CAPSTONE PROJECT REVIEW 1

FANTASY PREMIER LEAGUE TEAM OPTIMAZATION USING GUIDED LEARNING MODELS AND SOCIAL MEDIA SENTIMENT ANALYSIS

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INTRODUCTION

- Fantasy Premier League (FPL) is an immensely popular online game where participants assemble virtual teams of real Premier League players, competing based on players' actual performances in matches.
- With millions of players worldwide, managing teams requires strategic decisions and in-depth analysis. Maximizing points within budget constraints, planning fixtures, and selecting the right players are crucial for success.
- FPL Assistant serves as a valuable tool, providing insights, predictive analytics, and optimization strategies to help FPL players navigate the complexities of the Premier League with confidence and success.

An FPL assistant is expected to:

- Provide comprehensive player statistics and historical performance data to aid in player selection.
- Offer insights on fixture difficulty ratings, team form, and player fatigue to assist in fixture planning.
- Incorporate machine learning algorithms to suggest optimal team compositions within budget constraints.
- Integrate data from FPL Analytics and sentiment analysis to gauge player popularity and community sentiment.
- Provide real-time updates on injuries, suspensions, and transfer news affecting player availability.

OBJECTIVE

The primary objective of the Fantasy Premier League (FPL) Assistant project is to develop a comprehensive platform that leverages data engineering, machine learning, and artificial intelligence to provide FPL managers with actionable insights and tools to optimize their team management strategies.

The key objectives include:

- To analyse and predict player performance and points for each game week based on historical data, fixture difficulty ratings, and other relevant factors.
- To assist FPL managers in making informed decisions regarding player selection, transfers, and team formation.
- To prioritize fixtures and plan strategies for maximizing points while adhering to budget constraints.
- To enhance user experience and engagement by providing intuitive interfaces and personalized recommendations.
- To continually improve and refine the platform through feedback and iteration, ensuring its relevance and effectiveness for FPL managers.

ABSTRACT

- FPL, based on the English Premier League, poses challenges due to biases, fixture complexities, and budget constraints.
- Data engineering, machine learning, and AI help overcome these challenges by providing insights and optimizing team selection.
- FPL managers face a budget cap of 100 million, position limits, and specific scoring metrics for players.
- Fixture variations include blank game weeks, double fixtures, and limited transfers, requiring strategic team building.
- A platform aims to support FPL managers with visualizations, predictive analytics, and transfer tips.
- It plans to create optimal teams for the season and each game week while training an AI model for decision-making.
- The platform's goal is to empower FPL players to make informed decisions and compete effectively in the FPL.

LITERATURE REVIEW

- Player Recommendation System for Fantasy Premier League using Machine Learning
- Sports Analytics algorithms for performance prediction
- Game Plan: What AI can do for Football, and What Football can do for AI
- Multi-stream Data Analytics for Enhanced Performance Prediction in Fantasy Football
- Football Player Value Assessment Using Machine Learning Techniques
- Fantasy Premier League - Performance Prediction
- Who Should Be the Captain This Week? Leveraging Inferred Diversity-Enhanced Crowd Wisdom for a Fantasy Premier League Captain Prediction
- Time Series Modeling for Dream Team in Fantasy Premier League
- Football players performance analysis and formal/informal media: Sentiment analysis and semantic similarity
- TF-Pundit: A Real-time Football Pundit based on Twitter

SYSTEM ARCHITECTURE

Before each Game week, the Model plans for future Game week fixtures with decreasing order of priority to each successive fixture, and for each player calculates Team Form and Predicted Team Scoring Index (xGfor) and Predicted Team Conceding Index (xGagnst) by using :

- Form
- Attack Index
- Defence Index
- Fixture Difficulty Rating
- FPL API data
- Previous history from FPLAnalytics.com and whoscored.com
- Time-series forecasting from previous season data
- Team fatigue Index from other Fixtures from whoscored.com

PLAYER RATING RULES

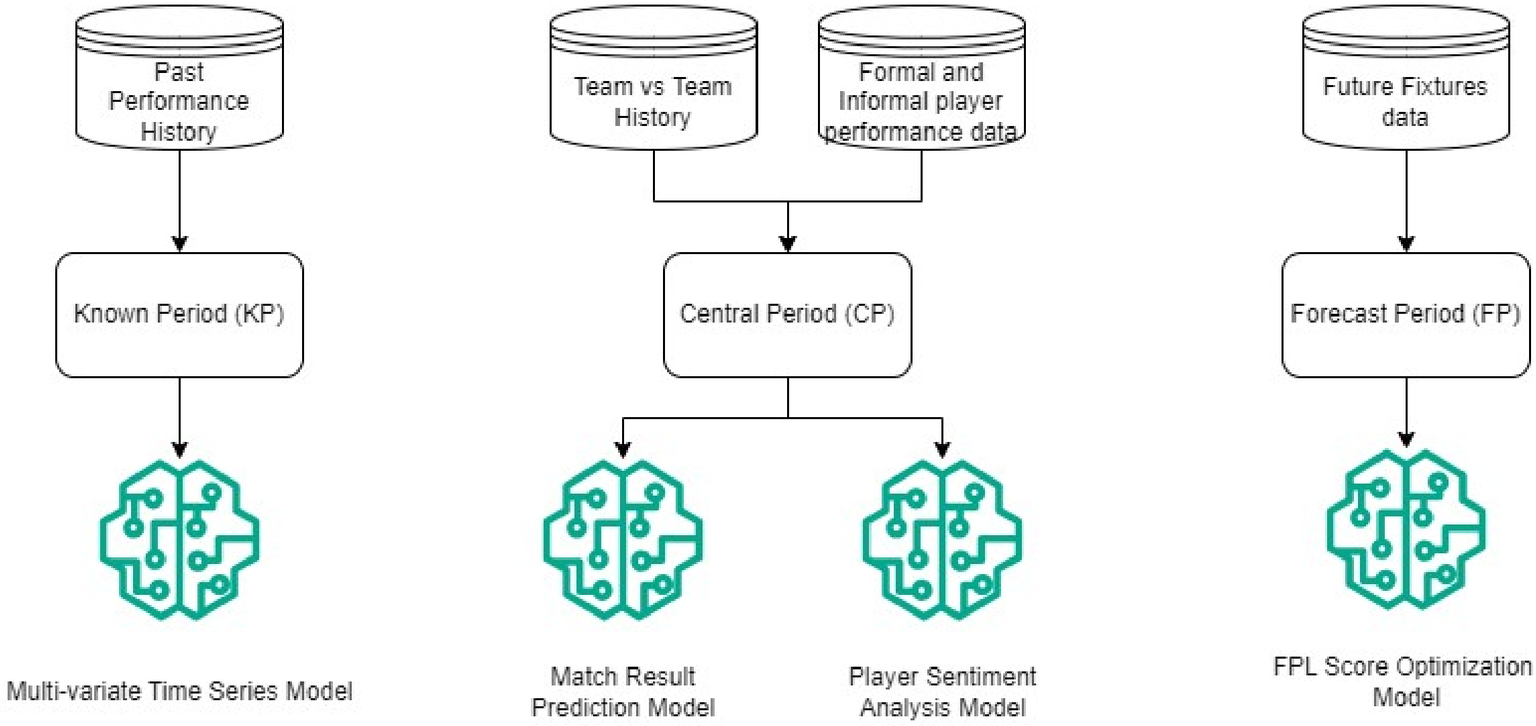
Attacker/ Midfielder:
We take the Predicted Team Score Index (xGfor) and the probable minutes per 90 index (xMP) and the match fitness (fatigue/ rest probability) and the Form of the player and the expected Scoring Index (xSc) and the expected Assisting Index (xAst) to calculate the probable points for the game (xPts).

Defender/ Goalkeeper:
We take the inverse of Predicted Team Conceding Index (xGagnst) and the probable minutes per 90 index (xMP) and the match fitness (fatigue/ rest probability) and the Form of the player and the expected save Index (xSv) and the discipline Index to calculate the probable points for the game.

METHODOLOGY

- For each player, a player Selection popularity Model is considered where we using % selected, % captained data from FPLAnalystics and FPL API and using Twitter Sentiment Analysis on tweets on threads related to @FPLtweets for Sentiment analysis for players and formulate Popularity Metric using BERT (Bidirectional Encoder Representations from Transformers)
- We then design a statistical model that predicts the best permutations of team (playing XI + 4 bench players) with formation using Predicted points per Cost Unit (Million) and create best possible team that maximizes the score for the upcoming fixtures.
- For Time-Series Modelling we will be using a hybrid of Autoregressive Integrated Moving Average (ARIMA) and Recurrent Neural Networks (RNNs) for time series prediction of player points and subsequent maximization of total points using Linear Programming (LPP).
- For Prediction of Fixture results and points for same season we will be using Random Forest Regressors with extreme Gradient Boosting (xgBoost).
- We aim to feed trained data to an LLM model to create a chat interface for user with the data.

SYSTEM ARCHITECTURE DIAGRAM



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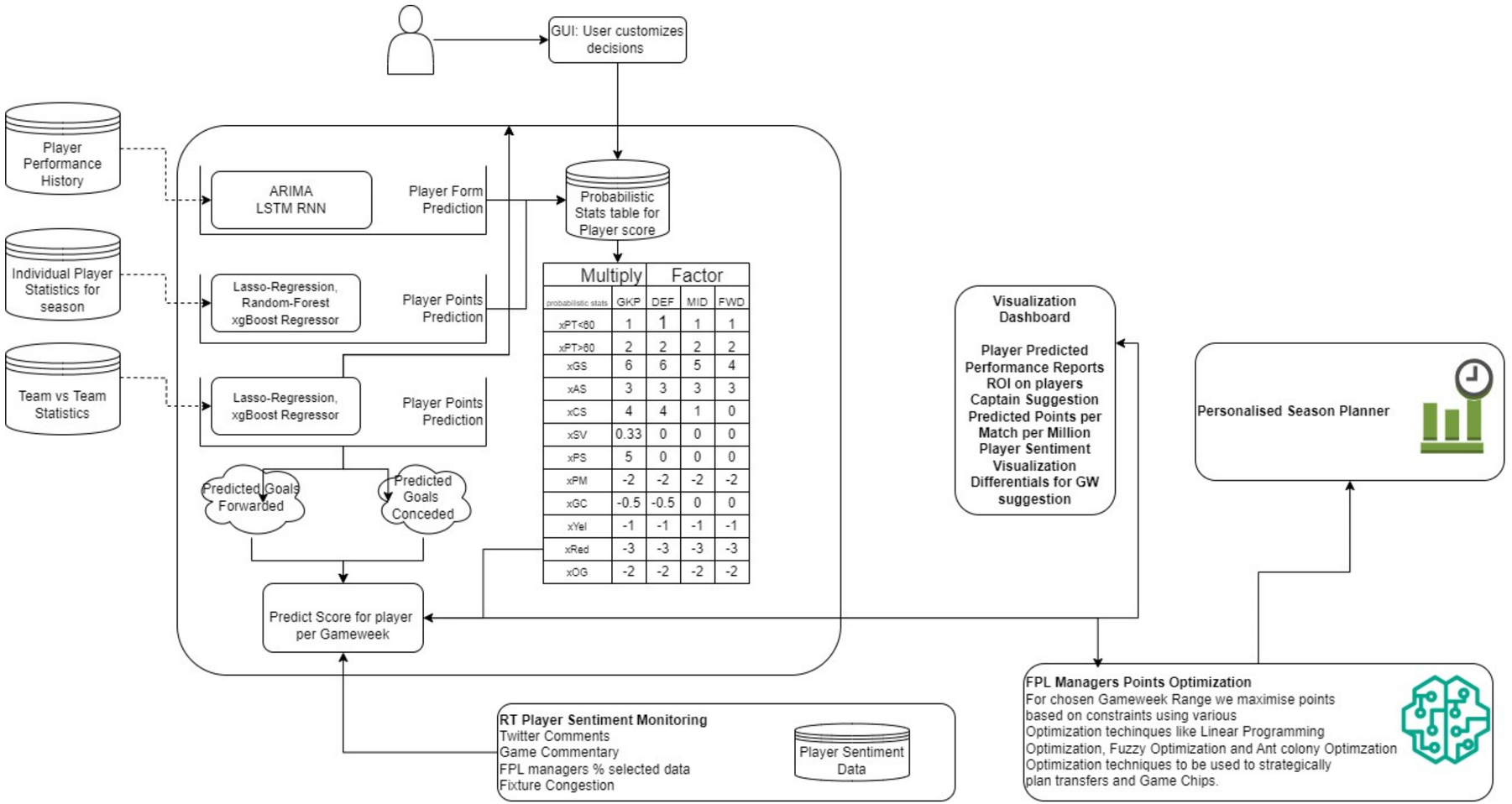

THANK YOU

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