Proposal for Field Session Project: Semantic Search with GenAI at Ricoh USA

Project Overview

The project aims to develop a state-of-the-art semantic search system for Ricoh technical documentation utilizing Generative AI (GenAI) technologies. Semantic search enhances traditional keyword-based search by understanding the contextual meaning behind the search queries, thereby providing more accurate and relevant results. This project will focus on leveraging advanced AI models to improve search capabilities, making information retrieval more intuitive and efficient.

Objectives

1. **Develop a Semantic Search Engine**: Create a search engine that can understand and process natural language queries to provide precise and contextually relevant results.
2. **Integrate Generative AI**: Utilize GenAI models to enhance the search capabilities, allowing for better understanding and generation of search results.
3. **User Experience Improvement**: Design and implement a user-friendly interface that enhances the overall search experience.
4. **Performance Optimization**: Ensure the system is efficient and can handle a high volume of queries with minimal latency.

Key Activities

1. **Research and Analysis**:
   - Study existing semantic search systems and GenAI technologies.
   - Identify key components and technologies required for the project.
2. **Design and Development**:
   - Design the architecture of the semantic search engine.
   - Develop and train GenAI models for understanding and generating search results.
   - Implement the search engine backend and frontend interfaces.
3. **Testing and Evaluation**:
   - Conduct extensive testing to ensure the accuracy and efficiency of the search engine.
   - Collect and analyze user feedback to refine and improve the system.
4. **Deployment and Maintenance**:
   - Deploy the semantic search engine in a controlled environment.
   - Monitor performance and make necessary adjustments for optimization.

Student Responsibilities

1. **Research Assistants**:
   - Conduct literature reviews on semantic search and GenAI technologies.

- Assist in identifying relevant datasets for training and testing.

2. **Developers**:
   - Work on the backend development of the search engine.
   - Implement GenAI models and integrate them into the search system.
   - Develop and refine the user interface for an optimal search experience.
3. **Data Scientists**:
   - Train and fine-tune GenAI models for semantic understanding and generation.
   - Evaluate model performance and iterate on improvements.
4. **QA Engineers**:
   - Develop and execute test plans to ensure the system's accuracy and reliability.
   - Assist in identifying and fixing bugs and performance issues.

Required Skills

1. **Programming Languages**: Proficiency in Python, JavaScript, or other relevant languages.
2. **AI and Machine Learning**: Understanding of AI/ML concepts and experience with frameworks such as TensorFlow or PyTorch.
3. **Web Development**: Experience with web development technologies (HTML, CSS, JavaScript).
4. **Data Analysis**: Ability to work with large datasets and perform statistical analysis.
5. **Problem-Solving**: Strong analytical and problem-solving skills.

Benefits for Students

- **Hands-on Experience**: Gain practical experience in cutting-edge AI and machine learning technologies.
- **Mentorship**: Work under the guidance of experienced professionals in the field.
- **Professional Development**: Enhance technical and soft skills through collaborative projects.
- **Networking**: Opportunity to connect with industry professionals and like-minded peers.