Course Project: Building an AI Application

Overview

In this course, you will complete a **substantial, application-focused AI project** developed over approximately **eight weeks**. The goal of this project is to design and implement an **AI system** that applies the concepts from class—such as intelligent agents, search, planning, reasoning, and modern AI tools—to a real-world problem.

This project emphasizes **building AI applications**, not training machine learning models from scratch. You will work with existing models and frameworks (e.g., large language models, retrieval systems, planners, and tools) to construct a complete, well-reasoned AI system.

Resources

- CS LLM Web App: https://ai.cs.wallawalla.edu/
- Ollama Server Via Python API, Server URL: http://ollama.cs.wallawalla.edu:11434
- Ollama Python library docs: https://github.com/ollama/ollama-python
- Ollama API documentation: https://github.com/ollama/ollama/blob/main/docs/api.md
- Z3 https://github.com/Z3Prover/z3

With instructor permission, you can download to and use any models on the CS Ollama server that are at most 14b (equivalent to about 9GB).

I encourage you to also download and use Ollama on your own machines.

Project Goals

By the end of the project, you should be able to:

- Design an AI system that integrates multiple components (e.g., retrieval, reasoning, planning, tools)
- Apply course concepts to a practical, real-world task
- Justify design decisions using AI principles discussed in class
- Evaluate the strengths, limitations, and ethical implications of your system
- Communicate technical progress clearly and professionally

Project Scope and Constraints

Your project **must** meet the following requirements. Note that you don't have to use an LLM (or any model at all), but it is encouraged:

- Focus on **AI system design and integration**
- Use **existing models or APIs** (no training models from scratch)
- Incorporate **external knowledge or structured information**, such as (but not limited to):
    - Retrieval-Augmented Generation (RAG)

- Vector databases
- Rules, tools, planners, or APIs
- Be sufficiently complex to support **8 weeks of iterative development**
- Be implemented primarily in code (not a purely conceptual project)

Examples include (but are not limited to!):

- A course-specific AI tutor or chatbot
- A planning or scheduling agent
- An intelligent document or codebase assistant
- A task-oriented or tool-using AI agent

Projects that will result in useful tools for the university or computer science department are strongly encouraged.

Project Timeline & Milestones

Project Kickoff (Start of Week 3)

- Project work officially begins at the start of the 3rd week of the course (Mon Jan 19th).
- You should have a clearly defined problem statement and initial system idea, in the form of a proposal.
- You're encouraged to discuss your project ideas with the instructor before submitting a proposal.
- The proposal should include a week-by-week development plan.

Weekly Progress Journal (Required)

Starting **the first Friday after the project kicks off**, you must submit a **weekly project journal update**.

Due: Every **Friday** for the remainder of the project

Each journal entry should briefly describe:

- What progress you made this week
- What challenges or blockers you encountered
- Any design decisions or changes
- Your plan for the following week

These updates are intended to encourage steady progress and reflection, not to be overly lengthy or tedious reports.

A template will be provided for the updates.

GitHub Repository Requirement

Starting at the **third week of the project**, **each individual student** must include in their update report:

- A link to a **GitHub repository** containing their project code
- Evidence of **ongoing development through commits** (not a single bulk upload)

Your commit history should clearly demonstrate:

- Gradual and incremental progress over time
- Individual contribution
- Meaningful development activity

Projects without visible commit progress will not receive full credit.

Final Deliverables

At the end of the project, you will submit:

1. **Working AI application**
2. **Source code** (via GitHub)
3. **Final written report**, including:
    - Problem description
    - System architecture diagram
    - Description of AI components used
    - Evaluation and limitations
    - Ethical considerations
4. **In-class demo or presentation**

Evaluation Criteria

Your project will be evaluated based on:

- **Technical correctness and functionality**
- **Appropriate use of AI concepts from the course**
- **Quality of system design and architecture**
- **Evidence of consistent progress**
- **Clarity of documentation and communication**
- **Thoughtful discussion of limitations and ethics**

Academic Integrity & Collaboration

You are encouraged to discuss ideas with classmates, but:

- All submitted code must be **your own**
- You must clearly cite any external libraries, frameworks, or sources used
- Misrepresentation of work or authorship will be treated as an academic integrity violation

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Final Note

This project is intended to mirror how AI systems are built in practice: **iteratively, thoughtfully, and with real-world constraints**. Start early, make steady progress, and use your weekly journals and GitHub commits to demonstrate your learning throughout the course!