CS 411W Professional Workforce Development II

Lab 1 - EduSense

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Version 1

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1. Introduction

1.1. Concerns Around AI in Education

Artificial Intelligence tools such as ChatGPT and Grammarly are becoming integral to students' everyday academic routines. While these tools can be helpful, there are growing concerns that relying too much on them will have a negative impact on important skills such as creativity, critical thinking, and problem-solving. One study found that students who depend heavily on AI for assignments score up to 20% lower on writing tasks compared to those who use it more thoughtfully. A systematic review from 2024 reported that students who lean too heavily on AI dialogue systems struggle with analytical reasoning and independent thinking. Many users also trust AI-generated responses without verifying them, which is often due to cognitive biases that affect their judgement.

1.2. Solution Requirements and Challenges

One of the challenges with LLM use amongst students is a substantial decline in the development of necessary skills, including critical thinking, independence, and the ability to learn effectively. EduSense needs to address the safeguards required to teach students how to use LLMs as an educational tool. Another challenge of LLM use amongst students is that educators are receiving poorer quality work, often created in part by an LLM. Students utilizing LLM technology to obtain the answer directly also needs to be addressed, as it can subvert the need to think critically about the assignment. LLM use amongst students can also lead to educators being unable to identify work that has been plagiarized. In order to prevent this, EduSense will need to provide educators with the ability to review student LLM use.

1.3. Introduction to EduSense

EduSense is currently in development as a mobile and web-based application designed to help students and educators use AI tools more intentionally. Instead of giving direct answers, the application will encourage students to think first by using guided questions, reflective prompts, and challenge modes to limit or delay AI input. Educators will also be able to upload assignments, monitor interactions with AI, and identify problem areas in comprehension. Key features include copy/paste restrictions, usage tracking, and admin level controls for oversight. EduSense is meant to support learning, not replace it, leading to students and other learners building stronger problem solving and critical thinking skills.

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2. Product Description

EduSense is an innovative web application designed to help students and educators use artificial intelligence tools more resourcefully and effectively. It addresses the growing concern that overreliance on AI can weaken essential skills such as critical thinking, creativity, and problem solving. EduSense encourages users to engage with their assignments independently, utilizing an LLM to aid them in their problem-solving process. The application allows instructors to upload assignments, monitor student interactions with generative AI, and identify areas where students might need additional help. By promoting intentional AI use, EduSense aims to empower students to develop lifelong learning skills while still benefiting from the advantages of modern technology.

2.1. Key Product Features and Capabilities

EduSense is designed to foster independent thinking and responsible use of AI in educational settings. The platform allows instructors to upload assignments, giving them control over the learning material and enabling seamless integration with classroom activities. Students can access an LLM for support while working on their assignments. Instead of providing direct answers, it uses guided prompts and leading questions to help students think through problems and develop their own solutions. By combining these features, it offers a unique and innovative approach that encourages critical thinking, supports educators, and helps students build essential problem-solving skills without becoming overly dependent on AI.

2.2. Major Components (Hardware/Software)

2.2.1 Hardware Components

Any modern laptop, desktop, or tablet with network access (802.11ac network adapter) that is capable of running a web browser is required on the user's end.

2.2.2 Software Components

2.2.2.1 Frontend

EduSense will utilize HTML, CSS, and JavaScript, as well as Django framework for interactivity and styling.

2.2.2.2 Backend

Python will handle EduSense's user requests, LLM interaction, and assignment uploads.

2.2.2.3 Database

SQLite will be used for storing assignments, interaction logs, and user data.

2.2.2.4 LLM

EduSense will employ LLaMA as its LLM.

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2.2.2.5 Integration

EduSense will integrate with Canvas Rust API to sync assignments and track student-AI interactions.

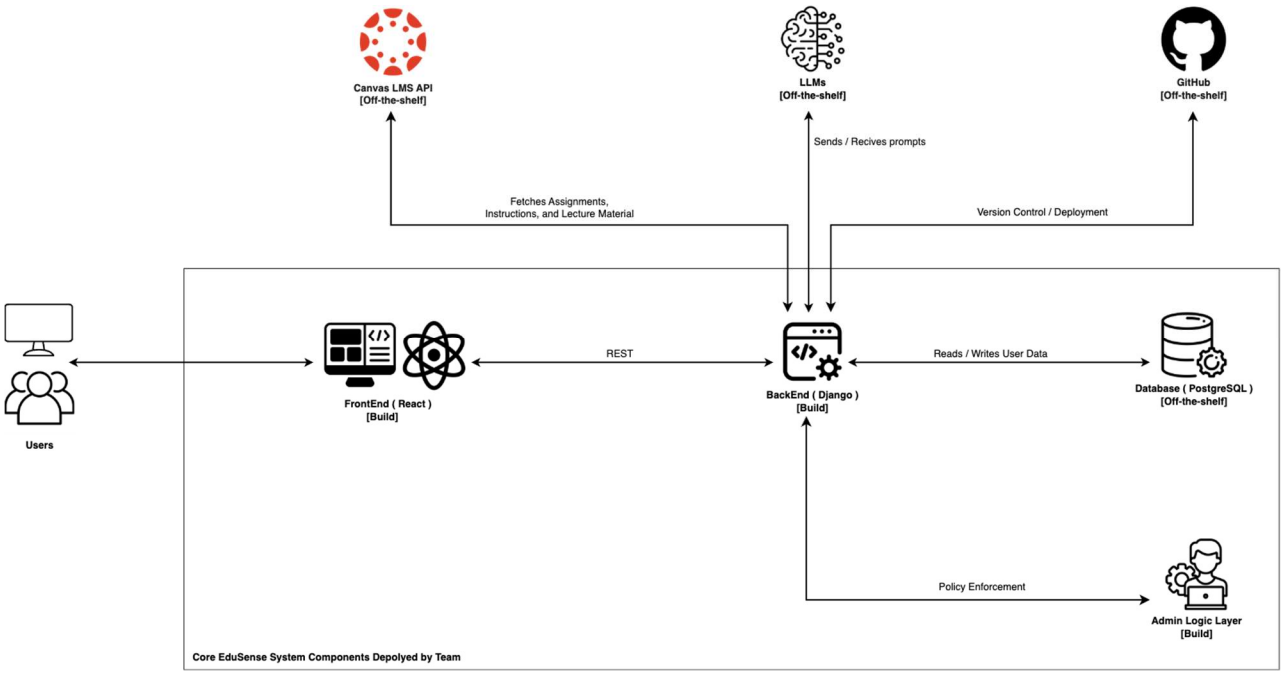

Figure 1: Major Functional Component Diagram

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3. Identification of Case Study

EduSense is being developed for students and educators in academic settings where AI tools are increasingly used for assignments and learning support. The product addresses the growing concerns that over-reliance on AI can negatively affect students' critical thinking and problem-solving skills. By providing a platform for intentional and responsible AI use, EduSense helps students build foundational skills while giving educators the tools to monitor and guide their interactions. Its goal is to support learning, not replace it, ensuring students can use AI as a tool without becoming dependent on it.

In the future, EduSense could be used beyond traditional classrooms. It has the potential to benefit corporate trainers who need to teach employees how to use AI responsibly and ethically in their professional roles. Lifelong learners and individuals engaged in self-study could also use EduSense to sharpen their analytical skills. Ultimately, any organization or individual looking to promote critical thinking and ethical AI use across various learning and professional development contexts could benefit from this product.

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4. Glossary

- Artificial Intelligence (AI): A commonly used term encompassing any machine learning algorithm designed to train from a given input to provide an expected output.
- Large Language Model (LLM): An advanced machine learning algorithm trained on massive text datasets to understand and generate human-like language.
- Canvas LMS: A learning management system used by educators to manage course content, assignments, and communication with students.
- 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.
- Guided prompts: Targeted questions or hints created to help students think critically and come up with their own solution.
- MFCD (Modified Functionality Component Diagram): A diagram showing the major hardware and software components of the product and how they interact.
- 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.

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5. References

1. Farhan, Hind N. “The Impact of AI-Powered Writing Tools on Students’ Writing Performance: A Content Analysis and Future Prospects.” ResearchGate, 1 Mar. 2025, http://www.researchgate.net/publication/389458566_The_Impact_of_AI-Powered_Writing_Tools_on_Students.
2. Freeman, Josh. “Student Generative AI Survey 2025 - HEPI.” HEPI, 26 Feb. 2025, www.hepi.ac.uk/2025/02/26/student-generative-ai-survey-2025/.
3. Ju, Qirui. “Experimental Evidence on Negative Impact of Generative AI on Scientific Learning Outcomes.” Research Square (Research Square), 21 Sept. 2023, https://doi.org/10.21203/rs.3.rs-3371292/v1.
4. M. Helena Vasconcelos, et al. “Explanations Can Reduce Overreliance on AI Systems during Decision-Making.” ArXiv (Cornell University), 13 Dec. 2022, https://doi.org/10.48550/arxiv.2212.06823.
5. Rastogi, Charvi, et al. “Deciding Fast and Slow: The Role of Cognitive Biases in AI-Assisted Decision-Making.” Proceedings of the ACM on Human-Computer Interaction, vol. 6, no. CSCW1, 30 Mar. 2022, pp. 1–22, krvarshney.github.io/pubs/RastogiZWVDT_cscw2022.pdf, https://doi.org/10.1145/3512930.
6. Zhai, Chunpeng, et al. “The Effects of Over-Reliance on AI Dialogue Systems on Students’ Cognitive Abilities: A Systematic Review.” Smart Learning Environments, vol. 11, no. 28, 18 June 2024, pp. 1–37, slejournal.springeropen.com/articles/10.1186/s40561-024-00316-7, https://doi.org/10.1186/s40561-024-00316-7.