

POTENTIAL PROJECT IDEAS – COMP 3106 INTRODUCTION TO ARTIFICIAL INTELLIGENCE

The following list of project ideas is not exhaustive; any project that solves a problem using artificial intelligence may be chosen. Some of these project ideas may require a dataset; you are responsible for creating/finding/procuring a dataset if necessary.

Note that it is recommended to do a project that has some novel aspect. Implementing a well-known solution to a well-known problem is not very interesting. For all of these ideas, consider a novel variant (e.g. add/remove a constraint, use different dataset, pre-process that data differently, tweak a method, etc.).

1. N-queens variant

The n-queens problem is a classic problem in artificial intelligence that can be solved using graph search. Consider implementing a solution to an interesting variant of the n-queens problem.

2. Card game playing agent

Card games are an interesting variant on adversarial search where the environment is not fully observable (i.e. cannot see cards in opponent's hand or deck). Consider implementing a card game playing agent for a variant of your favourite game of cards.

3. Path planning in multi-agent environments

In class, we considered path planning in a particular type of task environment, involving a single agent. Consider planning a path in a multiple agent environment with agents who have different goals.

4. Optical character recognition

Optical character recognition is the task of identifying written characters (i.e. letters and numbers) from an image. Consider a recognition pipeline involving feature extraction and Bayes theorem to classify characters.

5. Decision support system

Decision support systems use data and other information to aid humans in decision-making processes. Rule-based or fuzzy rule-based systems are often used for decision support because they can provide some degree of explanation or transparency. Consider implementing a decision support system in environments such as medical diagnosis, business, or manufacturing.

6. Video game playing agent

Many video games could be played automatically by an intelligent agent. Consider using reinforcement learning to train an agent to play a simple video game.

7. Game of life variant

The game of life is a simple model of artificial life played on a grid. Consider implementing a more sophisticated version of the game of life that incorporates more realistic patterns of life (e.g. resource needs, other species, etc.).

8. Sentiment analysis

Social media is a vast source of data that can be used to understand popular opinions toward a variety of topics or issues. Using methods from natural language processing, implement methods to analyze the sentiments of social media posts about a specific topic.

9. Image classification

Over the past several years, image classification using convolutional neural networks has exploded in popularity. Consider developing a unique image classifier for a novel task (e.g. rare disease from medical imaging) using a convolutional neural network.