Analysis of DOTA 2 Strategies

Behnaz Hosseini

Supervised by: Dr. Ehyaei

Department of Mathematical Sciences
Sharif University of Technology

Introduction

DOTA 2 (Defense of the Ancients) is a fast paced, online action game which is free to play. At first it was a custom map made for *Warcraft III*, but in 2009 Valve Corporation began developing the game, which was released in July 2013 for Steam. Since its stand alone release, DOTA 2 has become one of the most popular online games in the world, clocking over 600 thousand unique players online in a single day.

In DOTA 2, two teams of 5 players compete, each occupying fortified bases in opposite corners of the map (top right team called Dire and bottom left team called Radiant). Each team has an *ancient building* which they must defend from the other team. The ancient is defended by a series of guard towers. In addition, there are non-playable units called *creeps*, which slowly move towards and attempt to attack the enemy base. Players are needed to choose a hero from a pool of 100+ to play as in each game. All heroes have a unique set of abilities and can fulfill different roles within the game. Some heroes try to support their teammates by healing or shielding them, some try to kill enemy heroes, while others are designed to ignore enemy heroes and go straight to the enemy towers to take them down as fast as possible. As the match progresses, players earn money and experience which will be used to upgrade heroes with various items and skills.

Motivation

Dota 2 has a widespread and active competitive scene, with teams from across the world playing professionally in various leagues and tournaments. Premium Dota 2 tournaments often have prize pools totaling millions of dollars, the highest of any eSport.

The game needs excessive use of strategies and tactics in order to win a match. Each and every low level decisions (like which item to buy) as well as high level decisions matter and can change the outcome of the game.

DOTA 2 is like modern Chess; more appealing to the eye, yet needs you to be careful, quick to think and deceitful in order to win; just like in a game of Chess. (Also both are refused by International Olympic Committee to be added to Olympics!)

The game trailer can be watched here.

Expectations

In this study, I will analyze the match data of games played by the best and the brightest of DOTA 2 players, to find the winning strategies and all the tips and tricks which might lead a team to a win.

The data used is taken from `www.dotabuff.com`, and includes all pro games and international tournaments since the release of version 6.88 (12/6/2016) onward, as with each major version, game strategies change.

Game stats can be found on `www.dotabuff.com`, and a robot should be coded to extract the data. Only pro games and international tournaments stats will be used in this study, since the release of version 6.88 (12/6/2016) onward, as game strategies change with each major version released. There are other sources for obtaining data such as this and this. Data extractor robot will be coded using rvest package.

In DOTA 2, the most important phase might be the bans and picks. At

the start of the game, each team gets to ban five heroes and pick five. Most strategies revolve around heroes, their abilities and how they are played; so if players get the heroes they are good at playing, it will be much easier for the team to win. Therefore our first and foremost task will be analyzing bans and picks and how they have affected the outcome of games.

After the bans and picks, the important thing is Gold and Experience, which can be gained by attacking the enemies or farming. The faster a team's heroes gain Gold and Experience, the sooner they can upgrade their abilities or buy items to become stronger, which is crucial to win the game and should be analyzed in this study.

By the end of this study, I hope to provide an interesting set of results about the game's balance, strategies and how analyzing stats help DOTA 2 captains lead their teams to victory.