Settlers of Catan AI

COMP4106 Final Project

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1   Problem Space

Playing conventional board games has always been an area of focus for AI research and proof of ability. With many of the traditional tabletop games being solved by AI, many hobbiest projects have moved on to compete in games with more complicated rulesets. To this end, I intend to implement an AI that can competently play the popular board game "Settlers of Catan" with 1-3 other players.

2   Implementation Plan

Catan poses an interesting challenge to implement an AI. The obvious choice is to implement a minimax system, but this poses it's own challenge. The game does have a true points scoring system, but until a player achieves 10 points (the victory state), scores can be highly deceptive. Constructing any one road will not benefit the score at all, but having the longest continious road over the length of 5 gets 2 victory. Additionally, the every player on their turn has the option to trade. This means that the AI must be able to consider what goals the other players are working towards, and therefore minimizing the benefit to it's opponents while maximizing it's own.

   With all of these challenges considered, I plan on implementing a model-based reflexive agent, where actions will be determined by minimaxing. The agent will be storing a record of known information that other players give out. All resource transactions are public information, so using these in addition to what resources the opposing players are seeking, the agent can better guess the current goals of the opponents. With all of this information in mind, the agent will then perform a minimax, favoring progress towards the highest value feasible victory points gain.

3   Deliverables

This project will comprise of one main deliverable, containing the AI and an AI parsable version of "Settlers of Catan". As some games can run somewhat long, an additional video demonstration of the AI will be packaged for ease of evaluation targets. Success will be evaluated by the AI's ability to win an average game in under 20 turns.