

AI900 Thesis

Prerequisite(s): AI800, AI644, DS710

Course Description

The Thesis course is designed to provide students with an opportunity to apply their knowledge and skills in the domain of Artificial Intelligence to solve real-world problems or conduct innovative research in the field. This course encourages students to demonstrate their proficiency in Artificial Intelligence concepts, methodologies, and techniques while fostering creativity, critical thinking.

The course necessitates the completion of core AI courses, including topics such as machine learning, deep learning, and algorithms, in addition to familiarity with programming languages commonly used in AI, such as Python or R language.

Learning Outcomes

Upon successful completion of this course, students should be able to:

- Apply foundational concepts in artificial intelligence, including machine learning, deep learning, natural language processing, computer vision, or a combination of them, to solve a specific problem or address a research question.
- Design and implement an AI project that demonstrates their ability to analyze, model, and develop an AI solution. They will consider factors such as data acquisition and preprocessing, model selection and training, evaluation metrics, and system deployment.
- Have the opportunity to explore cutting-edge research topics or propose novel AI approaches to address existing challenges. They will conduct a literature review, identify research gaps, and contribute to the advancement of AI knowledge.
- Collaborate effectively within a team, demonstrating their ability to communicate project goals, progress, and results through comprehensive documentation, presentations, and demonstrations.

Topics

- **Submitting Proposal:** Students will develop a detailed proposal outlining the problem statement, objectives, methodology, and expected outcomes of their AI project. The proposal will be reviewed and approved by the course instructor.
- **Implementation:** Students will implement their proposed AI project, following sound software engineering practices and utilizing appropriate AI frameworks and tools. They will collect and preprocess data, design and train AI models, perform experiments, and iterate on their solutions based on feedback and evaluation results provided by the course instructor.
- **Progress Tracking:** Students will maintain an updated documentation of their progress, challenges encountered, solutions implemented, and insights gained throughout the project. Regular progress updates and discussions with the instructor will ensure timely feedback and guidance.
- **Final Report:** Students will prepare a comprehensive final report that details the problem domain, methodology, experimental setup, results, and analysis. This report should also include a critical evaluation of the project's strengths, limitations, and future directions
- **Presentation and Demonstration:** Students will deliver an oral presentation and demonstration of their project, demonstrating the implemented AI solution, highlighting its effectiveness, and addressing questions and feedback from faculty and peers.

Project Submission System:

Team Formation:

A group of 2 and a maximum of 3 students can form a project team. The supervisor will approve suggested teams within 3 days of course delivery.

Proposal Submission:

Each group will submit a proposal including a time plan for the project within the three first weeks of the semester.

Proposal Registration:

At the beginning of the fourth week, a seminar is held to present and approve proposals provided by the teams, after sending copies of the proposals to the seminar committee.

Proposals having less than 75% of seminar committee votes, have a chance to make the suggested improvements within one week, and the updated proposal will be approved by the supervisor.

No graduation projects are approved by the end of the semester unless they are enrolled on the planned date of registration, which is the fifth week following the successful completion of the registration seminar.

The student should attend 70% of the weekly meetings scheduled for the semester.

Report Submission:

The final report will be submitted to the supervisor by the end of the eleventh week of the semester.

Project Discussion:

At the end of the semester, the projects are discussed by a committee of faculty members and evaluated according to the following elements:

- Clarity and quality of the project proposal (10%)

- Implementation and functionality of the AI solution (20%)
- Rigor and depth of the experimental evaluation (10%)
- Quality and organization of the final project report (20%)
- Effectiveness of the oral presentation and demonstration (20%)
- Collaboration within the team (if applicable) (10%)
- Adherence to project timelines and milestones (10%)

General Guidelines:

The research report should have the following content:

- Research Title.
- Introduction.
- Study problem.
- The importance of study.
- Objectives of the study.
- Study questions.
- Theoretical background.
- Previous research work.
- Methodology and research methods and tools.
- Proposed approach/solution.
- Design of the proposed solution.
- Implementation of the proposed solution.
- Case study.
- Discussion and evaluation of results.
- Future work.
- List of references.