IT5005 Artificial Intelligence

Course Information (August 2025)

Sirigina Rajendra Prasad

Teaching Staff

- Lecturer:
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- Teaching Assistants:
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Problem Solving

- Know exact formula → Direct Coding
- No formula, but possess model of related problem → Search
- Not even that, then ask experts → Expert System
- Experts don't know? Collect data → Machine Learning

Difficulty ↓

IT5005: Artificial Intelligence (Syllabus)

Search
- Uninformed Search, Informed Search

Knowledge
- Propositional Logic

Uncertainty
- Bayesian Networks, Hidden Markov Models, Markov Decision Problems

Learning
- Deep Neural Networks, CNNs, Transformers

Evaluation Criteria

- Continuous Assessment: 70%
  - Midterm Test: 30%
    - One two-sided A4 cheat sheet
  - Assignment + Mini Project: 30%
  - Class Participation: 5%
  - Tutorial Participation: 5%

- Final Assessment: 30%
  - Final Exam
    - Date: 01-December-2025, 1:00 PM - 3:00 PM (confirm with school)
    - Venue: TBA (confirm with school)
    - One two-sided A4 cheat sheet allowed

Course Schedule*

Week	Date	Content
1	12-Aug	Introduction/Uninformed Search
2	19-Aug	Informed Search
3	26-Aug	Propositional Logic
4	02-Sept	Propositional Logic
5	09-Sept	Bayesian Networks
6	16-Sept	Markov Chains and HMMs
Recess Week		
7	30-Sept	Markov Chains and HMMs
8	07-Oct	Mid-Term
9	14-Oct	Introduction to Learning/Neural Networks
10	21-Oct	Deep Neural Networks
11	28-Oct	Convolutional Neural Networks
12	04-Nov	Transformers
13	11-Nov	MDP

*tentative: subject to change depending on progress over the weeks

Intended Learning Outcomes

Familiarity with the following

- AI agent program design strategies
  - Search-based Agents
  - Logic-based Agents
  - Agents that can deal with uncertainty
  - Learning-based Agents
- Agent program design paradigms
  - Modeling
  - Learning
  - Inference

Ability to make informed decisions for a given problem

Prerequisites

- Familiarity with the following
  - ➢ Programming (Python)
    - ○ Functions, OOP, Iterative, and Recursive Programming

  - ➢ Data Structures
    - ○ Linked Lists
    - ○ Stacks, Queues, Priority Queues, etc.

  - ➢ Numerical Methods
    - ○ Iterative methods for solving equations

  - ➢ Probability Theory and Random Variables
    - ○ Probability distributions, Bayesian Rule
    - ○ Expectation and Variance

  - ➢ Calculus
    - ○ Derivatives, Chain Rule, etc.

References:

- Textbooks:
  - ➤ **AIMA4e**: Stuart J. Russell and Peter Norvig, "Artificial Intelligence: A Modern Approach," Prentice Hall, 4th Edition, 2020
    - ○ https://linc.nus.edu.sg/record=b4500759

  - ➤ **AIFCA**: Poole, D.L. and Mackworth, A.K., *Artificial Intelligence: foundations of computational agents*. Cambridge University Press 3rd Edition.
    - ○ https://artint.info/