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## **Interactive Chatbot Interface for News Summarization Using Google Gemini and CNN/DailyMail Dataset**

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**Abstract—This paper presents the development of a chatbot-style graphical user interface (GUI) for automated news summarization using Google's Gemini 2.5 Flash model. The system allows users to input news articles, receive concise summaries, and optionally extract topics or reflective questions based on the content. The summarization system is powered by Google's generative AI through prompt engineering, while the GUI is developed using Streamlit to ensure a responsive and user-friendly experience. The CNN/DailyMail dataset is used to benchmark the model's performance and simulate user interaction. ROUGE evaluation metrics were applied to assess the quality of summaries generated.**

**Keywords—News Summarization, Large Language Models, Gemini, Streamlit, ROUGE, Chatbot Interface.**

## **I. INTRODUCTION**

With the explosion of digital content, particularly in the news domain, there is a growing need for efficient summarization systems that assist readers in quickly understanding long-form articles. Large Language Models (LLMs) such as Google's Gemini now enable sophisticated summarization through prompt-based generation. This paper documents the construction of a practical tool—a chatbot-style GUI for summarization tasks using Gemini and evaluates its performance using the CNN/DailyMail dataset.

## **II. RELATED WORK**

Traditional summarization techniques often rely on extractive methods like TF-IDF or TextRank. Recent developments in transformer-based models, such as BERT, GPT-3, and Gemini, have enabled abstractive summarization with high contextual understanding. Meanwhile, conversational agents and chatbots have seen extensive use in education, support, and content delivery. This work combines both paradigms to create an interactive summarization assistant.

## **III. DATASET**

The CNN/DailyMail summarization dataset (version 3.0.0) contains over 300,000 articles with corresponding human-written highlights. It is commonly used to train and evaluate summarization models. Each record consists of:

- **article:** Full text of the news article.
- **highlights:** A human-written summary used for evaluation.

The dataset was loaded using the Hugging Face datasets library and partially processed for real-time summarization by Gemini.

## **IV. METHODOLOGY**

### **A. Model Integration**

The Gemini 2.5 Flash model was accessed using the google-generativeai Python SDK, configured with a user-provided API key. Prompt engineering was applied to extract:

- A summary ( $\leq 5$  factual sentences)
- Top 3 topics (bullet list)
- 3 reflective questions

## B. Prompt Templates

- **Summary Prompt:** “Summarize the following news article in no more than 5 concise, factual sentences:\n\n{article}”
- **Topics Prompt:** “List the top 3 topics covered in this article in bullet points:\n\n{article}”
- **Questions Prompt:** “Write 3 thought-provoking questions a reader might ask after reading this article:\n\n{article}”

## C. Evaluation

We used the rouge\_score library to compute ROUGE-1, ROUGE-2, and ROUGE-L scores, comparing Gemini-generated summaries to the human-written highlights.

# V. GUI DESIGN

## A. Interface Framework

The GUI was developed using Streamlit for rapid prototyping. Features include API key input, text area for user-submitted articles, “Summarize” button, optional “Topics” and “Questions” buttons, chatbot-style conversation history, and automatic clearing of prior results.

## B. UX Enhancements

- Responsive layout with button columns
- Clear separation of input and output

- Real-time feedback and error handling
- Session state management for context

## **VI. RESULTS**

### **A. Sample Output**

**Example from CNN/DailyMail dataset:**

**Summary:** “The President addressed economic concerns in his State of the Union speech, highlighting efforts to reduce inflation and increase job growth...”

**Topics:** Economic policy, Presidential address, Employment statistics

**Questions:**

- 1) How does the government’s new economic plan compare to previous strategies?**
- 2) What challenges might hinder job growth in the near future?**
- 3) How are inflation trends affecting public sentiment?**

### **B. Evaluation Metrics**

**For a batch of 3 articles, average ROUGE scores were:**

**ROUGE-1: 0.41, ROUGE-2: 0.25, ROUGE-L: 0.39.**

## **VII. DISCUSSION**

**The Gemini model showed strong abstraction capabilities but occasional factual drift on long articles. The interactive interface improved engagement and usability. The modular design supports easy integration with other datasets or models.**

## **VIII. CONCLUSION**

**This work demonstrates a chatbot-style GUI for real-time summarization using Gemini LLM and the CNN/DailyMail dataset. Future work includes domain-specific fine-tuning, improved evaluation pipelines, and public deployment.**

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