NFL Fantasy Football Project Proposal

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Overview of my 2023 machine learning project. Expected completion time is 11 months, including project planning, data collection, data cleaning, exploratory analysis, statistical analysis, machine learning - model building, testing (which will happen live during the 2023 NFL season), reporting, and reflection.

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1. Overview

In this project, I aim to develop a fantasy football recommender system in which players will be suggested based on current and past player statistics, currently available players, and players already chosen.

There are a handful of other applications that complete similar tasks, however, there are few to none that are as complete as suggesting, in real-time, who should be picked up, dropped, or traded. Additionally, most other applications require some prior knowledge of players such that the chooser must select a number of players (say 4 specific players) and the app will suggest which (of the 4) to pick. Although this can be helpful and insightful, I aim to create a totally new method which uses prior history of players, bye-week knowledge, current players, injuries, etc., to determine what a participant should do each week. This includes picking their first week players (building a team) all the way to suggesting players for each week based on who will be playing who.

Not only will this project encompass the recommender system, it will explore other aspects of the data. I intend to use multiple machine learning techniques including linear regression, unsupervised clustering, and deep learning tactics. This app will not only contain information pertaining to the recommendations but also vital insights into players and/or teams as a whole. I aim to make the app interactive and easy-to-use. A final test will be conducted in the 2023 NFL football season where the recommendation system will be put to the test in a real Fantasy league championship.

It may be valuable to briefly discuss the reasoning as to why this project was chosen, beyond my personal interest. Firstly, the NFl has been around for over a century and the concept of fantasy football began in 1962. In 1997, the online fantasy football app was launched, which, since then, statistics of player and team performance has been recorded. Further, the data is more easily accessible and standardized across platforms than many other types of data which makes data collection more reliable. Lastly, there will continue to be new data forthcoming in the foreseeable NFL seasons, which allows for model updates, testing, and user trials. It's important to note that, in addition to the data stage of production, the project has many real-world applications and outside interest in the topic (discussed further in section 7).

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2. Fantasy Football Overview

Before describing the project, we must first understand what Fantasy Football is and how it works to better grasp the overall reasoning for this project's motive.

Fantasy Football is a popular virtual game that allows users to build and manage their own virtual team of NFL players. Participants draft real NFL players and compete against other participants by earning points based on the actual performance of their players in real NFL games.

1. Join a league and draft players: Users join a league with friends, co-workers, or other fantasy football players. They then draft real NFL players to build their virtual team.
2. Earn points: Users earn points based on the actual performance of their players in real NFL games.
3. Manage their roster: Users can make changes to their roster throughout the season, such as picking up free agents, dropping players, and trading players with other users.
4. Scoring: Points are awarded based on the league's scoring system, which typically includes categories such as passing yards, rushing yards, touchdowns, and interceptions.
5. Standings: The user with the most points at the end of the season wins the league championship.

Fantasy Football provides a fun and engaging way for NFL fans to compete against each other and test their knowledge and strategy skills. It's a great way to follow the NFL season and stay connected with friends and fellow NFL fans. Some leagues have pay-in, gambling-type, builds such that the user which wins with the most points, earns real money.

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3. Previous Works

There are many previous attempts to create something similar to such a model. However, in this project, I will create a model that not only predicts weekly point outcomes but also gives suggestions for which players to have on the starter roster. Before beginning this project, it would be vital to discuss previous studies and applications that already exist so that we can either try to improve upon what there already is, and/or create new models and insights which have not been thought of yet.

3.1. FantasyPros

FantasyPros

3.2.

3.3.

3.4.

3.5.

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4. Methodology

This project will have multiple components within it consisting of (1) data Exploration and general statistical insights, (2) machine learning models (i.e. recommendation system and predicted points), and (3) an interactive web application. Steps 1 and 2 (EDA, visualization, and machine learning) will require web scraping to gather the appropriate data.

4.1. Data Exploration and General Statistical Insights

In addition to the forthcoming machine learning models which will recommend players and predict weekly points (section 4.2.), there are many other insights which are useful to explore. These include, but are not limited to, player performance analysis, player injury analysis, player consistency analysis, player clustering based on performance and statistics, and player vs. opponent analysis (which could include location as a variable). This is not an exhaustive list, but instead starting points to break off from while exploring the data and getting a better understanding of the data at hand.

4.2. Machine Learning Models

R and Python!

4.3. Interactive Web Application

Figma

4.4. High-Level View of Architecture

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5. The Data

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6. Timeline

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7. Future Use