CrickVision

Project Team

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Chapter 1

Introduction

This document serves as a comprehensive proposal for CrickVision. It is a web-based application designed to revolutionize cricket strategy, talent identification, and team management. It outlines the problem facing the Pakistan cricket ecosystem and provides details on how CrickVision provides an innovative data-driven solution. The proposal focuses on its objectives, its core functionalities, technical approach, and the impact that it is expected to have on a large scale in modern cricket. The background of this system lies in the growing complexity and increasing data in contemporary cricket, where traditional intuition-based decision making is increasingly insufficient to maintain competitiveness. CrickVision continues to bridge this gap by integrating advanced data analytics and machine learning to deliver actionable prescriptive insights.

1.1 Problem Statement

Cricket coaches, selectors, and franchise managers currently operate within a broken ecosystem, relying heavily on basic statistical tools, disparate data sources, and subjective intuition for taking high-stake decisions. All of this leads to the problem of inefficient strategies, biased player selections, and missed opportunities for deserving players. The lack of integrated workload management tools contributes to preventable injuries, sidelining key players for extended periods and costing teams valuable performance. There is no single, integrated platform that effectively uses machine learning to translate complex, raw data into clear, actionable insights from talent identification and strategic planning to player welfare and financial management.The absence of these resource makes it to rely on human interpretation of vast datasets, which is slow, prone to cognitive biases and hinders a teams ability to achieve a certain performance.

1.2 Motivation

The motivation behind developing CrickVision stems from the disparity between the huge volume of data generated in modern cricket and the limited capacity of human intuition to effectively process it and utilize it for optimal decision before coming on the field. The high stakes involved in professional cricket, where multi-million dollar investments are done on players underscores the urgent need of minimizing risk and maximizing performance as a whole. Our commitment to the project was also based on the challenges faced by teams particularly Pakistan where raw talent is missed due to systems inefficiency of treating every player equally. We believe that providing this unified and integrated platform will help coaches and team selectors to make faster and more effective decisions keeping the interest of all players. This will lead to long term sustainability and success for cricket organizations.

1.3 Problem Solution

CrickVision addresses the problem by providing a web-based application that integrates advanced data analytics and machine learning to deliver actionable insights across all critical aspects of cricket management. It will serve as a central cockpit, enabling the coaches, team selectors and franchise managers to move beyond the fragmented system. Our application will translate complex statistical patterns into clear, and prescriptive recommendations for talent identification and player welfare.

Objectives:

1. To develop a report for opposing teams and players
2. To identify high-potential players that are missed
3. To justify the players and teams selection so that there is no biasness
4. To integrate a smart system which provides recommendations on input
5. Player-role matching based on skill and conditions
6. Allows franchise managers to balance their team during auction
7. A dashboard for visualizing players performance
8. Analyzing bowling partnership for combined pressure and wicket taking.
9. Generating pre-match strategies and Best XI recommendations

1.4 Stake Holders

Coaching Staff: Head Coach, Batting/Bowling Coaches, Fielding Coaches

Team Selectors: National and Franchise Selection Committees

Franchise Management: Team Owners, Team Directors and CEOs

Players

Cricket Boards: Pakistan Cricket Board, interested in talent development

Chapter 2

Project Description

2.1 Scope

CrickVision is precisely defined to deliver a comprehensive, web-based solution for cricket management, focusing on transforming raw data into meaningful insights. A core component of the scope involves pre-match opponent analysis, designed to generate tactical blueprints and identify exploitable weaknesses. A significant aspect of the project is the auction simulation tool which will help the franchise managers to optimize squad and financial investments. Explicitly out of scope for this project are live ball-by-ball data streaming, wearable biometric fatigue tracking, direct financial auction transactions, social media integration and video analysis tools. This application does not include captain selection as it just focuses on giving recommendations and justifications.

2.2 Modules

2.2.1 Module 1

This module focuses on player evaluation, discovery and the justification of selection decisions. It utilizes data to identify high potential players and provides valid reasoning for squad composition.

1. ML Data prep: This involves gathering and preprocessing datasets from different sources to prepare them for machine learning models.

2. Automated Scouting Report: It automatically creates comprehensive, data-driven scouting reports, highlighting opponent strengths, weaknesses and key tactical insights thereby saving significant manual effort

3. Data Driven Domestic Talent Identifier: This involves building machine learning models that analyze various performance to identify promising young talent.

2.2.2 Module 2

This module provides tools for pre-match planning and in-game performance analysis, assisting coaching staff in optimizing team strategies and creating Playing XI.

1. Role Suitability Predictor: It involves creating a predictive model that recommends players best suited for specific roles based on their skill sets, historical performance in similar situations and prevailing match conditions.
2. Virtual Team Selector: It is based on user input, generates data-backed pre-match strategies. including an optimal playing XI and tactical game plans.
3. Selection Justification Generator: It focuses on concise and data-supported summaries that provide reasoning for a players inlcusion or exclusion from squad, fostering transparency and accountability in selection processes.

2.2.3 Module 3

It supports long-term investment, team management and financial planning, offering tools for player welfare and strategic auction preparation.

1. Bowling Partnership Synergy Score: It involves developing a unique analytical module that quantifies the combined effectiveness of bowling pairs, assessing their ability to build pressure and take wickets.
2. Form and Fatigue Tracker: It focuses on creating a visual that tracks players recent performance trends alongside their physical workload.
3. Auction Simulator: It allows franchise managers to model various auction scenarios on historical PSL data and optimize bidding strategies to build a balanced team.

2.2.4 Module 4

It is a dashboard that acts as the central brain, integrating insights from all other modules to provide holistic, actionable advice and a single point of access.

1. Executive Dashboard: It is the central brain that synthesizes insights from all other modules, offering integrated, context-aware recommendations and alerts to guide strategic decision making.

2. UI Build and Merge: It involves integrating frontend and backend to ensure seamless data flow between features.

3. System Check and Tuning: It is a comprehensive testing phase including unit tests for ML models, integration tests for interactions between modules and performance evaluation.

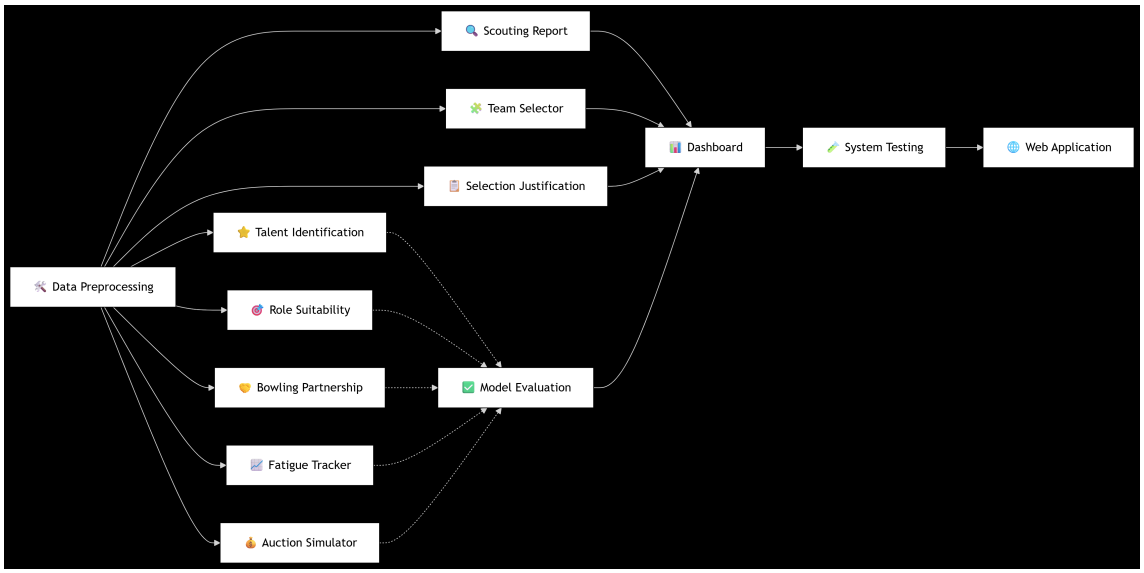

Figure 2.1: Pipeline

2.3 Tools and Technologies

CrickVision will be developed using a robust and modern technology stack, chosen for its scalability, performance and suitability for data-intensive and machine learning application.

- Backend and Machine Learning: Python (with libaries such as Pandas, Numpy, Scikit-learn, TensorFlow/PyTorch for ML models).
- Database: PostgreSQL for structured data storage and complex queries.
- Frontend: React for building a dynamic, interactive and responsive user interface.
- Version Control: Github

2.4 Work Division

Name	Registration	Responsibility / Module / Feature
Tabidah Usmani	22i-2070	Components Integration, Module 2 - Feat 1, Module 2 - Feat 3, Module 3 - Feat 2
Sara Zahid	22i-1861	System check and tuning, Module 1 - Feat 1, Module 1 - Feat 2, Module 3 - Feat 1
Amna Javaid	22i-2025	ML prep, Module 1 - Feat 3, Module 2 - Feat 2, Module 4 - Feat 1

Table 2.1: Work Division

2.5 Timeline

Iteration #	Time frame	Tasks / Modules
01	Sept–Oct	ML Data prep, Automated Scouting Report, Data-Driven Talent ID
02	Nov–Dec	Role Suitability Predictor, Virtual Team Selector, Selection Justification
03	Feb–Mar	Bowling Partnership Synergy, Form and Fatigue Tracker, Auction Simulator
04	Apr–May	Executive Dashboard, UI Build and Module merge, System Check and Tuning

Table 2.2: Project Timeline

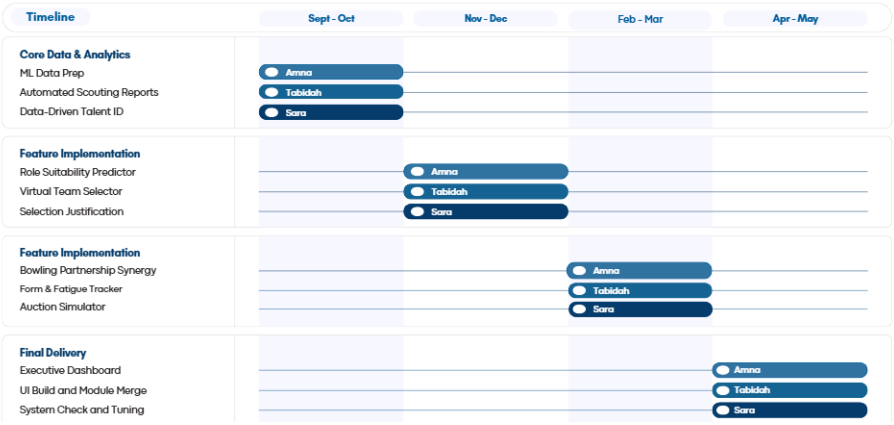

Figure 2.2: Project Timeline

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