Software Requirements Specification

for

MMA FIGHT PREDICTOR

Version 1.0 approved

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Revision History

Name	Date	Reason For Changes	Version

1. Introduction

1.1 Purpose

The "MMA Fighter Matchup Predictor" is a data-driven software designed to analyze fighter statistics and predict the outcome of an MMA fight. The purpose of this project is to provide deeper insights for analysts and coaches, enabling them to make informed decisions and strategize effectively. This predictive tool aims to assist stakeholders such as coaches, analysts, and MMA enthusiasts by offering an objective assessment of fighter matchups.

1.2 Document Conventions

The conventions used in this document follow the IEEE SRS format and section numbering guidelines. All requirements are uniquely numbered for easy reference and are prioritized based on criticality, where high-priority requirements are essential for core functionality.

1.3 Intended Audience and Reading Suggestions

This document is intended for:

- Software developers who wish to extend or maintain the project.

- MMA analysts and coaches seeking insights into fighter matchups.

- Data scientists and machine learning practitioners interested in predictive modeling.

- Stakeholders evaluating the viability of the software.

1.4 Product Scope

The MMA Fighter Matchup Predictor leverages web scraping, data manipulation, and machine learning to generate predictions. It allows users to select a weight division, choose two fighters, and obtain an outcome prediction based on historical performance, fighting styles, and statistical analysis. The system is designed for use in Google Colab, utilizing Python-based libraries for data extraction and machine learning.

1.5 References

- UFC Official Website (UFC.com)

- Google Colab Environment

- GitHub Copilot

2. Overall Description

2.1 Product Perspective

This project is an independent software tool designed to assist users in analyzing MMA fighter matchups. It operates as a standalone application on Google Colab, utilizing machine learning and web scraping to provide accurate predictions.

2.2 Product Functions

- **Weight Division Selection** – Users select a weight category.

- **Fighter Selection** – Dropdown lists allow selection of two fighters from the chosen weight class.

- **Prediction Generation** – The system processes fighter data and generates a predicted winner.

- **Data Display** – The interface presents fighter statistics, images, and the predicted outcome.

2.3 User Classes and Characteristics

The system has only one type of user:
- **General User (Coaches, Analysts, Enthusiasts)** – Can select fighters, view predictions, and analyze statistics.

2.4 Operating Environment

The application runs on **Google Colab** and uses the following technologies:
- **Python** for scripting.
- **Pandas** for data manipulation.
- **BeautifulSoup4** for web scraping.
- **scikit-learn** for machine learning model implementation.
- **NumPy** for numerical calculations.

2.5 Design and Implementation Constraints

- Limited to Google Colab for execution.

- Requires an active internet connection for web scraping.

- No authentication system; open access for users.

- Future improvements may include filtering the second dropdown to exclude the first selected fighter.

2.6 User Documentation

Comprehensive documentation will be provided within Google Colab notebooks to guide users on:

- How to select fighters and generate predictions.

- Understanding the output results.

- Potential enhancements for future development.

2.7 Assumptions and Dependencies

- UFC.com remains a valid source for fighter data.

- Google Colab remains freely available for running the code.

- Fighters' statistics are regularly updated for accurate predictions.

3. External Interface Requirements

3.1 User Interfaces

Google Colab Notebook UI with 3 dropdowns:

- Weight class selection

- Fighter 1 selection

- Fighter 2 selection

- And a "Predict" button.

3.2 Hardware Interfaces

No specific hardware requirements.

3.3 Software Interfaces

- Web scraping via **requests** and **BeautifulSoup4**.

- Data manipulation using **Pandas** and **NumPy**.

- Machine learning via **scikit-learn**.

3.4 Communications Interfaces

Internet connection required for scraping UFC data and running the software on google colab

4. System Features

4.1 Weight Division Selection- Dropdown list to select a specific weight class.

4.3 Fighter Selection- Two dropdown lists to select fighters from the chosen division.

4.4 Prediction Generation- The system processes fighter statistics and outputs a winner prediction.

4.5 Data Display- Fighter images, key statistics, and predicted outcome are shown in an organized format.

5. Other Nonfunctional Requirements

- 5.1 Performance Requirements
  - Predictions must be generated within 5 seconds.
- 5.2 Safety Requirements
  - No sensitive data is stored; all processing is real-time.
- 5.3 Security Requirements
  - No user authentication required as data is publicly available.
- 5.4 Software Quality Attributes
  - Reliability: Accurate fighter statistics and predictions.
  - Usability: Simple interface for easy selection and viewing.
  - Scalability: Future expansions possible with additional features.
- 5.5 Business Rules
  - Users can only select fighters from the same weight division

6. Other Requirements

6.1 Database Requirements

The software does not require a database for the execution

6.2 Legal and Regulatory requirements

Data Privacy Compliance: The matchup predictor must comply with data protection regulations to safeguard personal information, ensuring that user data is securely stored and only accessible to authorized users.
- **Priority:** 9

Licensing and Third-Party Dependencies: The use of third-party libraries or APIs in Django must comply with their respective licensing agreements.
- **Priority:** 7

6.3 Internationalization requirements

Language Support: For potential future expansion, the system should be designed to support additional languages without major codebase changes.
- **Priority:** 5 (Low)

Appendix A: Glossary

- MMA – Mixed Martial Arts.

- UFC – Ultimate Fighting Championship.

- ML – Machine Learning.

Appendix B: Analysis Models

- Data Flow Diagram (DFD)

Appendix C: To Be Determined List

- Improvement of fighter selection dropdown filtering.
- Expansion of model training with more fight data.