

Project Proposal

AI Concierge Avatars using LLMs and Agentic Workflows

Company Background

We are an applied AI research and development group at CU Boulder focused on building practical agentic AI systems that integrate Large Language Models (LLMs), knowledge retrieval, and conversational interfaces into real-world workflows. Our work spans education, enterprise automation, robotics, and human-AI interaction. We collaborate with Learning institutions and industry partners to prototype next-generation intelligent systems that enhance user experience and improve operational efficiency.

Description of the Work

Students will design and develop an intelligent digital avatar that functions as a concierge for environments such as schools, universities, or hotels. The system will use LLMs and agentic workflows to provide personalized, context-aware assistance through natural language interaction.

Example capabilities include:

- answering frequently asked questions
- providing directions and facility information
- scheduling services or appointments
- retrieving information from structured and unstructured data sources
- maintaining conversational context across multiple interactions
- escalating complex requests to human staff when needed

Students will build a working prototype that integrates conversational AI, retrieval-augmented generation (RAG), and orchestration of specialized agents. The project may include a web or mobile interface, avatar representation, and evaluation of performance using metrics such as response quality, usability, and task completion success.

Desired Skill Set

Students are expected to learn new tools during the project. Helpful background includes:

- Python or JavaScript programming
- basic understanding of APIs
- interest in AI, machine learning, or NLP
- familiarity with web development (helpful but not required)
- curiosity about human-computer interaction
- willingness to learn modern AI frameworks

Potential technologies:

- LLM APIs (OpenAI, Azure OpenAI, open-source models)
- RAG pipelines and vector databases
- agent orchestration frameworks
- web frameworks (Streamlit, React, Flask)

- speech interfaces (optional)
 - cloud deployment (optional)
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Preferred Team Size

4 students

Projects that include both software development and user experience design tend to benefit from small multidisciplinary teams.

Location of Work

Remote-friendly.

Students may work remotely with periodic virtual meetings.

If desired, optional on-site meetings may be arranged in the Boulder/Denver area. Mileage reimbursement can be provided if in-person collaboration is required.

NDA

Students may be asked to sign a non-disclosure agreement (NDA) if the project involves proprietary datasets, architecture designs, or evaluation criteria.

Intellectual Property

If required by the sponsoring CU Boulder organization, students may be asked to assign intellectual property rights related to project deliverables. Otherwise, students will retain ownership of their work and artifacts produced during the course.

Why this project is appealing

This project exposes students to one of the fastest-growing areas of computer science: agentic AI systems. Students will gain hands-on experience designing intelligent assistants that combine LLM reasoning, knowledge retrieval, and workflow automation. The resulting prototype can be demonstrated as part of a professional portfolio and adapted to domains such as healthcare, enterprise IT, education, and robotics.

Optional Architecture Diagram

