Technical Report - **Product specification**

Game Sense

Course:	IES - Introdução à Engenharia de Software
Date:	Aveiro, 07/10/2024
Students:	113968: Guilherme Rosa 113920: João Roldão 113765: Rui Machado 114588: Henrique Teixeira
Project abstract:	GameSense is a football analytics app that provides real time analysis of simulated football games. It is also capable of simulating games based on past data.

Table of contents:

1 Introduction

2 Product concept
- Vision statement
- Personas
- Main scenarios

3 Architecture notebook
- Key requirements and constrains
- Architetural view
- Module interactions

4 Information perspetive

5 References and resources

1 Introduction

GameSense is a football analytics app designed for enthusiasts and professionals seeking deeper insights into the beautiful game. The app provides real-time analysis of team, players performances and statistics, allowing you to easily compare teams and players. Additionally, it can predict game outcomes based on real past statistics.

2 Product concept

Vision statement

Concept

Our system will be used for real-time analysis of simulated football games. It captures detailed statistics of the game, including team performance, individual player metrics, and additional stats. The system generates dynamic insights, creates leaderboards and rankings based on data, allowing users to compare teams and players effectively.

Inspiration

While there are similar products like *Flash Score* and *Zero Zero* that already provide detailed statistics and diverse graphs for every team, player, and managers across all recorded seasons, our system is different. It offers simulation and prediction capabilities that set it apart. Users can simulate matches using historical data, analyze team form, past performances and player's stats to predict outcomes and odds. This helps users explore different match scenarios and prepare more effectively for upcoming games.

Motivation

The concept was developed because we wanted a tool that could help us with our football bets by compiling historical data and identifying the best betting opportunities. We aimed to create a solution that not only provides detailed statistics, but also helps users to simulate and predict match outcomes, enhancing their betting strategies.

Use Case Diagram

Personas and Scenarios

A **Persona** is a fictional character created to represent potential users and their interactions with a system. It embodies a specific set of traits and motivations, helping humanize and define the context of how an app will be used. Personas help illustrate how different types of users might engage with the system, making future use cases more relatable and easier to understand.

A **Scenario** is a narrative that outlines the interactions between personas (or other actors) and the system. It describes the flow of events in a particular use case, illustrating either how the system is currently used or detailing the required functionality for a new or updated system. Scenarios provide insight into the use case, offering a clearer understanding of the challenges and requirements involved.

Persona #1: Fan

Name: António Geirinhas

Age: 34

Location: Lisbon, Portugal

Occupation: Accountant

Description: António is a passionate Sporting CP fan who loves his team. He has loved the sport since he was a child and rarely misses a match of his favorite club, whether in the stadium or watching from home. He actively checks out football statistics and match analysis.

Motivation:

- Wants to stay updated with real-time stats during matches to feel more connected with the game and to better understand how the game is going.
- Enjoys predicting outcomes of matches for fun and sometimes he places bets.
- Appreciates detailed player comparisons and tactical breakdowns with statistics to back up his opinions during arguments with friends.

Persona #2: Coach

Name: Jorge Vitória

Age: 48

Location: Porto, Portugal

Occupation: Head Coach of Leixões Sport Club

Description: Jorge is an experienced football coach who has managed teams in various levels of football, from youth teams to professional clubs. He has a masters degree in statistics, showing how focused he is in extracting maximum performance from his players through data analysis. Jorge stays ahead of other teams by analyzing opponents' tactics and adjusting his strategies accordingly.

Motivation:

- Wants real-time game statistics to make informed decisions during matches, especially for substitutions and tactical changes.
- Enjoys a good post-match analysis to identify areas for improvement and prepare for upcoming opponents.

Persona #3: Player

Name: Ricardo Monteiro

Age: 26

Position: Central Midfielder

Club: *Sporting Clube de Braga*

Description: Ricardo is a talented midfielder who prides himself on his passing accuracy and vision on the pitch. He is highly disciplined and a perfectionist in all things in life, making him look for ways to improve his game all the time, whether through personal data analysis or feedback from coaches.

Motivation:

- Wants data insights to track his own performances and benchmark against his past games and league averages.
- Enjoys seeing tactical breakdowns to understand how his positioning impacts team dynamics.

Persona #4: Scout

Name: Marta Lopes

Age: 40

Location: Birmingham, England

Occupation: Head of Scouting of *Wolverhampton Wanderers Football Club*

Description: Marta is an experienced scout who travels across Europe to evaluate up-and-coming talent for her club. She relies heavily on data analysis to pick potential recruits before seeing them live in action. Marta is always looking for ways to gain a competitive edge in identifying talent, including emerging trends in performance analytics.

Motivation:

- Needs performance simulations and historical data to assess if a player is what she needs to fit her team's tactics.
- Analyzes young players, how their stats have been developing, their injury record and which tactics they have played under.
- Looks to back her insights with stats when presenting to the club's manager and board a newly recommended player for acquisition.

Scenario #1: António Geirinhas (Fan)

Keeping up with a Game

António is excited about an upcoming match between Sporting CP and their rivals but, unfortunately, he can't watch it.. During the game, he opens the GameSense app to keep informed with in-game events (goals, yellow cards, substitutions, etc.) and check for statistics to get a better sense for how the game his going for Sporting, the team he is supporting.

Scenario #2: Jorge Vitória (Coach)

Preparing the tactical plan for a game

Preparing for a match, Jorge uses GameSense to analyze his opponent's recent performances. He simulates different matches to identify potential weaknesses in the opposing team's tactics and vulnerabilities within his own squad. Then, he can help his players exploit the opponent's weaknesses and strengthen their own skills for the game.

Scenario #3: Ricardo Monteiro (Player)

Review player performance

Ricardo wants to improve as a player and for that he logs into GameSense to review his personal statistics from his recent matches. Using this information Ricardo knows what to train to improve his game. Ricardo can also check for opponents statistics and try to find out any possible weaknesses that he can exploit.

Scenario #4: Marta Lopes (Scout)

Seeking a new talent

Marta is looking out for a promising player to her team's squad. Using GameSense, she filters players on key performance metrics like passing accuracy, expected goals and adaptability to different tactics. She discovers a young talent whose stats have been consistently improving.

Product requirements (User stories)

Live Statistics (Epic #1)

- **User Story #3**
  As António
  I want to check the game result in live
  So that I can follow a game if I am not able to watch it.
- **User Story #4**
  As Jorge
  I want to check my teams game stats in live
  So that I can adapt my tactics in a game to give my team a better chance of winning.
- **User Story #10**
  As Jorge
  I want to see what players of other teams are injured
  So that I can prepare matches in a better way.

Historical Statistics (Epic #2)

- **User Story #1**
  As Ricardo
  I want to check my overall personal statistics
  So that I can improve as a professional.
- **User Story #2**
  As António
  I want track my favorite team's standing in the championship
  So that I stay updated on their progress.
- **User Story #7**
  As Marta
  I want to see every game and player statistics in detail
  So that I can write my reports.
- **User Story #8**
  As Marta
  I want find the player with the most goals
  So that I can convince the team's board to contract him.
- **User Story #9**
  As António
  I want to see the result's history of my team's next opponent
  So that I know what to expect.

- **User Story #11**
  As Ricardo
  I want recommendations for specific skills or areas to focus on
  So that I can improve and make a bigger impact on the pitch.
- **User Story #12**
  As Marta
  I want to evaluate the injury history and risk factors of a player
  So that I can make safer recommendations for player signings.

Game Prediction (Epic #3)

- **User Story #6**
  As Jorge
  I want to simulate a game against an opponent
  So that I can see what is a probable outcome and try to beat the odds using statistical data of the simulated game

Social Media Interaction (Epic #4)

- **User Story #5**
  As António
  I want to easily share key stats and insights from games to my social media page
  So that i can have informed discussions with my followers

3 Architecture notebook

Key requirements and constraints

<Identify issues that will drive the choices for the architecture such as: Will the system be driven by complex deployment concerns, adapting to legacy systems, or performance issues? Does it need to be robust for long-term maintenance?

Identify critical issues that must be addressed by the architecture, such as: Are there hardware dependencies that should be isolated from the rest of the system? Does the system need to function efficiently under unusual conditions? Are there integrations with external systems? Is the system to be offered in different user-interfacing platforms (web, mobile devices, big screens,...)?

E.g.: (the references cited in [XX] would be hypothetical links to previous specification documents/deliverables)

There are some key requirements and system constraints that have a significant bearing on the architecture. They are:

- The existing legacy Course Catalog System at Wylie College must be accessed to retrieve all course information for the current semester. The C-Registration System must support the data formats and DBMS of the legacy Course Catalog System [E2].
- The existing legacy Billing System at Wylie College must be interfaced with to support billing of students. This interface is defined in the Course Billing Interface Specification [E1].
- All student, professor, and Registrar functionality must be available from both local campus PCs and remote PCs with internet dial up connections.
- The C-Registration System must ensure complete protection of data from unauthorized access. All remote accesses are subject to user identification and password control.
- The C-Registration System will be implemented as a client-server system. The client portion resides on PCs and the server portion must operate on the Wylie College UNIX Server. [E2]
- All performance and loading requirements, as stipulated in the Vision Document [E2] and the Supplementary Specification [15], must be taken into consideration as the architecture is being developed.>

Architetural view

→ Discuss architecture planned for the software solution.

→ include a diagram

Module interactions

→ explain how the identified modules will interact. Use sequence diagrams to clarify the interactions along time, when needed

→ dicuss more advanced app design issues: integration with Internet-based external services, data synchronization strategy, distributed workflows, push notifications mechanism, distribution of updates to distributed devices, etc.>

4 Information perspetive

<which concepts will be managed in this domain? How are they related?>

<use a logical model (UML classes) to explain the concepts of the domain and their attributes>

5 References and resources

<document the key components (e.g.: libraries, web services) or key references (e.g.: blog post) used that were really helpful and certainly would help other students pursuing a similar work>