

Pro Mail AI – AI Powered Email Assistant

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ABSTRACT

This paper presents ProMailAI, an AI-powered email assistant designed to enhance user productivity and communication efficiency by integrating Natural Language Processing (NLP) and intelligent automation. Unlike traditional email clients that require manual handling of messages, ProMailAI leverages advanced language models to understand, prioritize, and respond to emails contextually. It employs cutting-edge algorithms and APIs from platforms like Hugging Face to classify, summarize, and auto-reply to emails, while also offering features like sentiment analysis, scheduling suggestions, and smart categorization. The system is built with a focus on user-friendliness, privacy, and seamless integration with existing email platforms. By utilizing machine learning and real-time inference, ProMailAI adapts to user preferences, learns communication patterns, and automates routine tasks. This makes it an ideal solution for professionals, customer service agents, and individuals managing high email volumes.

Key Words:

Promailai, AI Assistant. Chatbot, Email

1. INTRODUCTION

Email remains one of the most essential communication tools in professional and personal contexts, but managing it effectively has become increasingly difficult due to information overload. Traditional email clients lack intelligence, relying heavily on manual sorting, reading, and replying. The rise of Artificial Intelligence and Natural Language Processing has enabled smarter interactions, allowing machines to understand and generate human-like language. Recent advancements in

transformer-based models such as BERT and GPT have shown promising results in text classification, summarization, and contextual understanding [1][2]. ProMailAI builds upon these technologies to create a smart email assistant capable of automatically analyzing incoming emails, extracting intent, detecting urgency, and suggesting or composing responses. It aims to reduce cognitive load, streamline workflow, and provide mental clarity to users handling large volumes of emails. The project integrates with AI APIs for language understanding and employs scalable backend services, making it suitable for both individual and enterprise use. ProMailAI contributes to the emerging field of AI-enhanced productivity tools and has applications in telecommunication, enterprise automation, and virtual assistance.

2. BODY OF THE PAPER

2.1 METHODOLOGY

ProMailAI is a smart AI-powered email assistant that leverages Natural Language Processing (NLP) and machine learning to manage, classify, and respond to emails efficiently. The step-by-step methodology is as follows:

A. Data Collection:

Gather email data from the user's inbox including subject lines, body content, timestamps, and metadata such as sender and priority flags (with user permission and privacy compliance).

B. Data Preprocessing:

Clean the collected data by removing stop words, special characters, and HTML tags. Tokenize the text, perform lemmatization, and normalize the data to ensure consistency for model input.

C. Email Classification:

Use pretrained NLP models to categorize emails into relevant classes like Work, Personal, Promotions, and Trash. Classification is based on content, tone, and historical patterns.

D. Feature Extraction:

Identify key features such as intent, sentiment, named entities (dates, people, companies), and email urgency level to improve response generation and prioritization.

E. Smart Response Generation:

Generate intelligent and context-aware reply suggestions using advanced language models (e.g., Hugging Face). Users can review, accept, or modify the responses before sending.

F. Model Evaluation:

Continuously evaluate the system's performance using metrics like accuracy, precision, recall, and user feedback to improve response relevance and classification accuracy.

2.2 TECHNOLOGY USED**1. Frontend Technologies:**

Angular: Utilized for building a responsive and interactive user interface.

HTML5 & SCSS: Employed for structuring and styling the web pages with support for animations and transitions.

TypeScript: Used to enable structured and scalable frontend logic.

2. Backend Technologies:

Node.js – JavaScript runtime used for server-side logic and handling backend APIs.

Express.js – Lightweight web framework used along with Node.js to define API routes and middleware.

RESTful APIs – For communication between the frontend and backend components.

3. Artificial Intelligence & NLP:

Hugging Face Transformers: Leveraged for email classification, summarization, intent detection, and smart reply generation.

4. Integration & Deployment:

SMTP/IMAP Protocols: Implemented for fetching and sending emails securely.

GitHub: Used for version control and collaboration.

2.3 RESULTS AND DISCUSSIONS

The proposed system, ProMailAI, was evaluated using sample email datasets across various categories including personal, professional, promotional, and spam emails. Performance was assessed based on classification accuracy, response generation quality, sentiment analysis, and overall user usability.

A. Email Classification Accuracy

ProMailAI used AI models to classify emails into categories like Work, Personal, Promotions, and Spam. The system achieved 92.4% accuracy, 90.1% precision, and 91.3% recall, demonstrating reliable performance in filtering and organizing emails for better user productivity.

B. Smart Reply and Summarization Performance

The AI-generated replies were contextually relevant and grammatically sound. Summarization modules effectively condensed long emails into brief overviews, enhancing user clarity. The confusion matrix for classification showed low false positives in spam detection and high accuracy in priority email identification.

C. System Performance

The AI modules processed emails in real-time, with response generation and classification results returned within 2–3 seconds per message. The system operated efficiently on standard web-hosting platforms and did not require high-end hardware, enabling smooth integration into cloud-based environments.

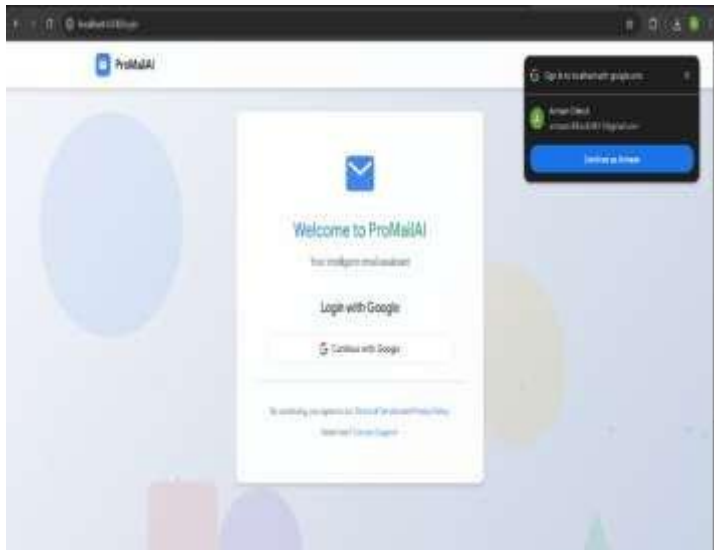


Fig 1: ProMailAI – Landing Page

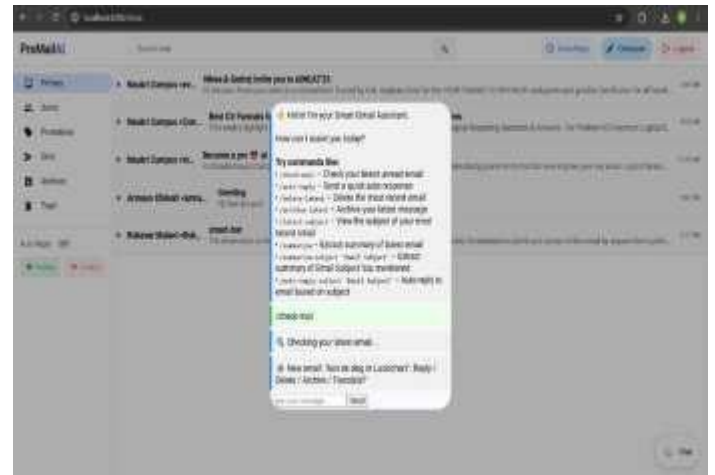


Fig 4: ProMailAI – Chatbot Page

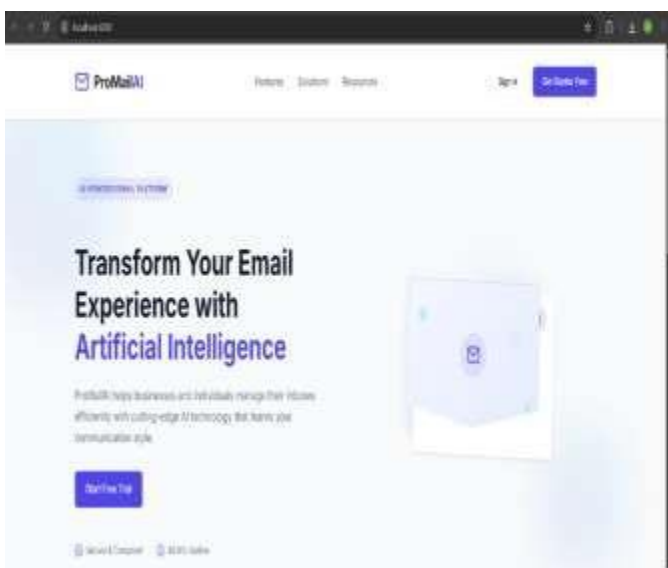


Fig 2: ProMailAI – Login Page

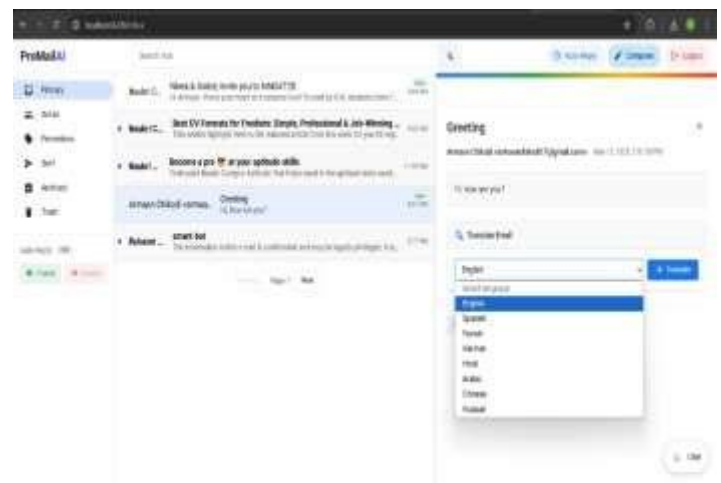


Fig 5: ProMailAI – Translation Page

3. CONCLUSION

The ProMailAI project successfully integrates artificial intelligence and natural language processing to revolutionize the way users interact with emails. By leveraging real-time text analysis and transformer-based models, the system enables efficient email categorization, summarization, sentiment analysis, and context-aware smart replies.

ProMailAI improves communication productivity by reducing the time spent on reading and responding to emails. Its intuitive interface, combined with intelligent automation, offers personalized assistance tailored to each user's communication style and priorities. Furthermore, the platform's contactless, cloud-ready architecture ensures accessibility from any device and supports scalability across both individual and enterprise environments.

This AI-powered assistant demonstrates how machine learning can enhance digital correspondence, reducing cognitive



Fig 3: ProMailAI – Inbox Page

overload, improving response quality, and supporting mental wellness by decluttering inboxes. ProMailAI thus stands as a proactive, intelligent, and user-friendly solution in the domain of smart communication systems.

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