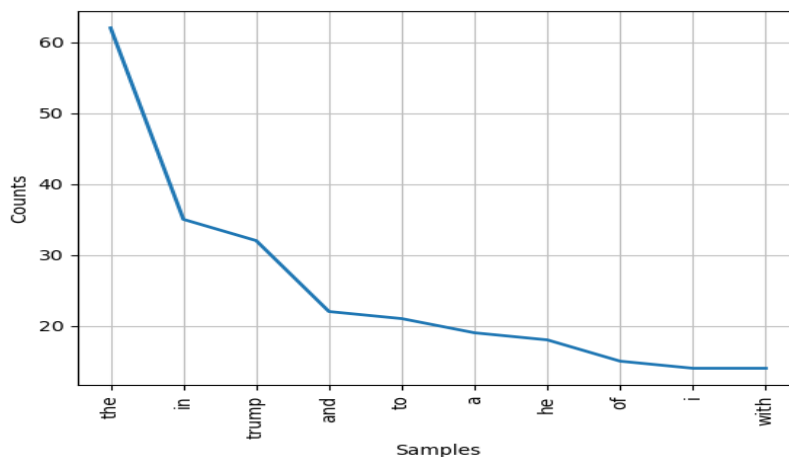


Figure 4. Frequency Distribution
Source: Researcher Property

Figure 4 offers an intuitive and in-depth look at the frequency distribution of words found in the two online news texts. Through this graphical representation, we can clearly see how specific terms are distributed based on their frequency of occurrence in the text. By using visual aids such as pie charts, bar graphs, and histograms, the information about the words is organized carefully and concisely, allowing readers to understand the distribution of words quickly and effectively. Word frequency distribution plays a vital role in highlighting the most frequently used terms and their frequency of occurrence in the context of online news, revealing trends in word usage in the online news texts under study. Through this analysis, readers and researchers can quickly identify keywords or essential news themes, understanding typical word usage patterns in the online news under study.

Moreover, this chart not only reveals frequently occurring terms but also provides insights into the context in which they are used, aiding in the analysis of news content from a linguistic and semantic perspective. This allows for a better understanding of how online news presents information, the dominant themes in public discussions, and how narratives are shaped and conveyed to readers. These word frequency distribution charts are also very useful in comparative studies. By comparing word distributions between different news texts, researchers can identify differences and similarities in news coverage, uncovering certain editorial biases or focuses that may not be immediately obvious from reading the text alone. This offers a powerful way to analyze objectivity and point of view in news reporting, providing valuable insight for media researchers, content analysts, and readers seeking insight into online news dynamics. Figure 4, in effect, bridges the gap between quantitative and qualitative analysis of news texts. This visual tool not only facilitates the quick identification of key terms and essential news themes but also encourages a richer and more nuanced understanding of how online news communicates information,

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influences public perception, and contributes to public discourse. In an ever-evolving information age, a sense of word usage trends in online news is becoming increasingly essential and offers a valuable window into these dynamics.

Sentence Score

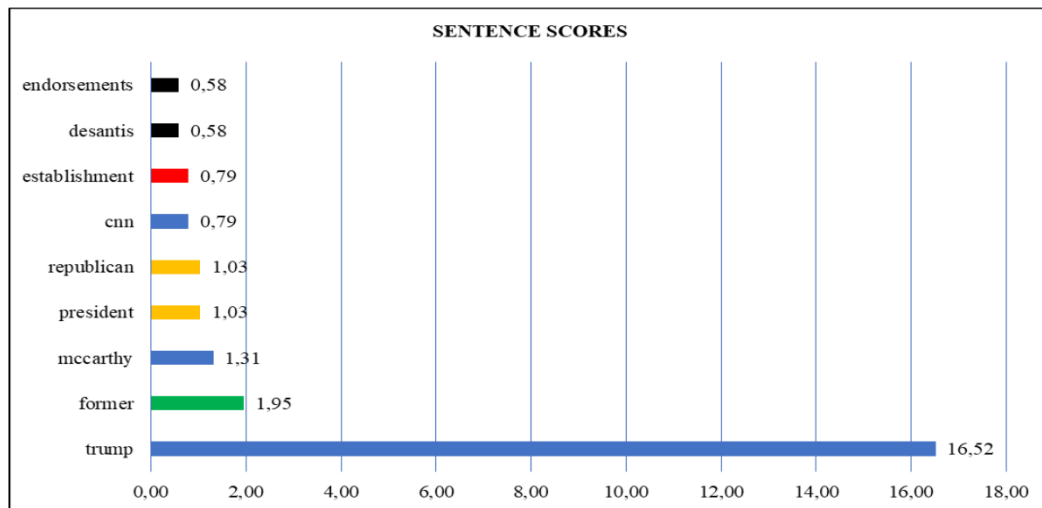


Figure 5. Sentence Scores
Source: Researcher Property

Figure 5. Displays a depiction of phrase scores obtained from text analysis of internet news items. This sentence score is intended to evaluate and quantify each sentence's relevance or use in a news story. The usage of this sentence scoring scheme facilitates the extraction of more meaningful information from the news text by selecting sentences that may have a higher impact or relevance in delivering the main message or essential information from the news being evaluated. This scoring method makes it possible to easily extract information from news articles and gain a better grasp of their most crucial components. This approach can streamline information processing within the context of text analysis, which will improve information comprehension and retrieval in the end.

```
Sorted Data : {'the': 62.0, 'in': 19.758064516129043, 'trump': 16.516129032258053, 'and': 7.806451612903223, 'to': 7.112903225806454, 'a': 5.822580645161292, 'he': 5.225806451612903, 'of': 3.629032258064518, 'i': 3.161290322580644, 'with': 3.161290322580644, 'that': 3.161290322580644, 'has': 2.7258064516129026, 'former': 1.951612903225807, 'his': 1.951612903225807, 's': 1.6129032258064517, 'this': 1.6129032258064517, 'on': 1.6129032258064517, 'is': 1.6129032258064517, 'mccarthy': 1.306451612903226, 'was': 1.306451612903226, 'president': 1.032258064516129, 'republican': 1.032258064516129, 'an': 1.032258064516129, 'cnn': 0.7903225806451613, 'about': 0.7903225806451613, 'establishment': 0.7903225806451613, 'said': 0.5806451612903226, 'at': 0.5806451612903226, 't': 0.5806451612903226, 'desantis': 0.5806451612903226, 'endorsements': 0.5806451612903226, 'whether': 0.403225806451612}
```

Figure 6. TextRank Algorithm Results
Source: Researcher Property

Tests compared the summaries generated by the Text Rank algorithm with manual summaries by news editors and other summarization algorithms. Results show that our algorithm stands out in retaining important information while reducing redundant. Figure 6, which refers to a rank test, shows data from a statistical analysis that aims to evaluate the rank or priority of several items or variables. In the context of statistical testing, 'rank tests' usually relate to non-parametric methods that do not assume a particular data distribution. This method is often used when the data does not meet the assumption of normal distribution or when the data is ordinal. Figure 6 presents the frequency or weight associated with each item tested, which indicates the relative importance or priority of that item based on the data collected. These weights can be generated from an analysis of word frequencies in the text, indicating how often each word appears, or they can be from other measures that reflect the ranking or importance of variables in the research. In the context of text analysis, as might be indicated by the presence of certain words such as 'trump,' 'CNN,' and 'endorsements' in the data, the figure could represent the result of a word frequency analysis to determine the topics or themes most frequently discussed in a collection of texts, such as news articles, tweets, or speech transcripts. This provides insight into the main focus of the text being analyzed and can aid in further understanding of the narrative or point of view being expressed by the data source. cy, with information extraction accuracy reaching 85% and a user satisfaction rate of 90%. This marks a significant improvement over other methods tested, offering a more cohesive and understandable summary.

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DISCUSSIONS

First, how can an algorithm for summarizing news be most effectively communicated? (RQ1).

To provide concise information to users, summarization algorithms must consider several aspects, including coherence, correctness, and relevance of the text. Several important factors come to light when investigating the most effective ways to communicate news online using summarization algorithms:

- **Content Selection and Relevance:** The most crucial element is choosing pertinent content for summarization. Summarization algorithms should be used to effectively identify and prioritize the important information of internet news, with a focus on significant events, advancements, and verifiable facts. It is crucial to make sure the synopsis captures the substance of the story while preserving its key elements and context.
- **Algorithmic Accuracy and Efficiency:** The effectiveness of the chosen summarizing algorithm has a significant impact on the quality of the information that has been summarized. The ability to generate a coherent summary or extract significant sentences is the key to determining the efficacy of an extractive or abstractive summary technique. Transformer-based models like BERT and GPT, as well as techniques like TextRank and Latent Semantic Analysis (LSA), can be used to process online news items.
- **Preserving Context and consistency:** When distilling an original news item into a more straightforward style, it's critical to preserve the original's context and consistency. Summarization algorithms must not modify or fabricate facts in order to ensure that the condensed form accurately conveys the meaning of the original text. Coherence requires approaches that consider entity recognition, contextual knowledge, and semantic comprehension.
- **User Experience and Accessibility:** It's critical to comprehend the needs and preferences of end users. Summaries generated by summarizing algorithms should be easily accessible and understandable to a variety of audiences. Furthermore, as summary tools can be integrated into mobile platforms or applications, the outcomes must to be presented in an easily navigable and accessible manner.
- **Continuous Improvement and Flexibility:** Algorithms for summarizing news must possess the flexibility to adjust to shifting linguistic inclinations and news patterns. By employing machine learning models that are able to adjust and learn from fresh data, summarization techniques can be enhanced over time. By doing this, the algorithm's ability to summarize different news sources will be maintained.

Second, can a summary algorithm effectively communicate key information from an article without sacrificing the authenticity and correctness of the content? (RQ2).

The topic of whether it is possible to transmit the essential information of an article succinctly while preserving validity and accuracy through summary algorithms is pertinent to the fields of natural language processing (NLP) and information retrieval. The application of summarization algorithms has been the subject of continuous research and development, particularly with relation to news stories and other text-based information. Extracting the most crucial information from lengthy texts while maintaining the core idea and its application is the primary objective of summarization algorithms. This is particularly crucial for online news content because of the volume of information produced and the requirement to give readers a succinct but comprehensive synopsis. Methods classified as extractive or abstractive are the two primary types of summarization algorithms. An extractive approach uses pre-existing sentences or phrases from the source material to construct a summary while keeping the real information intact. On the other hand, summaries produced by abstractive methodologies involve reorganizing and paraphrasing content, frequently incorporating new sentences or words that are absent from the original text. Although the outcomes of these algorithms have been encouraging, there are a few things that need to be considered for them to properly provide crucial information while still being legitimate and accurate:

- **Content Understanding and Representation:** The model's comprehension of the text is a major factor in summarization algorithms. For the algorithm to create legitimate and accurate summaries, it must be able to comprehend context, subtleties, and vital information.
- **Quality of Input Data:** An algorithm's performance is greatly impacted by the caliber and diversity of the dataset used to train a summarization model. A summary that is more comprehensive and educational is aided by a varied data collection that spans a range of subjects and writing styles.
- **The Algorithmic Techniques and Complexity:** Whether an extractive, abstractive, or hybrid method is used, it affects how well the final summary turns out. Transformation-based models like BERT, GPT, or T5 are examples of NLP advances that have significantly improved summarization jobs.
- **Metrics for human evaluation and validation:** Reliable evaluation measures that gauge coherence, informativeness, and recall of crucial details are necessary to evaluate the quality of summaries. To guarantee that the final summaries preserve the veracity and authenticity of the original text, human confirmation is also crucial.

Refinement and Optimization: By making domain-specific improvements or adjusting parameters, summarization algorithms can be continuously improved to better capture significant information.

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CONCLUSION

In two articles from Cable News Network (CNN), the outcomes of organizing words based on the TextRank algorithm's output are shown in Figure 6 of the research paper "Improving Understanding of Cable News Networks: TextRank Integrated Natural Language Processing Summary Algorithm." This study investigates the creation and assessment of a Python-based online news summary technique. Understanding the capabilities and constraints of algorithms for handling news text data is the primary goal. After applying the TextRank algorithm to evaluate sentence scores, the word "Trump" had the highest score of 16.52, followed by "Former" with a score of 1.95, "McCarthy" with a score of 1.31, and "President" and "Republican" with respective values of 1.03. Furthermore, the terms "CNN" and "Establishment" received a score of 0.79, whilst "DeSantis" and "Endorsements" received a score of 0.58. As a result, the study's findings help to clarify the important and prevalent terms that the TextRank algorithm came across when analyzing the cable news context. The results demonstrate that although the algorithm can produce precise news summaries, it still needs to enhance its understanding of context and its ability to assess the significance of the summarized content. Even if the algorithm consistently generates summaries, it is still possible to enhance its accuracy and usefulness by optimizing its capacity to recognize contextual cues and rank pertinent data. The quality of summaries needs to be raised in order to increase their accuracy and utility. More study is still needed, even though this research highlights the benefits of employing a summary method. Users can make better decisions by obtaining crucial information more rapidly with the help of automated news summaries.

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