Project Proposal for Hackathon

Title: Innovative Research and Innovation Analysis Tool (IRIAT)

Problem Statement:

In the academic environment of engineering colleges, educators face the challenge of ensuring that student project proposals are original and not recycled from previous years. The current manual review process is time-consuming and not always effective, as it relies heavily on the instructors' familiarity with past projects. There is a need for a system that can automatically and accurately verify the uniqueness of each submission, saving time and enhancing educational integrity.

Solution Overview:

The proposed system, IRIAT is a specialized platform designed to automate the verification of originality in student project proposals within engineering education. The system will utilize advanced AI to convert submitted project proposals into embeddings and compare them against a database of past projects stored as embeddings in a pgvectors database. This approach ensures that educators receive accurate, real-time feedback on the uniqueness of each proposal.

Unique Advantages:

- Deep Semantic Analysis: Utilizing AI for deep semantic analysis, IRIAT compares the content of new project proposals with historical data, identifying similarities beyond mere keywords, focusing on the underlying ideas and concepts.

- Efficient Data Management: By converting proposals to embeddings and storing them in an optimized vector database (pgvectors), the system ensures efficient and scalable data handling.

- Real-Time Data Access: Direct API integrations ensure that the data is the latest, addressing the gap in AI models like ChatGPT, Deepseek , which might use outdated information.

- Real-Time Originality Checks: Educators receive immediate feedback on the originality of submissions, enabling them to address issues promptly.

Comparison to Existing Solutions:

- Manual Review: Traditionally, faculty members manually review new proposals against previous projects, a process that is subjective and labor-intensive. IRIAT automates and objectifies this process.

- Generic Plagiarism Detection Tools: Compare text **word-for-word** or **phrase-for-phrase** using basic string-matching algorithms. Look for **exact matches** or **partial matches** in a large text corpus.

  IRIAT provides a single access point with streamlined, unified query handling. Uses **AI embeddings and vector similarity** instead of simple word-matching. Converts entire project proposals into **numerical vectors** (stored in a **pgvectors database**), allowing the system to compare the meaning rather than just the words.

- ChatGPT and Other AI Models: These models offer generalized answers that might not be up-to-date or specific to user queries about patents and research. IRIAT ensures data relevancy and currency

Future Scope:

- Expansion Across Disciplines: While initially focused on engineering, IRIAT can be adapted for other academic disciplines, enhancing its utility across a university or educational system.

- Integration with Academic Management Systems: IRIAT could be integrated with existing academic management platforms, providing a seamless experience for both students and faculty.

- Enhanced Predictive Models: Future developments can introduce predictive models to suggest improvements or potential areas of innovation within student proposals based on trend analysis.

Proposed System Architecture:

- User Interface: Simple, user-friendly web interface tailored for academic use, allowing faculty to upload and check documents effortlessly. Interactive dashboard for viewing the originality scores and detailed comparison reports.

- Backend: Integration with pgvectors to store and retrieve project embeddings efficiently. AI-powered semantic processing module to convert text to embeddings and perform similarity checks.

- Output: Detailed reports on proposal originality, highlighting potential duplicates and providing links to similar past projects.Visual indicators (e.g., color-coded originality scores) to quickly alert educators to possible issues.

Visual Mockup:

- Initial Screen: Faculty members are prompted to upload a student's project proposal in PDF format.

- Processing Screen: The document is processed, with a visual display of the analysis progress.
- Results Page: Presents a detailed originality report, including a similarity score, similar past projects, and specific sections of concern highlighted.

Conclusion:

IRIAT revolutionizes the way educational institutions handle the originality verification of student projects. By leveraging cutting-edge AI and efficient database technologies, it provides a robust tool that ensures academic integrity and supports the creative and innovative endeavors of engineering students. This system not only saves time for educators but also helps foster a culture of honesty and innovation within academic communities.