LITERATURE REVIEWS

1

Reference in APA format	Vishnuprasad and Paul Martin, "Meeting Summarizer Using Natural Language Processing", International Journal for Research in Applied Science & Engineering Technology (IJRASET) ISSN: 2321-9653; IC Value: 45.98, vol.11 Issue: VI Month of publication: June 2023, DOI: https://doi.org/10.22214/ijraset.2023.53578.	
URL of the Reference	**Authors Names and Emails**	**Keywords in this Reference**
https://www.ijraset.com/best-journal/meeting-summarizer-using-natural-language-processing-380	Dr S. V. Viraktamath, Jahnavi R , Vidya, Abhay S Bhat*, Sathvik Nayak, asbhat2107@gmail.com	TFIDF, PageRank algorithm, Glove embedding, SVD, NLG
The Name of the Current Solution (Technique/ Method/ Scheme/ Algorithm/ Model/ Tool/ Framework/etc)	**The Goal (Objective) of this Solution & What is the problem that need to be solved**	**What are the components of it?**
Mostly focused on the solution using Extractive Summarization Techniques.	The main objective of this document is to go through a process which involves increasing the efficiency of Extractive Summarization. The Lecture Summarization system was to provide a utility for students that could summarize lecture content based on their desired number of sentences.	Words and phrases play a vital role in the extraction of summary. Specially designed for Microsoft Teams removes the time stamps and associates each sentence with its corresponding speaker. Identification of High frequency words in the context play a major role in the coherency of the transcript.

The Process (Mechanism) of this Work; Means How the Problem has Solved & Advantage & Disadvantage of Each Step in This Process

	Process Steps	Advantage	Disadvantage (Limitation)
1	Input	The model's input is a transcript document created especially for transcripts from Microsoft Teams. The text is then divided into separate sentences for additional analysis.	There may be some inconsistencies in the transcript that was used as input, but these will be fixed later in the process.
2	Pre-Processing	Pre-processing involves removing stop words and standardizing text to enhance summary accuracy and focus on meeting's essential topics.	It can be difficult to use efficient pre-processing methods, particularly when dealing with heterogeneous and unstructured meeting data. Additionally, it can take a lot of time, especially when handling big amounts of textual data
3	TF-IDF	TF-IDF is a document term feature matrix that calculates the frequency of a word within a document, based on its Inverse Document Frequency and Term Frequency. This method enhances summary accuracy by determining the significance of words within the document.	TF-IDF overlooks word semantics, disregarding term links and treating words as separate entities, potentially losing contextual information. Accurately handling synonyms becomes challenging due to extra processing.
4	PageRank Algorithm	PageRank is an unsupervised graph-based algorithm	TextRank's operation relies on sentence co-occurrence, but its

		that rates sentences based on relevance to a meeting's context, identifying top-ranked sentences for output summary, eliminating the need for human input.	lack of semantic understanding may result in incorrect conversation context and loss of significant semantic information.
5	GLOVE Embedding	Glove, an unsupervised learning technique, creates word embeddings, which record word semantic associations and improve the ability of summarizers to accurately identify and convey meaning, making them memory-efficient.	GloVe embeddings are effective in natural language processing but struggle with capturing finer semantic nuances, capturing rare words accurately, and handling polysemy effectively due to their pre-trained large text corpora.

Major Impact Factors in this Work

Dependent Variable	**Independent Variable**	**Moderating variable**	**Mediating (Intervening) variable**
The dependent variable is the quality of the generated meeting Summary. Quality measured using metrics such as accuracy, coherence, relevance to the original meeting content	The independent variables mentioned in the document include tokenization, stop-word removal and other feature extraction techniques like TF-IDF scores, Glove Embeddings, SVD components and also TextRank	The possible moderating variable is the specificity of meeting content like general meeting (Vs) specific technical meetings. As the embeddings change as per the meeting requirement.	The mediating variable involved in the document could be the semantic similarity, calculated through methods like Glove embeddings. [higher the semantic

	algorithms that we employ for ranking		similarity tends to give more contextually accurate summaries]

Relationship Among the Above 4 Variables in This article
Independent variables like pre-processing techniques, feature extraction methods, and summarization algorithms interact with domain specificity, influencing semantic similarity and affecting meeting summary quality, providing insights.

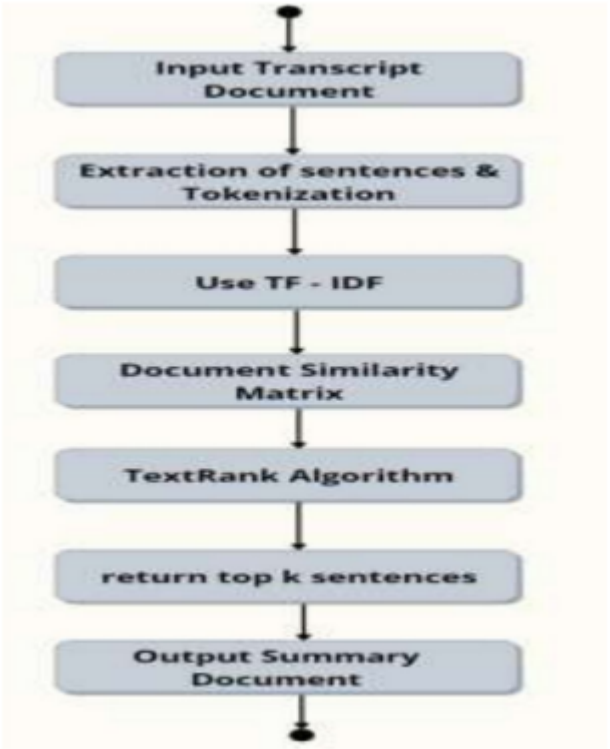
Input and Output	**Feature of This Solution**	**Contribution & The Value of This Work**
Input: Meeting transcripts from the Microsoft Teams along with their timestamps. **Output**: A summarized transcript of the meeting with around 70% less textual data.	The proposed solution mainly uses Extractive summarization techniques and methods for the summarized document.	The document shows the advantage of Glove Embeddings and TextRank algorithms for the top ranking sequences for more concise and coherent summary.

Positive Impact of this Solution in This Project Domain	**Negative Impact of this Solution in This Project Domain**
The use of methodologies mentioned firstly provides a concise and informative summary of the meeting and additionally, the system allows customers to customize the level of	One limitation could be the reliance on NLP techniques, which may not always accurately capture the nuances and context of the meeting content. This could result in the omission or misinterpretation of

detail in the summary, providing flexibility and adaptability to individual preferences. Overall, the solution enhances productivity and optimizes information extraction and knowledge management settings.	important information. Additionally, the summarization process may not be suitable for all types of meetings or documents, particularly those with highly technical or specialized content.

Analyse This Work by Critical Thinking	**The Tools That Assessed this Work**	**What is the Structure of this Paper**
The high accuracy of the proposed approach suggests that it could be effective up to some extent and does not work for all types of meetings and mainly specialized technical meetings where we have to deal with jargon's, but it is effective for general business meetings.	In Microsoft Teams a feature called Microsoft Notes. A Chrome Extension is also used for the text summarization part from the Captions.	Abstract I. Introduction II. Proposed System III. Technologies Used IV. Related Work V. Performance analysis VI. Conclusion & Future Scope VII.

Diagram/Flowchart



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2

Reference in APA format	Srishti Subhash Chandra Prasad, “Business Meeting Summary Generation using Natural Language Processing (NLP)”, Student ID: x20142218 , January 2021	
URL of the Reference	**Authors Names and Emails**	**Keywords in this Reference**
https://norma.ncirl.ie/6262/1/srishtisubhashchandraprasad.pdf	Srishti Subhash Chandra Prasad. [School of Computing National College of Ireland Supervisor: Majid Latifi]	Extractive & Abstractive Techniques, TF-IDF, TextRank algorithm, RNN, LSTM, seq-2-seq, attention mechanism model, ROUGE Metrics
The Name of the Current Solution (Technique/ Method/ Scheme/ Algorithm/ Model/ Tool/ Framework/etc)	**The Goal (Objective) of this Solution & What is the problem that need to be solved**	**What are the components of it?**
The paper mainly focused on the solution using Extractive and Abstractive Summarization Techniques using different methodologies focusing on getting the more accurate and concise output.	One of the objectives is to study the related work in the domain of text summarization with its different approaches. Proposing a research methodology to perform text summarization and ML algorithm using deep neural networks with python and ML libraries such as nltk, numpy, tensorflow, keras using LSTM and RNN.	• The paper discusses the related work regarding the different methodologies in the field of abstractive and extractive text summarization with different techniques. • The paper describes the design and flow of the abstractive and extractive models and discusses why it is important. • The model is evaluated using metrics such as ROUGE scores and human evaluation.
The Process (Mechanism) of this Work; Means How the Problem has Solved & Advantage & Disadvantage of Each Step in This Process		

	Process Steps	Advantage	Disadvantage (Limitation)
1	Data Collection and Preparation	The study processed meeting transcripts from the ICSI corpus, consisting of 75 sessions with an average duration of 72 hours. The analysis of over 1000 lines in each transcript provided a rich, varied structured data format for better understanding.	Accurate transcriptions and missing data can significantly impact research findings, while data complexity and unique features of the ICSI corpus may limit generalizability.
2	Data Pre-Processing	Eliminating crosstalk and background noise enhances data quality by ensuring precise, targeted summaries. This process eliminates unnecessary sentences and jargon, ensuring valid language constructions.	Aggressive cleaning can lead to loss of crucial information or contextual cues, especially jargon removal, which can be challenging to balance with background noise and time.
3	Data Transformation/ Feature Extraction	Vectorization reduces text data to numerical vectors, simplifying high-dimensional areas for machine learning algorithms. TF-IDF identifies important terms for feature extraction, making data computationally economical.	Conventional TF-IDF algorithms may not capture semantic links between words, potentially causing complex meanings to disappear and fragmenting semantically related phrases, potentially impacting the summarization process.

Major Impact Factors in this Work

Dependent Variable	Independent Variable	Moderating variable	Mediating (Intervening) variable
The dependent variable is the quality of the generated meeting Summary. Quality measured using factors like coherence, relevance, accuracy, and readability.	The paper shows various text summarization techniques, like extractive summarization using TF-IDF and TextRank algorithms, and abstractive summarization, as independent variables.	Text complexity, data quality, and user preferences moderate the effectiveness of both extractive and abstractive summarization techniques.	Extracted sentences and attention focus act as mediating variables, influencing how the abstractive summarization techniques process the i/p and summary.

Relationship Among the Above 4 Variables in This article

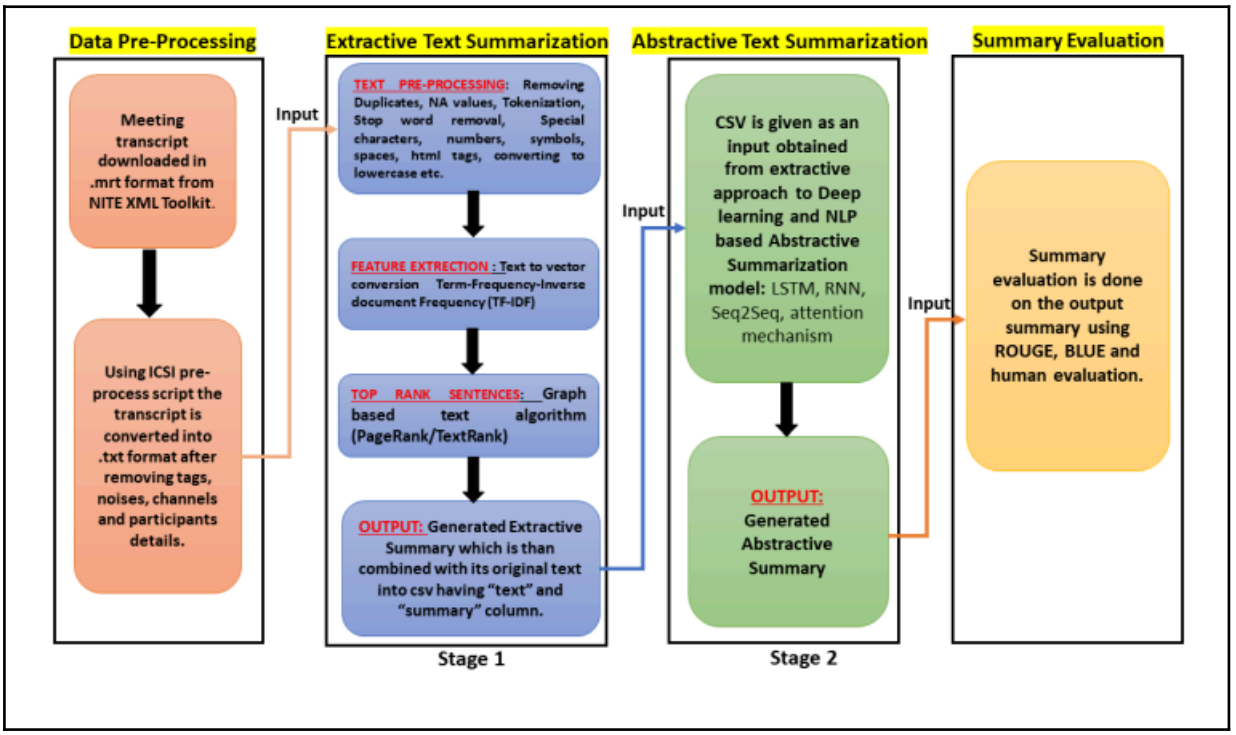
The analysis of independent variables, such as pre-processing techniques, feature extraction methods, RNN-LSTM, and summarization algorithms, can provide insights into the optimal combination for different meeting content types.

Input and Output		Feature of This Solution	Contribution & The Value of This Work
Input	**Output**	The main features of the proposed work include the hybrid approach, the utilization of NLP, a well-defined workflow and design, dataset pre-processing, and evaluation with ideas for future work.	The researcher employed many methodologies, including TextRank, RNN, and LSTM with attention mechanisms, to produce succinct and comprehensible synopses from numerous extended transcripts of business meetings. With fewer redundant and clear summaries, this method
Meeting transcripts from the ICSI corpus	A summarized transcript of the meeting using both techniques.		

		seeks to reduce time and labor costs.

Positive Impact of this Solution in This Project Domain	**Negative Impact of this Solution in This Project Domain**
The method facilitates the efficient management of big multiple transcript files, saving time and effort while obtaining pertinent information from enormous texts. By comparing the generated summaries to reference summaries, the method attempts to provide summaries that are both human readable and have higher ROUGE metrics. This suggests that the summaries that are created are more precise and consistent with the original information.	The study admits that it is difficult to forecast summary findings in the absence of a sizable number of epochs and a substantial quantity of data. This restriction suggests that the performance of the solution could change based on the dataset and satisfying transcript complexity. The Abstractive technique reduces the amount of transcripts from 75 to 60 due to computing limits, which may affect the scalability of larger transcripts. It also produces its own raw input, making it more complex.

Analyse This Work by Critical Thinking	**The Tools That Assessed this Work**	**What is the Structure of this Paper**
The high accuracy of the proposed approach suggests that it could be effective up to some extent but as the research on using Neural network based solutions is still new and even complex it promises greater scope for generating summaries using this approach which leads to complete understanding of context of meeting and generate summaries.	In summary, the tools assessed in the proposed work include Python 3.7, IDEs such as Spyder, Jupyter Notebook, and PyCharm, Google Colab, and the NITE XML toolkit for dataset annotation and storage.	Abstract I. Introduction II. Related Work III. Proposed Research Methodology IV. Design Specification V. Implementation VI. Evaluation & Results VII. Conclusion & Future Work
Diagram/Flowchart		



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3

Reference in APA format	Rajat Verma and Sparsh Gupta, "Automated Meeting Minutes Generator", Journal of Emerging Technologies and Innovative Research (JETIR), January 2022, Volume 9, Issue 1.	
URL of the Reference	**Authors Names and Emails**	**Keywords in this Reference**
https://www.jetir.org/papers/JETIR2201426.pdf	Rajat Verma, Sparsh Gupta, Shubh Sharma, Tanishq Aggarwal, Mahesha A.M	Meetings, Meeting notes, online meetings, meetings minutes.
The Name of the Current Solution (Technique/ Method/ Scheme/ Algorithm/ Model/ Tool/ Framework/etc)	**The Goal (Objective) of this Solution & What is the problem that need to be solved**	**What are the components of it?**

The paper mainly focused on the solution using Abstractive Summarization Techniques and how it helps in getting the concise output for the meeting transcript.	Automating the process of creating meeting minutes or notes is the aim of the suggested solution. By eliminating the need for manual note-taking, the approach seeks to free up participants to concentrate on the meeting itself.	The components of the solution include: 1. UI Design: ReactJS and TailwindCSS. 2. System Design: The system utilizes speech-to-text (STT) conversion for transcribing the meetings (abstractive) 3. Database Design: SQL is used for designing the database of the system. 4. Authentication & Security: Django REST framework for user authentication and security measures. 5. ReactJS Website: The notes generated by the system are displayed using ReactJS website. The data is fetched from Django REST APIs using fetch requests.

The Process (Mechanism) of this Work; Means How the Problem has Solved & Advantage & Disadvantage of Each Step in This Process

	Process Steps	Advantage	Disadvantage (Limitation)
1	Machine learning for speech-to-text conversion	Machine learning algorithms are used to transcribe speech into human-readable text. The advantage of this step is that it allows for efficient and accurate conversion of spoken words into text.	The disadvantage is that the accuracy of the transcription may vary depending on the quality of the audio and the complexity of the speech.
2	Text Summarization	The text summarizer converts transcriptions into meeting notes, reducing lengthy discussions into concise, relevant notes using	Abstractive summarization is a method for summarizing a text based on key ideas, but it may not capture

		abstractive techniques like entity recognition and semantic analysis.	all crucial details discussed in a meeting.
3	UI Design	TailwindCSS and ReactJS are used in UI design, with ReactJS's component-based architecture allowing modularity and TailwindCSS prioritizing utility over aesthetics for aesthetically pleasing designs.	Tailwind's low-level CSS classes can negatively impact website or application performance, and modification and maintenance may require experience with these technologies.
4	System Design	The proposed system utilizes speech-to-text (STT) for abstractive text summarization and conversion, enhancing efficiency in meeting notes and making briefings more concise.	The drawback is that, depending on the intricacy of the speech and the language employed, the accuracy of STT and abstractive summary may differ.
5	Database Design	The database is designed using SQL. Managing structured data effectively and offering dependable data storage and retrieval are two benefits of utilizing SQL.	One drawback of SQL is that it could need knowledge of database administration and upkeep.

Major Impact Factors in this Work

Dependent Variable	**Independent Variable**	**Moderating variable**	**Mediating (Intervening) variable**
The dependent variables could include the quality and accuracy of the transcribed speech,	The independent variables include machine learning algorithms for speech-to-text	The moderating variables during a meeting may include the number of participants, the	There are no specific mediating variables mentioned in the

the effectiveness of the text summarization process, and the overall user satisfaction with the generated meeting notes.	conversion, text summarizer implementation, and ReactJS and TailwindCSS UI design for UI.	complexity of the discussions, and the level of background noise.	given document content.

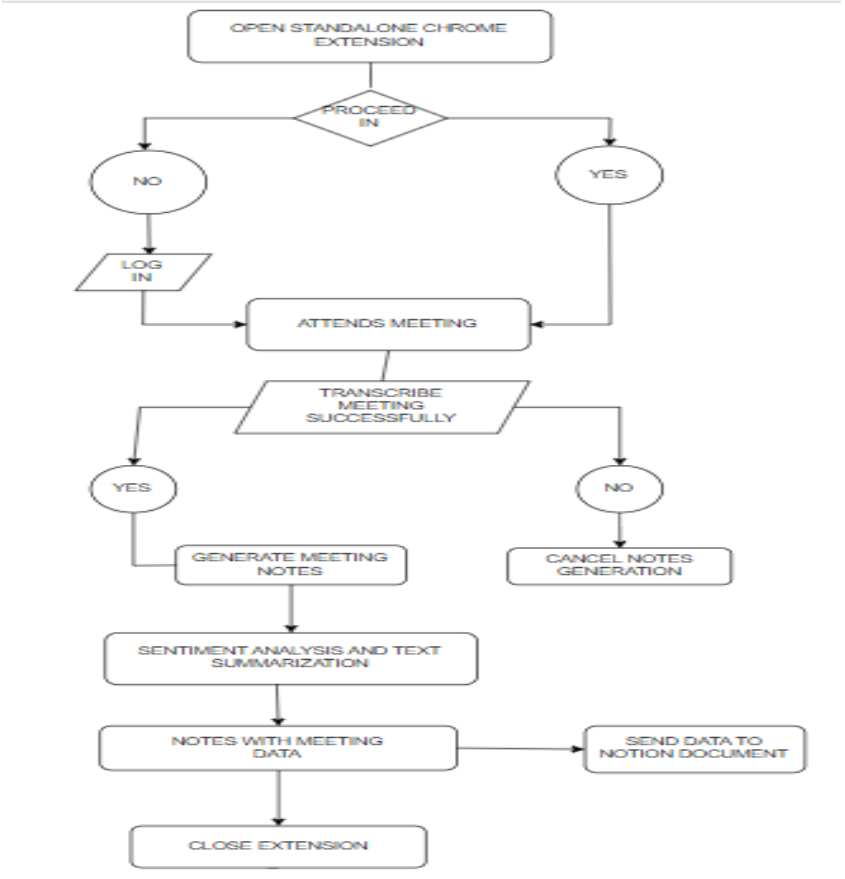
Relationship Among the Above 4 Variables in This article
Independent variables like meetings, participants, and speech-to-text conversion impact dependent variables like quality and accuracy. Moderating variables like participant count and text summarization parameters influence content and length.

Input and Output	**Feature of This Solution**	**Contribution & The Value of This Work**
Input: audio recording of the meeting with at least 2 participants. **Output**: automated meeting minutes mailed to the user, and made visible on website	The proposed solution automates meeting minutes creation, freeing participants' time for meetings, reducing manual note-taking and providing easy-to-memorize notes via email and dashboard website.	Machine learning techniques like Azure speech-to-text help reduce manual labor, increase team output, and provide concise notes for effective review and memorization in online learning environments.

Positive Impact of this Solution in This Project Domain	**Negative Impact of this Solution in This Project Domain**
The approach reduces manual note-taking during meetings, improving efficiency and team productivity. It also aids online learning by providing concise, to-the-point notes for efficient revision and memorization.	Online meetings face challenges in memory retention and potential transcription errors, necessitating continuous enhancement to ensure accurate and complete conference summaries.

Analyze This Work by Critical Thinking	The Tools That Assessed this Work	What is the Structure of this Paper
Abstractive summarization techniques and machine learning tackle text summarization problems including semantic analysis and lexical relations. The project's methodology includes an abstractive text summarizer, speech-to-text conversion, and a chrome plugin. The outcomes show that the algorithm can reasonably accurately translate spoken words into text.	In summary, the tools assessed in the proposed work include Azure speech-to-text algorithms, ReactJS and TailwindCSS for UI design.	Abstract I. Introduction II. Related Work III. Proposed Work IV. Methodology V. Design of Proposed System VI. Conclusion VII. Result VIII. References

Diagram/Flowchart



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4

Reference in APA format	Umadevi and Jagadesh Kannan, “Text Summarization of Spanish Documents”, Publisher: IEEE, INSPEC Accession Number: 18291119, DOI: 10.1109/ICACCI.2018.8554839.	
URL of the Reference	**Authors Names and Emails**	**Keywords in this Reference**
https://ieeexplore.ieee.org/document/8554839	K.S Umadevi, Romansha Chopra, Nivedita Singh, Likitha Aruru	Graph, text-rank, automated summarizer, distortion, extraction
The Name of the Current Solution (Technique/ Method/ Scheme/ Algorithm/ Model/ Tool/ Framework/etc)	**The Goal (Objective) of this Solution & What is the problem that need to be solved**	**What are the components of it?**
The paper mainly focused on the solution using Text Summarization where it uses Extractive content based methodologies and performs some of the modifications to experiment and get more concise nesses.	The main goal is to encounter the syntactic and semantic associations in a language. The proposed mechanized content synopsis plans to hold only key sequences in the content while skipping rest of the data	The proposed system has two main components: the pre-processing phase and trainable summarizer. It mainly focuses on addressing the sentences and how to classify each sentence of that document into either a "right" or "off course" sentence, creating an extractive summary.

The Process (Mechanism) of this Work; Means How the Problem has Solved & Advantage & Disadvantage of Each Step in This Process

	Process Steps	**Advantage**	**Disadvantage (Limitation)**
1	Pre-Processing Phase	Pre-processing data involves opening a file, reading contents, and using natural language	The pre-processing phase can potentially lead to the loss of crucial information, making data

		processing techniques to clean and normalize text, making it easier to analyze and summarize.	accuracy a challenging task.
2	Calculation of Frequency & Normalization	Normalization measures sentence similarity using a distortion measure, aiding in identifying related sentences and aiding in computational purposes by weighting and ranking documents based on word frequency.	Frequency calculation may prioritize common words, impacting summary accuracy. Normalization's choice of similarity limit can affect summary accuracy.
3	Key word Extractive Summaries	The next step involves generating keyword extractive summaries using PageRank and an extraction-based approach, identifying important sentences and extracting key information using Weighted graphs and Damping Factor.	The disadvantage is that it may not fully capture the text's meaning and may miss crucial details due to the rotating PageRank and damping factor used.
4	Trainable Summarizer	A trainable summarizer learns summaries from academic examples, classifying sentences into "right" or "off course" for accuracy and relevance in extractive summaries.	The Part SUMY API is utilized, but it may not be suitable for texts significantly different from the training data due to its large training data requirement.
5	Evaluation	The ROUGE Metrics API is utilized to assess the efficiency of the TextRank algorithm, providing a degree of similarity for summary accuracy and transcript highlights.	ROUGE only measures n-gram overlap. So it does not take into account the semantic meaning of the summary. It is sensitive to the choice of reference summaries.

Major Impact Factors in this Work

Dependent Variable	Independent Variable	Moderating variable	Mediating (Intervening) variable
The dependent variable is the quality of summary output and it is dependent on the accuracy and relevance of the original news article.	The independent variables in the paper include methodologies used and unique content because the uniqueness influences the overall summary generated in the process.	The relationship between dependent and independent variables is not significantly influenced by any specific moderating variables, but a damping factor demonstrates some of these qualities.	Cosine similarity and sentence likeliness act as mediating variables because it explains why certain sentences/words /phrases are given preference.

Relationship Among the Above 4 Variables in This article

The analysis of the interaction between independent variables and moderating variables, such as methodologies and unique content, can provide insights into the most effective techniques and algorithms for different meeting content types.

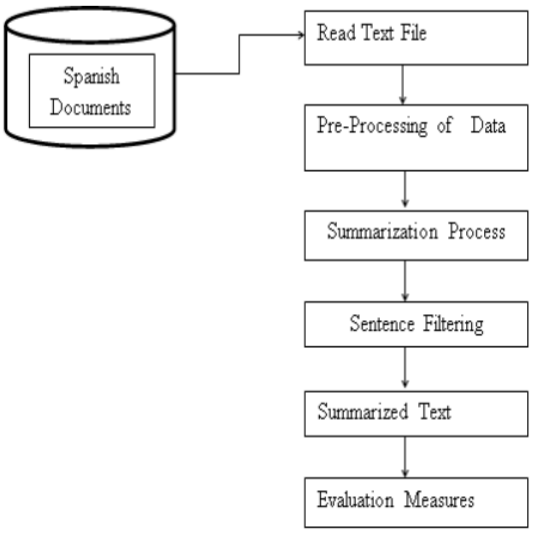
Input and Output		Feature of This Solution	Contribution & The Value of This Work
Input	**Output**	The proposed system automatically summarizes large text data using an arcsine probability density function, ensuring significant information is not overlooked and evaluating its efficiency and accuracy.	The proposed system significantly contributes to natural language processing and text summarization, offering efficient and accurate summaries for news articles, documents, and text classification, with potential for future enhancement.
News article(corpus transcript) between two	A short summarized transcript of the news article		

columbi ans	with key informatio n.		

Positive Impact of this Solution in This Project Domain	Negative Impact of this Solution in This Project Domain
The proposed system efficiently summarizes large text data, saving time and effort for users, and aids in identifying key information from original documents.	The solution's reliance on external resources like SUMY API may introduce limitations, impacting the accuracy and reliability of summaries, and potentially limiting their usefulness in multilingual environments.

Analyze This Work by Critical Thinking	The Tools That Assessed this Work	What is the Structure of this Paper
The proposed approach achieves high accuracy through the modified PageRank algorithm, prioritizing sentences at the beginning and end, calculating frequency, and ranking them accordingly for further processes.	SUMY API and Rogue Metrics API were used to evaluate the generated summaries by comparing them to manually summarized text.	Abstract II. Introduction III. Literature Review IV. Architecture of Proposed System V. Methodology VI. Results and Discussion VII. References

Diagram/Flowchart



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5		
Reference in APA format	Md Tahmid Rahman Laskar and Xue-Yong Fu, "Building Real-World Meeting Summarization Systems using Large Language Models: A Practical Perspective", Issue Date: September 2023.	
URL of the Reference	**Authors Names and Emails**	**Keywords in this Reference**
https://www.catalyzex.com/paper/arxiv:2310.19233	Md Tahmid Rahman Laskar, Xue-Yong Fu, Cheng Chen, Shashi Bhushan TN Dialpad Canada Inc.	Text Summarization, Large Language Models (LLM's), GPT-4, GPT-3.5, PaLM-2, LLaMA-2, zero-shot performance
The Name of the Current Solution (Technique/ Method/ Scheme/ Algorithm/ Model/ Tool/ Framework/etc)	**The Goal (Objective) of this Solution & What is the problem that need to be solved**	**What are the components of it?**
The paper mainly focuses on experimenting different Large Language Models (LLM's) like GPT-4 and more with different types of datasets and tests the cost, inference and performance and suggests a model for summarization.	The objective of this research is to identify the most effective model to summarize organizational meetings that could be used in real-world applications in scenarios when in-domain labeled datasets are not available. By experimenting with several models it suggests a model by considering different parameters in mind.	The paper presents an extensive evaluation of closed-source LLMs as well as open-source LLMs in several benchmarks meeting summarization datasets. A practical perspective on the trade-offs that come with selecting a model for real-world usage based on its performance, cost, and computational requirements.
The Process (Mechanism) of this Work; Means How the Problem has Solved & Advantage & Disadvantage of Each Step in This Process		

	Process Steps	Advantage	Disadvantage (Limitation)
1	Selecting Large Language Models(LLM's)	Researchers chose 3 closed-source LLMs and 1 open-source LLM for real-world meeting summarization systems, not transformers due to domain-specific fine-tuning limitations, instead focusing on zero-shot performance.	LLMs, including ChatGPT, can 'hallucinate', producing high-quality text with factually incorrect information, despite extensive data training and complex or ambiguous text, leading to mistranslations or loss of meaning.
2	Summarization via Truncation	The approach divides a transcript into n-word chapters, with final summaries generated for each by concatenating or re-summarizing summaries, providing a comprehensive summary considering the entire transcript's context.	The process may necessitate more computational resources and still pose challenges in maintaining coherence and generating a final summary.
3	Prompt (Re-write) and Prompt (Re-summarize)	The prompts generate a summary from the chapter summaries, offering various options like concatenating or re-summarizing/re-writing them.	The effectiveness of prompts varies based on meeting context, content, and prompt type. Long summary prompts perform less than short summary prompts.
4	Models	The researcher employs four LLMs, including three closed-sources and one open-source, to benchmark their performance in meeting transcripts, delivering precise results and customizing content to	Closed-source LLMs lack public architecture and weights, making customization and fine-tuning difficult. Open-source projects may have limited

		company language and style.	resources compared to large corporations.
5	Datasets	The researcher utilized relevant datasets such as MeetingBank, QMSUM, AMI, and ICSI to develop a summarization system for real-world ASR-generated transcripts in organizational meetings.	The quality and relevance of data significantly influence model performance, potentially leading to biased or unfair models if the dataset is not representative of the specific problem or task.
6	Experiments	Researchers test various datasets and LLMs for cost effectiveness, performance. LLaMA-2-7B appears promising due to its cost effectiveness and inference speed in industrial use.	The researcher has chosen LLaMA-2-7B as their LLM, but there may be other LLMs not listed in their plate.

Major Impact Factors in this Work

Dependent Variable	Independent Variable	Moderating variable	Mediating (Intervening) variable
The dependent variables, R-1, R-2, R-L, and B-S, are performance metrics used to assess the quality and similarity of generated summaries compared to reference summaries.	The paper discusses various models and approaches used for summarization, including GPT-3.5 and GPT-4, as independent variables.	No explicit mention of moderating variables.	No explicit mention of mediating variables.

Relationship Among the Above 4 Variables in This article
The paper examines the impact of prompts, summarization approaches, and LLM models on performance, quality, and cost-effectiveness, aiming to identify the most effective model for real-world organizational meeting summarization.

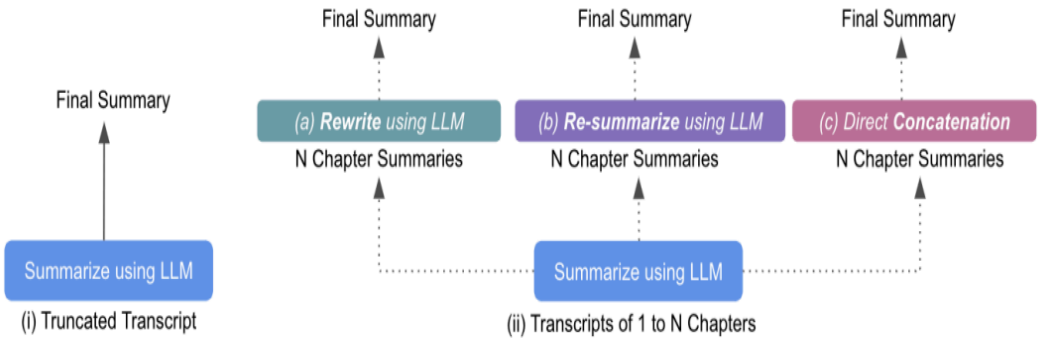
Input and Output	Feature of This Solution	Contribution & The Value of This Work
<table><tr><th>Input</th><th>Output</th></tr><tr><td>dataset or the meeting transcript.</td><td>The output is the generated summary.</td></tr></table>	The proposed solution evaluates various LLMs to identify the most effective LLM, considering performance, cost, and privacy concerns while balancing them.	The proposed work suggests that the LLaMA-2-7B model is more promising for real-world industrial usage, offering valuable insights for deploying LLMs in meeting summarization systems.

Positive Impact of this Solution in This Project Domain	Negative Impact of this Solution in This Project Domain
The study suggests that large language models (LLMs) are crucial for creating real-world meeting summarization systems, as they generate summary on a broader level, rather than focusing on specific contexts.	The proposed work offers advantages but also has limitations, such as the need for expensive hardware and massive data sets, and potential bias and system hallucinations.

Analyse This Work by Critical Thinking	The Tools That Assessed this Work	What is the Structure of this Paper
A language model with good zero-shot performance can generate coherent summarizations without specific training data, based on its general language understanding capabilities.	LLM models GPT-4, GPT-3.5 and others as well as Evaluation metrics like Rouge metrics and different datasets used while experimenting the model	Abstract I. Introduction II. Related Work III. Our Methodology IV. Experiments V. Using LLMs in Real-World Systems VI. Conclusion

		VII. Limitations and References

Diagram/Flowchart



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6

Reference in APA format	Mr. Riyazahmed Jamadar, Mehul Pawar, Pavan Karke, Amogh Sonar, Yashshri Zungure, Sushant SharavagiAssistant Professor. "AUTOMATIC SPEECH RECOGNITION: SPEECH TO TEXT CONVERTER". Department Of Information Technology, Aissms Institute Of Information Technology, Pune,Maharashtra, India 2023.	
URL of the Reference	**Authors Names and Emails**	**Keywords in this Reference**
https://www.irjmets.com/uploadedfiles/paper/issue_5_may_2023/39369/final/fin_irjmets1684406871.pdf	Mr. Riyazahmed Jamadar, Mehul Pawar, Pavan Karke, Amogh Sonar, Yashshri Zungure, Sushant Sharavagi	Analysis, Research, CSS, HTML, Python, Speech Recognition.
The Name of the Current Solution (Technique/ Method/ Scheme/ Algorithm/	**The Goal (Objective) of this Solution & What is the problem that need to be solved**	**What are the components of it?**

Model/ Tool/ Framework/etc)		
A multilingual speech-to-text conversion system., Bidirectional non stationary Kalman filter, MFCC (Mel Frequency Cepstral Coefficients), HMM (Hidden Markov Model)	The goal of this problem is to develop a speech-to-text conversion system which solves the need for converting spoken language into written text and allows for enhanced accessibility.	Preprocessing, Acoustic Modeling , Language Modeling, Decoding and Post-processing, Training and Optimization, Evaluation and Fine-tuning

The Process (Mechanism) of this Work; Means How the Problem has Solved & Advantage & Disadvantage of Each Step in This Process

	Process Steps	Advantage	Disadvantage (Limitation)
1	Speech signal is captured and converted into digital format using an analog-to-digital converter.	The speech signal digitally is that it allows for easy processing and analysis. improves signal quality and can be manipulated and analysed.	The background noise or other factors that can reduce the accuracy of the conversion.
2	The speech is segmented into smaller units called phonemes, which are the basic units of sound in a language.	Segmenting the speech into phonemes helps in recognizing different words.	It can be challenging for languages with complex phonetic structures.
3	These phonemes are then compared to well-known sentences, words, and phrases using a mathematical model	The speech-to-text conversion process has the advantage of providing a written representation of spoken language	It is limited by the availability of a comprehensive database.

Major Impact Factors in this Work

Dependent Variable	Independent Variable	Moderating variable	Mediating (Intervening) variable
• Number of words in summary • accuracy	• Spoken words • word error rate (WER) • character error rate (CER)	• The paper does not explicitly mention a moderating variable but Voice recognition might act as it.	• The paper does not explicitly mention a mediating variable.

Relationship Among the Above 4 Variables in This article
• As the number of words in summary and accuracy of the solution is dependent on spoken words, word error rate, character error rate. As these variables increases the word count in the summary increases and accuracy decreases. • Recognition of the speech from the audio file is directly related to the accuracy and the number of spoken words in speech.

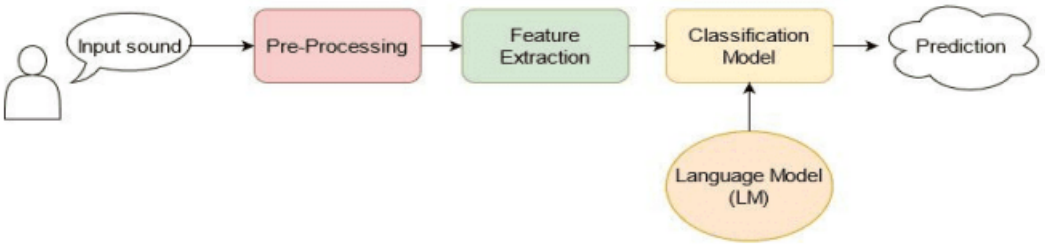
Input and Output	Feature of This Solution	Contribution & The Value of This Work
Input / **Output** speech utterance / corresponding text representation of the speech	This can turn spoken words into written text instantly. It uses features such as MFCC (Mel-frequency cepstral coefficients) to distinguish words and achieve an overall word accuracy of 90%.	Designing a multilingual speech-to-text conversion system is a good thought, where different languages together are converted into text.

Positive Impact of this Solution in This Project Domain	Negative Impact of this Solution in This Project Domain

To achieve better accurate results is the positive impact of this solution in this project domain.	The mathematical model may have limitations in adapting to new or evolving linguistic patterns, slang, or domain-specific terms.

Analyze This Work by Critical Thinking	The Tools That Assessed this Work	What is the Structure of this Paper
These new tools can change what people say into written words and it is all about making communication and getting information simpler and more convenient.	Dev tools, Hidden Markov Models, Mel-frequency cepstral coefficients.	Abstract I. THE MEETING RECOGNITION ENGINE II. SUMMARIZATION III. CONCLUSIONS AND FUTURE WORK IV. ACKNOWLEDGEMENTS V. Conclusion

Diagram/Flowchart



---End of Paper 6—

7

Reference in APA formats	Nazim Dugan, Cornelius Glackin, Gérard Chollet, Nigel Cannings. "The Intelligent Voice ASR system for the Iberspeech 2018 Speech to Text Transcription Challenge". Intelligent Voice Ltd, London, UK.	
URL of the Reference	**Authors Names and Emails**	**Keywords in this Reference**

https://www.isca-archive.org/iberspeech_2018/dugan18_iberspeech.pdf	Nazim Dugan , Cornelius Glackin , Gérard Chollet , Nigel Cannings	DNN-HMM hybrid acoustic model, MFCCs (Mel Frequency Cepstral Coefficients), iVectors, Kaldi framework, Ground truth transcriptions, Data augmentation, Language model (LM),, Lexicon update, Feature extraction, speech recognition, forced alignment, neural network
The Name of the Current Solution (Technique/ Method/ Scheme/ Algorithm/ Model/ Tool/ Framework/etc)	**The Goal (Objective) of this Solution & What is the problem that need to be solved**	**What are the components of it?**
The Intelligent Voice ASR system for the Iberspeech Speech to Text Transcription Challenge	The goal of this solution is to develop a DNN-HMM hybrid acoustic model with MFCC's and iVectors as input features.	Automatic Speech Recognition (ASR), Deep Neural Networks, phonetic corpora, speech databases, dialogue corpora, SLT, Kaldi framework, neural network architectures.

The Process (Mechanism) of this Work; Means How the Problem has Solved & Advantage & Disadvantage of Each Step in This Process

	Process Steps	Advantage	Disadvantage (Limitation)
1	Benchmarking the ASR model: The author used a benchmarking process to compare the produced ASR model with the base model.	This process helped in evaluating the performance of the final ASR model and other experiment results before its production.	Getting the start and end times of words right is crucial. If they're wrong, the ASR system might not learn correctly, and its accuracy will suffer.
2	Two-step time alignment: The author used a two-step time alignment process to solve the misalignment	The advantage of this process was that it improved the accuracy of the time alignments.	The disadvantage was that it required additional computational resources and time.

	issue in training and development transcripts, using a forced alignment script and the NIST sclite ASR scoring utility, a component of the Speech Recognition Scoring Toolkit.		
3	Frame subsampling factor adjustment: During the model testing phase, the author chose a different frame subsampling factor compared to the training process. This adjustment, with a frame subsampling factor of 3 in training and 2 in testing, resulted in more accurate results when using Viterbi decoding with a language model.	The advantage of this adjustment was improved accuracy in the testing of audio.	The specific disadvantages of this process are not mentioned in the given document.

Major Impact Factors in this Work

Dependent Variable	Independent Variable	Moderating variable	Mediating (Intervening) variable
• the context of the reference paper is the Word Error Rate (WER) results obtained from the ASR system	• Mel Frequency Cepstral Coefficients (MFCCs) and iVectors as input features	There is no specific mention of moderating variables. Therefore, it is not possible to identify any moderating variables from the context of the reference paper.	There is no specific mention of moderating variables. Therefore, it is not possible to identify any moderating variables from the context of the reference paper.

Relationship Among the Above 4 Variables in This article

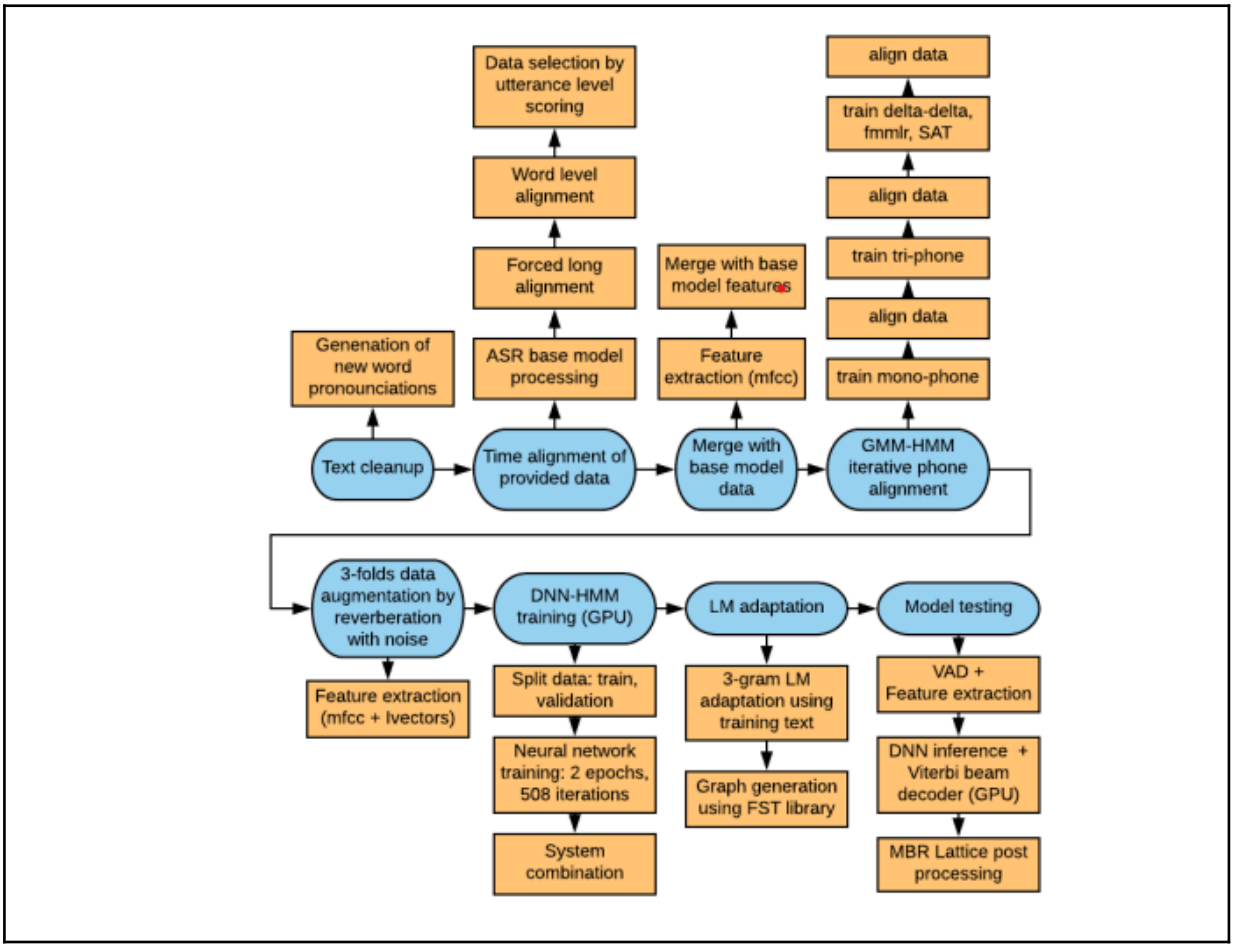
- The paper discusses the reduction in WER results achieved through the acoustic model building process and the usage of the provided data for training and testing the ASR system.

Input and Output	Feature of This Solution	Contribution & The Value of This Work
<table><tr><th>Input</th><th>Output</th></tr><tr><td>Audio recording</td><td>transcription of speech into text.</td></tr></table>	The model is based on a DNN-HMM hybrid architecture and uses MFCC's and iVectors as input features. The Kaldi framework is used for model development.	The contribution of this work's key innovation is a two-step process for aligning spoken words with their corresponding written text. It uses a forced alignment method and the NIST Sclite ASR scoring utility for precise word-level timing alignment.

Positive Impact of this Solution in This Project Domain	Negative Impact of this Solution in This Project Domain
This was achieved through a smart combination of DNN-HMM and GMM-HMM methods, which significantly improved ASR accuracy compared to the basic model.	The negative impact in this project domain is the potential data dependency and complexity associated with the system's performance, making it resource-intensive and less adaptable to languages with limited data.

Analyze This Work by Critical Thinking	The Tools That Assessed this Work	What is the Structure of this Paper
This demonstrates strengths in its choice of methodology and alignment procedure, the lack of quantitative results and detailed training information limits a comprehensive evaluation.	Kaldi framework, Time-delayed Deep Neural Network (TDNN)	Abstract I. Introduction II. Data preparation III. ASR model training IV. Discussion V. Conclusion and Future work

Diagram/Flowchart



---End of Paper 7—

8		
Reference in APA format	Gabriel Murray, Steve Renals, Jean Carletta "Extractive Summarization of Meeting Recordings "Centre for Speech Technology Research University of Edinburgh, Edinburgh EH8 9LW, Scotland 2012.	
URL of the Reference	**Authors Names and Emails**	**Keywords in this Reference**
https://era.ed.ac.uk/bitstream/handle/1842/1040/murray-eurospeech05.pdf?sequence=1&isAllowed=y	Gabriel Murray, Steve Renals, Jean Carletta	extractive summarization, prosodic and lexical features, ICSi corpus, evaluation metrics
The Name of the Current Solution	**The Goal (Objective) of this Solution & What is**	**What are the components of it?**

(Technique/ Method/ Scheme/ Algorithm/ Model/ Tool/ Framework/etc)	the problem that need to be solved	
Latent Semantic Analysis (LSA)	Aim is to find the findings and results of the research related to automatic speech summarization. Compare and contrast different summarization approaches, including Maximal Marginal Relevance (MMR), Latent Semantic Analysis (LSA), and feature-based approaches.	Author used extractive Summarization for meeting summary which intern determines the performance of the similarity of the summary and original meeting.

The Process (Mechanism) of this Work; Means How the Problem has Solved & Advantage & Disadvantage of Each Step in This Process

The insights into various approaches used to address the challenge of automatic speech summarization, particularly in the context of meetings including , including Maximal Marginal Relevance (MMR), Latent Semantic Analysis (LSA), and feature-based approaches.

	Process Steps	Advantage	Disadvantage (Limitation)
1	First extract a set of features from the meeting recordings, including both prosodic features (such as pitch and duration) and lexical features (such as the frequency of words).	It is a relatively simple and straightforward approach	It can produce summaries that are choppy and lack coherence.
2	Use a machine learning algorithm to select the features that are most important for summarization.	It can be used to summarize meetings quickly and efficiently.	It can miss important information that is not explicitly stated in the meeting.
3	Finally, they use a sentence scoring function to score each sentence in the meeting recording based on the selected features. The sentences with the highest	It can be used to summarize meetings that are not well-structured or that contain a lot of irrelevant information.	It can be difficult to apply to meetings that are very long or that contain a lot of technical jargon.

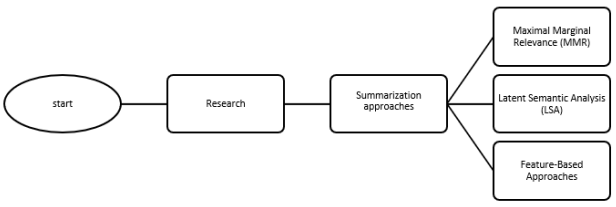
	scores are then selected to be included in the summary.		

Major Impact Factors in this Work

Dependent Variable	Independent Variable	Moderating variable	Mediating (Intervening) variable
● ROUGE Score. ● Cosine Similarity. ● F1 score	● Weight Parameter can be varied to trade off between relevance and redundancy in the summary ● redundancy that will cause a high/low score	The selection of sentences based on singular values (topic selection criteria) directly affects the content and informativeness of the summary. Changing the dimensionality reduction method may lead to different summary lengths and contents, which can impact the quality of the summary.	The choice of the evaluation metric is important in assessing the quality of the generated summaries. Different evaluation metrics may lead to different assessments of the summary quality. It mediates the relation between similarity and summary.

Relationship Among the Above 4 Variables in This article

- Increasing the number of retained dimensions or topics in LSA is likely to result in longer summaries and decreasing the number of retained dimensions may lead to shorter summaries.
- To assess the correlation between topic selection criteria and informativeness, quality metrics such as ROUGE or F1 score can be used. These metrics can quantify how well the selected sentences cover important content from the original document.
- Giving higher importance to topics with larger singular values is likely to result in selecting sentences that contain more essential and informative content related to those topics.

<table>
<tr><th>Input and Output</th><th>Feature of This Solution</th><th>Contribution & The Value of This Work</th></tr>
<tr>
<td>
<table>
<tr><th>Input</th><th>Output</th></tr>
<tr><td>An audio file of meeting is given</td><td>Summary is generated with the use of extractive summarization.(LSA)</td></tr>
</table>
</td>
<td>Developing manually controllable filters such that users can find the exceptions that can be altered.</td>
<td>Good to have this knowledge from this paper as we review all the summarization techniques to get the accurate and more similarity output.</td>
</tr>
<tr><th colspan="2">Positive Impact of this Solution in This Project Domain</th><th>Negative Impact of this Solution in This Project Domain</th></tr>
<tr><td colspan="2">Extractive summarization is easier to implement and more faithful to the source, but it can be repetitive, incoherent, or miss important information.</td><td>Since this is a performance evaluation of various techniques, not much to project on the negative side as all the things used are defined in advance.</td></tr>
<tr><th>Analyze This Work by Critical Thinking</th><th>The Tools That Assessed this Work</th><th>What is the Structure of this Paper</th></tr>
<tr><td>This work is good, as they tried automatic summary generation with high low performance evaluation and selected the best one to get an accurate one.</td><td>Switchboard and Callhome corpora, ICSI corpus</td><td>Abstract
I. Introduction
II. Summarization Approaches
III. Experimental setup
IV. Results
V. Sample Summarization Output
VI. Conclusion Future work</td></tr>
<tr><th colspan="3">Diagram/Flowchart</th></tr>
<tr><td colspan="3"> 
</td></tr>
</table>

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9

Reference in APA format	Anna Nedoluzhko and Ondˇrej Bojar. "Towards Automatic Minuting of Meetings". Charles University, Institute of Formal and Applied Linguistics 2019.	
URL of the Reference	**Authors Names and Emails**	**Keywords in this Reference**
https://ceur-ws.org/Vol-2473/paper3.pdf	Anna Nedoluzhko, Ondˇrej Bojar	Automatic minuting, Dialogue transcripts, Summarization methods, Extractive summarization, Supervised learning, Graph-based methods, Pointer-generator networks
The Name of the Current Solution (Technique/ Method/ Scheme/ Algorithm/ Model/ Tool/ Framework/etc)	**The Goal (Objective) of this Solution & What is the problem that need to be solved**	**What are the components of it?**
Towards Automatic Minuting of Meetings	The goal is to design an automatic creation of meeting minutes.	Classification of meetings, meeting minutes, available meeting datasets, dialogue summarization methods, summarize the obtained knowledge.

The Process (Mechanism) of this Work; Means How the Problem has Solved & Advantage & Disadvantage of Each Step in This Process

	Process Steps	**Advantage**	**Disadvantage (Limitation)**
1	Classification of Meetings: Classification of meetings involves categorizing them based on their purpose, participants, or topics. It can be useful for organizing schedules and resources.	Helps to know the factors which may affect how the meeting is organized, and kind of agendas and minutes it needs.	It can produce summaries that are choppy and lack coherence.

2	Meeting minutes: Meeting minutes are summaries or records of discussions, decisions, and action items in a meeting.	Provides a formal record of meetings and helps in accountability and tracking action items.	Its consumes more time to create detailed minutes and may not capture every nuance of discussions
3	Available Meeting Datasets: There are datasets available for training and evaluating models related to meetings and dialogue summarization	It's useful for developing and testing meeting-related models and enables research in the field.	Privacy concerns regarding recorded meetings.
4	Dialogue summarization: It is the process of making the content of a meeting into a concise summary. Here the author discusses various methods for meeting dialogue summarization, including focused-unfocused, extractive-abstractive, and supervised-unsupervised approaches.	Maintains the original context and is often more coherent. Can produce more concise summaries, human-like summarization.	May not always generate concise summaries, and coherence can still be an issue. Challenging to generate accurate and coherent summaries, and may introduce errors.

Major Impact Factors in this Work

Dependent Variable	Independent Variable	Moderating variable	Mediating (Intervening) variable
• Automatic minuting of meetings," can be considered the dependent variable.	• Types of Meetings • Meeting Minutes Structure • Meeting agendas • Linguistic properties	• Meeting Content • Meeting Context	• Methods for summarization

Relationship Among the Above 4 Variables in This article

- The nature and characteristics of different types of meetings (business, decision-making, information sharing, etc.) can influence the success of automatic minuting. A well-prepared agenda may provide a clear structure for summarization.
- The content and context of meetings, including factors like location, face-to-face vs. remote, and group size, may moderate the relationships between the independent variables and the dependent variable.
- These methods mediate the relationships between the characteristics of meetings, minutes, and linguistic properties, influencing the success of automatic minuting.

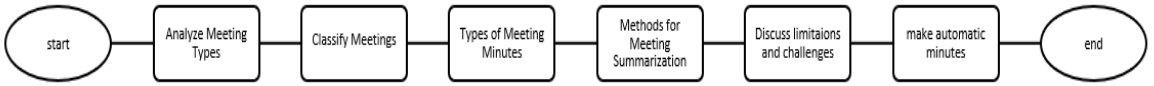
Input and Output	Feature of This Solution	Contribution & The Value of This Work
<table><tr><th>Input</th><th>Output</th></tr><tr><td>Meeting or conversation</td><td>Concise summary of the meeting</td></tr></table>	Dialogue summarization can be done through extractive or abstractive methods, and the choice of method depends on the specific use case and data available.	This information is valuable for researchers, practitioners, and developers interested in automating the process of creating meeting minutes and improving meeting management.

Positive Impact of this Solution in This Project Domain	Negative Impact of this Solution in This Project Domain
Participants can quickly review and reference important points without having to go through the entire meeting transcript. This can result in increased productivity and overall time savings.	Automating the process of creating meeting minutes may result in a loss of the human touch and personalization.

Analyze This Work by Critical Thinking	The Tools That Assessed this Work	What is the Structure of this Paper
Automatic minute is a wise strategy for meeting summarization and we need to have a detailed understanding of common types of meetings, of the linguistic properties and commonalities in the structure of meeting minutes, as well as of	MATRICS, WordNet API, NLTK, spacy	Abstract I. Introduction II. Meetings and Minutes Description III. Available Datasets for Automatic Minuting

methods for their automation.		IV. Methods for Meeting Summarization V. Discussion VI. First Steps Towards Automatic Minuting VII. Conclusion

Diagram/Flowchart



---End of Paper 9---

10

Reference in APA format	Yashar Mehdad, Giuseppe Carenini, Frank W. Tompa, Raymond T. NG. "Abstractive Meeting Summarization with Entailment and Fusion". Department of Computer Science, University of British Columbia ,University of Waterloo 2013.	
URL of the Reference	**Authors Names and Emails**	**Keywords in this Reference**
https://aclanthology.org/W13-2117.pdf	Yashar Mehdad, Giuseppe Carenini, Frank W. Tompa, Raymond T. NG	Abstractive summarization, Recorded meeting summarization, Community detection, Entailment detection, Word graph, Path selection, Multidirectional entailment graph
The Name of the Current Solution (Technique/ Method/ Scheme/ Algorithm/ Model/ Tool/ Framework/etc)	**The Goal (Objective) of this Solution & What is the problem that need to be solved**	**What are the components of it?**

Abstractive Meeting Summarization with Entailment and Fusion	The paper aims to address the limitations of existing approaches by developing a system that can generate informative and readable summaries of meeting conversations. The problem that needs to be solved in the paper is the task of recorded meeting summarization.	Community Detection, Entailment Detection, Word Graph Construction, Path Selection and Ranking, Language Generation

The Process (Mechanism) of this Work; Means How the Problem has Solved & Advantage & Disadvantage of Each Step in This Process

Performance of Detection of spam in email is evaluated based on different algorithms and constraints. Even though this author compared various results upon validating the test data and trained data using machine learning with all supervised and Lazy learning algorithms.

	Process Steps	Advantage	Disadvantage (Limitation)
1	Community Detection: This aims to identify groups of sentences that can be clustered together to generate an abstract sentence. The CONGA algorithm is used for community detection based on the score of edges in a graph.	Helps to identify groups of related sentences, allowing for more focused summarization. Enables the generation of abstract sentences that capture the main ideas of each community.	May not accurately capture the semantic relationships between sentences if the community detection algorithm fails to identify relevant connections.
2	Entailment Detection: This component focuses on identifying the entailment relations between pairs of sentences. A logistic regression classifier is trained using various features to predict the entailment links between sentences in the document.	Identifies the entailment relations between sentences, helping to filter out redundant or irrelevant information. Enables the selection of the most informative sentences for summarization.	May struggle with complex sentence structures or ambiguous cases where the entailment relation is not clear.

3	Word Graph Construction: Once the communities and entailment relations are identified, a word graph is constructed over the sentences in each community. The word graph represents the relationships between words in the sentences.	Represents the relationships between words in the sentences, allowing for a more comprehensive understanding of the content.	Constructing the word graph can be computationally expensive, especially when dealing with a large number of sentences.
4	Path Selection and Ranking: This involves selecting the most informative path in the word graph as the abstract sentence summary. A ranking model is employed to combine various scores, such as entailment score, coverage score, and length score, to determine the best path.	Improves the overall informativeness and coherence of the generated summaries.	The ranking strategy may not always accurately capture the most relevant and informative path, leading to potential loss of important information.
5	Language Generation: The final component focuses on generating the abstractive summary sentence based on the selected path in the word graph. A language model trained on the English Gigaword corpus is used to generate grammatically correct and coherent summaries.	It enhances the readability and fluency of the generated summaries.	The generated summaries may not always capture the exact semantics or nuances of the original sentences.

Major Impact Factors in this Work

Dependent Variable	**Independent Variable**	**Moderating variable**	**Mediating (Intervening) variable**

• Metrics such as ROUGE-1 and ROUGE-2 scores, can be considered as the dependent variable.	• meeting summarization • word graph construction • community detection • entailment detection • sentence fusion	The characteristics of meeting transcripts, such as the formality of language, syntactic structure, and the presence of transcription errors.	The methods used for meeting summarization, including community detection and entailment detection, could be considered as mediating variables

Relationship Among the Above 4 Variables in This article
• This variable depends on the different components and methods proposed in the system. • They mediate the relationship between the independent variables (components and methods) and the dependent variable (effectiveness) by influencing how information is selected and fused in the summarization process. • These factors may moderate the relationship between the independent variables and the effectiveness of the summarization system.

Input and Output	**Feature of This Solution**	**Contribution & The Value of This Work**
Input / **Output** recorded meeting / Summary of recorded meeting	The solution combines various techniques i.e. word graph construction, community detection, entailment detection, path selection, and language generation, to create a comprehensive framework for abstractive summarization. These features work together to generate informative and readable summaries of meeting conversations.	Got to know about various new techniques and introducing a novel approach to language generation.

Positive Impact of this Solution in This Project Domain	**Negative Impact of this Solution in This Project Domain**

The positive impact of the proposed solution in the project domain includes improved efficiency, contribute to more effective project management, and informed decision-making, ultimately leading to successful project outcomes.	The negative impact is that it may not possess the same level of judgment and critical thinking as human summarizers.

Analyze This Work by Critical Thinking	The Tools That Assessed this Work	What is the Structure of this Paper
The proposed work demonstrates innovation and addresses important challenges in meeting summarization. Balancing the benefits and drawbacks, and considering the specific requirements and context of the project, can help ensure the successful integration and utilization of the solution.	NLP tools like NLTK, spaCy, scikit-learn.	Abstract I. Introduction II. Abstractive Summarization Framework III. Experiments and Results IV. Discussion V. Conclusion and Future Work VI. Automatic Minuting VII. Conclusion

Diagram/Flowchart

---End of Paper 10---

11

Reference in APA format	Aryan Jha, Sameer Temkar, Preetam Hegde, Navin Singhaniya - "Business Meeting Summary Generation Using NLP" ITM Web of Conferences 44, 03063 ICACC-2022.	
URL of the Reference	**Authors Names and Emails**	**Keywords in this Reference**

https://doi.org/10.1051/itmconf/20224403 063	Aryan Jha, Sameer Temkar, Preetam Hegde and Navin Singhaniya	Natural language processing, Text summarization, Extractive summarization, abstractive summarization.
The Name of the Current Solution (Technique/ Method/ Scheme/ Algorithm/ Model/ Tool/ Framework/etc)	**The Goal (Objective) of this Solution & What is the problem that need to be solved**	**What are the components of it?**
Natural Language Processing	The goal is to employ Business Summarization in Business Meetings to assist us summarize a recorded meeting while maintaining critical information and ensuring that the summarized meeting has the right context and meaning. Investigate various Business summarizing strategies.	Extractive summarization method involves extracting key sentences or paragraphs from the original text and compressing them into a shorter text. Sentence scoring, Intermediate representation like each sentence is a list of significant attributes such as sentence length, position in the document, the existence of certain phrases.

The Process (Mechanism) of this Work; Means How the Problem has Solved & Advantage & Disadvantage of Each Step in This Process

	Process Steps	Advantage	Disadvantage (Limitation)
1	Speech to text conversion	The Rev-AI Speech-to-Text API is used for text conversion, ensuring precise and concise meanings for easy comprehension by everyone.	Voice recognition technology may cause misheard or misinterpreted words, and voice

			transcription may also be costly.
2	Extractive Summarization	Extractive summarization techniques generate summaries by selecting a subset of the original text's sentences. Extractive summarization also has higher accuracy, lower computational complexity.	Extractive summarization is easier to implement and more faithful to the source, but it can be repetitive, incoherent, or miss important information.
3	Summary Evaluation	ROUGE is a set of metrics for automatically generating Business Meeting summarization and machine translation, with ROUGE-1 indicating better fluency than ROUGE-2 and ROUGE-L.	ROUGE only operates on the overlaps. A score of 1 could only be obtained if both summaries have the exact same n-grams, thus making it hard to tell the model's performance from the computed scores alone.

Major Impact Factors in this Work

Dependent Variable	Independent Variable	Moderating variable	Mediating (Intervening) variable
The dependent variable is the test accuracy metric, which is indicated using F-measure.	The independent variables mentioned in the document include sentence score. The score of a sentence in topic representation approaches demonstrates how well the sentence	The document does not explicitly mention any moderating variables. The possible moderating variable is the ROUGE, which may influence the performance of	The document does not explicitly mention any mediating variables

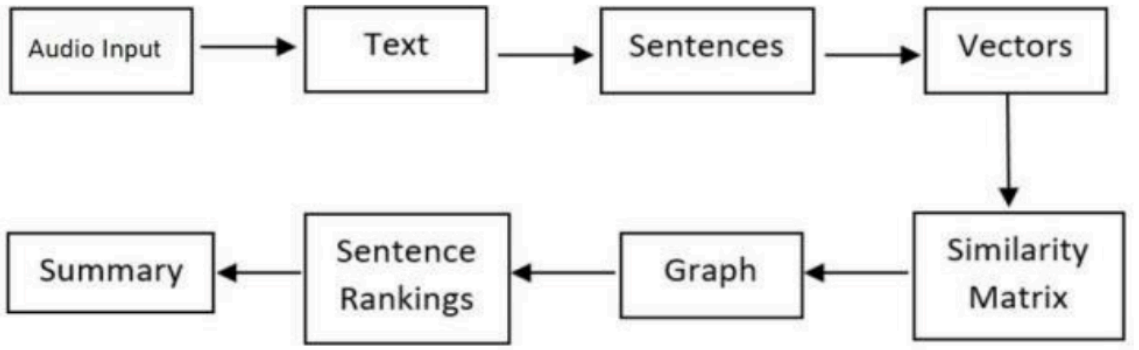
	explains some of the most important topics in the text.	different summaries.	

Relationship Among the Above 4 Variables in This article
The dependent variable (F-measure) is influenced by the independent variables (sentence scores and ROUGE), with sentence scoring potentially moderating the performance of ROUGE potentially mediating the accuracy score of the generated summaries.This complex interplay showcases how these variables interact in the context of generating accurate summary.

Input and Output	Feature of This Solution	Contribution & The Value of This Work
Input / **Output** meeting of 30 minutes / Extractive Summary	The proposed solution uses speech to text conversion, Extractive summarization and sentence scoring features for generating summary.	The document evaluates the generated summary using: ROUGE 1 model and then correlates highly with human judgment.

Positive Impact of this Solution in This Project Domain	Negative Impact of this Solution in This Project Domain
The use of both Extractive summarization and ROUGE 1 features can improve the accuracy of summary generation.	The solution is an Extractive summarization method, which relies heavily on the converted text content data. Which can lead to being repetitive, incoherent, or miss important information.

Analyse This Work by Critical Thinking	The Tools That Assessed this Work	What is the Structure of this Paper

The high accuracy of the proposed approach suggests that it could be effective in real-world applications. It could help businesses by saving time during these lengthy Business Meetings, it is necessary to summarize the meetings.	NLP tools like NLTK, spaCy, scikit-learn.	Abstract I. Introduction II. Organization of report III. System implementation IV. Proposed method for summarization V. Applications VI. Experimental result VII. Output VIII. Conclusion
Diagram/Flowchart		
		

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12

Reference in APA format	Pallavi Lodhi, Shubhangi Kharche, Dikshita Kambri and Sumaiya Khan - "Business Meeting Summarisation System" May 22, 2022.	
URL of the Reference	**Authors Names and Emails**	**Keywords in this Reference**
https://easychair.org/publications/preprint_open/hp72F	Pallavi Lodhi, Shubhangi Kharche, Dikshita Kambri and Sumaiya Khan	Meeting summarization, Natural language processing, Abstractive summarization, Audio summarization, Artificial intelligence.
The Name of the Current Solution	**The Goal (Objective) of this Solution & What is**	**What are the components of it?**

(Technique/ Method/ Scheme/ Algorithm/ Model/ Tool/ Framework/etc)	the problem that need to be solved	
Abstractive Summarization	This work demonstrates summarizing a business meeting held in regional or professional languages with the help of a machine learning model. The summarization is done using the abstractive method where in words are allocated based on their frequency of occurrence in the text file.	Abstractive summarization method summarizes sentences or paragraphs from the original text based on their frequency and compresses them into a shorter text. Seq2seq model architecture(use to solve complex language like machine translation, etc.), encoder and decoder.

The Process (Mechanism) of this Work; Means How the Problem has Solved & Advantage & Disadvantage of Each Step in This Process

	Process Steps	Advantage	Disadvantage (Limitation)
1	Data collection	The data collection includes text and audio input, allowing users to provide business transcripts and record or provide audio files.	File-based files can cause contention and corruption when users access the same file, leading to issues with less audible audio data and accent variations.
2	Abstractive Summarization	Abstractive methods are allocated based on their frequency of occurrence in the text file. Abstractive summarisation technology cherry-picks the most relevant points from a data set and	Abstractive summarization focuses much on generating good results with respect to a particular sentence and too little on the corpus of text containing thousands

		creates an easily digestible summary.	of such sentences. And in this model, one of the limitation is it could only translate 1 language.
3	Error analysis	The suggested work uses GTTs library for recognising the speech audio and translating it to text and and cloud translation API to translate Hindi audio to English. These are Cloud libraries.The user can get the text summary in whichever language he or she wants. This output is available in two formats: audio and text.	As used libraries in this model are cloud libraries, if the internet connection is not stable, the GTTs library may not be able to read and record the audio. Currently the system is only summarized in Hindi and English language. If any other languages are used in the meeting, the system will not recognize the language and will cause discrepancy in the summarization.

Major Impact Factors in this Work

Dependent Variable	Independent Variable	Moderating variable	Mediating (Intervening) variable
There are multiple dependent variables in this model, Audio Summary Quality, System Performance, User Satisfaction, Language	The independent variables mentioned in the document are Number of Training Samples, Translation API, Language used, User Input Preferences.	The document does not explicitly mention any moderating variables. The possible moderating variable is the audio summarization system, which may influence the performance of	The document does not explicitly mention any mediating variables

Translation Accuracy		different summaries.	

Relationship Among the Above 4 Variables in This article
The dependent variable (language translation accuracy) is influenced by the independent variables (translation API and number of training samples), with audio summarization potentially moderating the accuracy score of the generated summaries.This complex interplay showcases how these variables interact in the context of generating accurate summary.

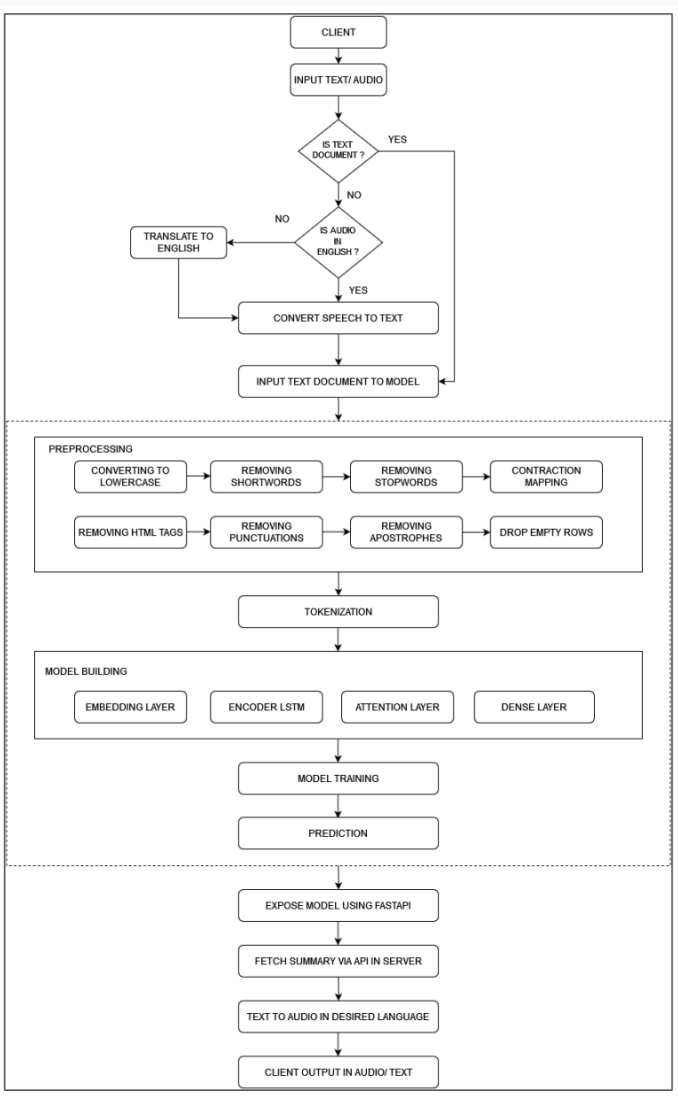
Input and Output	Feature of This Solution	Contribution & The Value of This Work
Input / **Output**: Hindi meeting / Summary	The proposed solution uses Google cloud translation, Abstractive summarization and tokenization features for generating summary.	The document evaluates the generated summary using Abstractive Summarization, Multilingual Support, Training Model Improvements, Addressing Real-World Needs.

Positive Impact of this Solution in This Project Domain	Negative Impact of this Solution in This Project Domain
The use of both Abstractive summarization and cloud API to translate a language into desired language, where these features can improve the accuracy of summary generation.	Currently the system is only summarized in Hindi and English language. If any other languages like Marathi, Gujarati are used in the meeting, the system will not recognise the language and will cause discrepancy in the summarization.

Analyze This Work by Critical Thinking	The Tools That Assessed this Work	What is the Structure of this Paper
The high accuracy of the proposed approach suggests that it could be effective in real-world applications. It could help businesses by saving	NLP tools like NLTK, spaCy, scikit-learn.	Abstract I. INTRODUCTION II. RELATED WORK AND BACKGROUND

time during these lengthy Business Meetings, it is necessary to summarize the meetings from a language to another desired or required language.		KNOWLEDGE III. DATA COLLECTION IV. MODEL FRAMEWORK V. METHODOLOGY VI. EXPERIMENTAL SETUP VII. RESULTS DISCUSSIONS VIII. LIMITATIONS IX. CONCLUSION

Diagram/Flowchart



---End of Paper 12---

13

Reference in APA format	Swapnil Waghmare, Chaitanya Pathak, Raj Kshirsagar, Suyog Malkar - "Business Meeting Summarization Using Natural Language Processing(NLP)" (IJSREM) Volume: 05 Issue: 07 | July – 2021.	
URL of the Reference	**Authors Names and Emails**	**Keywords in this Reference**
https://ijsrem.com/volume-05-issue-07-july-2021	Swapnil Waghmare, Chaitanya Pathak, Raj Kshirsagar, Suyog Malkar	Abstractive Summarization, AES algorithm, Natural Language Processing (NLP), Multimedia.
The Name of the Current Solution (Technique/ Method/ Scheme/ Algorithm/ Model/ Tool/ Framework/etc)	**The Goal (Objective) of this Solution & What is the problem that need to be solved**	**What are the components of it?**
MMS (Multi-Modal Summarization)	The MMS method involves capturing speech using microphones, transcribing the speech, segmenting and aligning it with the corresponding manual report, and then generating a summary using abstractive summarization techniques.	Natural Language Processing (NLP) is used to analyze and understand the text data generated during the meeting. Speech Processing, Computer Vision, Advanced Encryption Standard (AES) Encryption.

The Process (Mechanism) of this Work; Means How the Problem has Solved & Advantage & Disadvantage of Each Step in This Process

	Process Steps	**Advantage**	**Disadvantage (Limitation)**

1	Data Capture	Capturing multi-modal data, including speech, visual, and other relevant information, offers a comprehensive view of the meeting and enables more accurate summary generation.	Capturing and processing multi-modal data can be time-consuming and resource intensive.
2	Data Processing	The data is processed using technologies like natural language processing, speech processing, and computer vision, resulting in a more accurate and comprehensive summary.	The accuracy of the summary is dependent on the accuracy of the data processing technologies used.
3	Summary Generation	The summary is generated by combining the key topics and themes identified during the data processing step and paraphrasing them into a concise and readable summary. The summary is then encrypted using AES encryption to ensure its security and sent to the meeting participants via email.	Abstractive summarization techniques can be more challenging to implement and may not always accurately capture the essence of the original text.

Major Impact Factors in this Work

Dependent Variable	Independent Variable	Moderating variable	Mediating (Intervening) variable

The dependent variable is the quality and security of the textual summary.	Mentioned independent variables are Abstractive summarization, the technologies and libraries used, including Speech Recognition, Spacy, PyCrypto, the AES encryption algorithm.	There doesn't seem to be a clear moderating variable mentioned in the PDF.	The document does not explicitly mention any mediating variables.

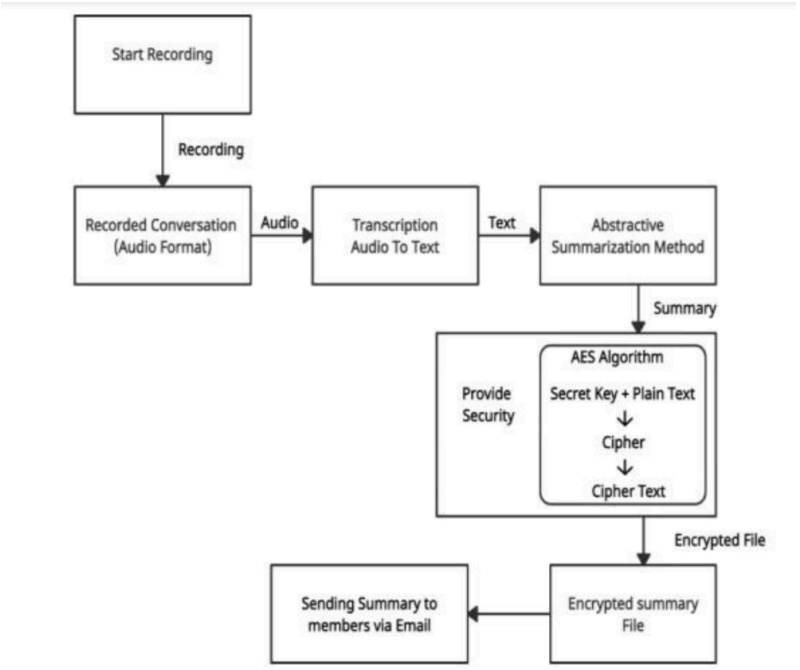
Relationship Among the Above 4 Variables in This article
The independent variables (abstractive summarization methods and various technologies), influence the dependent variable (quality and security of the textual summary). While there are no explicit moderating or mediating variables mentioned, the chosen independent variables directly affect the dependent variable, with the goal of improving the summary's quality and security in the context of meeting summarization.

Input and Output	**Feature of This Solution**	**Contribution & The Value of This Work**
Input: audio meeting **Output**: MMS Summary	The proposed solution aims to enhance the accuracy, security, and efficiency of business meeting summarization by integrating NLP, speech processing, computer vision, and AES encryption.	The proposed method utilizes abstractive summarization to provide a condensed, secure summary of business meetings, offering a more accurate, efficient, and secure method for summarizing meetings.

Positive Impact of this Solution in This Project Domain	**Negative Impact of this Solution in This Project Domain**
The use of abstractive summarization and multi-modal sensing also improves the accuracy of the summary by capturing the main contents of the meeting.	Dependency on speech recognition, loss of context like text summarization algorithms may not always capture the full context and nuances of the original text.

Analyze This Work by Critical Thinking	The Tools That Assessed this Work	What is the Structure of this Paper
By examining the methodology, evaluating the effectiveness of the summarization techniques, assessing the security measures implemented, and considering the practicality and usability of the system.	NLP tools like NLTK, spaCy, AES tool stack, scikit-learn.	Abstract I. Introduction II. Literature survey III. Implemented system IV. Result V. Comparison table VI. Conclusion VII. Reference

Diagram/Flowchart



---End of Paper 13---

14

Reference in APA format	Sheetal Patil, Avinash Pawar, Siddhi Khanna, Anurag Tiwari, Somay Trivedi - "Text Summarizer using NLP (Natural Language Processing)" Volume 12, Issue 3, 2021, DOI (Journal): 10.37591/JoCTA.

URL of the Reference	Authors Names and Emails	Keywords in this Reference
https://www.researchgate.net/publication/365790121_Text_Summarizer_using_NLP_Natural_Language_Processing	Sheetal Patil, Avinash Pawar, Siddhi Khanna, Anurag Tiwari, Somay Trivedi	Automatic summarization, Extractive, Natural Language Processing, frequency-based
The Name of the Current Solution (Technique/ Method/ Scheme/ Algorithm/ Model/ Tool/ Framework/etc)	**The Goal (Objective) of this Solution & What is the problem that need to be solved**	**What are the components of it?**
Frequency based approach	The goal is to collect sentences and tokenize sentences into words and then calculate sentence score on the basis of TF-IDF score which is being used to select the most important sentences to retain the information and merge it to form a summary.	Natural Language Processing (NLP) is used to analyze and understand the text data from the input. Term Frequency (TF), Keyword Frequency, Stop Words Filtering, Clustering Approach like K-means Clustering.

The Process (Mechanism) of this Work; Means How the Problem has Solved & Advantage & Disadvantage of Each Step in This Process

	Process Steps	Advantage	Disadvantage (Limitation)
1	Text Preprocessing	The process involves importing libraries like NLTK and creating clean sentences by removing special characters, digits, and words, thereby standardizing and	It may remove important information that is not recognized as special digits, words, or characters.

		simplifying text analysis.	
2	Term Frequency-Inverse Document Frequency (TF-IDF) Calculation	It helps with the calculation of TF-IDF score for each word in a paragraph. The advantages of this are that it helps to identify the most important words in the text and assign them a higher score, making it easier to select the most important sentences.	Inaccurate - It may not take into account the context of the words, which can lead to inaccurate results.
3	Sentence Scoring and Selection	Calculating the sentence score based on the TF-IDF score of the words in the sentence and selecting the most important sentences to merge into a summary. It helps to identify the most important sentences in the text and create a concise summary.	It may not capture the nuances of the text and may miss important information that is not included in the selected sentences.

Major Impact Factors in this Work

Dependent Variable	**Independent Variable**	**Moderating variable**	**Mediating (Intervening) variable**
The possible dependent variable is the effectiveness or quality of the text summarization.	Possible independent variables are the choice of keywords, or the type of text being summarized.	The length of the input document may be a moderating variable, as longer documents may necessitate different summarization techniques	The document does not mention any mediating variables, but the TF-IDF score may mediate the relationship between word choice and

		compared to shorter ones.	summary quality.

Relationship Among the Above 4 Variables in This article
The independent variables (the choice of text summarization technique) may influence the dependent variable (quality of summary). The mediating variable (TF-IDF score) is used to assess the importance of words in the summarization process, which affects the quality of the summary. The moderating variable (length of the input document) could moderate the relationship between the summarization technique and the quality of the summary, as longer documents may require different approaches.

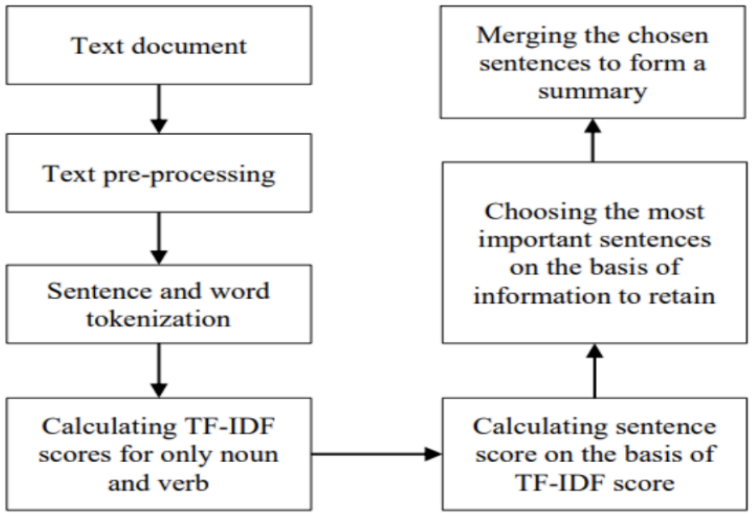
Input and Output	**Feature of This Solution**	**Contribution & The Value of This Work**
Input: Text Document **Output**: freq based summary	The solution employs natural language processing techniques to analyze text, identifying key information through extractive summarization, tokenization, and ranking, and addressing information overload.	This proposal proposes a text summarization solution using natural language processing and an extractive summarizer to efficiently identify and use key information in large text volumes.

Positive Impact of this Solution in This Project Domain	**Negative Impact of this Solution in This Project Domain**
Positive impact on the project domain by improving access to information, enhancing natural language processing tasks, and increasing text processing capacity.	Loss of Context, Sensitivity to Word Frequency which may lead to unbalanced accuracy of the generated summary, Lack of Human Judgment.

Analyze This Work by Critical Thinking	**The Tools That Assessed this Work**	**What is the Structure of this Paper**
The article discusses the benefits of automated summarization and the significance of this PDF lies in its proposal of an	None	Abstract I. Introduction II. Literature survey III. Problem statement IV. Proposed system

effective and efficient method for text summarization, which can be particularly useful in fields such as research and development.		V. Approach VI. Conclusion VII. Future scope VIII. Reference

Diagram/Flowchart



---End of Paper 14---

15

Reference in APA format	Chetana Varagantham, J. Srinija Reddy , Uday Yelleni , Madhumitha Kotha , Dr P.Venkateswara Rao - "TEXT SUMMARIZATION USING NLP" JETIR May 2022, Volume 9, Issue 5.	
URL of the Reference	**Authors Names and Emails**	**Keywords in this Reference**
https://www.jetir.org/papers/JETIR2205397.pdf	Chetana Varagantham, J. Srinija Reddy, Uday Yelleni, Madhumitha Kotha , Dr P.Venkateswara Rao	Machine Learning, Text Summarization, Natural Language Processing (NLP) ,Clustering, Tokens
The Name of the Current Solution (Technique/ Method/ Scheme/ Algorithm/	**The Goal (Objective) of this Solution & What is the problem that need to be solved**	**What are the components of it?**

Model/ Tool/ Framework/etc)		
k-means clustering approach	Based on sentence scoring, the clustering technique is used to extract the final summary sentences, which are segregated into lowest and highest weighted sentences. The final output is based on the highest scored clusters, which provide meaningful and efficient summaries.	Sentence segmentation, Tokenization, Stop word removal, Stemming.

The Process (Mechanism) of this Work; Means How the Problem has Solved & Advantage & Disadvantage of Each Step in This Process

	Process Steps	Advantage	Disadvantage (Limitation)
1	Pre-processing step	The process involves transforming the input document into a collection of words or phrases, and performing natural language processing tasks like sentence segmentation, tokenization, stop word removal, and stemming.	It may result in the loss of some important information.
2	Scoring step	Calculating the frequency weight age of each word in the sentence in the entire document and allocating a total score for the sentences, which helps us to find the important sentences.	It may not capture the context and meaning of the sentences accurately.

3	Clustering step	Using k-means clustering to divide the sentences into clusters based on their scores and selecting the highest scored clusters to generate the final summary which helps to group similar sentences together, reduces redundancy in the summary.	It may not capture the diversity of the input document and may result in the loss of some important information.

Major Impact Factors in this Work

Dependent Variable	Independent Variable	Moderating variable	Mediating (Intervening) variable
The possible dependent variable is the effectiveness or efficiency of the text summarization.	Possible independent variables are the choice of keywords, tokenizing.	But the possible moderating variable could be Clustering.	The text does not explicitly mention a mediating variable.

Relationship Among the Above 4 Variables in This article

The independent variables (morphological elements) may influence the dependent variable (effective summarization). The moderating variable (clustering) could moderate the relationship between the summarization technique and the quality of the summary, as longer documents may require different approaches.

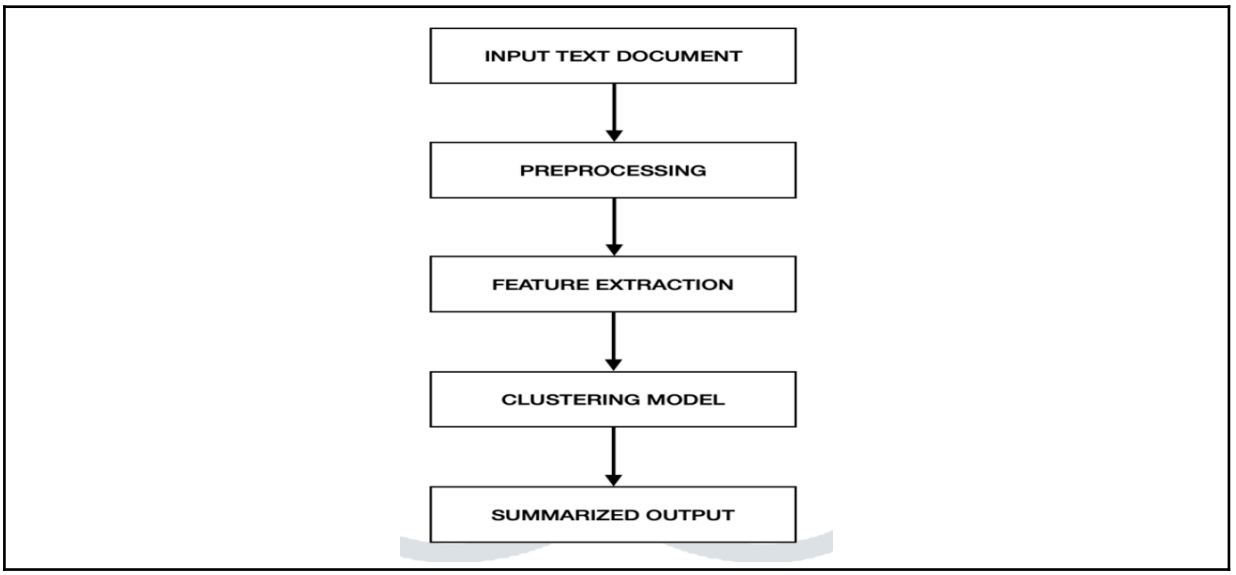
Input and Output	Feature of This Solution	Contribution & The Value of This Work
Input | Output	The solution can automatically generate a summary of the input document without human intervention. And it can handle large volumes of	Contribution in this work proposal of a text summarization solution is the development of a framework for extractive

Text Document	clustering based summary	text data and summarize them efficiently. The solution can generate summaries quickly and accurately, which can save time and effort for users.	text summarization using k-means clustering.

Positive Impact of this Solution in This Project Domain	Negative Impact of this Solution in This Project Domain
This approach can help to reduce the amount of time and effort required to read and understand large volumes of text data, which can be especially useful in domains such as news articles, research papers, and legal documents.	The extractive approach used in this solution may result in the loss of context, which can affect the accuracy and relevance of the generated summary. Limited language support and Dependence on quality of input data.

Analyse This Work by Critical Thinking	The Tools That Assessed this Work	What is the Structure of this Paper
The paper provides a comprehensive overview of the existing systems of text summarization, the proposed system, and the workflow involved in the process. However, it is important to consider the potential limitations of the proposed solution, such as the loss of context and dependence on the quality of input data.	None	Abstract I. Introduction II. Literature survey III. Existing system IV. Proposed system V. Workflow VI. Result VII. Conclusion VIII. Reference

Diagram/Flowchart



---End of Paper 15---

16

Reference in APA format	Jaisal Shah and Neelam Jain, "Advances in Automatic Meeting Minute Generation: A Survey", IJARSCT, Volume 3, Issue 1, February 2023, DOI: https://ijarsct.co.in/Paper8328.pdf.	
URL of the Reference	**Authors Names and Emails**	**Keywords in this Reference**
https://ijarsct.co.in/Paper8328.pdf	Jaisal Shah and Neelam Jain	Automatic Meeting Minute Generation
The Name of the Current Solution (Technique/ Method/ Scheme/ Algorithm/ Model/ Tool/ Framework/etc)	**The Goal (Objective) of this Solution & What is the problem that need to be solved**	**What are the components of it?**
The current solution for automatic meeting minute generation is called the Automated Minute	Aim is to find the performance Automated Minute Book Creation (AMBOC) system is to automate the process of generating meeting minutes	Supervised learning for classification which determine the Speech recognition Speaker verification and Text summarization

Book Creation (AMBOC) system.		

The Process (Mechanism) of this Work; Means How the Problem has Solved & Advantage & Disadvantage of Each Step in This Process

Process is used for automated method to record minutes and transcripts of a meeting with the benefit of speaker identification using deep leanring and Deep neural network

	Process Steps	Advantage	Disadvantage (Limitation)
1	Mel Frequency Cepstral Coefficient (MFCC)	Human auditory system modeling: MFCCs are inspired by the human auditory system's sensitivity to different frequency bands, making them effective for capturing important features in audio signals.	One disadvantage of Mel Frequency Cepstral Coefficients (MFCCs) is that they may not capture high-frequency information as effectively as other feature extraction methods.
2	Transformers	Parallelization: Transformers can process input data in parallel, which	Large Memory Footprint: Transformers can have a large memory footprint, which may make them unsuitable for deployment on resource-constrained devices.
3	Deep Neural Networks (DNN)	Deep learning models, particularly deep neural networks, have demonstrated exceptional performance in tasks like image and speech recognition, natural language processing, and game playing.	Deep learning models are intricate and often necessitate the use of advanced expertise for their design, training, and refinement.

Major Impact Factors in this Work

Dependent Variable	Independent Variable	Moderating variable	Mediating (Intervening) variable
Performance of the model in generating meeting minutes (e.g., accuracy percentage, adequacy score, fluency, grammatical accuracy)	The study utilized text summarization techniques, resampling techniques, machine learning classifiers, phrase segmentation, and audio/text information combination for event identification and summarization.	The study did not consider speaker recognition, and the analysis process was logically separated.	Use of auditory and perceptual signals (e.g., noise level, roughness, teaser power) to identify and summarize important events in audio data

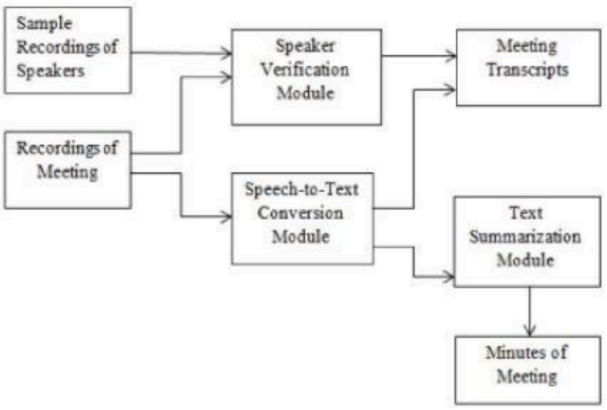
Relationship Among the Above 4 Variables in This article
The Independent Variables directly impact the Dependent Variable, while the Moderating and Mediating Variables can influence or mediate this relationship, respectively, by affecting the process or outcomes of automatic meeting minute generation.

Input and Output	Feature of This Solution	Contribution & The Value of This Work
Input: speech recordings, text transcripts, and meeting data. **Output**: speaker identification, and summaries.	The proposed solution focuses on both extractive and abstractive summarization techniques.	Deep Learning techniques to extract crucial information from significant debates during meetings.

Positive Impact of this Solution in This Project Domain	Negative Impact of this Solution in This Project Domain
This allows participants to focus more on the meeting itself and actively engage in discussions. The proposed solution improves productivity by streamlining the process of generating meeting minutes, saving time and resources, and ensuring	Ability to manage picture and video files.the Base64 technique is unable to manage picture and video files. This limitation can hinder the comprehensive documentation of meetings that involve visual content.

Analyse This Work by Critical Thinking	The Tools That Assessed this Work	What is the Structure of this Paper
The context mainly consists of information about text summarization techniques, evaluation methods, and research studies related to audio and text summarization.	LSE (Latent Semantic Evaluation) LSA (Latent Semantic Analysis), Machine learning classifiers	Abstract I. Introduction II. Background III. Methodology IV. Main Finding V. Implementation VI. Design VII. Conclusion

Diagram/Flowchart



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17

Reference in APA format	Neslihan Akar and Metin Turan, "A General Approach for Meeting Summarization: From Speech to Extractive Summarization", Istanbul Commerce University, 2022, Volume 9, DOI: 10.18488/76.v9i2.3038.

URL of the Reference	Authors Names and Emails	Keywords in this Reference
https://archive.conscientiabeam.com/index.php/76/article/view/3038/6741	Neslihan Akar, Metin Turan	Human Factor, Sound Recording Environments, Language-Specific Problems, Interference and Noise
The Name of the Current Solution (Technique/ Method/ Scheme/ Algorithm/ Model/ Tool/ Framework/etc)	**The Goal (Objective) of this Solution & What is the problem that need to be solved**	**What are the components of it?**
converting audio to text in meeting summarization and . It transcribes the audio stream from each meeting participant into text .	converting audio recordings of meetings into text and summarizing the obtained texts.	Speech to Text Conversion, Text Summarization, Sentence Similarity Comparison

The Process (Mechanism) of this Work; Means How the Problem has Solved & Advantage & Disadvantage of Each Step in This Process

	Process Steps	Advantage	Disadvantage (Limitation)
1	Speech to Text Conversion: speech-to-text conversion (ASR) is a technology that converts spoken language into written text, despite challenges like noise, accents, and language complexity. Despite these, research continues to improve accuracy.	increased Efficiency, Accuracy	Data loss and noise recognition.

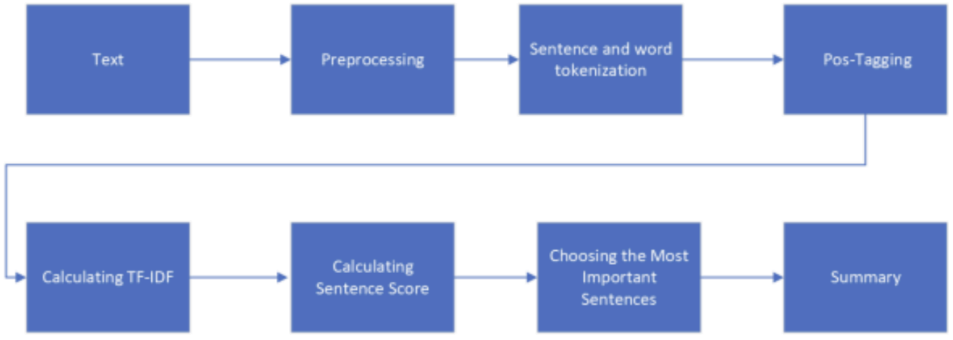
2	Text Summarization: Text summarization is the condensing of a lengthy text into a shorter version, preserving key information and enhancing reader comprehension through techniques like extraction and abstraction.	Capturing important points.	Loss of Context
3	Comparison with Human Summaries	Efficiency and Time saving.	Ambiguity and Inference

Major Impact Factors in this Work

Dependent Variable	Independent Variable	Moderating variable	Mediating (Intervening) variable
The success rate of extractive summarization is a measure of the technique's effectiveness in producing summaries that resemble human-generated ones.	Meeting texts, speech-to-text conversion, and summarization ratios (40% and 20%) are input data for summarization processes, involving both human and machine summarizers.	Human summarizers and a dictionary are used to support the summarization process of meeting texts, ensuring equal ratios and accuracy.	Machine and human summarizers' similarity ratios and selective words determine summarization process success.

Relationship Among the Above 4 Variables in This article

Independent, Moderating, and Mediating Variables drive the summarization process, providing support and guidance, and evaluating results to impact the success rate of the extractive summarization technique.

<table>
<tr><th>Input and Output</th><th>Feature of This Solution</th><th>Contribution & The Value of This Work</th></tr>
<tr>
<td>
<table>
<tr><th>Input</th><th>Output</th></tr>
<tr><td>audio input meeting</td><td>extractive summary</td></tr>
</table>
</td>
<td>It converts the spoken words in the audio files into written text. which gives us even better results.</td>
<td>Contribution in this work proposal of a text summarization solution is the development of a framework for extractive text summarization using freq based approach.</td>
</tr>
<tr><th colspan="2">Positive Impact of this Solution in This Project Domain</th><th>Negative Impact of this Solution in This Project Domain</th></tr>
<tr><td colspan="2">Converting audio recordings of meetings into text, the solution enables the summarization.</td><td>Hominy and misunderstanding. Loss of information.</td></tr>
<tr><th>Analyze This Work by Critical Thinking</th><th>The Tools That Assessed this Work</th><th>What is the Structure of this Paper</th></tr>
<tr><td>Critical thinking requires examining the logical reasoning, evidence, and validity of the research findings</td><td>speech recognizer toolkit, Algorithms, human summarizers.</td><td>Abstract
I. Introduction
II. Methodology
III. Data
IV. Results and Evaluation.
V. conclusion</td></tr>
<tr><th colspan="3">Diagram/Flowchart</th></tr>
<tr><td colspan="3"> 
</td></tr>
</table>

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18

Reference in APA format	Hamza Shabbir Moiyadi, Harsh Desai, Dhairya Pawar, Geet Agarwal, Nilesh M.Patil, "NLP Based Text Summarization Using Semantic Analysis", IJAEMS, Vol-2, Issue-10, Oct-2016, DOI:https://www.neliti.com/publications/2396 78.	
URL of the Reference	**Authors Names and Emails**	**Keywords in this Reference**
https://www.neliti.com/publications/2396 78	Harsh Desai, Dhairya Pawar, Geet Agrawal, Nilesh M.Patil.	text summarization techniques and classical approaches to text summarization.
The Name of the Current Solution (Technique/ Method/ Scheme/ Algorithm/ Model/ Tool/ Framework/etc)	**The Goal (Objective) of this Solution & What is the problem that need to be solved**	**What are the components of it?**
Latent Semantic Analysis (LSA) Summarizer.	(LSA) Summarizer solution mentioned in the document is to summarize text documents.	Pre-processing, Singular Value Decomposition (SVD), Summary Generation.

The Process (Mechanism) of this Work; Means How the Problem has Solved & Advantage & Disadvantage of Each Step in This Process

Process is used for automated method to record minutes and transcripts of a meeting with the benefit of speaker identification using deep leanring and Deep neural network

	Process Steps	**Advantage**	**Disadvantage (Limitation)**
1	Pre-processing	Removal of stop words. Enhanced summarization accuracy.	Initial deployment costs and potential technical challenges in maintaining sensors in remote areas.
2	Singular Value Decomposition (SVD): Singular Value Decomposition (SVD) is a text summarization	Dimensionality Reduction, Noise Reduction.	SVD might not handle missing data.

	technique that reduces dimensionality, identifying latent semantic relationships, and extracting essential features for concise summaries.		
3	Filtering.	Improved Accuracy.	
4	Sentence Selection.	sentences contain the most relevant and meaningful information.	

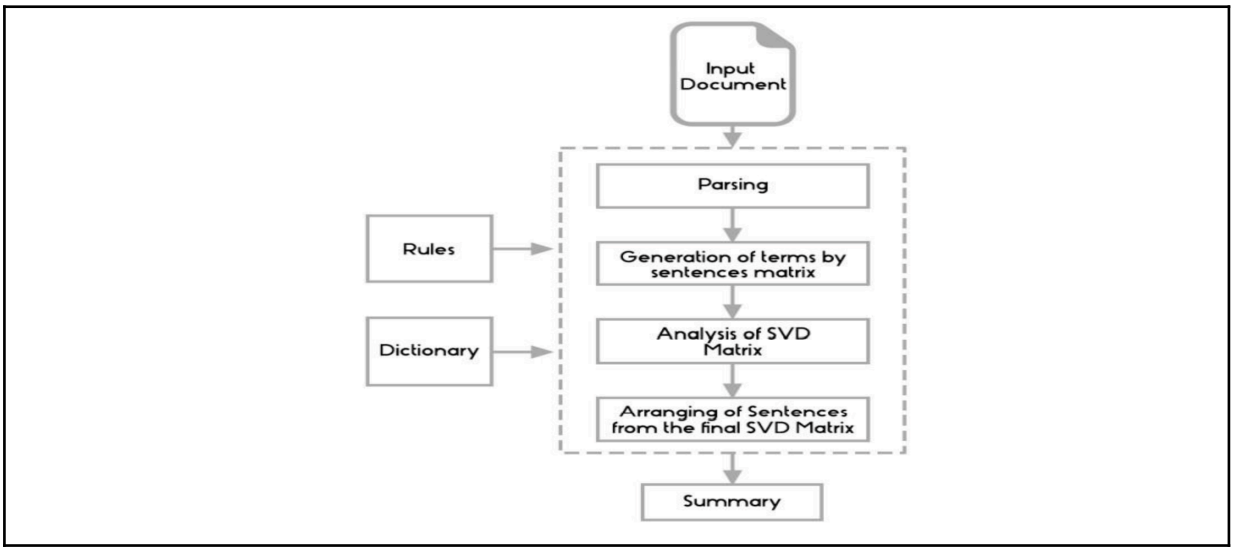
Major Impact Factors in this Work

Dependent Variable	Independent Variable	Moderating variable	Mediating (Intervening) variable
The dependent variable is the quality and effectiveness of the generated document summary, measured in coherence, relevance, and comprehensiveness compared to the original document.	The system employs Latent Semantic Analysis (LSA) as the independent variable for document summarization, primarily used to extract semantic information from input documents.	Semantic rules and dictionaries from NLP libraries enhance semantic analysis and SVD phases, providing contextual information and world knowledge, but their effectiveness may vary with different domains or languages.	The SVD matrix mediates the extraction of latent semantic structures from input documents, influencing the quality of summarization and acting as an intermediary step between the input and final summary.

Relationship Among the Above 4 Variables in This article

The proposed system focuses on Latent Semantic Analysis (LSA) and Singular Value Decomposition (SVD) matrix for document summarization, with semantic rules and NLP libraries potentially influencing the process's effectiveness.

<table>
<tr><td colspan="3"></td></tr>
<tr><th>Input and Output</th><th>Feature of This Solution</th><th>Contribution & The Value of This Work</th></tr>
<tr><td><table><tr><th>Input</th><th>Output</th></tr><tr><td>meeting data.</td><td>techniques to select top sentences</td></tr></table></td><td>Latent Semantic Analysis (LSA) usually summarizes and arrange the sentences.</td><td>This work is designed for the LSA in that it derives the latent semantic structure from the document, allowing for a more meaningful summary.</td></tr>
<tr><th colspan="2">Positive Impact of this Solution in This Project Domain</th><th>Negative Impact of this Solution in This Project Domain</th></tr>
<tr><td colspan="2">Perform LSA at original text to Summarized Text.</td><td>Takes much time to generate the summary.</td></tr>
<tr><th>Analyse This Work by Critical Thinking</th><th>The Tools That Assessed this Work</th><th>What is the Structure of this Paper</th></tr>
<tr><td>Arranging of sentences from the SVD matrix</td><td>Python, NLTK (Natural Language Toolkit, Gensim (Python library).</td><td>Abstract
I. Introduction
II. Literature Review
III. Discussion
IV. Proposed System
V. Conclusion & Result</td></tr>
<tr><th colspan="3">Diagram/Flowchart</th></tr>
</table>



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Reference in APA format	Viveksheel Yadav, Faraz Ahmad and Ashuvendra Singh, "Techniques for Meeting Summarization: An Analysis and Suggestions for Improvement", Mathematical Statistician and Engineering Applications, October 2022, Vol-71, No. 4, India,ISSN (Online): 2094-0343, DOI: https://www.philstat.org/index.php/MSEA /article/view/688.	
URL of the Reference	**Authors Names and Emails**	**Keywords in this Reference**
https://www.philstat.org/index.php/MSEA /article/view/688	Viveksheel Yadav , Faraz Ahmad, Ashuvendra Singh.	Text Recognition, Document Images, OCR, Speech to Text Conversion, Multilingual Languages, K Nearest Neighbor, Text Summarization.
The Name of the Current Solution (Technique/ Method/ Scheme/ Algorithm/ Model/ Tool/ Framework/etc)	**The Goal (Objective) of this Solution & What is the problem that need to be solved**	**What are the components of it?**

TFRSP (Text Frequency Ranking Sentence Prediction).	To combine extractive and abstractive summarization techniques using supervised and unsupervised learning algorithms.	Extractive Summarization, Abstractive Summarization, Supervised and Unsupervised Learning Algorithms.

The Process (Mechanism) of this Work; Means How the Problem has Solved & Advantage & Disadvantage of Each Step in This Process

	Process Steps	Advantage	Disadvantage (Limitation)
1	Extractive Summarization. By scoring each and every sentence, we normalize them using cosine similarity methodology and top rank to select the important sentences.	Easier Evaluation and Faster Processing	Redundancy.
2	Abstractive Summarization: generating new sentences, unlike using the same sentences in the meeting by creating neural networks and LSTM layers.	Reduced Redundancy.	Difficulty in Ensuring Accuracy.
3	Integration Techniques.	Data Accessibility and Sharing, Cost and Time Efficiency.	

Major Impact Factors in this Work

Dependent Variable	Independent Variable	Moderating variable	Mediating (Intervening) variable
The dependent variable is the quality and effectiveness of the document	The independent variable is the use of convolutional neural networks as the primary	No Moderating variables	No mediating variables.

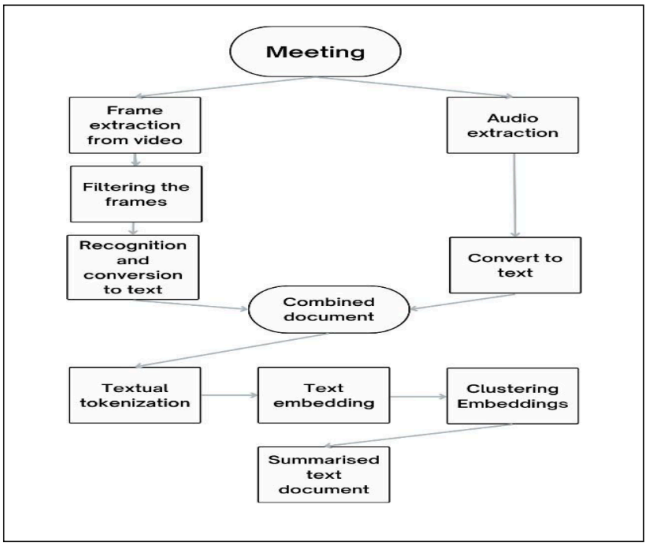
summarization algorithm.	method for extracting important information from documents.		

Relationship Among the Above 4 Variables in This article
The quality and effectiveness of the summarization algorithm directly depend on the utilization of convolutional neural networks for information extraction, with no additional factors influencing this relationship.

Input and Output	Feature of This Solution	Contribution & The Value of This Work
Input / **Output** meeting data / Using both techniques we generate summaries.	Reduce computational power while maintaining accuracy by integrating different models to generate a summary.	It utilizes the Text Rank (TR) method with the Term Frequency-Inverse Document Frequency (TF-IDF) algorithm for extractive summarization.

Positive Impact of this Solution in This Project Domain	Negative Impact of this Solution in This Project Domain
Reduce the computational power required while maintaining the accuracy of the model. By integrating different models, TFRSP is able to generate a summary that is comparable to a summary written by a person.	Computational complexity and Reduced accuracy.

Analyse This Work by Critical Thinking	The Tools That Assessed this Work	What is the Structure of this Paper

The context mainly discusses various methods and techniques used in handwriting and voice recognition, as well as text summarization.	Support Vector Machine(SVM), TSRFP model, KNN algorithm, Minimum Distance Classifier.	Abstract i. Introduction. ii. Literary review. iii. Methods. iv. Proposed system v. Conclusion.
Diagram/Flowchart		
		

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Reference in APA format	Han van der Aa, Josep Carmona, Henrik Leopold, Jan Mendling, "Challenges and Opportunities of Applying Natural Language Processing in Business Process Management", Univ. Politecnica de Catalunya Barcelona, Spain, ISSN (Online)2591-2801, vol.2 Issue 10, August 2018, DOI:https://aclanthology.org/C18-1236.	
URL of the Reference	**Authors Names and Emails**	**Keywords in this Reference**
https://aclanthology.org/C18-1236	Jan Mandlig, Henrik Leopold	process mining, compliance checking, BPMN-Q, temporal logic, abstraction layers, automated matching, linguistic conventions, conceptual models.

The Name of the Current Solution (Technique/ Method/ Scheme/ Algorithm/ Model/ Tool/ Framework/etc)	The Goal (Objective) of this Solution & What is the problem that need to be solved	What are the components of it?
NLP techniques would facilitate the automation of particular tasks in business process management.	Main goal is to execute a single process instance and to build useful conversational systems that support the execution of business processes.	Transform process model to textual descriptions. Instance Management. NLP(natural language processing).

The Process (Mechanism) of this Work; Means How the Problem has Solved & Advantage & Disadvantage of Each Step in This Process

	Process Steps	Advantage	Disadvantage (Limitation)
1	Textual Process Descriptions to Process Models: The system aims to automatically transform textual process descriptions into process models using tailored NLP techniques. These techniques identify actions and their inter-relations in the text to lay the foundation for generating a process model. Challenges include identifying contextual information and dealing with the ambiguity of natural language	Process models enhance communication, identify bottlenecks, and inefficiencies, leading to targeted improvements and optimizing resource allocation through visualization, simulation, and analysis.	Converting textual descriptions to models can lead to interpretation errors, oversimplification, and misalignment with actual processes, while maintaining and updating models can be time-consuming and resource-intensive.
2	Translate Process Models: The system can handle multiple definitions of the same process by comparing models created by students to text statements for grading and feedback purposes. It	Process models enhance understanding, identify inefficiencies, facilitate simulation and analysis, and improve communication among stakeholders, facilitating better understanding,	Converting textual descriptions to process models can introduce interpretation errors, maintenance challenges, oversimplification, and alignment issues, potentially leading to

	allows for automatic comparison, grading, and feedback provision to students learning to formalize processes	optimization of resources, and collaboration.	discrepancies between model and actual processes.
3	Mapping Textual and Model Descriptions: The system involves a phase where issues are fixed through refactoring of the process model, using NLP techniques to enhance semantic abstraction levels.	Mapping textual descriptions to model representations enhances communication, thereby increasing efficiency and productivity.	Accurate models can be time-consuming, potentially oversimplify complex business processes, impacting analysis effectiveness and updating them with dynamic operations.
4	Tailored Dialogue Systems: The system uses customized dialogue systems for troubleshooting and stakeholder guidance, such as chatbot-aided troubleshooting, where artificial agents complement human operators in contact centers.	Personalized Customer Interaction, Enhanced, Efficient Handling of Queries, Real-time Insights and Analytics	Complexity and maintenance and updates issues.
5	Conversational Systems for Process Navigation: Conversational systems with NLP features, such as semantic understanding and context resolution, aim to assist stakeholders in navigating processes based on available descriptions.	Enhanced User Experience, Increased Accessibility, Improved Efficiency:	Limited Understanding, Data Privacy and Security Concerns
6	Text Annotation and Analysis: The system involves annotating textual descriptions of process models to establish relations and elicit new information for more precise descriptions. Annotations can also serve as training data to enhance automatic language analyzers for specific tasks	Text annotation and analysis enhance understanding, drive data-driven decision making, identify patterns and trends, and ensure compliance with regulations and standards.	Text data analysis is complex, resource-intensive, subjective, and raises privacy and security concerns due to its complexity, potential biases, and potential misalignment with organizational goals.

Major Impact Factors in this Work

Dependent Variable	Independent Variable	Moderating variable	Mediating (Intervening) variable
The dependent variable in this scenario is the effectiveness of BPM practices, specifically NLP techniques, in improving processes, efficiency, and outcomes within organizations.	The study introduces NLP techniques as an independent variable to enhance BPM practices, with researchers manipulating this variable to observe its impact on the dependent variable.	The complexity of business processes may moderate the relationship between NLP techniques and BPM effectiveness, as complex processes may require different levels of integration or yield varying results.	The accuracy and completeness of NLP-generated process models may influence the relationship between NLP techniques and BPM effectiveness, potentially leading to improved outcomes.

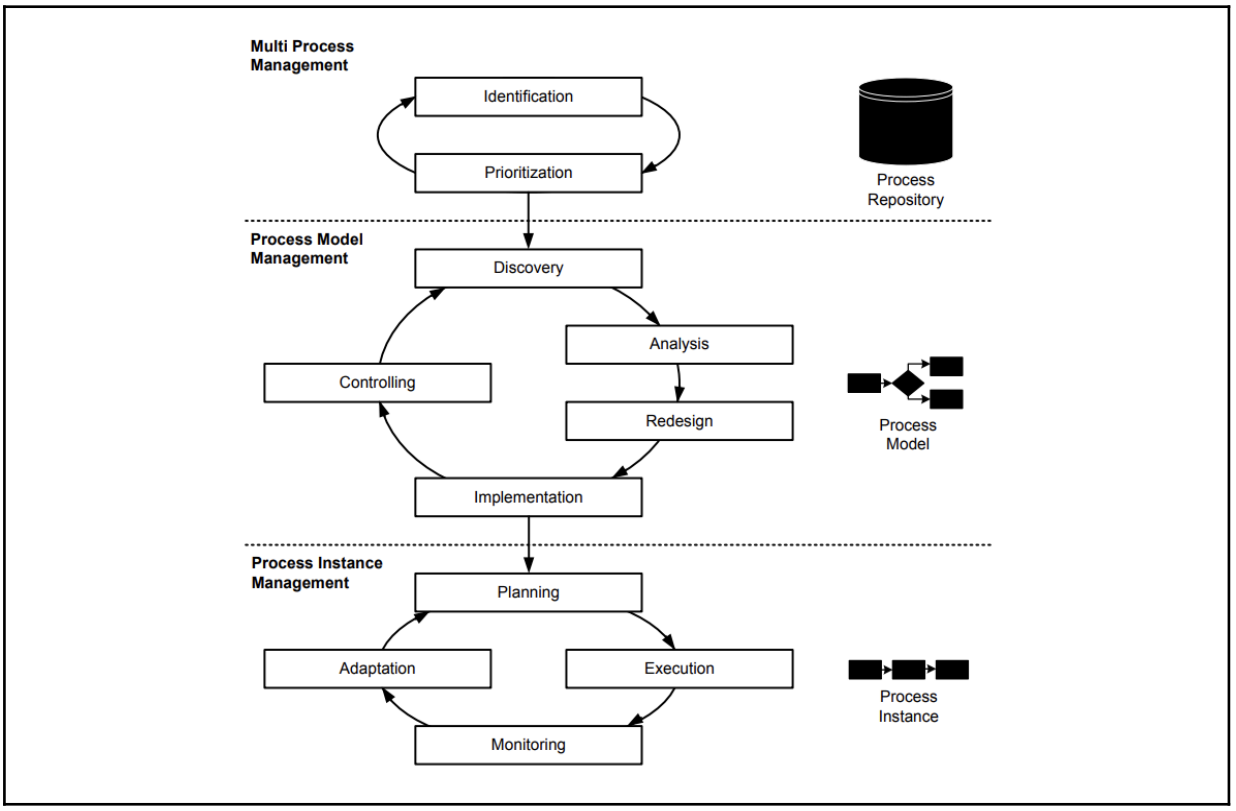
Relationship Among the Above 4 Variables in This article
The study suggests that the effectiveness of Business Process Management (BPM) is influenced by NLP techniques, potentially influenced by process complexity and the quality of generated process models.

Input and Output	Feature of This Solution	Contribution & The Value of This Work
Input | Output	Integration of natural language processing (NLP) features and textual and graphical process descriptions.	Aligning textual descriptions of processes with graphical representations and improve the understanding and analysis of business processes by bridging the gap between

Conversion between formal process descriptions and text.	Applications that consider both the process perspective and its enhancement through NLP.		textual and graphical descriptions.

Positive Impact of this Solution in This Project Domain	**Negative Impact of this Solution in This Project Domain**
Improving the understanding and analysis of business processes.	Lack of domain adaptation and Missing tasks or relations.

Analyse This Work by Critical Thinking	**The Tools That Assessed this Work**	**What is the Structure of this Paper**
NLP can contribute to improving the understanding, analysis, and refinement of business processes.	Business Process Model and Notation (BPMN). Integer Linear Programming (ILP). NLP(natural language processing).	Abstract i. Introduction ii. Background iii. Expanding BPM Capabilities through NLP. iv. Application. v. Conclusion.
Diagram/Flowchart		



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