

AI File Assistant with Smart Chart

Shubham Deore^{*1}, Krushnal Patil^{*2}, Bhupesh Patil^{*3}, Prof. R.M. Samant^{*4}

^{*1,2,3}STES's NBN Sinhgad School Of Engineering, Department Of Information Technology,
Savitribai Phule Pune University, Pune, Maharashtra, India.

^{*4}Project Guide, Department Of Information Technology, NBN Sinhgad College Of Engineering, Pune,
Maharashtra, India.

ABSTRACT

AI File Assistant with Smart Chart is an intelligent document management and analysis system designed to help users efficiently organize, analyze, and extract insights from various digital files. The primary objective of this project is to provide a smart platform that enables users to upload documents, retrieve relevant information through natural language queries, generate automated summaries, and visualize extracted data using interactive charts. The system integrates Artificial Intelligence and Natural Language Processing (NLP) techniques to understand document content and deliver accurate responses based on user requests. The Smart Chart module automatically converts structured data into meaningful visual representations, allowing users to identify trends, patterns, and key insights effectively.

The application is developed using modern web technologies, including ReactJS for the frontend interface, Python-based AI services for document processing and analysis, and a database system for secure data storage and retrieval. Key features of the system include intelligent file search, AI-powered question answering, document summarization, keyword extraction, data visualization, and interactive chart generation. The implementation of the proposed system reduces manual effort in document analysis, improves information accessibility, and enhances decision-making through automated insights and visual analytics.

Experimental evaluation demonstrates improved efficiency in document retrieval, faster information extraction, and enhanced user experience through intelligent assistance and real-time chart generation. The study concludes that AI File Assistant with Smart Chart provides a reliable, scalable, and user-friendly solution for intelligent document management and data-driven analysis in academic, business, and organizational environments.

Keywords: Artificial Intelligence, File Assistant, Natural Language Processing, Smart Charts, Data Visualization

I. INTRODUCTION

In today's digital era, organizations, educational institutions, and businesses generate and manage a large volume of electronic documents daily. Extracting meaningful information from these files manually is often time-consuming, inefficient, and prone to errors. Users frequently face challenges in locating relevant information, understanding lengthy documents, analyzing data, and generating visual insights from large datasets. These challenges have increased the demand for intelligent document management systems that combine Artificial Intelligence (AI), Natural Language Processing (NLP), and data visualization technologies to improve productivity and decision-making.

AI File Assistant with Smart Chart is developed as an intelligent document management and analysis platform that integrates AI-driven document processing with automated chart generation. The project utilizes ReactJS for building a dynamic and responsive frontend interface, while Python-based AI services handle document processing, content analysis, and natural language understanding. A secure database system is used for efficient file storage and information retrieval. The core functionalities of the system include intelligent file upload and management, AI-powered question answering, document summarization, keyword extraction, semantic search, and Smart Chart generation for visualizing structured data.

The Smart Chart module automatically converts extracted numerical and analytical information into interactive application emphasizes scalability, data security, usability, and efficient information retrieval, making it a reliable

solution for academic, business, and organizational environments. By combining intelligent document assistance with automated visualization capabilities, the proposed system significantly reduces manual effort and enhances the overall document analysis experience.

II. METHODOLOGY

The methodology of the AI File Assistant with Smart Chart project focuses on designing and implementing an intelligent document management and analysis system that enables users to upload files, extract information, generate summaries, answer queries, and visualize data through interactive charts. The proposed approach follows a modular and systematic development strategy to ensure accuracy, efficiency, scalability, and user-friendliness. The methodology involves requirement analysis, system architecture design, document processing, artificial intelligence integration, data visualization, and performance testing to achieve the objectives of the proposed system.

System Design and Architecture

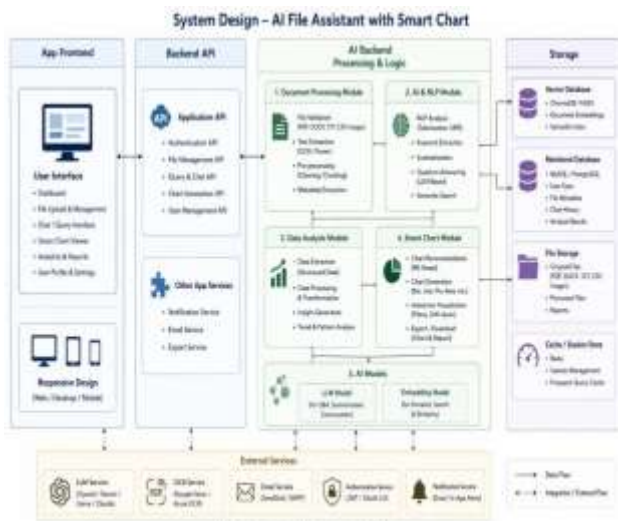


Fig 1: System Design of AI File Assistant with Smart Chart

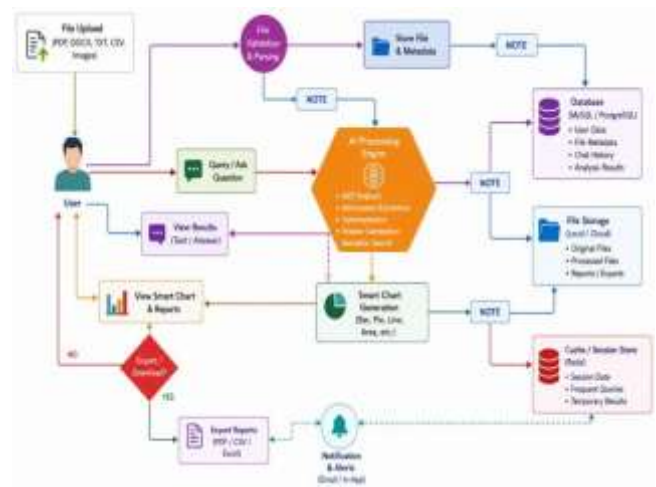


Fig 2: Data Flow diagram

Fig 1: System Design



Fig 3: Activity Diagram

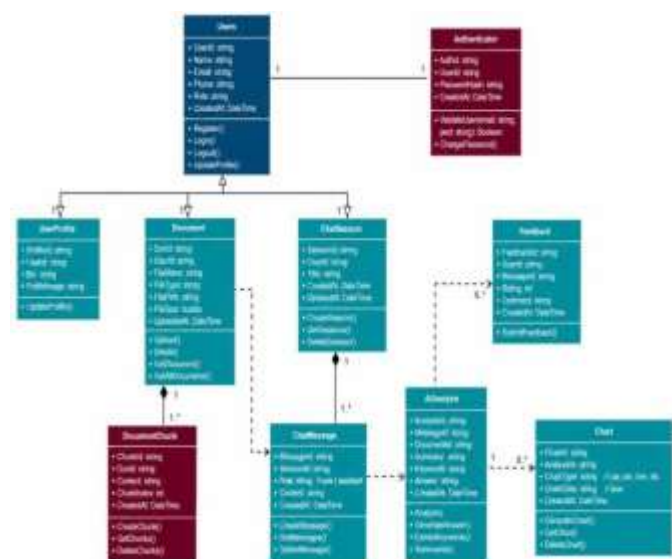


Fig 4: Class Diagram

Functional Modules and Implementation

The AI File Assistant with Smart Chart application is implemented using a modular architecture to improve scalability, maintainability, and system performance. Each module is designed to perform a specific task while seamlessly interacting with other components of the system. The modular implementation enables efficient document processing, intelligent information retrieval, and automated data visualization.

The **File Management Module** allows users to upload, organize, and manage various document formats, including PDF, DOCX, TXT, CSV, and image files. The module performs file validation, metadata extraction, and secure storage while ensuring data integrity and accessibility.

The **AI Processing Module** utilizes Natural Language Processing (NLP) and Large Language Models (LLMs) to analyze document content. It performs text extraction, document summarization, keyword extraction, semantic search, and intelligent question answering. This module enables users to interact with uploaded documents using natural language queries and receive accurate context-aware responses.

III. MODELING AND ANALYSIS

This section describes the system model, technologies, and analytical approach used in the AI File Assistant with Smart Chart project. The proposed system integrates Artificial Intelligence (AI), Natural Language Processing (NLP), semantic search, and data visualization techniques to provide intelligent document analysis and automated chart generation. The primary objective of the model is to enable efficient information extraction, document understanding, and visual representation of data obtained from uploaded files.

The system follows a layered architecture consisting of document processing, AI analysis, data management, and visualization components. Initially, users upload files in various formats such as PDF, DOCX, TXT, CSV, and image files. The document processing module extracts textual and structured information using OCR and text parsing techniques. The extracted content is then preprocessed through tokenization, cleaning, and formatting to improve analysis accuracy.

The AI Processing Module employs Natural Language Processing techniques including keyword extraction, semantic search, document summarization, and question-answering mechanisms. Large Language Models (LLMs) are utilized to understand user queries and generate context-aware responses based on the uploaded documents. To enhance information retrieval performance, document embeddings are generated and stored in a vector database, enabling efficient similarity search and retrieval of relevant content.

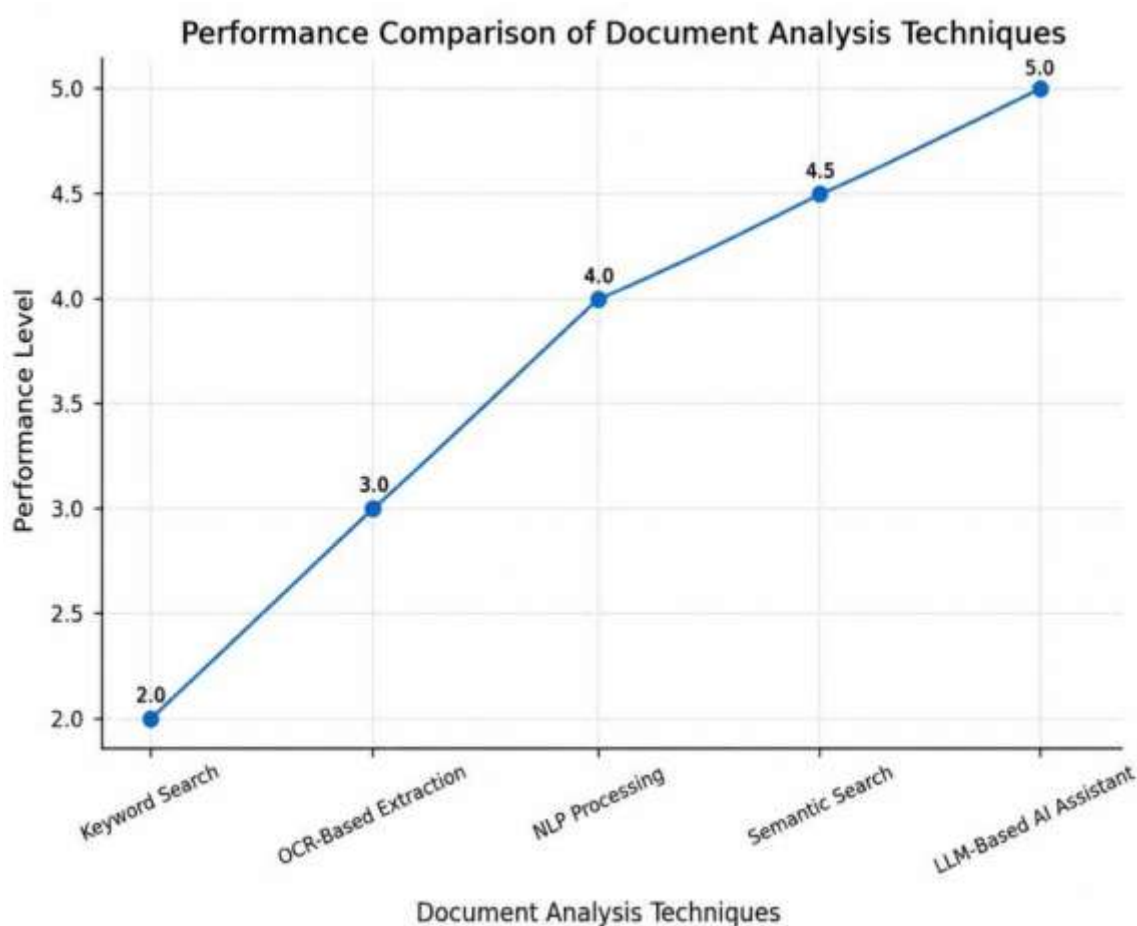
IV. RESULTS AND DISCUSSION

The proposed AI File Assistant with Smart Chart system was evaluated based on document processing efficiency, response accuracy, information retrieval performance, and chart generation capability. The system was tested using multiple document formats including PDF, DOCX, TXT, CSV, and image files. Performance analysis was conducted by comparing different document analysis approaches and AI-based techniques used for information extraction and question answering.

The experimental results demonstrate that AI-powered document processing significantly improves information retrieval speed and response relevance compared to traditional keyword-based search methods. The Smart Chart module successfully transformed structured data into visual representations, enabling users to analyze information more efficiently. The integration of Natural Language Processing (NLP), semantic search, and Large Language Models (LLMs) improved the overall accuracy and usability of the system.

Table 1. Comparison of Performance Level of Different Document Analysis Approaches

SN.	Model Type	Learning Approach	Performance Level	Observations
1	Keyword Search	Traditional	Low	Limited contextual understanding
2	OCR-Based Extraction	Rule-based	Moderate	Effective for text extraction only
3	NLP Processing	AI-Based	Moderate	Improved Text Understanding
4	LLM-Based AI Assistant	AI-Based	Very High	Accurate responses and intelligent analysis
5	Semantic search	AI-Based	High	Context-aware information retrieval


Figure 2:

V. CONCLUSION

This research work developed an AI-powered document management and analysis system, namely AI File Assistant with Smart Chart, to improve the efficiency of document processing, information retrieval, and data visualization. The proposed system integrates Artificial Intelligence, Natural Language Processing (NLP), semantic search, and smart chart generation techniques to provide intelligent assistance for analyzing and understanding digital documents.

The implementation of AI-based document processing enables efficient text extraction, document summarization, keyword identification, and context-aware question answering. The integration of Large Language Models (LLMs) and semantic search mechanisms significantly improves the accuracy and relevance of information retrieval compared to traditional keyword-based search approaches. Furthermore, the Smart Chart module automatically transforms extracted data into interactive visualizations, allowing users to identify trends, patterns, and insights more effectively.

Overall, the proposed AI File Assistant with Smart Chart system offers a reliable and intelligent solution for document management, knowledge extraction, and data-driven decision-making. The system can be effectively utilized in academic, business, research, and organizational environments where efficient document analysis and visualization are essential.

VI. REFERENCES

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