Lab 2 – Section 1 & 2

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1 Introduction

EduSense is a web and mobile platform designed to promote mindful, responsible use of AI tools by students while providing instructors with visibility into students AI interaction. It integrates with learning management systems such as Canvas LMS and leverages large language models through an Ollama API connection.

1.1 Purpose

The purpose of this document is to define the functional and non-functional requirements of the EduSense prototype so that developers, testers, instructors, and stakeholders have a shared understanding of the system's capabilities and constraints.

1.2 Scope

EduSense is a web and mobile application that enables students to use large language models responsibly while allowing instructors to monitor AI-assisted work. The prototype provides controlled interaction with a local LLM through the Ollama API and integrates with Canvas LMS for course and assignment management.

- Secure user authentication for students and instructors.
- Assignment management, including upload, parsing, and linking to course data.
- AI guidance using locally hosted LLMs
- Conversation history tracking to show when and how AI was used.

The full product goal is to integrate AI support directly into Canvas, enabling academic institutions to monitor and assess AI assisted learning while preserving student privacy and data control.

1.3 Definitions, Acronyms, and Abbreviations

- AI: Artificial Intelligence systems that perform reasoning or language processing tasks.
- LLM: Large Language Model is a neural network trained for text generation and reasoning.
- Canvas LMS: Learning Management System used to manage course content, assignments, and users.
- Ollama: Local API used to host and query LLMs on a user or institution server.
- DRF: Django REST Framework is a Python library for building RESTful APIs.
- Frontend: React-based web interface used by students and instructors.
- Backend: Django server handling database access and API communication.
- Challenge Mode: Feature that limits the number of AI prompts per assignment to encourage independent work.
- FERPA: Family Educational Rights and Privacy Act is a U.S. law governing protection of student data.

1.4 References

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1.5 Overview

Section 2 describes the overall system architecture, primary functions, user roles, and environment.

2 Overall Description

EduSense is a client-server web system built with a React frontend and a Django REST Framework backend. It connects to a local Ollama API that hosts an LLM, Llama 3.1 8B. The system functions as an extension to existing learning management systems, primarily Canvas LMS.

2.1 Product Perspective

EduSense operates as an intermediate layer between the user and the large language model (LLM). Students submit prompts related to assignments imported from Canvas, and the backend records each prompt and response to create a verifiable conversation history. Instructors can access this stored data to review student activity and evaluate how the LLM was used. All communication with the model is handled through the OllamaGenerateView API, which provides local and secure request handling. The prototype uses an SQLite database to store user accounts, assignments, conversations, and LLM responses. A future deployment will migrate to PostgreSQL and include institution-level single sign-on (SSO) for centralized authentication.

2.2 Product Functions

Major system functions include:

- **User Authentication**: Validates users as students or instructors using EduSense Login
- **Assignment Management**: Uploads or imports assignments from Canvas, parses text, and links questions to stored responses.
- **Conversation Handling**: Stores each prompt, adjusted prompt, and LLM response with timestamps and assignment IDs.

- **AI Guidance**: Forwards validated prompts to the local Ollama LLM API and returns context-specific responses.
- **Challenge Mode**: Limits the number or type of prompts allowed per assignment to promote independent thinking.
- **Instructor Analysis**: Displays summaries of student activity, prompt frequency, and topic difficulty.
- **Admin Controls**: Allows enabling or disabling EduSense features for specific courses or assignments.

2.3 User Characteristics

User 1:

- **Role**: Student
- **Interaction Type**: Interacts with EduSense to receive guided AI feedback while completing assignments. Can view personal history but cannot modify stored data.
- **Technical Skill**: Basic computer and browser skills

User 2:

- **Role**: Instructor
- **Interaction Type**: Uploads or imports assignments, reviews conversation logs, and manages course settings.
- **Technical Skill**: Moderate familiarity with Canvas and web tools

User 3:

- **Role**: Administrator
- **Interaction Type**: Configures system parameters, manages users, and monitors LLM integration.
- **Technical Skills**: Technical background in system maintenance

2.4 Constraints

N/A.

2.5 Assumptions and Dependencies

N/A.