Lab 1: Draft

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1. Introduction

1.1. Societal Problem

Ever since the use of LLM-based or Gen-AI (Generative AI) tools such as ChatGPT, Google Gemini, and many others, many individuals have raised concerns in schools about students' use of these tools. Many believe that students are becoming more reliant on these tools as they are increasingly used to generate information pertinent to any individual student's studies. Oftentimes, students and even the broader spectrum of Gen-AI users will rely on the system's responses without verifying the information (Vasconcelos et al. 2023). When students do this, particularly for writing assignments, it is not entirely uncommon that they may employ the tool's response verbatim as "their" answer. This is a form of plagiarism and should be greatly discouraged. A study conducted on a group of students who rely fully on AI for their assignments scored almost 20% lower during a writing assignment than those who don't rely upon the technology (Ju, 2025). These studies suggest a greater struggle for students to develop certain skills when relying on the increasingly appealing Gen-AI technologies.

1.2. The Solution

A solution to this problem should address the growing gap in critical thinking skills in the students of today. Critical thinking is the wellspring which feeds innovation, expression of the self, and the mind, and it should be nurtured. Educators are receiving increasingly more work from students that is of poor quality or plagiarized, likely due to the use of Gen-AI, and often they are unable to identify its employment. While there does exist automated plagiarism and Gen-AI detectors, in their current state they are inconsistent at best.

In response to this problem and to provide a solution, Team Emerald is creating Edusense, utilizing LLM technolgies to facilitate and encourage learning in today's students. Edusense will respond to students' prompts with its own prompts, meant to encourage critical thinking and allow students who would benefit from that added push to reach their own valid conclusions

2. **Edusense Product Description**
   Edusense is a tool we are

2.1. Key Features and Capabilities

All the while, Edusense will offer complete transparency to educators, who are able to adjust Edusense's settings to best fit their lesson plan. Additionally, educators will be able to use Edusense to identify common problem points their students have, allowing them to revise and update their lesson plans for the future.

2.2. Major Components

2.2.1. Hardware Components

User Device: Any modern laptop, desktop, or tablet capable of running a web browser.
Network Access: 802.11ac Network Adapter

2.2.2. Software Components

For the purposes of Edusense, Team Emerald will develop several pieces of interconnected software to make the product function. These pieces of software will include the following:

2.2.2.1. Web Interface

Edusense will utilize a web-based interface so that students and instructors may access the platform without the need to install additional software onto their own devices. The user interface itself will be produced using HTML, CSS, and Javascript, meanwhile for integrating with the project's backend, the Django Python framework will be employed.

2.2.2.2. Project Backend

Under the hood, Edusense is going to require software functions to communicate with all of its moving parts. These parts include the frontend web interface, the LLM model the project will be incorporating, the Canvas API, and Edusense's database model. Interaction between these parts as well as many significant product functions will be performed using the Python-based backend.

2.2.2.3. Database

Edusense will likely make use of a SQLite or PostgreSQL-based database structure depending on project complexity. The database will log user information and activity as well as relevant information about assignments.

2.2.2.4. Canvas Integration

For the purposes of reading assignments and being convenient for students to use, a goal of Edusense is to integrate with the Canvas-Rust API. The integration will give

Edusense select access to course materials and assignments, to better ensure that the tool does not interfere with students critical thinking and solve problems in their stead.

2.2.2.5. LLM Integration

Edusense will be integrating with an LLM platform through the use of Ollama.

3. Identification of Case Study

Edusense is designed to be used by both students and instructors. The goal is to encourage students to foster their critical thinking skills while allowing their instructors to oversee their use of the tool and ensure that it is not abused. In the future, the platform could be extended to most any educational setting.

4. Glossary

5. Artificial Intelligence (AI): A commonly used term encompassing any machine learning algorithm designed to train from a given input to provide an expected output.
6. Large Language Model (LLM): An advanced machine learning algorithm trained on massive text datasets to understand and generate human-like language.
7. Canvas LMS: A learning management system used by educators to manage course content, assignments, and communication with students.
8. Challenge Mode: Setting that encourages learners to try on their own before getting help. It limits access to answers to encourage thinking through the assignment first.
9. Guided prompts: Targeted questions or hints created to help students think critically and come up with their own solution.
10. MFCD (Modified Functionality Component Diagram): A diagram showing the major hardware and software components of the product and how they interact.
11. Usage Tracking: The process of recording how users interact with the system, such as which features they use or how they engage with LLM prompts.

12. References

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