



DOTA 2

**Team winning predictor model**

**Springboard - Data Science  
Career Track**

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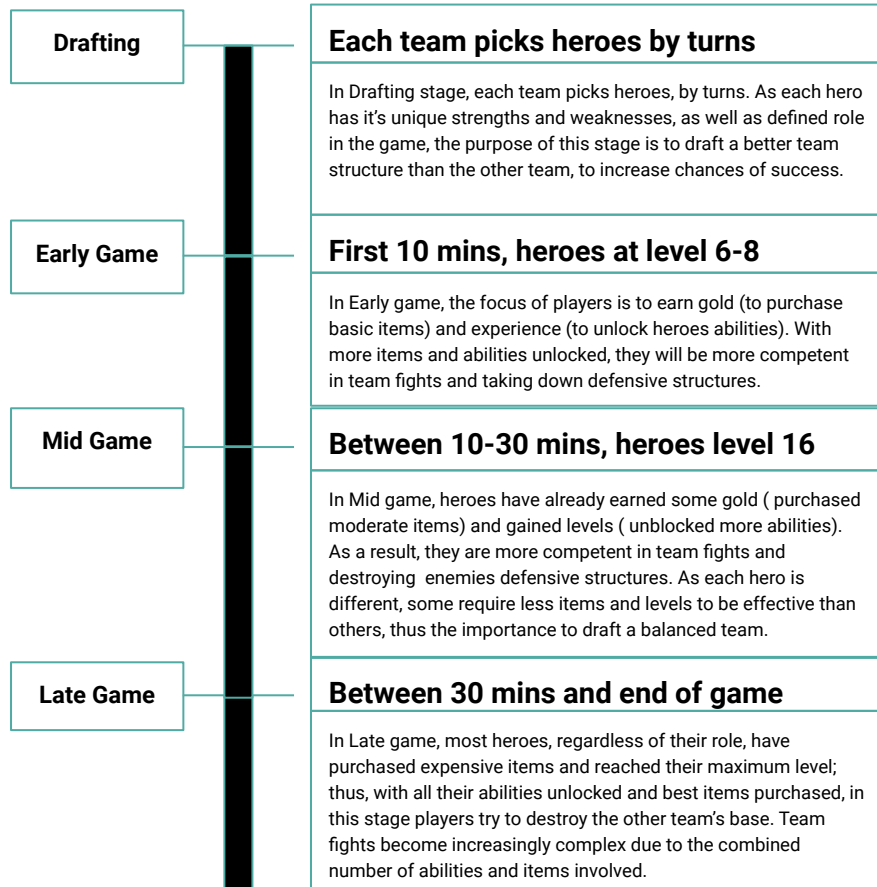
**Mentor - Dr. Guy Maskall**

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# Dota 2

# Game Dynamics and Phases

- **What is dota about?** Two teams of 5 players each compete to destroy the opponents' team base. The team that destroys the opponents' base first wins the game.
- **The heroes** Each player selects and controls a character (hero) from a pool of 115 heroes. Each hero has unique abilities, strengths and weaknesses, which make them better suited for specific roles (e.g. killing enemy heroes / supporting teammates,...); there are also heroes that are not suited for specific roles, but can play on different roles properly (balanced heroes).
- **The hero abilities (earned with experience)** Each hero has on average 4 unique abilities, players have freedom to unlock abilities in any sequence order, to best suit their game needs (each ability once unlocked, can be leveled up to 4 times, becoming more powerful with each level up).
- **The items (purchased with gold)** The item shop provides players with the option to purchase up to 155 different items, each of which gives their hero passive and/or active attributes.
- **The gold & experience** To earn gold and experience, players can (i) last hit creeps (bots in the map), (ii) kill enemy heroes, or (iii) destroy enemy defensive structures. It provides more gold/experience to kill enemy heroes than to kill bot creeps.
- **When a hero dies** If a player gets killed by a (i) bot creep, (ii) defensive structure, or (iii) another player, it will need to wait in his base to respawn. During this time, the player will not earn any gold or experience.
- **Summary** Dota 2 is considered by many as the most difficult video game to master. With 18.784.179.344.417.256 possible team drafts available, the need to plan for early-mid-late strategy, and hundreds of factors that impact in victory, *what should a new player do to improve their chances of winning? what hero should they choose, based on any given draft?*



**At the beginning of a game, can we determine what team will win based on their draft of heroes? For your hero, in your draft, what items should you buy? Can we define, before the game starts, what strategy is best (early, mid or late strategy / kill vs. farm strategy)?**

## 1 Context

In Dota 2, 5 vs 5 players compete to destroy the opponents base to win. The game has one of the steepest learning curves, with players averaging hundreds/thousands of hours to reach average player skills.

In this project we will create a prediction model based on game data available for 50k games.

We will explore the data to find valuable insights about what draft of heroes, items and strategies are better in terms of increasing the winning chances.

## 2 Criteria for success

- To identify the main factors that determine victory, and introduce them into a model that will be able to predict which team will win.
- To be able to identify, before the game starts, what items should players buy to maximize their chances of winning.

## 3 Scope of solution and space

- The analysis will be made on a sample of 50.000 games, from which we will train the model on 35.000 and test it on 15.000 games.
- The model must be ready to be used before December 2020.

## 4 Constraints within solution and space

- We assume that the sample of games is representative of the population. As the sample is very small (equivalent to 1 hour of gameplay online), this could not be the case.
- We assume that players on each game have a similar skill level, but there could be “smurfs”, whose performance would distortion the real performance of a team.
- The game changes constantly with new patches changing heroes and items abilities, therefore the analysis is only valid for the patches of the dataset used.
- The game is very complex, and we will not have information about the micromechanics of the game. Therefore, our analysis will not include the effect of how “mechanically” good a player is.

## 5 Stakeholders

- Dr. Guy Maskall - Mentor of the project
- VanN - Top 100 world ranking player and Dota 2 streamer

## 6 Key data sources

OpenDota Data - Downloaded into Kaggle Account in the project David Anzelmo. Several CSV with data of 50.000 Dota 2 matches.