

Research Paper

AI - POWERED MULTILINGUAL DOCUMENT TRANSLATION AND SUMMARIZATION SYSTEM

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ABSTRACT - This project presents an AI-powered multilingual document translation and summarization system that simplifies document processing and helps users overcome language barriers. Unlike conventional systems that require separate tools for text extraction, translation, summarization, and report generation, this application combines all these functions into a single web-based platform. The system is developed using Python Flask for the backend and HTML, CSS, Bootstrap, and JavaScript for the frontend. It extracts text from PDF documents, translates the content into multiple languages, generates concise summaries using AI-based Natural Language Processing (NLP) techniques, and creates downloadable PDF reports. A secure user authentication module is also included to protect user data and ensure safe access. The integrated workflow reduces processing time and improves the overall user experience. Testing results show that the system provides accurate translations, meaningful summaries, and reliable report generation while preserving the original context of the documents. Its modular design makes the application easy to maintain, scalable, and suitable for students, researchers, businesses, and other organizations. Future enhancements include support for OCR-based handwritten document recognition, additional language options, cloud deployment, and the integration of more advanced AI models to further improve translation accuracy and summarization quality.

KEYWORDS: Artificial Intelligence, Natural Language Processing, Multilingual Translation, Document Summarization, Document Processing.

INTRODUCTION

Document processing plays an important role in academic, professional, and business environments. As Artificial Intelligence (AI)

and Natural Language Processing (NLP) continue to evolve, document translation and text summarization have become faster and more accurate. This project integrates AI-based document translation, PDF text extraction, text

summarization, and report generation into a single web-based application. By bringing these features together on one platform, the system simplifies document processing, saves time, and helps users work with multilingual documents more efficiently.

LITERATURE SURVEY

Artificial Intelligence (AI) and Natural Language Processing (NLP) have made document translation and text summarization more efficient in recent years. Many existing systems can either translate documents or generate summaries with good accuracy. However, users often need different applications to complete these tasks, which makes the process time-consuming. To address this issue, the proposed system combines PDF text extraction, multilingual translation, AI-based summarization, and

PDF report generation into a single web-based application. This integrated solution makes document processing faster, easier, and more convenient for users

RELATED WORK

Several researchers have worked on document translation and summarization to help users understand information available in different languages. Earlier systems mainly focused on translating text from one language to another. These systems helped users read documents in their preferred language but did not provide features such as text summarization or report generation. As technology improved, AI and NLP were introduced to make translation more accurate and useful. Researchers also developed summarization methods that help users understand the main points of a document in less time.

However, many existing applications still offer translation and summarization as separate features, requiring users to use multiple tools. The proposed work combines document upload, text extraction, translation, summarization, and PDF generation in a single platform, making document processing easier and more convenient for users.

EXISTING METHOD

The existing document translation and summarization systems mainly perform a single task, such as translation or text summarization. Users often have to use multiple applications to extract text from PDF files, translate the content, generate summaries, and create reports. This makes the overall process time-consuming and less convenient. In addition, some systems support only a limited number of languages or produce less accurate results for complex documents. Most existing solutions also do not provide a single platform that combines all the essential document processing features. As a result, the overall workflow becomes less efficient and requires more user effort.

PROPOSED METHOD

The proposed system is designed to simplify document processing by combining AI-based document translation, text summarization, PDF text extraction, and automated report generation into a single web application. Users can upload PDF documents, extract the text, translate the content into different languages, and generate concise summaries using Natural Language Processing (NLP). This helps users understand lengthy

documents quickly without reading the entire text. The system improves accessibility by reducing language barriers and supporting multilingual communication. It also makes document analysis faster by providing accurate summaries and downloadable reports, saving both time and effort. The web-based interface is simple to use, and all uploaded documents are processed securely to ensure reliable data handling. By integrating multiple AI-powered features into one platform, the proposed system offers a practical, efficient, and cost-effective solution for students, researchers, professionals, and organizations that regularly work with multilingual documents.

SYSTEM ARCHITECTURE

The AI-Powered Multilingual Document Translation and Summarization System starts with the User, who interacts with the application through the Web Interface (HTML, CSS, JavaScript). The request is processed by the Flask Backend, which manages the complete workflow. The user uploads a document through the Document Upload (PDF) module. The uploaded file is then processed by the Text Extraction (PyMuPDF) module to extract the text

content. The extracted text is sent to the
Translation Module (MarianMT) for

multilingual translation. The translated text is further processed by the Summarization Module (BART) to generate a concise summary. Both modules utilize Hugging Face Transformers to improve translation and summarization accuracy. Finally, the PDF Generator creates a report containing the translated text and summary. The Output (Translated PDF + Summary) is then provided to the user, ensuring simple and efficient document processing.

Language Processing (NLP). It begins with

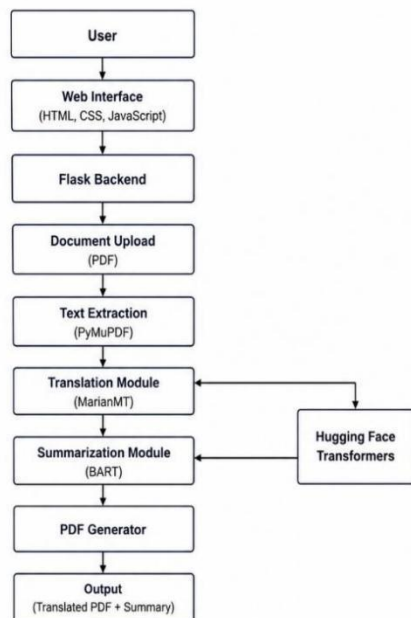


Fig 1: System Architecture

METHODOLOGY DESCRIPTION

The methodology describes the sequence of steps followed to process documents using Artificial Intelligence (AI) and Natural

uploading a PDF document, after which the system extracts the text for further processing. The extracted content is translated into the selected language and then summarized to present the main ideas in a shorter form. Finally, a report is generated and made available for viewing or downloading. This workflow simplifies document processing, improves accuracy, minimizes manual effort, and saves time for users.

RESULTS AND DISCUSSION

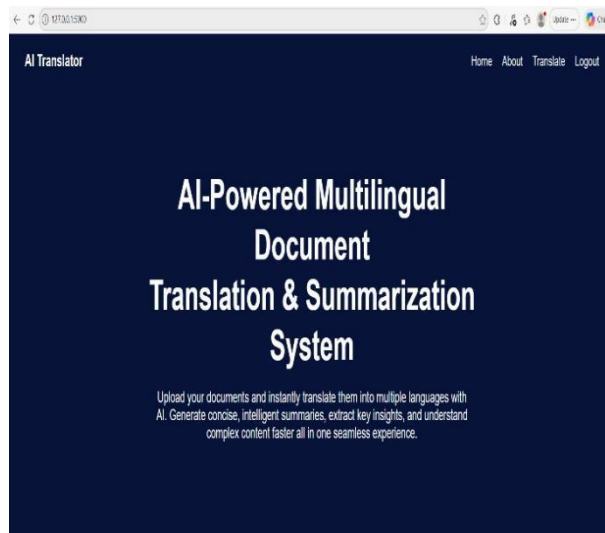


Fig 2: Home Page

The home page introduces the AI-powered document translation and summarization system. It provides an easy-to-use interface for uploading documents, translating them into multiple languages, and generating summaries quickly.

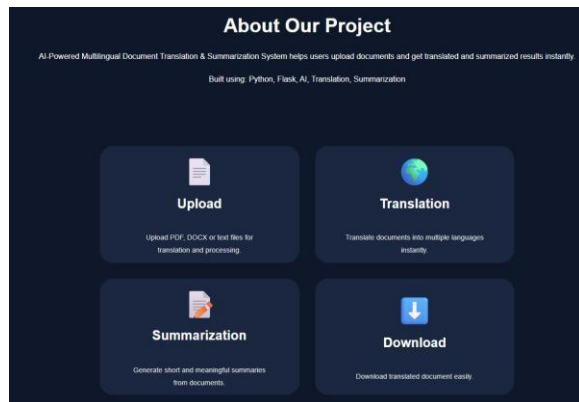


Fig 3: About Page

The About page provides basic information about the project and its features. It explains how users can upload documents, translate them, generate summaries, and download the final output.

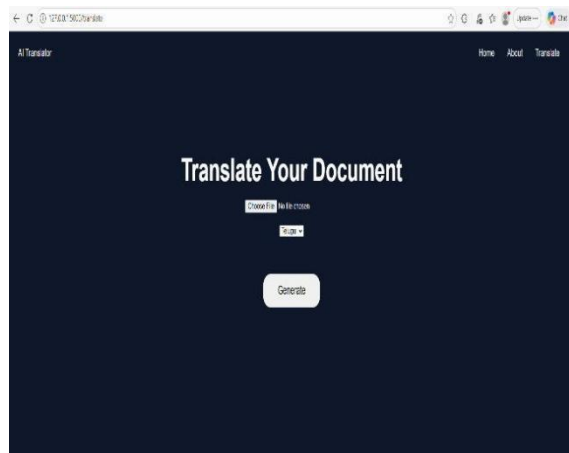


Fig 4: Translate Page

The Translate page is used to upload a document and choose the target language. The system then translates the document, generates a summary, and displays the output for the user.

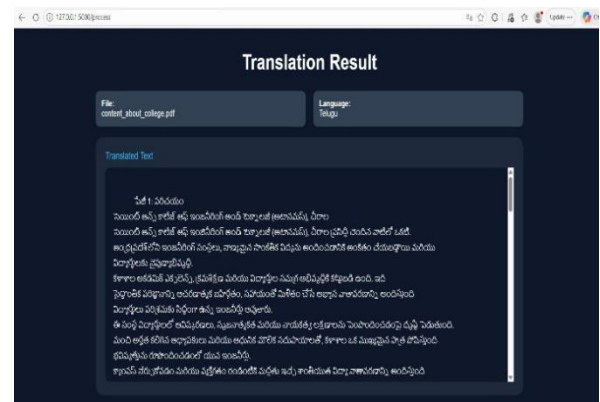


Fig 5: Result Page

The Result page shows the translated document and its summary after the processing is completed. Users can read the translated content, download it as a PDF, or upload another document to perform translation and summarization again.

CONCLUSION

The AI-Powered Multilingual Document Translation and Summarization System provides a simple and effective way to process documents in different languages. It combines document upload, text extraction, translation, summarization, and PDF generation in a single platform. The system helps users understand document content quickly by providing accurate translations and concise summaries. It reduces the need for multiple tools and saves time and effort. The project demonstrates how AI and NLP technologies can improve document

processing and make information more accessible to users from different language backgrounds.

FUTURE SCOPE

The system can be further improved by adding support for more languages and better translation models. Future versions may include OCR technology to process scanned and handwritten documents. Cloud deployment can be implemented to improve accessibility and scalability. Additional AI models can also be integrated to enhance translation quality and generate more detailed summaries. These improvements will make the system more powerful, flexible, and useful for a wider range of users.

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