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INC28

Generative AI for Industrial Asset Management

Automation Engineering Program

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Abstact

This project aims to develop a Generative AI system to support industrial asset management by enhancing how technical information is retrieved, analyzed, and utilized. Users can upload PDF or Excel files containing equipment data, maintenance records, or technical manuals. The system extracts and stores the information in a vector database (Weaviate) to enable efficient semantic search and question answering. When users pose questions, the AI retrieves relevant content and generates accurate responses based on the stored documents.

Moreover, the system allows users to submit descriptions of specific problems or issues encountered with assets. Based on the provided information and existing knowledge, the AI generates detailed action plans (orders) outlining suggested solutions. These orders are automatically exported as downloadable PDF files, providing users with a practical and professional output that can be directly applied in operational settings. To ensure continuous improvement, the platform incorporates a feedback mechanism where users can rate the usefulness and accuracy of the generated orders.

By combining document retrieval, natural language understanding, and generative capabilities, this project offers a powerful tool for streamlining asset management processes, reducing response times, and supporting more informed decision-making in industrial environments.

Introduction

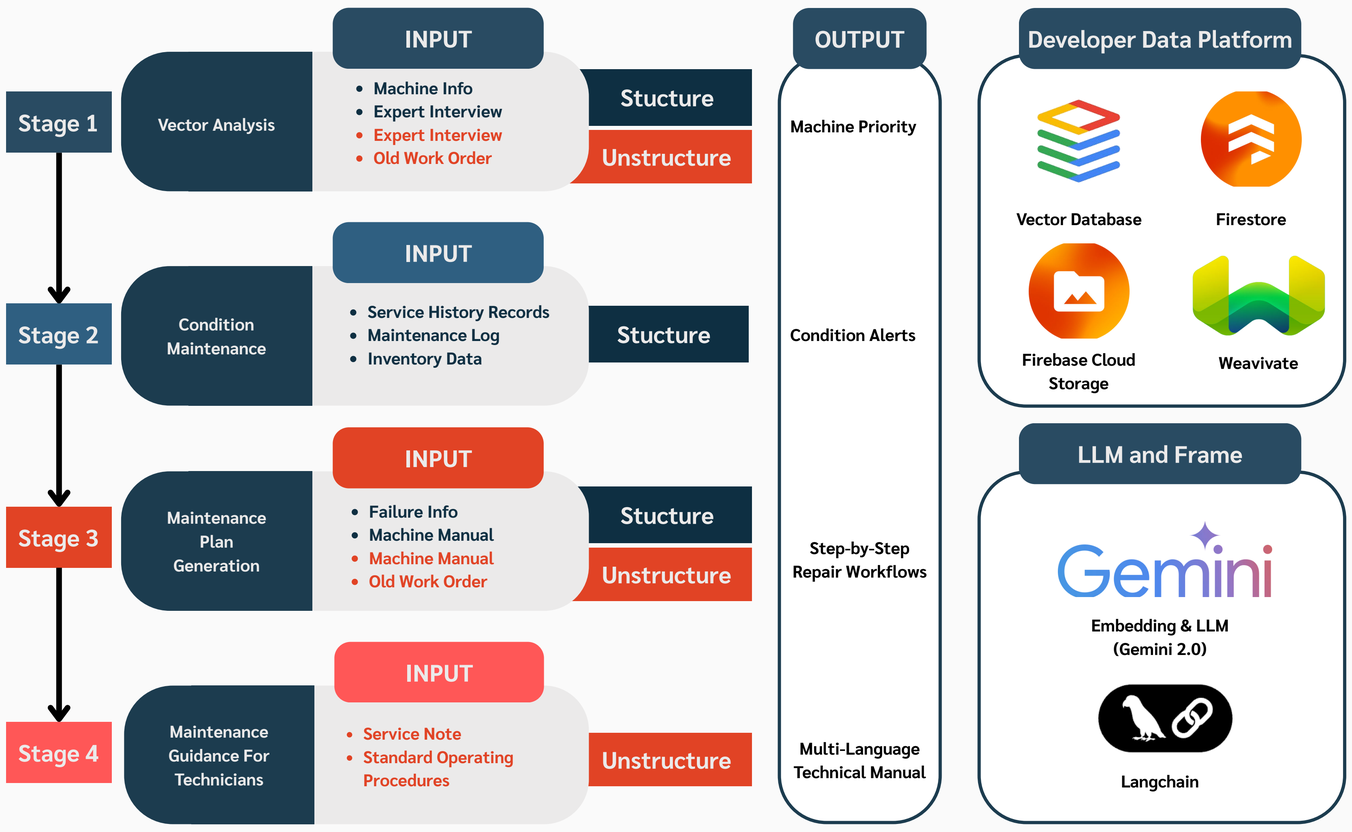
In today's industrial sector, asset management still faces challenges such as scattered technical documents, problem analysis relying heavily on human expertise, and a lack of data-driven decision-making systems. This project develops a Generative AI system capable of processing PDF/Excel files, extracting key information into a vector database to support semantic search, question answering, and the generation of automated action plans in PDF format, with a built-in feedback mechanism for continuous improvement.

Key Highlights:

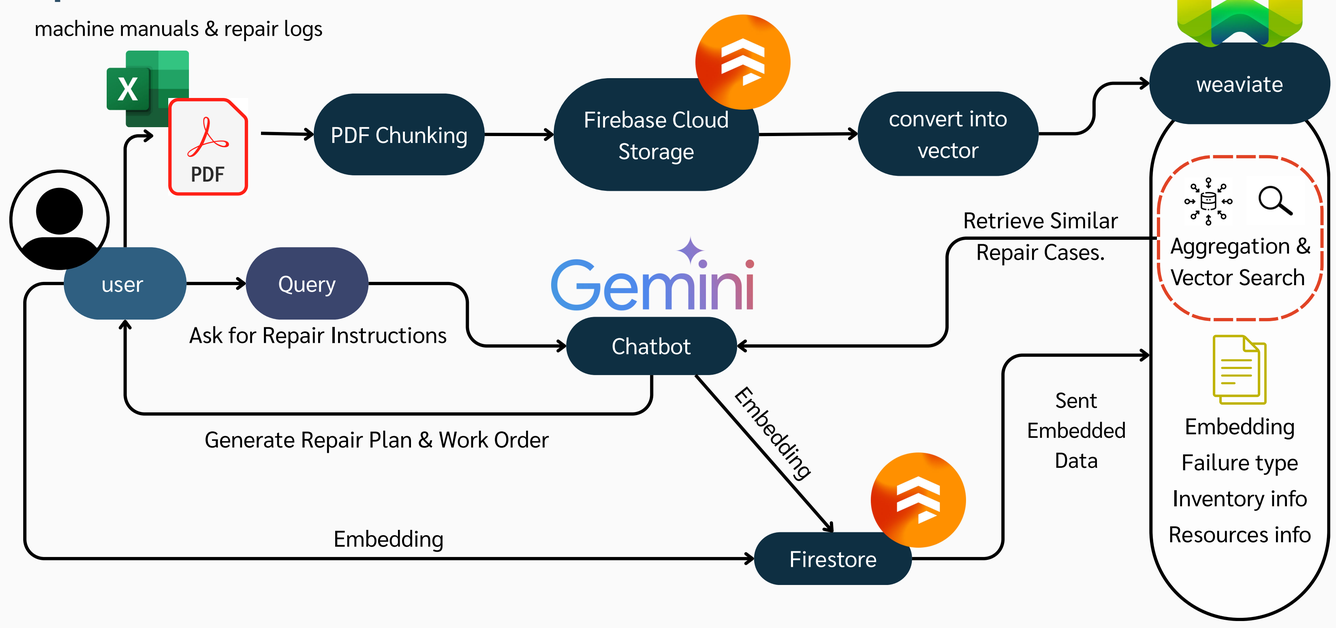
- Integrates document retrieval, natural language understanding, and professional response generation
- Reduces downtime by prioritizing maintenance tasks accurately
- Enhances analysis and decision-making with clear, actionable recommendations

Methodlogy

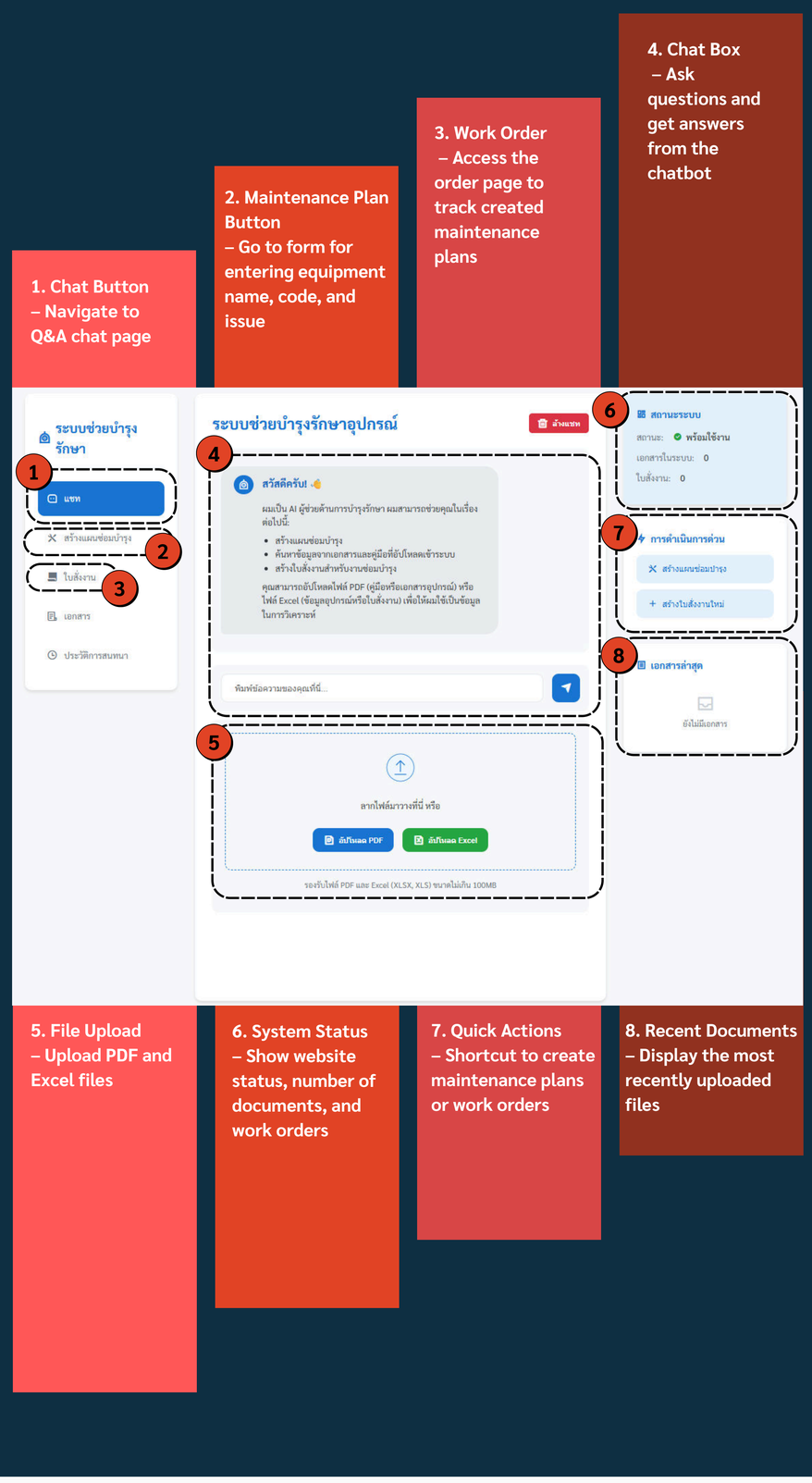
- **Stages 3 and 4 are the main focus of this study.**



Repair Plan Generators Work Flow



Result



Conclusion

- Developed a system that allows users to upload PDF and Excel files and automatically extract technical information using Generative AI.
- Enabled semantic search and Q&A with clear source attribution to improve access to relevant information.
- Provided AI-generated maintenance plans and repair suggestions based on user input and document content.
- Supported faster, more accurate decision-making and improved efficiency in industrial asset management.

Reference

1. Al Naqbi, H. (2024, January 30). Enhancing work productivity through generative artificial intelligence: A comprehensive literature review. Sustainability, 16(3), 1166.
2. Akpan, I. J., Kobara, Y. M., Owolabi, J., Akpan, A. A., & Offodile, O. F. (2024, July 31). Conversational and generative artificial intelligence and human–chatbot interaction in education and research. International Transactions in Operational Research.
3. Tang, H., Chen, D., & Chu, Q. (2024, May 8). ChatSOS: Vector database augmented generative question answering assistant in safety engineering. arXiv.
4. Dascalescu, D., & Hasan, Z. (2023, January 16). Vector embeddings explained. Weaviate Blog.
5. Cardenas, E. (2023, August 15). Distance metrics in vector search. Weaviate Blog.
6. Dunaj, E. (2023, November). What are custom AI agents? RightInformation.
7. Akhtar, H., & Rojas Arbulu, S. (June 2024), Generative AI Predictive Maintenance Applications