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UrbAIIn - Game AI for Urban Public Transportation

In context of Train Fever



Passengers waiting for the arriving bus.



Every city has different types of buildings: green = residential, blue = industrial, red = commercial, yellow = leisure.



A possible line connecting the different buildings from the image above.

Introduction: Playing games is quite fun. But it's even more fun if there is some competition within the game. In early September 2014 a small team of Swiss game enthusiasts released a game called Train Fever, a simulation where players can set up railroads and urban public transportation networks. Since the game was such a huge success, they decided to not only release updates regularly but doing a follow-up game introducing some more features that didn't made it into the first version. One of these features is an Artificial Intelligence that could simulate an opponent player.

Approach/Technologies: The goal of this first project was to gather the requirements and set up the basic structure for an AI that could be used within the game. The problem we decided we wanted to solve was urban public transportation with buses. This means primarily: finding and optimizing lines. Splitting the problem into smaller chunks we came up with the following sub-problems:

- Finding spots to set up bus stops
- Connect some of the spots to get a line
- Deciding what type and how many buses to buy
- Monitor a line and make improvements

Before solving these problems we defined what data of the game is needed and how the AI can interact with the game. Here we tried to define a generic model that could be easily adapted to other environments but Train Fever. To find spots we looked at the buildings, their types and their neighborhood. It's essential to connect the different types of buildings as for example the inhabitants choose the fastest way getting from their home to their workplace. Tackling the more complex problems we tried to map them on already known problems and applied our knowledge of theories finding good solutions. In case of lines we took the traveling salesman problem as a start and applied genetic algorithms. And for choosing buses the knapsack problem came in handy.

Result: We got promising results but there is a lot of work ahead of us until the AI can compete with a human player. Managing buses is a good start but there are more abilities the AI has to master being a real opponent for any player. But there is still a second project and a master thesis left to dig deeper into the very interesting field of gaming AI.