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F1 Fantasy Web Application with AI Integrations

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The main objective of this project is to utilize machine learning models to support better predictions for F1 related content, which by building an F1 Fantasy web app with AI driven predictions and analytics so users can make decisions when picking and managing their fantasy teams with access to AI predictions. The project will increase user engagement and decision-making accuracy by providing personalized insights from historical and real time F1 data.

Specifically, the app will aim to increase fantasy team selection predictions by at least 30% using AI to give users recommendations based on past performance and driver stats.
Increase user engagement and retention by 25% in the first 6 months post launch with an easy-to-use, data rich interface and interactive features.

Simplify F1 performance metrics so fantasy sports are accessible to casual fans and experienced users. Encourage competitive community engagement with leaderboards, performance tracking and interactive forums.

The project addresses some of the key issues faced by F1 Fantasy players, which are too many unusable data, not enough tools to predict and no personalized insights. By providing a modern AI powered solution the app will deliver tangible benefits to the user and an active fantasy sports community.

Objectives

1. Market and User Needs Analysis

a) Conduct research among F1 enthusiasts to understand the preferences and expectations of F1 fans for applications related to the sport.

b) Keep track of existing fantasy sports platforms, recognizing the strengths, weaknesses, and what left to be desired.

c) Review historical F1 data sets to understand the factors influencing driver and team performance, which will result in a well-rounded understanding of the sport for future machine learning implementation.

2. Application Design

a) Develop a prototype for the web application based on research discoveries and best UX/UI practices.

b) Design the AI prediction model, indicating the key performance indicators that will be used for the predictions.

c) Gather feedback on the prototype from potential users and make any necessary adjustments

3. Application Implementation

a) Select appropriate technologies for building the application.

b) Train the AI prediction model in a dataset that contains historical F1 data.

c) Program the application's core functionalities with security and performance into consideration.

d) Conduct initial testing to search for easy to replicate bugs, as well as having a first look at usability

4. Deployment and Evaluation

a) Release a beta version for a selected group of users, including casual fans, competitive players, and F1 enthusiasts.

b) Collect feedback on:

- The accuracy and usefulness of AI predictions.
- Overall user experience and design of the app.
- Community features and engagement tools.

c) Analyze user behavior data as an evaluation to the application.

d) Improve the application according to the feedback given, concentrating more on the most requested features or major issues.

e) Measure success against the project’s aims using specific KPIs such as:

- Prediction accuracy: Comparison of AI-driven recommendations with actual race outcomes.
- Engagement rates: Track how many people use the app daily and the number of hours they spend on it.
- User retention: Percentage of users still using the app after specific periods of time.

3. Context

About the sports industry

These days, sports are a concept that everyone is aware of. The definition of it exists in all modern dictionaries, which basically can be understood as a game, competition, or activity needing physical effort and skill played or done according to rules, for enjoyment and/or as a job [1]. Sport has existed in human society since recorded history, with editions of Omlypic in ancient Greece, which researchers figured dated back to 776 BC when it was initially held as a sports festival in honor of local heroes [2].

Following the development of mankind, sports evolved into a global industry with multiple branches, along with their own businesses, players, and fans. Sports investments have become increasingly common due to the fact that the income and marketing value of sports teams in general are worth a lot more than ever before. Proofs of them have been shown in multiple reports, examples being the $4.351 billion enterprise value worth of Manchester City FC football club in the England Premier League, with multiple other clubs being worth more than $1 billion and recording double-digit percentage growth since the previous year according to a 2023 report [3].

With peak growth recently, the sports industry being in the technology era has undergone multiple transformations on the consumption of its audiences, which has shifted dramatically from traditional stadium attendance to digital platforms. Ultrahigh-definition services and over-the-top (OTT) media have become central to the viewing experience, allowing fans to engage with content in more interactive ways [4]. The COVID-19 pandemic accelerated this shift, with a decline in physical gatherings and a

surge in online participation, such as co-watching and online discussions. Platforms like YouTube have also played a significant role in this digital transformation, offering new ways to experience sports mega-events [5].

With that, sports fans now have additional interest in data, whether for their own team or as a sport in general. Data analytics has become increasingly integral to sports analysis, influencing both player performance and fan engagement. The use of wearable technology, big data analytics, and sensor technology has revolutionized how sports are played and analyzed [6]. Fans now seek new ways to interact with the sport that they enjoy, which for example are interactive experiences like fantasy sports, e-sports, and betting platforms. Along with that happening, taking into account the fact that sports are built on the idea of competition, having teams and players rivalry, their fans also compete in multiple ways, which includes fantasy sports.

Early days of fantasy sports

The fantasy sport idea is easy to grasp, as the name suggests, it is an imaginary situation concept based on a real-life sport. When the fans get more engaged with the sport they follow, these people might start to create situations, and cases that did not actually happen, and discuss theories about those events. For example, what would happen if we put the football team Manchester United in their European championship-winning season of 1998 versus the formation of Real Madrid in their own European champions season of 2023? Or what would happen if Formula 1 driver Max Verstappen started his journey in the highest tier of F1 as a Mercedes AMG Petronas driver instead of Red Bull Racing? From this concept, fantasy sports started to exist in the form of tabletop and board games.

The roots of fantasy sports stretch to the mid-19th century with the creation of the earliest manufactured in-home games using a pinball-like design as Richard G. Lomax wrote in the Handbook of Sports and Media [7]: *"In Francis Sebring's 1866 Parlor Base-Ball game, a coin (representing a baseball) would be propelled along a flat wooden surface by a coiled spring (the pitcher) toward a movable flipper (the batter). The batter would then hit the coin into one of several open slots on the playing surface and create a specific outcome of the game-player's at-bat (Reilly, 2005)."*
This format of the board game allowed the player to use their imagination and make up a game somewhat similar to a real-life baseball game, with players being whomever the player wants to assign to, which makes the player more attached to their real-life baseball player references.

Since then, there have been multiple types of fantasy sports that have been played. The first version is mentioned above, with the implementation of a board game.

Another version use a computer system to simulate the actual game. In this version, all the stats for each player are created by the players and utilized by the computer, for example, speed, agility, technique, etc, to generate a lot of information only for a single game. Taking into account a basketball match, the computer can use the stats set for the players in the NBA and create fantasy information regarding a match, such as 3-pointer throws, number of blocks, final MVP, and more. In theory, if the stats imported to the players are relatively close to their actual performance in real life, the computer will generate a more likely result between them. This type of fantasy is implemented in sports games nowadays. Games like FC 25, F1 Manager, and Football manager use this system to simulate matches between so-called AI in career mode. Every sport that exists can have a fantasy gaming platform implemented in cyberspace.

The modern version of fantasy sports

---------- Do not count from this point on ----------

…And

In any sport entity there will be a focus on marketing in order to increase income.

The F1 Fantasy Web Application with AI Predictions provides entertainment by incorporating data-driven predictions and fantasy sports, thus enhancing user experience for Formula 1 enthusiasts. This project addresses a rising interest in Formula 1, the growing number of fantasy gamers, and AI-powered solutions aimed at competitive gaming.

Background and Motivation

Talk about what kind of fantasy sport platform, kind of betting without money + competitive. AI can be use at a price / hint from AI. AI can be powerup, can use 1 time. AI usage can be redeem by daily login

Platform + AI

1 – **Explain what fantasy sport is (close to betting , removing the money cause if we do)**

2 – talk about the growing popularity -> leads to talk specifically about f1 fantasy platforms specifically (explain what they are doing)

3 – describing what are current system that provide similar functionality, why are we doing new one, what can be done new

F1 – competition

Aim, context , functional req, nonfunctional req

PRI description

wireframe

Formula 1 popularity has grown significantly in the last few years, leveraged by wide media coverage, streaming services, and detailed content such as Drive to Survive. In addition, the fans are more and more attracted to fantasy sports platforms, which give them much deeper engagement with aspects of the sport. However, most of the current fantasy sports platforms lack advanced analytics and AI-powered insights targeted at their users.

The integration of a system for AI-based prediction in this project will give users an edge over others and strengthen their interaction with the platform. AI predictions can be used to deliver optimize user decision-making, and dynamically create experiences based on current race data combined with historical trends.

External Factors Affecting the Project

Stakeholders: Targeted consumers are Formula 1 fans, fantasy game players, and passionate data analysts. With other stakeholders are sponsors and advertisers who view the app as a medium wherein they can reach out to users, media partners in Formula 1, and actual teams in Formula 1 looking to increase their influence. In addition, organizations which supply real-time and historical F1 race data can also be counted in.

Industry Trends: Increasing global popularity of competitive and fantasy gaming, combined with developments in the field of AI and predictive analytics, creates a special sweet spot where these can come together for an even better experience of both worlds

Other systems: Existing third-party F1 APIs that the project can use to incorporate data. Other social media platforms (X, Facebook, etc.) for user engagement, predictions sharing, and league standings.

Events:

Regulatory Landscape: Adherence to data protection legislation such as GDPR will be paramount to protecting user data. Specific challenges may occur which slow down the integration process of third-party APIs. For example, those providing race data, while ensuring that their terms and conditions are upheld.

Processes and Use Cases

It should be designed to do the following: fantasy league team selections and performances; AI model predictions to suggest the best teams or outcomes of races; integration with live data streams during races. Sources and Sinks Sources Include historical F1 data, comprising race results, drivers' statistics, performance of teams, and track conditions. Live data feeds provided through third-party APIs offering telemetry data, race timings, and live commentary. User-generated inputs include fantasy team selections, user preferences, and feedback.
External Feedback: Collected through user surveys and community forums to improve application functionality.
Skinks:

Centralized Database: Stores user information, fantasy team data, and prediction outputs.
Reports and Insights: Generates and exports data visualizations for user consumption.
Third-Party Tools: External platforms (e.g., marketing systems) may use aggregated data for campaign management or audience analysis.

Competition Analysis

Conducting a competitive analysis highlights gaps in the market and potential differentiation for the F1 Fantasy Web Application.

Existing Platforms

Official Formula 1 Fantasy League

Strengths: Officially linked to Formula 1; broad reach of audience; simple user interface.
Weaknesses: Lacks analytics; gameplay is static; no AI integrated.

DraftKings and FanDuel (Fantasy Platforms)

Strengths: In-dominant platforms with broad bases of users; a variety of sports covered.
Weaknesses: Lack of focus on Formula 1; limited race analytics.

Motorsport Manager Online

Strengths: Provides engaging team management experience.
Weaknesses: Focused on game mechanics rather than predictive analytics for real races.

Differentiation Opportunities

AI-Driven Insights: Predictive analytics based on historical and live data.
Custom Visualizations: Interactive charts and graphs to track fantasy team performance.
Engagement Features: Real-time updates during races, gamification elements, and personalized recommendations.
Community Building: Social features to let users create leagues, compete with friends, and share insights.

Market Potential

This is a very interesting niche but growing market at the intersection of Formula 1, fantasy sports, and AI. By offering a seamless, data-rich, and engaging experience, this app can position itself as a leading player for user demands on advanced analytics and an interactive platform.

Bibliography

[1] J. Swaddling, The Ancient Olympic Games, University of Texas Press, 1999.

[2] Cambridge University Press & Assessment, Cambridge University Press & Assessment, [Online]. Available: https://dictionary.cambridge.org/dictionary/english/sport.

[3] A. SARTORI, „Football Clubs' Valuation: The European Elite 2023," Football Benchmark, 2023.

[4] A. P. A. D. Kirti Mahajan, „Revolutionizing Fan Engagement: Adopting Trends and Technologies in The Vibrant Indian Sports Landscape," *International Journal of Management Thinking,* 2023.

[5] G. B. É. M. A. &. R.-Ó. K. Ráthonyi, „How Digital Technologies Are Changing Sport?.," *Applied Studies in Agribusiness and Commerce ,* 2018.

[6] J. A. &. P.-W. R. Lee Ludvigsen, „From television to YouTube: digitalised sport mega-events in the platform society," *Leisure Studies,* p. 615–632, 2022.

[7] R. G. Lomax, „Fantasy Sports: History, Game Types, and Research," w *Handbook of Sports and Media*, New York, 2006, pp. 383-392.