Software Requirements Specification

for

EduSense

Version 2

Prepared by Cody Donahue

Old Dominion University

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1. Introduction

This section provides an overview of the EduSense system and introduces the key goals and structure for this Software Requirements Specification.

1.1 Purpose

The purpose of this Software Requirements Specification (SRS) is to describe the functional and nonfunctional requirements for the EduSense system. This document provides a detailed reference for developers, testers, and stakeholders to ensure the system will meet the needs of students and instructors. It defines what the software will do and the constraints which it must operate under.

1.2 Scope

EduSense is an AI powered academic assistant platform designed to enhance student learning and help instructors by integrating with the Canvas LMS. It connects local large language models (LLMs) via Ollama and manages data through a Python backend with SQLite and a Django web interface.

Key goals are:

- Assignment tracking and performance summaries.
- Providing a guided tutoring system that answers students' questions without revealing direct solutions.
- Offering instructors data-driven insights into class performance trends. Benefits include improved engagement and personalized feedback.

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1.3 Definitions, Acronyms, and Abbreviations

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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1.4 References

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1.5 Overview

The remainder of this document outlines:

- Section 2: Overall system description and user environment.
- Section 3: Specific system features and functional requirements
- Section 4: nonfunctional requirements (performance, security, etc.).
- Section 5: Supporting information and appendices

2. Overall Description

This section provides a high-level overview of the EduSense system, including major components, user characteristics, and assumptions.

2.1 Product Perspective

EduSense is an academic support platform that assists students through interactive guidance and performance metrics. The backend, developed with SQLite, manages data processing and analytics, while the Django web interface provides an intuitive and accessible user experience. A local AI module (via Ollama) interprets user input to provide context-aware tutoring assistance.

EduSense is designed not to generate or complete written assignments, assessments, or any other graded work. Instead, the system focuses on guided reasoning, concept reinforcement, and skill development through Socratic-style prompts and explanations. This design ensures academic integrity and compliance with institutional policies while promoting effective learning.

2.2 Product Functions

Main system functions include:

1. Interactive AI Tutoring
    - Engages users in guided conversations to clarify concepts and steps to solve problems.
    - Encourages independent learning by providing steps and explanations without ever giving answers.
2. Performance Analytics
    - Tracks user interactions and learning patterns to identify knowledge gaps.
    - Generates data visualizations to summarize topic mastery and interaction time.
    - Allows instructors to view trends to identify knowledge and instructional weaknesses.
3. Knowledge Retrieval and Context Awareness
    - Uses locally stored materials to deliver contextually relevant guidance.
    - Uses structured learning resources (lecture notes, textbooks, key terms).
4. Session Logging
    - Logs each student-AI session for reflection and review to continuously improve the system.
    - Enables students to revisit prior sessions for review.
5. Configurable AI Behavior
    - Allows instructors to adjust guidance levels and restrictions of the LLM.
    - Allows instructors to choose which LLM will be used for the course/assignment.

2.3 User Characteristics

User Role	Description	Technical Expertise
Student	Interact with the tutoring interface, view progress reports, and receive personalized feedback.	Basic computer skills
Instructor	Monitor analytics, manage AI tutoring parameters, and review course reports.	Moderate computer proficiency
Administrator	Maintain database, configure system settings, and manage API tokens.	High technical proficiency

2.4 Constraints

N/A

2.5 Assumptions and Dependencies

N/A