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# ENHANCING KNOWLEDGE MANAGEMENT IN THE EUROPEAN SPACE AGENCY THROUGH A RAG-BASED SOLUTION

**Abstract**

Abstract The European Space Agency (ESA) is a rapidly evolving organization with a mission to explore space and expand human knowledge. As ESA's work becomes more complex and data-intensive, the need for effective knowledge management (KM) has become increasingly crucial, especially at a time where the retirement age is reaching its peak. This paper presents a Retrieval Augmented Generation (RAG) solution developed for ESA Mechanical Engineers to relevant information retrieval, improve search capabilities, knowledge sharing and collaboration.

Purpose Information at ESA tends to be captured in unstructured documents scattered across various formats and data sources. Engineers from the TEC recurrently spend countless hours sifting through vast amounts of unstructured documents to find critical and relevant information to their activities. Faced with this challenge, the purpose of this study was to develop and evaluate a RAG-based solution for ESA mechanical engineers to enhance information retrieval. The solution aims to address the challenges of managing and accessing relevant engineering information and providing efficient search mechanisms.

Methodology The RAG-based solution was developed through a user-centered design process, involving extensive consultation with ESA mechanical engineers. The solution utilizes a similarity technique to generate answers based on relevance. Additionally, the solution features a search engine to quickly locate relevant paragraphs and documents.

Results The RAG-based solution was implemented in ESA's mechanical engineering department and evaluated through a user survey and feedback sessions. The survey results showed that 90

Conclusions The RAG-based solution has demonstrated significant potential in enhancing knowledge management for ESA engineers. The positive evaluation results indicate that the solution has improved the effectiveness of knowledge sharing within the department. The study also highlights the importance of user-centered design and the value of involving end-users in the development and evaluation of KM solutions.

Future Directions Future research could focus on expanding the solution to include other engineering disciplines within ESA and exploring the integration of artificial intelligence (AI) to further enhance its capabilities. Additionally, investigating the impact of the solution on overall organizational performance would be valuable for understanding its broader implications.