

# Timeline

## Present to February 10th

February 10th is the last day we expect to receive the initial code and other materials from the competition organizers. During this time, we plan to study the TPG model so we can better understand what the program does when we receive it. If we receive the code before the 10th, then we will move on to the next milestone early.

## February 10th - 17th

February 10th through the 17th we should have the code from the competition organizers. During this time we will be looking through, and analyzing the given code to understand what it does, and how it works. After we fully understand the code we can begin to move on to the next step.

## Feb 17th - Mar 16th

From February 17th through March 16th, a period of 4 weeks, we will be focusing on the first major challenge we expect for this project; linking the TPG code to the game. The code for the TPG is in C, and may not come with the actions the character can perform coded in yet; our job for this milestone will be making sure the agent can correctly perform every action available to it, and make sure that the TPG is able to interface with the game through the API given by the organizers.

## March 16th - April 13th

From March 16th through April 13th, we will be using this time to figure out how to set up the external memory. The external memory will store all of the learning that the AI has done. The algorithm has been given to us by the organizers in the form of pseudo code. Once we implement the algorithm, and get it to work properly we can then move onto the next phase of the project.

## Mar 23rd -Apr 13th

We have given ourselves from March 23rd to April 13th to deal with unforeseen challenges. As we are working with various assumptions on what will be required to make the TPG work, and what components are required, there are inevitably going to be things we have overlooked or initially misunderstood. There is also great likelihood for things to take longer than we initially planned for, and so an additional 3 weeks have been set aside to deal with such complications.

## Apr 13th - May 1st

We plan to have the core of the project completed by May 1st, as to have something we can show off by the time we graduate. To accomplish this, the last thing we will need is to design a Fitness Function that will influence how the agent will grow as it learns. We have been given an example Fitness Function, so we expect it will only take 2 weeks at most to design our own.

## May 1st - June 8th

During this period we will be refining our fitness function, and running test to see how we can make the AI perform better. Since we will be graduated by this time we will continue to work on the project on our own time, and we will submit our project to the competition.

# DOTA II TPG Proposal

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- Abstract
  - Use TPG to interface with DOTA 2
  - Create a learning AI that can beat the in game AI
- Problem

Interfacing, commands, external memory, fitness function, unknown.

During this project, we expect to encounter several challenges based on the prompt for the competition, as well as unforeseen circumstances. Firstly, we will have to use the given API to interface between the TPG program and the game instance. This will require learning the API and how to set up the testing server. We will make the assumption that the given TPG code is also not set up for the DOTA II game, and among the modifications we will need to make is giving the program all of the actions it can perform in-game. This requires knowledge of DOTA II, and an understanding of the TPG code itself. The TPG code cannot teach the agent, however, if the agent has no memory, and so we will need to set up an external memory for it to keep its process over time. This will require setting up the external memory hardware, partitioning it and connecting it to the program. Lastly, we have the unknown. Many assumptions have been made on the status of the TPG code and requirements for the competition as we do not have all of the information yet. As such, there will inevitably be problems and challenges we have missed or overlooked, and we will need to adapt to them as they occur.

- How to solve

Learn how to make TPG interface with a given API, program in the different functions the TPG can act on in the game, partition and develop the external hard drive we will acquire for the project, based on the example fitness function given to us, design and implement a simple fitness function for rudimentary study, study and adapt to unforeseen circumstances as we encounter them.

To overcome these challenges, we have planned

- Bottom line goal

Our bottom line goal is to get a working AI that knows how to play the game, and can beat the DOTA II bot.

- How this is beneficial

This project is beneficial to us because we get to work with new tools that we have not used before. TPG's are fairly new tools only coming out less than a year ago. We will also be getting a lot of experience working with different ideas like genetic programming, and AI learning which are big topics in our field of study. Once we get the project working we will be able to submit it, and potentially be able to go to the convention and show off our results.

- Budget

Our budget includes only the external memory, which we decided to buy ourselves in order to keep it after the semester is over. The price for the external memory was \$60, and we also bought a portable sleeve to cover it which was \$8. The total budget was about \$75 after taxes, which we have already covered.