A Project for Degree of Bachelor of Science

Cricket Match Conduction and Performance Evaluation System

A project submitted to the Department of Computer Science and Engineering in partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Engineering.

By

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Session: 2011-2012

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Recommendation of the Board of Examiners

The project titled ***Cricket Match Conduction and Performance Evaluation System*** submitted by Sajib Ahamed(Roll: B-110305035) and Shahadat Hossain Sohag (Roll: B-110305018) has been found as satisfactory and accepted as partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Engineering on April 2017.

Examiners

1 ..... Supervisor

2 ..... Examiner

3 ..... Examiner

4 ..... Chairman

Declaration of Authorship

This is to certify that the work presented in this project is carried out by the candidates- Sajib Ahamed and Shahadat Hossain Sohag under the supervision of Md. Ashraf Uddin in the Department of Computer Science and Engineering, Jagannath University, Dhaka-1100, Bangladesh. It is also declared that neither of this project nor any part of this project has been submitted anywhere else for any degree or diploma. Information derived from the published and unpublished work of others has been acknowledged in the text and a list of references is given.

Countersigned	Signature	Signature
.....	.....	.....
(Md. Ashraf Uddin)	(Sajib Ahamed)	(Shahadat Hossain Sohag)
Supervisor	**Candidate**	**Candidate**

Dedication

Dedicated to

Our beloved parents

Abstract

Cricket Match Conduction and Performance Evaluation System is a web based application by which we can conduct any local cricket match. There are three types of users - Unregistered users, Registered users and Admin. The unregistered users can only view the contents of the website, the registered users can post in the blog named cricblog and ask any query in the Frequently Ask Questions (FAQ) section and the admin can manipulate the system functionality like database change or any kind of works which needs higher permission. There is a live scoreboard for an ongoing match and anyone can see that. Records of the players are stored in an organized database. The players are evaluated based on the stored information. Every player will obtain a ball by ball rating points with respect to the evaluated value which is generated before based on their information. After finishing the match we can find the most valuable batsman and the most valuable bowler and also the man of the match. Before starting a match there is an exclusive system which can predict the score based on the previous records of the players. There is a well organized blog named cricblog on where only the registered users can post, comment and reply on an article. A registered user can ask any query about cricket and also the registered users can answer, comment and vote them.

Acknowledgment

We must sense grateful to the Almighty Allah to complete the dissertation. At the outset, we would like to express gratitude to our supervisor Md. Ashraf Uddin, who has supported our plans to continue this work as a B.Sc in Computer Science and Engineering.
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Sajib Ahamed

Shahadat Hossain Sohag

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Chapter 1

Introduction

1.1 Introduction

Cricket is now a days a popular game which is playing all around the world. Almost 105 countries play cricket all around the world.[1] So it becomes important to handle cricket data and measure best outcome. Measurement of player performance is equally important as well as conducting a match. Although cricket is a popular game but it is not spread out as it is expected. So for spreading cricket more around the world there needs to write blogs and answer more questions about cricket. Cricket is a game and more people follow it more fun they get. So we are working for fun.

[1] According to Wikipedia there are 10 Full members, 39 Associate members, 56 Affiliate members of ICC , `https://en.wikipedia.org/wiki/List_of_International_Cricket_Council_members`

1.2 Overview

This application is basically for cricket lovers. This application provides one the opportunity of conducting a local match by registering on the website. The user can create a match, create team and finally create squad to start the match. He is the only authenticate person who can conduct this match ball by ball.
An unregister user can see running matches, the scorecard, the contents of blog and the frequently asked questions and their answers. Blogs can be written by register users, and comment and reply on comments are only can submit the register users. The blog handles the task of spreading out cricket all over the internet users.
Frequently asking question (FAQ) is another approach of spreading out cricket by answering various questions of users by answering them. This is a community by which people can practice cricket more.
There are some special features. This is a player value evaluation by using his previous playing history.
At the stage of running match the system automatically calculates a player rating value and with the help of this rating the system finally select the Man of the Match after the match finished.
The system can predict score before starting a match by using the stats of the players and help the team to get an idea about the opponent.

1.3 Motivation towards the work

Cricket is now an emerging game around the world. It is gaining its popularity day by day. Technology has been entered in all form of cricket. But some of those sectors are not handled automatically. Such as, Man of the Match. Till now man of the match is

determined by analog system. That is the selection of man of the match is determined by commentators votes or a selected panel which is formed by ICC. So for making it automatic we need to take some steps. So for this purpose we were encouraged to make this application. There are some cricket related websites like espncricinfo, cricbuzz etc. which are providing cricket related works such as, live scoreboard, blogs, news, live commentary, player profile etc. Those are also some motivation from where we encourage to conduct local matches. There are some special features like, player evaluation, ball by ball player rating and selects man of the match by this rating and score prediction which are not provided by those websites mentioned before. So this would be nice if we apply them. So this is also a motivation of our work.

1.4 Problem Definition

Cricket is one of the popular games around the world. Huge part of cricket is played locally, which scoreboards are conducted manually. So it is the demand of cricket lovers to conduct the cricket scoreboards and stores player records by using computer.

Another factor is evaluating the player value which can provide clear measurement of player ability. Man of the match system is not as advanced as compared to other things in cricket. It is still measured manually which sometimes make it more complicated. It is high time that we use a computer based application to do the job.

1.5 Project Outline

This book is organized in six chapters which reflect various topics related to the features of used design tools, system design, designing database, implementation and manual of the application.

The rest of the book is organized as follows.

Chapter 2 called Preliminary describes about the information gathering and requirement analysis. We have visited some prominent cricket related websites to evaluate and determine the necessary features for our Conduction of Cricket Match and measurement of Player Performance application. This topic has been described elaborately in this chapter.

Chapter 3 called System Design provides the overall view of our system design. It describes about the software process model, database design, E-R diagram, features of the proposed system and the flowchart.

Chapter 4 called Design Tools describes the tools and languages such as Laravel, PHP, MySQL, Bootstrap and web API for fetching data called CricAPI which are used to implement our web application are described.

The next chapter, Chapter 5 called Manual deals with manual, description and snapshots of the features of our application.

Finally Chapter 6 called Conclusions provides an overall discussion of the work

concludes the report and outlines the future work. Future work suggests the enhancement of this project in terms of including more features in the actual web site in future.

The Bibliography includes all the references used in this work. The appendix provides additional information that readers can refer to if needed, such as coding of the original work.

Chapter 2

Preliminaries

2.1 Introduction

Cricket is a popular game and it is full of entertainment and excitement. According to **Wikipedia** "Cricket is a national sport which is played between two teams of eleven players each who score runs (points) by running between two sets of three small, wooden posts called wickets. Each of the wickets is at one end of a rectangle of flattened grass called the pitch. Around the pitch is a much larger oval of grass called the cricket ground ."[1]

Both teams want to score runs and to maintain this scored runs there is needed score controller called scoreboard. Today everything comes under digitization. So cricket score has been controlling by computer and it helps people to see any update of cricket from any corner of the world. So the demands of the people are increasing and they want more news and update about cricket. That is, people want more information about cricket. So there establishes blog, news portal, answering site of any question of cricket to enrich the cricket knowledge. Number of website has been working for this purpose. There are several websites where those issues are handled individually or all together.

2.2 Some Existing System and their Features

2.2.1 ESPNCricinfo

It is a cricket news website. The site was originally conceived in a pre-World Wide Web form in 1993 by Dr Simon King, a British researcher at the University of Minnesota, was acquired in 2002 by the Wisden Group publishers of several notable cricket magazines and the Wisden Cricketers Almanack. It was sold to ESPN, jointly owned by The Walt Disney Company and Hearst Corporation, in 2007. The main features of website are given below [2, 3]:

- It contains various news, columns, blogs, videos and fantasy sports games.
- It has a live blog of cricket matches, which includes a scorecard options, allowing readers to track such aspects of the game as wagon wheels and partnership breakdowns.
- For each match, the live scores are accompanied by a bulletin, which details the turning points of the match and some of the off-field events.
- The site also used to offer Cricinfo 3D, a feature which utilizes a match's scoring data to generate a 3D animated simulation of a live match.
- It has also a feature called StatsGuru which is a database, containing statistics on players, officials, teams, information about cricket boards, details of future tournaments, individual teams, and records.
- It also has CricIQ, an online test to challenge every fans cricket knowledge.

2.2.2 Cricbuzz

It is a sports news website and app to all exclusively for the game of cricket. The site was created and is edited by Piyush Agrawal, Pankaj Chhaparwal and Pravin Hegde in the year 2004. The main features of website are given below [4, 5]:

- It contains live streaming of cricket scores, ball-by-ball commentary, upcoming schedules, teams and player rankings.
- It also contains videos, pictures, cricket based online games.
- The website contains a special column for news updates.
- Fantasy Cricket allows fans to form their own teams and go head-to-head in competition with friends all over the internet.
- It has several mobile apps.

2.2.3 CricWaves

It is cricket website. The company headed by Srinivasu Kota which is launched in 2009. Its software architect based on Texas, USA. The website runs under the company Cricfeeds Pvt. Limited and has registered offices based in India. The main features of website are given below [6, 7]:

- It has a data of cricket records from past 4 years.
- Any International match information is in the site.
- It has information about cricket teams, live commentary, score board and all other player stats in a widget format.

2.2.4 Sify Sports

Sify or Satyam Infoway Limited is an Internet service provider in India and rated as one of the Top ten technology companies worldwide recommended for investment by Fortune in the year 1999. It was established in Chennai in the year 1998. The main features of website are given below [8, 9]:

- It provides access to scores of all ongoing cricket matches in the world along with complete scorecards and statistics.
- It also reserves a special column for slideshows and videos.

2.2.5 Cricket Nirvana

Cricket Nirvana is a site designed and maintained for Nimbus by Sportz Interactive. The main features of website are given below :

- It is a site filled with information from the cricketing world, inclusive of news, records, history and regularly updated with photographs.
- Live scores from international and T20 matches is made available through the medium of this website.
- The site also features columns by contemporary cricket authors and off the pitch specials.

2.2.6 Yahoo! Cricket

It is a cricket related website. While in name part of the US-based, it is hosted and administrated by Yahoo! India. It was launched in August, 2008. Yahoo! Cricket has

fast become the leading destination for all cricket enthusiasts. The main features of website are given below [10, 11]:

- It features ball-by-ball commentary, latest news and articles, insightful columns, and eye-catching photos and videos.
- It also features ongoing series upcoming schedules, team information, archive of previous matches and teams rankings.

2.2.7 Sports.NDTV

New Delhi Television is, and has been for over two decades, a pioneer in Indias news television. It is today the most watched and the most respected news network in India. The main features of website are given below [12, 13]:

- It offers detailed news, reviews, analysis of ongoing cricket matches where you can see cricket scores live that are updated ball-by-ball.
- Player Zone is a special column reserved for cricketers which includes news, photos, videos and features.
- The website also gives importance to the IPL tournaments.

Chapter 3

System Design

3.1 Software Process Model

As we develop a project, we can start from a very motivating question Can software engineering principles, concepts and methods be applied to website development? The answer is many of them can, but their application may require a somewhat different spin [14] . Master modern software engineering procedures to build real-world and social applications besides systems for life-critical software. One will learn how to design, develop and deliver applications for mobile and Internet by means of open source and Microsoft Windows. And you will explore all features of the software lifecycle , from procurement and design, through to testing and maintenance. Fundamental activities in all software processes are :

- Specification - what the system should do and its development constraints
- Development - production of the software system (design and implementation)
- Validation - checking that the software is what the customer wants
- Evolution - changing the software in response to changing demands

Now we are going to describe very popular software model:

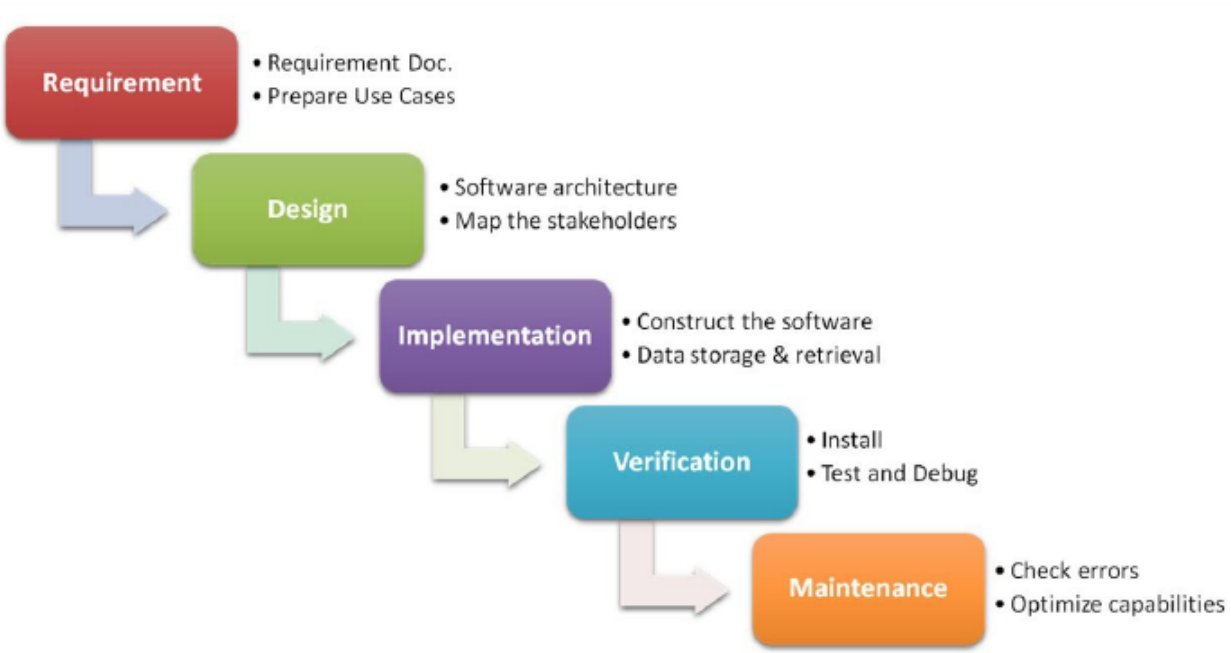

Figure 3.1: Waterfall Model

3.1.1 Waterfall Model

Separate and distinct phases of specification and development. After each stage is defined it is signed-off, and development goes on to the following stage. The phase of Waterfall Model are.

1. Requirements analysis and definition
2. System and software design
3. Implementation and unit testing
4. Integration and system testing
5. Operation

As it is difficult so in real life rarely follow it. Phase of waterfall model can be illustrated as following Figure 3.1 This model is only appropriate when the necessities are well-understood. Waterfall model defines a process of stepwise refinement

- Based on hardware engineering models
- Widely used in military and aerospace industries

The drawback of the waterfall model is the difficulty of accommodating change after the process is underway. One phase must be completed before going to next phase.

3.1.2 Prototyping Model

Often, a customer defines a set of general objectives for software, but does not identify detailed input, processing or output requirements. In other cases, the developer may be unsure of the efficiency of an algorithm, the adaptability of an operating system, or the form that human-machine interaction should take. In these, and many other situations, prototyping paradigm may offer the best approach [14]. The phases of this model are-

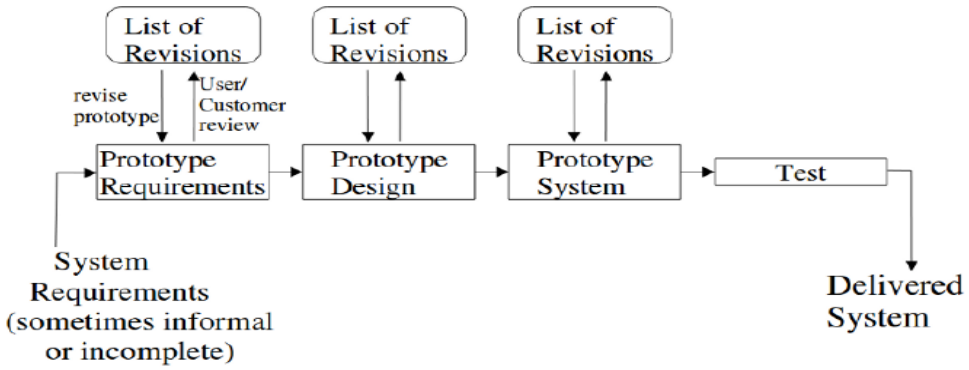

Figure 3.2: Prototyping Model

- Gather requirements.
- Developer and customer define overall objectives; identify areas needing more investigation risky requirements.
- Quick design focusing on what will be visible to user - input and output formats.
- Use existing program fragments, program generators to throw together working version.
- Prototype evaluated and requirements refined.
- Process iterated until customer and developer satisfied.
- Then throw away prototype and rebuild system to high quality.
- Alternatively can have evolutionary prototyping - start with well understood requirements.

The prototyping model can be viewed as following Figure 3.2

3.1.3 Spiral Model

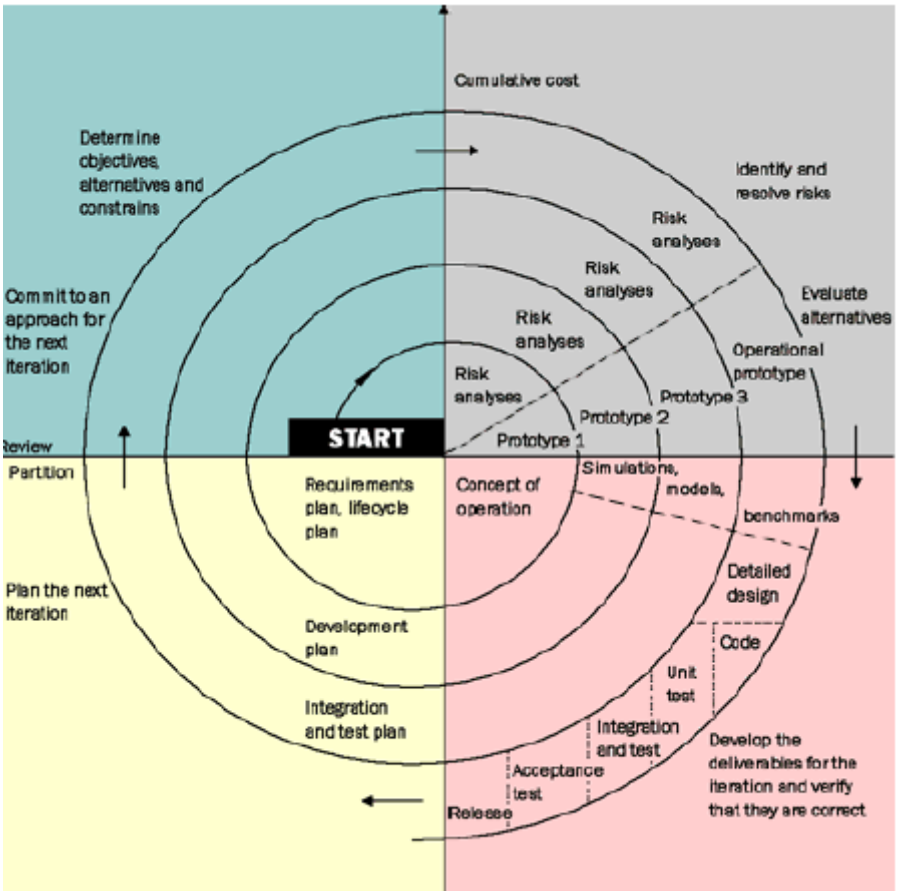

Figure 3.3: Spiral Model

Process is depicted as a spiral rather than as a sequence of activities with backtracking. Each loop in the spiral denotes a phase in the method. No fixed phases such as specification or design - loops in the spiral are chosen depending on what is required. Risks are explicitly assessed and resolved throughout the process as shown in Figure 3.3. This model is concerned with some contents

- Innermost loop might be concerned with system feasibility

- Next loop with requirements definition,
- Next loop with system design, and so on.

3.1.4 Web-based Applications

Within a decade, the World Wide Web has become ubiquitous, and it continues to grow unabated at exponential rate. These web-based systems and applications now deliver a complex array of functionality to a large number of diverse groups of users. Such web applications have the following significant characteristics [15]:

1. Web applications constantly evolve. In many cases, it is not possible to fully specify what a Web site should or will contain at the start of the development process, because its structure and functionality evolve over time, especially after the system is put into use.
2. The content of a web application may include text, graphics, images, audio, and/or video that is integrated with procedural processing.
3. Web applications are meant to be used by a vast, variable user community-a large number of anonymous with varying requirements, expectations, and skill sets. Therefore, the user interface and usability features have to meet the needs of a diverse, anonymous user community to whom we cannot offer training sessions, thus complicating human-Web interaction, user interface, and information presentation.
4. Nowadays, most Web-based systems are content-driven (database-driven). Web based systems development includes creation and management of the content, as well as appropriate provisions for subsequent content creation, maintenance, and management after the initial development and deployment on a continual basis (in some applications as frequently as every hour or more).

5. In general, many Web-based systems demand a good look and feel, favoring visual creativity and incorporation of multimedia in presentation and interface. In these systems, more emphasis is placed on visual creativity and presentation.

6. Web applications have a compressed development schedule, and time pressure is heavy. Hence, a drawn-out development process that could span a few months to a year or more is not appropriate.

7. Web applications are developed by a small team of (often young) people with diverse backgrounds, skills, and knowledge.

8. Web development uses cutting-edge, diverse technologies and standards, and integrates numerous varied components, including varied components, including traditional and non-traditional software, interpreted scripting languages, HTML files, databases, images, and other multimedia components such as video and audio, and complex user interfaces.

As our dependence and reliance on the Web has increased dramatically over the years, their performance, reliability and quality have become paramount importance. As a result, the development of Web applications has become more complex and challenging than most of us think. To successfully build and maintain large, complex Web-based systems and applications, Web developers need to adopt a disciplined development process and a sound methodology

3.1.5 Model Selected for the Proposed System

Now we are going to describe the logic by which we have determined the perfect model for our project. As our target was to implement a book review application, we always reminded that we were going to implement a web based application.

3.1.5.1 The Reason for Not Choosing Waterfall Model

First of all, we considered the waterfall model for our project. We have already known that when the requirements of a problem are reasonably well understood and project duration is very short then waterfall model is suitable. But it was not possible to fully specify what our website should or would contain at the start of the development process, because its structure and functionality evolved over time. We have also learned that the first phase of waterfall model is Requirements analysis and definition. So our project could not meet the first criteria of waterfall model. Besides, our project duration was not too short. So finally, it was decided that waterfall model could not be the perfect model to follow for our project.

3.1.5.2 The Reason for Not Choosing Prototyping Model

After the failure of waterfall model, we thought about prototyping model to use. In prototyping model, prototype is evaluated and requirements are refined and this process iterated until customer and developer satisfied. But our web development had to use cutting-edge, diverse technologies and standards, and integrates numerous varied components, including varied components, including traditional and non-traditional software, interpreted scripting languages, HTML files, databases, images, and other web components and complex user interfaces. Moreover our project is content-driven (database driven). Web based systems development includes creation and management of the content, as well as appropriate provisions for subsequent content creation, maintenance, and management after the initial development and deployment on a continual basis (in some applications as frequently as every hour or more). So prototyping model could not be able to provide the appropriate environment and design step to meet all these requirements. Besides we knew we have to implement a single entity that is a collection of logically connected web pages. So navigation would be an important factor. But in prototyping

model, it was not possible as this facility was absent in this model to implement.

3.1.5.3 The Reason for Not Choosing Spiral Model

Spiral model combines the features of the prototyping model and the waterfall model. Both waterfall model and prototyping model failed to fulfill our demand. So it was also clear to us we could not use this model, too. As this model was incomplete, risk-driven and estimation of budget and time harder to judge at the beginning of the project and our target was to design and implement a website, we did not feel more interest with this model. Finally considering all the cases of three prominent software models and the characteristics of web applications cited above, we were sure that no software model could be helpful for our project. So we were desperately in need of adopting a disciplined development process and a sound methodology that will be multidisciplinary in nature for designing our website perfectly at last we got the solution that fulfilled almost all the criteria. Yes, we have used web engineering for our website.

3.1.6 Web Engineering

Web Engineering is the application of systematic, disciplined and quantifiable approaches to development, operation, and maintenance of Web-based applications. It is both a proactive approach and a growing collection of theoretical and empirical research in Web application development. Web technologies are constantly evolving, making new types of applications possible, which in turn may require innovations in how they are built, deployed and maintained [16]. Web development is perceived at different levels [8], shown in the following Table 3.1. For someone relatively new to Web development, be they developers, users or managers, the Web is manifested through the Web pages, the outcome of the simplest and most visible level. It also happens to be the easiest to understand and master since it is built upon a mark-up language (HTML) rather

6.	Web project planning and management
5.	Web-based System
4.	Web Site Construction
3.	Web Site Design
2.	Web Page Design
1.	Web Page Construction

Table 3.1: Levels of Perception in Web Development

than a programming language. The next level, Web Page Design, becomes apparent as the developers and managers gain experience. If they are from Information Technology background they realize that special skills are required, many outside computer science itself, the background of software engineers. The non-IT managers and developers, on the other hand, may not start to appreciate the crucial role of programming, databases, networks and other IT areas till later. The page design, though, may not be regarded as problematic since there are many packages that promise to ease the burden of page design. In software engineering terms, these two levels correspond to user interface, generally regarded as a matter of detail and lying more in human computer interaction arena. The next level of perception regards Web Site Design or Information Architecture for some. Here, the hyper textual nature of the Web comes into play, since good web sites provide good navigation structures (i.e., structures that help its users achieve their goals). This level has not been addressed at all by traditional software engineering, and again may involve skills outside computer science. In Table 3.2, only levels 4 to 6 deal with processes of interest to software engineers. To add to the perceptual difficulties here, a large number of organizations enter the Web development at stage 3, i.e. by decreeing that they must have a Web Presence Consequently, Web development may be viewed mainly in terms of publishing or brand building/reinforcement., where lessons learnt from software engineering are regarded as irrelevant or simply ignored. The

understanding and importance of other stages become clearer only after a Web site is created, and the realization that it is, after all, an information system. The need for systematic, measurable and repeatable development processes then becomes apparent. Late recognition of the importance of Web Engineering could then lead to a redesign and re-engineering of the existing sites and applications, resulting in wasted efforts and resources. Thus, software engineering is applicable and necessary at the application and project management levels but is not sufficient for all the activities as depicted in the table. Further, there is a consensus, explained below, that even where software engineering is applicable, more and newer development, testing and maintenance methods will have to be found to deal with specific problems of Web development. [17] More importantly, the Design and Implementation phase of web engineering is able to provide the perfect design facilities which are fully different from conventional software process model. This phase has the following scenarios, Table 3.2.

Interface Design: It describes the structure and organization of the user interface. It also includes a representation of search layout, a definition of the modes of interaction and a description of navigation mechanisms.

User
Interface Design
Aesthetic Design
Content Design
Navigation Design
Architecture Design
Component Design
Technology

Table 3.2: Interface Design

Aesthetic Design: It is also called graphic design. It describes the "look and feel" of the Web application. It also includes color schemes, geometric layout, text size, font and placement, the use of graphics and related aesthetic decisions.

Content Design: It defines the layout, structure and outline of all content that is presented as part of the Web application. It establishes the relationships between content objects.

Navigation Design: It represents the navigational flow between content objects and for all web application functions

Architecture Design: It identifies the overall hypermedia structure for the Web application.

Component Design: It develops the detailed processing logic required to implement functional components.

3.1.6.1 Multidisciplinary Nature of Web Development

Building a complex Web-based system calls for knowledge and expertise from many different disciplines and requires a team of diverse people with expertise in different areas [18]. Figure 3.4 As a result, Web engineering is multidisciplinary and encompasses contributions

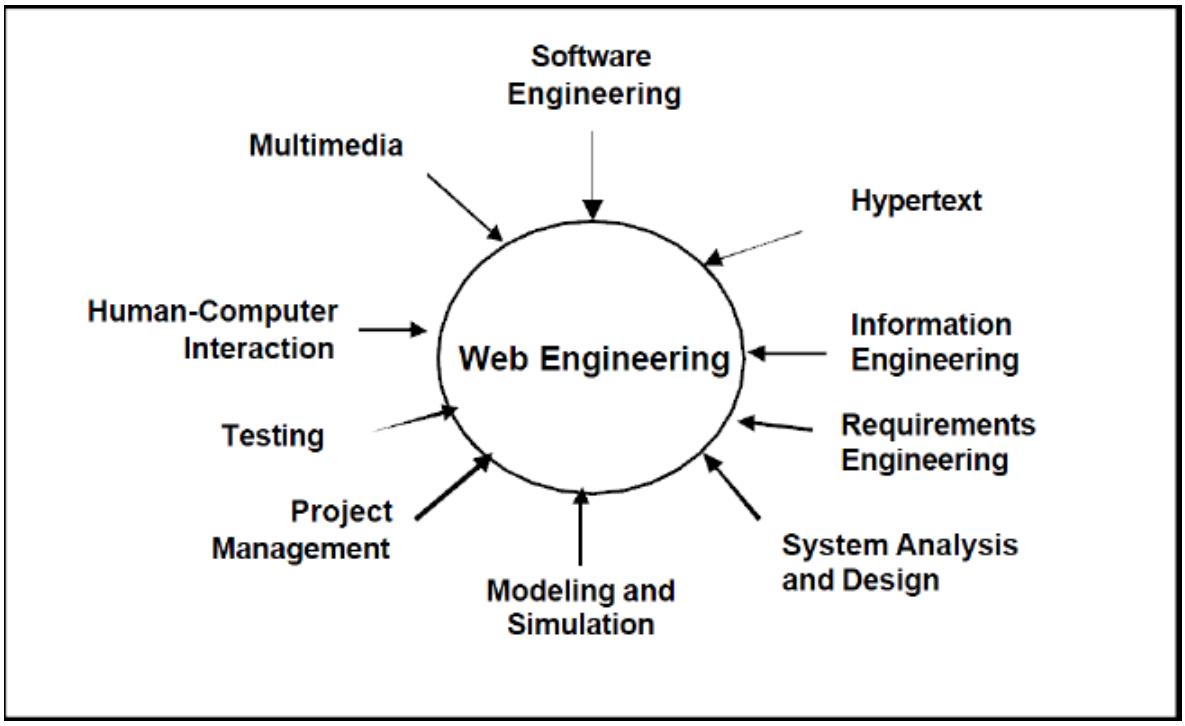

Figure 3.4: Web Engineering is Multidisciplinary

from areas such as systems analysis and design; software engineering; hypermedia and hypertext engineering; requirements engineering; human-computer interaction; user interface development; information engineering; information indexing and retrieval; testing, modeling, and simulation; project management; and graphic design and presentation.

3.2 Database Design

3.2.1 E-R Diagram

This is a higher-level data model that is based on a perception of a real world that consists of a collection of basic objects, called entities and of relationships among these objects. Here the relationship is the association among several entities. More specifically, entity-relationship model is a widely used model that provides a convenient graphical representation to view data, relationships and constraints [19].

Entity:
An entity is a "thing" or "object" in the real world that is distinguishable from all other objects. An entity has a set of properties and the values for some set of properties may uniquely identify an entity. An entity may be concrete, such as a person or a book, or it may be abstract, such as loan, or a holiday, or a concept.

Entity Set:
An entity set is a set of entities of the same type that share the same properties, or attributes. The pictorial representation of the E-R model is the E-R diagram. E-R diagram can express the overall logical structure of a database graphically. Such a diagram consists of the following major components [19]:

- Rectangle: It represents entity sets.
- Ellipse: It is used to represent attributes.
- Diamond: It represents relationship sets.
- Line: It links attributes to entity sets and entity sets to relationship sets.
- Double Ellipse: It denotes multi-valued attributes.

- Dashed Ellipse: It denotes derived attributes.
- Double Line: It indicates total participation of an entity in a relationship set.
- Double Rectangle: It represents weak entity sets.

There is an entity named **Users** which has three attributes named user_id, name, email. where the user_id is the primary key separated by using an underline bellow it. The entity set is illustrated in Figure 3.5, and the Matches entity set illustated in Figure 3.6.

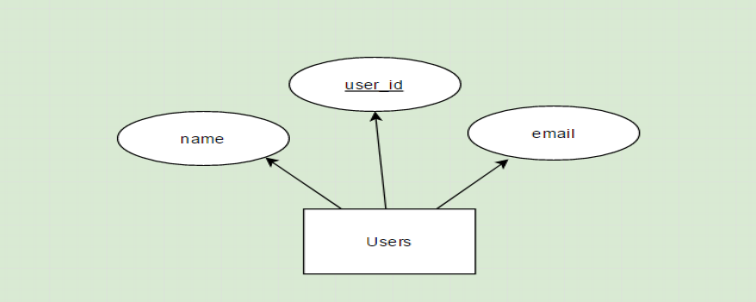

Figure 3.5: Entity set for Users table

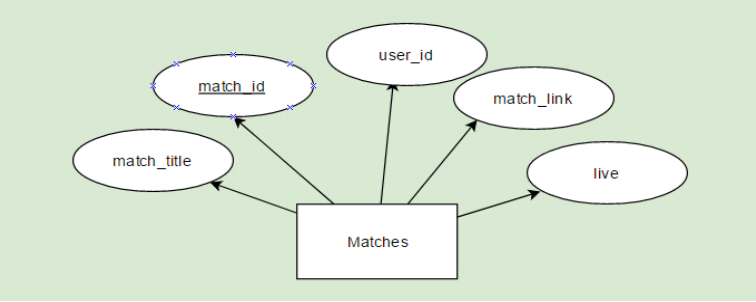

Figure 3.6: Entity set for Matches table

In this page, there are some entities with attributes of our database are shown in Figure

3.7, 3.8

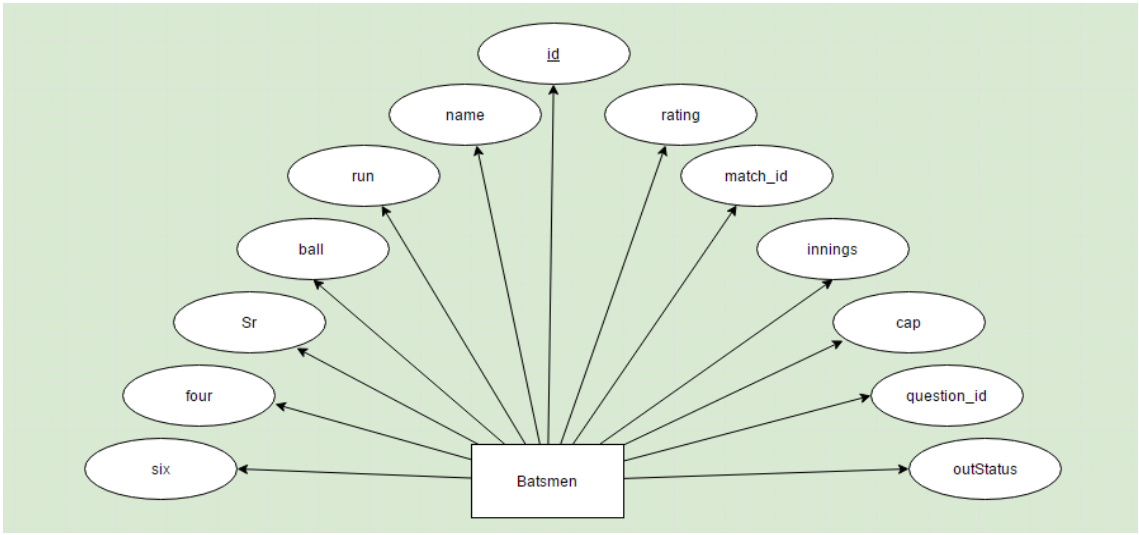

Figure 3.7: Entity set for Batsmen Table

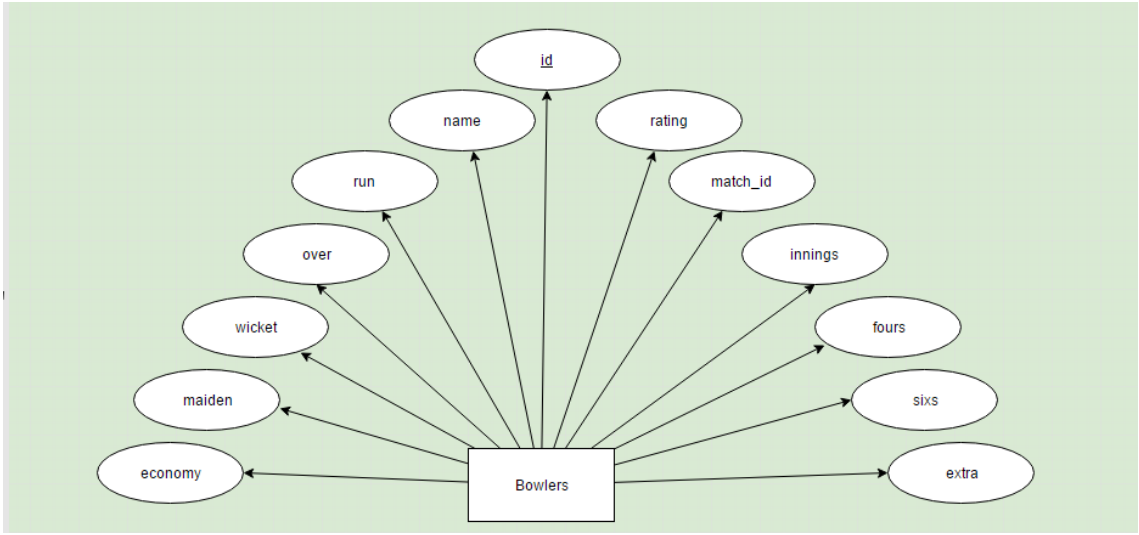

Figure 3.8: Entity set for Bowlers Table

In this page, there are some entities with attributes of our database are shown in Figure 3.9, 3.10, 3.11.

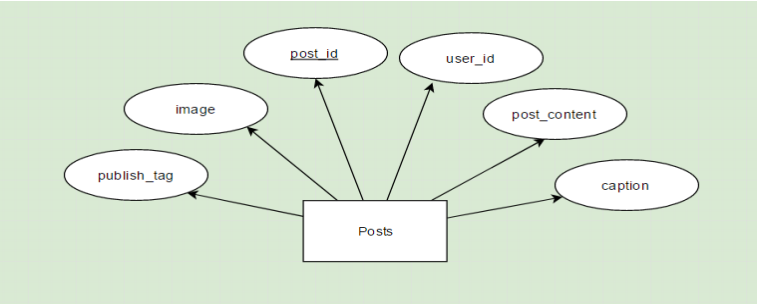

Figure 3.9: Entity set for Posts table

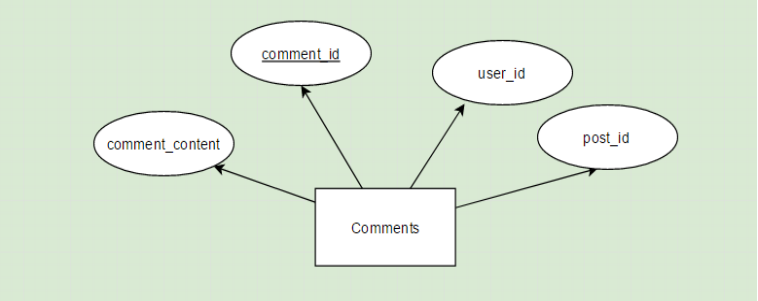

Figure 3.10: Entity set for Comments table

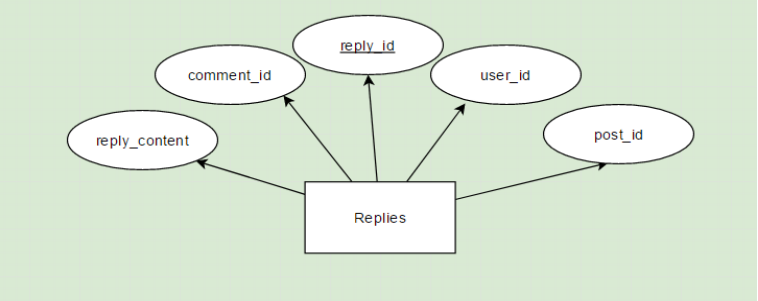

Figure 3.11: Entity set for Replies table

In this page there are some entities with attributes of our database are shown in Figure 3.12, 3.13, 3.14.

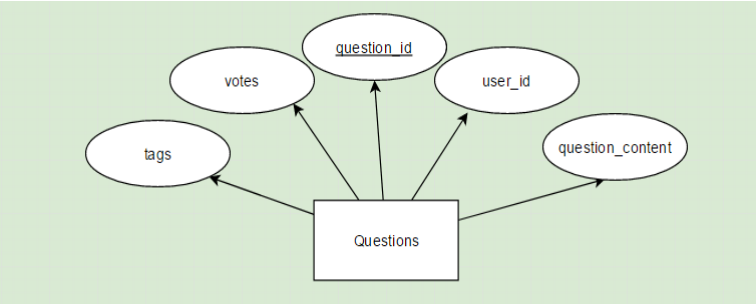

Figure 3.12: Entity set for Questions table

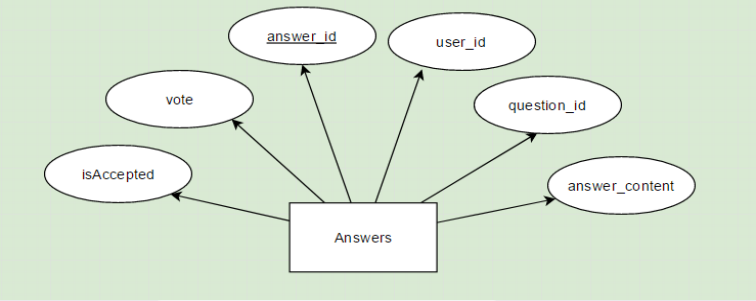

Figure 3.13: Entity set for Answers table

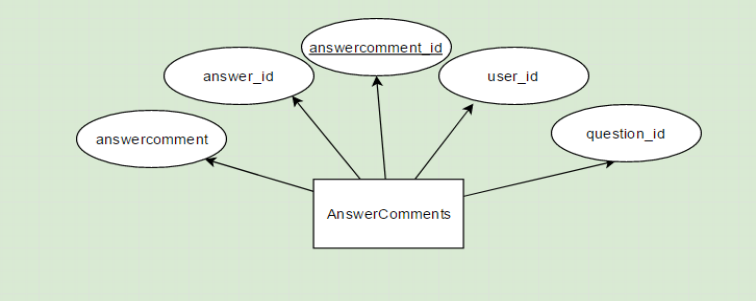

Figure 3.14: Entity set for AnswerComments table

In this page there is commentaries entity illustrated with attributes in Figure 3.15

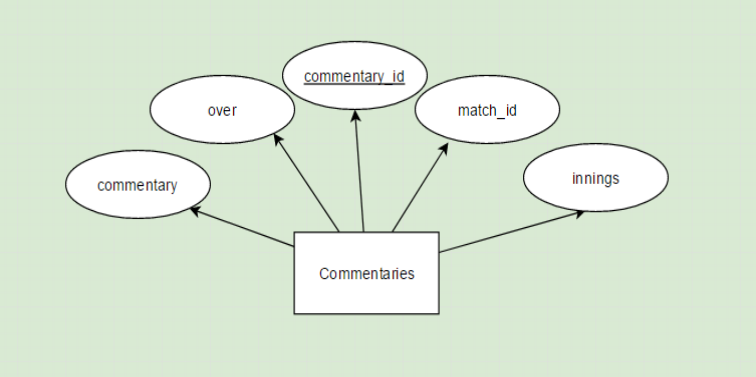

Figure 3.15: Entity set for Commentaries table

3.2.2 Schema Diagram

In general, a relation schema consists of a list of attributes and their corresponding domains. A schema diagram shows the graphical representation of relation schema. The schema diagram of our used relation schema is shown in Figure 3.16

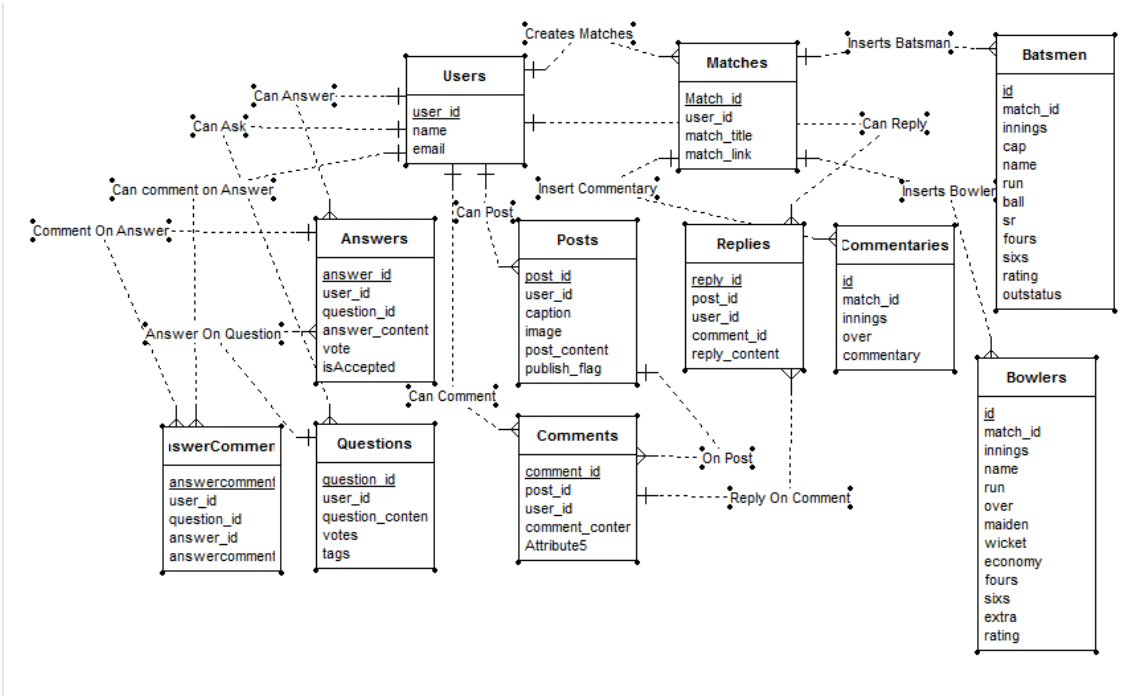

Figure 3.16: Schema Diagram

3.3 Features of Proposed System

A website contains several contents or features. Our website is not exceptional. There are several features of our website also see Figure 3.17. The features are describing bellow-

- A general user which means unregistered user can easily see the contents which they want to see.

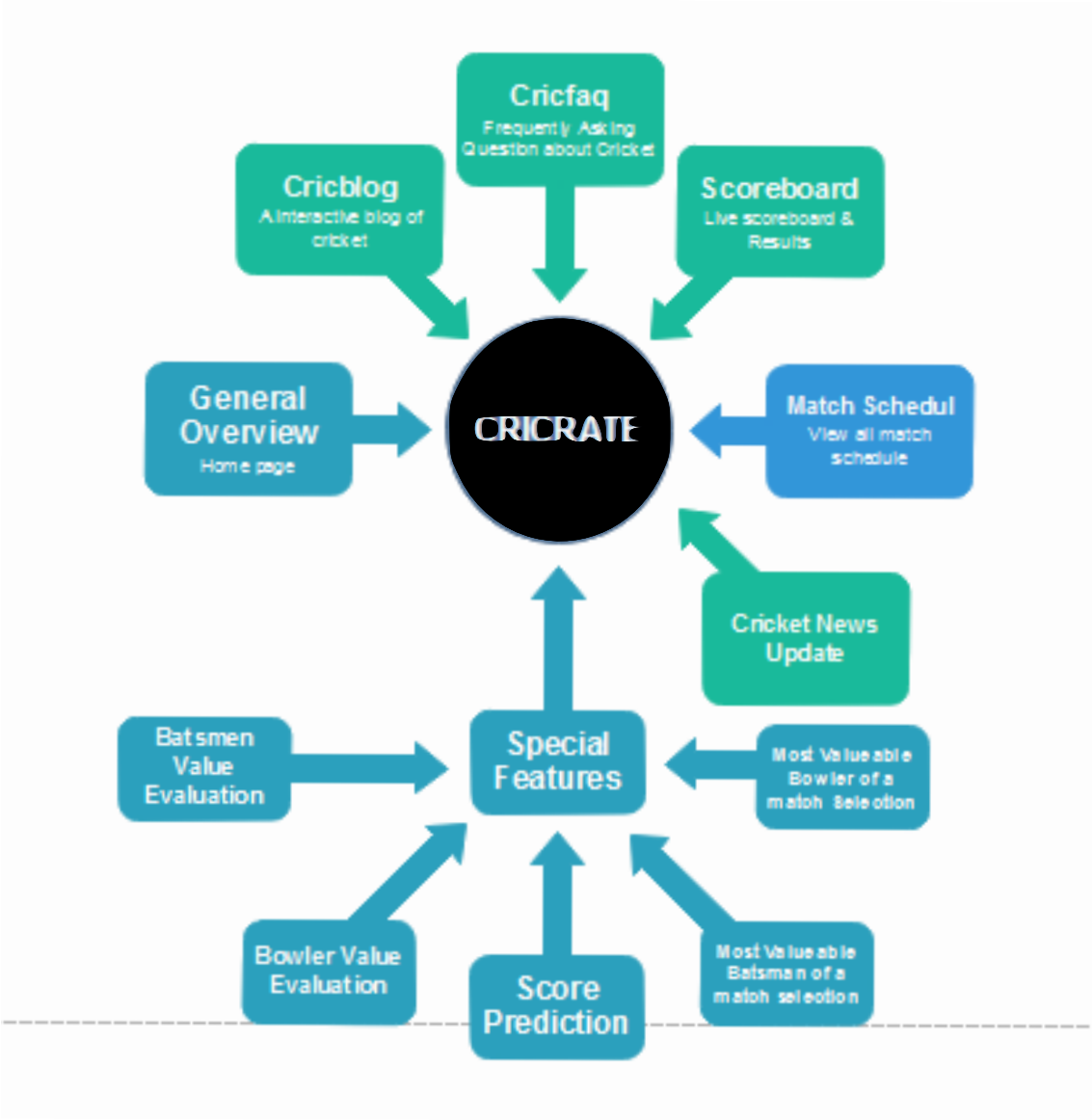

Figure 3.17: Features of Proposed System

- One can easily register to the website to conducting his own matches i.e. local matches. The registration takes a few seconds and zero cost. See chapter 5 for more about registration and login.
- A cricket related blog named **Cric-Blog** which contains the articles of different writers. After registering to the website the registered user can write articles on the blog. The user can write any content but it must be related with cricket. The system judges the content by searching the reserved keywords. If it satisfied the system i.e. if there are a satisfactory number of words found which are matched with reserved keywords then the system publish it. Otherwise it throws a notification to the writer that the article is irrelevant.

  The registered user also can comment on any article of the blog and can reply on the comments.
- One register user can post a Question about cricket on the Frequently Asking Questions (FAQ) page. And can answer his/her own question or another users question. User can also give rating to a question or an answer. With help of this rating the system generates the top rated questions.
- There is a schedule page of all matches i.e. upcoming matches, live matches and already played matches results and scoreboards. One can find out his desired matches by this schedule page.
- There are some special features also. They are elaborately described bellow-

3.3.1 Player Evaluation

Player means batsman and bowler. We evaluate them individually.

3.3.1.1 Batsman Evaluation

The proposed system can calculate a Evaluated Value for every batsman with help of their past record data. The value helps the system to define the good batsman and bad batsman by differentiating the evaluated value. The evaluated value is stored at the database and used for future aspect mentioned before. The Algorithm 1 bellow depicts the Batsman Evaluation.

Algorithm 1: Batsman evaluation

Input: Batsman record which contains batsman global average(G_{Avg}), global strike rate(G_{Sr}), batsman last ten matches average(LTM_{Avg}), last ten matches strike rate(LTM_{Sr})

Output: Evaluated Value(E_v) within range [0,10]

1 `batsmanValue(`G_{Avg}, G_{Sr},LTM_{Avg},LTM_{Sr}`)`

2 $I_G = G_{Avg} \times G_{Sr}$

3 $I_{LTM} = LTM_{Avg} \times LTM_{Sr}$

4 $I = Avg(I_G, I_{LTM})$

5 $E_v = map(I, 0, 60000, 0, 10)$

6 **return** E_v

At the algorithm above We see the function $batsmanValue$ contains 4 parameters, i.e. G_{Avg}, G_{Sr},LTM_{Avg},LTM_{Sr} refers to Global Average, Global Strike rate, Last Ten Matches Average, Last Ten Matches Strike Rate respectively.

The I_G refers to Global Index at line 2 which is calculated from the product of Global Average and Global Strike rate.

At line 3 the procedure of calculating I_{LTM} (Which is Index of Last Ten Matches) is same as before excepts it is calculated from Last Ten Matches Average and strike rate.

And the final Index (I) is the average of I_G and I_{LTM}.

Finally the **Evaluated Value (E_v)** is the value which is mapped within a range $[0, 10]$ from the range $[0, 60000]$ [1]

3.3.1.2 Bowler Evaluation

As like batsman the system generates bowler's evaluated value to measure the bowler's performance. The Algorithm 2 bellow depicts the Bowler Evaluation.

Algorithm 2: Bowler evaluation

Input: Bowler record contains bowler global average, global economy, bowler last ten matches average, last ten matches economy

Output: Evaluated Value within range [0,10]

`bowlerValue(`G_{Avg}, G_{Ec},LTM_{Avg},LTM_{Ec}`)`

$I_G = (100 - G_{Avg}) \times (100 - G_{Ec})$

$I_{LTM} = (100 - LTM_{Avg}) \times (100 - LTM_{Ec})$

$I = Avg(I_G, I_{LTM})$

$E_v = map(I, 0, 60000, 0, 10)$

return E_v

The procedure of Bowler Evaluation is same as Algorithm 1 excepts some subtle difference . We know a bowler who has the less the bowling average the more valuable bowler he is. So we subtract a bowler average and Economy (which is expressed as G_{Ec} and LTM_{Ec}) from 100. And the remaining calculation is same as the Algorithm 1 described before.

[1]The upper limit of mapping range is 60000 because the highest average of a batsman would be 100 and the highest strike rate would be 600. So the product would be 60000

3.3.2 Ball by Ball Rating

The system calculates every player's a ball by ball rating value which finally select the most valuable batsman and bowler and the man of the match. This rating is calculating on the running time of a match.

3.3.2.1 Batsman rating point

The Batsman rating point calculation is illustrated at Algorithm 3. Here we are calculating the point for all 11 batsmen. The system generates a rating point for every ball faced by a batsman with help of the run he produces from that ball. It also takes into account that the run has been produced from which bowler i.e. how valuable bowler is he. The procedure described bellow-

The While loop from line 1 to 16 check if the the match running or not, i.e. if the total ball is less than or equal 300 or wicket is less than or equal 10. The if condition at line 2 to 10 check if the batsman is out or not. If OUT then check his run. If the run is between 50 to 99 then he will get 5% bouns of his total point. And also get 10%, 15%, 20% for 100 to 149, 150 to 199 and 200 to more respectfully.

If the Bastman not out and on strike then he obtains point for every ball he faces. The Primary Point of ball j (PP_j) is the product of Run of ball j (R_j) and $\frac{1}{36}$. We multiply it by $\frac{1}{36}$ because we want to bind the point for every over in between 0 to 1. So we know there are 6 balls in an over and the maximum run of a ball could be 6. So for 6 balls there have to be at most 36 runs. For this purpose we use $\frac{1}{36}$.

Next we calculate the bonus point of each ball with respect to the current Bowler's Evaluation value (see at line 13). Where Bw_{cE_v} is the the Evaluated Value of current bowler (See Appendix A). And finally we adding the primary point and bonus point to obtain

the final rating point player i at line 15.

Algorithm 3: Batsman Rating Point

Input: Bowler E_v, Run of the ball

Output: Batsman rating point

1 **while** $j \leq 300$ *and* $i \leq 10$ **do**
2 **if** Bt_i *is out* **then**
3 **if** $Bt_{iTR} \geq 50$ *and* $Bt_{iTR} < 100$ **then**
4 $RP_i = RP_i + (RP_i \times \frac{5}{100})$
5 **else if** $Bt_{iTR} \geq 100$ *and* $Bt_{iTR} < 150$ **then**
6 $RP_i = RP_i + (RP_i \times \frac{10}{100})$
7 **else if** $Bt_{iTR} \geq 150$ *and* $Bt_{iTR} < 200$ **then**
8 $RP_i = RP_i + (RP_i \times \frac{15}{100})$
9 **else if** $Bt_{iTR} \geq 200$ **then**
10 $RP_i = RP_i + (RP_i \times \frac{20}{100})$
11 **else**
12 $PP_j = R_j \times \frac{1}{36}$
13 $PB_j = Bw_{cE_v} \times R_j$
14 $B_j = \text{map}(\ PB_j, 0, 60, 0, \frac{1}{36}\ )$
15 $RP_i = RP_i + (PP_j + B_j)$
16 $j = j + 1$

3.3.2.2 Bowler rating point

The bowler rating point calculation (Pictured at Algorithm 4) is same like batsman rating point excepts the calculation of primary point (PP_j) is done by subtracting the run (R_j) from 3. Because we see that the less runs a bowler has given the more good bowler he is. But the maximum runs of a ball is 6. So we can do it by subtracting the

run from 6. But if a bowler makes a dot ball i.e. gives 0 run of a ball then this value would be $(6 - 0 = 6)$. But the occurrence of dot is high. Which is the equally valuable of a batsman hits a six. But hitting a six occurrence is very low. So it results mismatch with respect to batting rating point. So we see that if we subtract the run from 3 then that is more relevant.

Algorithm 4: Bowler Rating Point

Input: Batsman E_v, Run given of the ball

Output: Bowler rating point

$i = cBw$ `// Current Bowler`

while $j \leq 300$ **do**

  $PP_j = (3 - R_j) \times \frac{1}{36}$

  $PB_j = Bt_{cE_v} \times (3 - R_j)$

  $B_j = \text{map}(\ PB_j, 0, 30, 0, \frac{1}{36}\ )$

  $PR_i = PR_i + (PP_j + B_j)$

if $Bw_{iTw} \geq 3$ *and* $Bw_{iTw} < 5$ **then**

  $PR_i = PR_i + (PR_i \times \frac{5}{100})$

else if $Bw_{iTw} \geq 5$ **then**

  $PR_i = PR_i + (PR_i \times \frac{10}{100})$

We assume if after end of an innings then a bowler can take wickets more than 2 but less than 5 then he will get additional 5% bonus of his existing rating point. And if he will get wickets more than 4 than he get 10% additional bonus of his existing rating point.

3.3.3 Score Predictor

An exclusive **Score predictor** technique is implemented in our system. The feature is worked according to this algorithm depicts at Algorithm 5.

The approach of predicting score is described bellow-
First we calculate all batsmen faced balls ($BtCFB_i$) and find the Total Ball (TB) faced by all batsmen. If the TB is greater than or equal 300 then we find the total wicket fallen to face 300 balls. This task is shown at line 1 to 6 at Algorithm 5.
Then We find Total Balls can be faced by the batting side and how many wicket fallen to face those balls.
Next count the count the total wicket taken (TWT) by the bowling side and how many balls it takes to do that job dipicts at Algorithm 5 at line 9 10 14.
At line 15 and 16 we calculate the average of ball faced from batsmen predicted balls and bowler predicted balls. And the average wickets from batting side predict to fall and bowling side predict to take.
And we calculate the Bonus or Penalty (BoP) shown at line 17 to 19. Finally the Final Predicted Run (FPR) is calculated at line 20 to 21.

N.B: The source code of the algorithms described before are given at Appendix B.

Algorithm 5: Score prediction

Input: Statistics of Squad members of both team

Output: Predicted Score

foreach Bt_i *in Batting team* **do**
  $BtCFB_i = \frac{Avg_{Bt_i} \times 100}{SR_{Bt_i}}$
  $TB = TB + BtCFB_i$
  if $TB \geq 300$ **then**
    $TWF =$ the loop counter
    Break
if $TB \geq 300$ **then**
  $TB = 300$ `// Check how many balls can be faced by the batting team`
`/* Bowler can take wicket */`
$BwCTW_i = \frac{TBD_{Bw_i}}{Avg_B w_i}$
$TWT = \sum_{j=0}^{6} BwCTW_j$ `// Assume there are 6 bowler who are selected to perform ball. The first 4 bowlers can perform 10 overs and remaining 2 bowlers can do 5 overs each.`
if $TWT < 10$ **then**
  $TBBwD = 300$
else
  $TBBwD =$ Number of balls need to do. `// See Appendix B for viewing the code`
$Avg_b = average(TB, TBBwD)$
$Avg_w = average(TWF, TWT)$
for $k = 0$ *to* Avg_w **do**
  $sum = sum + BtCFB_k$
$BoP = \frac{Avg_b - sum}{Avg_w}$
for $l = 0$ *to* Avg_w **do**
  $FPR = FPR + \frac{BtCFB_l + BoP}{SR_{Bt_l}}$

3.4 Flow Chart

This section depicts the flow chart of the system. The flow chart includes the accessibility of different kind of users i.e. Unregistered users, Registered Users, and Admin. Figure 3.18 illustrates the overall flow chart of the system.

3.5 Usecase Diagram

The usecase diagram explains the rules of users. That means which user can perform which operations. Which user has how much permission to access. The Figure 3.19 illustrates the usecase diagram of our system. There are three types of users in our website. Unregistered, Registered and Admin.

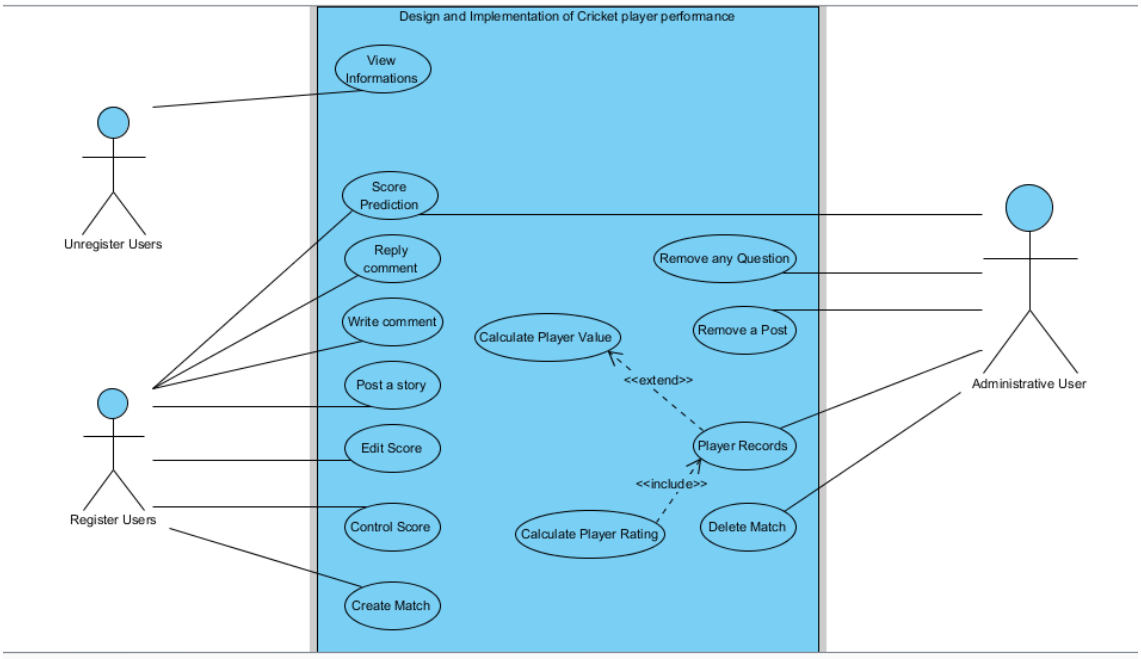

Figure 3.19: Usecase Diagram

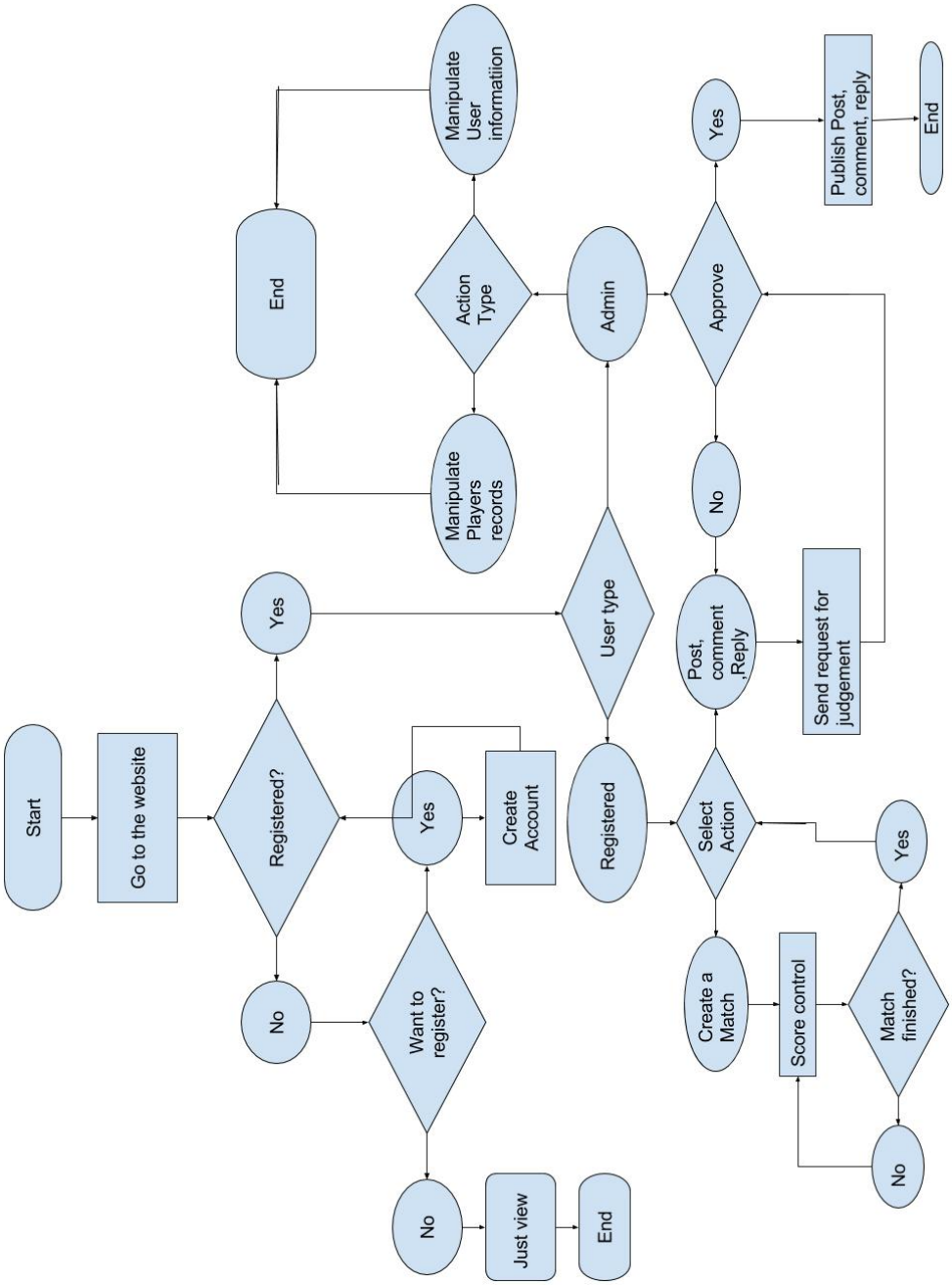

Figure 3.18: System Flow Chart

Chapter 4

Design Tools

4.1 Overview

In the implementation of our project, we have used the services of various design tools available to us. The list of these tools is given below:

- Laravel 5.3 (PHP Framework)
- MySQL
- PhpMyAdmin
- Bootstrap (Front-end Framework)
- JQuery
- Sublime Text 3 IDE

A brief description of these services is the main contents of this chapter.

4.2 Laravel

For developing an application in PHP, the trendiest and very efficient framework used today is Laravel [20]. Laravel is a free, open-source PHP web framework and intended for the development of web applications following the model-view-controller (MVC) architectural pattern. Some of the features of Laravel are a modular packaging system with a dedicated dependency manager, different ways for accessing relational databases, utilities that aid in application deployment and maintenance, and its orientation toward syntactic sugar. Laravel comes with a lot of resources out of the box, it has a cool router, eloquent for model repositories, swiftmailer for the mailing, blade engine for your templates, a system to create your migrations (think about it as a way of creating your database tables inside your PHP code, which is nice), a cache component to cache everything you want, a monolog logger, etc. The best thing about Laravel is that it is a high quality framework.

4.3 MySQL

A database is a structured collection of data. It may be anything from a simple shopping list to a picture gallery or the vast amounts of information in a corporate network. A relational database stores data in separate tables rather than putting all the data in one big storeroom [21]. This adds speed and flexibility. To add, access, and process data stored in a computer database, we need a database management system. MySQL is a relational database management system (RDBMS) that runs as a server providing multiuser access to a number of databases [26]. MySQL is used in web application and acts as the database component of the LAMP software stack [21]. Libraries for accessing MySQL databases are available in all major programming languages with language-specific APIs [26]. To administer MySQL databases one can use the included command-line tool (commands:

mysql and mysqladmin) [21]. MySQL Database Server is very fast, reliable, and easy to use. It was originally developed to handle large databases much faster than existing solutions and has been successfully used in highly demanding production environments since. MySQL Server offers a rich and useful set of functions. It works in client/server or embedded systems [22].

4.4 PhpMyAdmin

phpMyAdmin is a free and open source tool written in PHP intended to handle the administration of MySQL or MariaDB with the use of a web browser. It can perform various tasks such as creating, modifying or deleting databases, tables, fields or rows; executing SQL statements; or managing users and permissions.[23]
Some important features of phpmyadmin [24] are -

1. Web interface
2. MySQL and MariaDB database management
3. Import data from CSV and SQL
4. Export data to various formats: CSV, SQL, XML, PDF (via the TCPDF library), ISO/IEC 26300 - OpenDocument Text and Spreadsheet, Word, Excel, LaTeX and others
5. Administering multiple servers
6. Creating PDF graphics of the database layout
7. Creating complex queries using Query-by-Example (QBE)
8. Searching globally in a database or a subset of it

9. Transforming stored data into any format using a set of predefined functions, like displaying BLOB-data as image or download-link
10. Live charts to monitor MySQL server activity like connections, processes, CPU/Memory usage, etc.
11. Working with different operating systems.

4.5 Bootstrap

Bootstrap is a free and open-source front-end web framework for designing websites and web applications. It contains HTML- and CSS-based design templates for typography, forms, buttons, navigation and other interface components, as well as optional JavaScript extensions. Unlike many web frameworks, it concerns itself with front-end development only. [25] Some important features of Bootstrap are-

1. Bootstrap 3 supports the latest versions of the Google Chrome, Firefox, Internet Explorer, Opera, and Safari (except on Windows). It additionally supports back to IE8 and the latest Firefox Extended Support Release (ESR)
2. Since 2.0, Bootstrap supports responsive web design. This means the layout of web pages adjusts dynamically, taking into account the characteristics of the device used (desktop, tablet, mobile phone).
3. Starting with version 3.0, Bootstrap adopted a mobile-first design philosophy, emphasizing responsive design by default.
4. The version 4.0 alpha release added Sass and flexbox support.

For documentation visit http://getbootstrap.com/ [26]

4.6 jQuery

jQuery [27] is a cross-platform JavaScript library designed to simplify the client-side scripting of HTML. It is free, open-source software using the permissive MIT license [28]. Web analysis indicates that it is the most widely deployed JavaScript library by a large margin.

jQuery's syntax is designed to make it easier to navigate a document, select DOM elements, create animations, handle events, and develop Ajax applications. jQuery also provides capabilities for developers to create plug-ins on top of the JavaScript library. This enables developers to create abstractions for low-level interaction and animation, advanced effects and high-level, themeable widgets. The modular approach to the jQuery library allows the creation of powerful dynamic web pages and Web applications [29].

4.7 Sublime Text

Sublime Text is a proprietary cross-platform source code editor with a Python application programming interface (API). It natively supports many programming languages and markup languages, and its functionality can be extended by users with plugins, typically community-built and maintained under free-software licenses.
Features of Sublime text are -

1. "Goto Anything", quick navigation to files, symbols, or lines
2. "Command palette" uses adaptive matching for quick keyboard invocation of arbitrary commands
3. Simultaneous editing: simultaneously make the same interactive changes to multiple selected areas

4. Python-based plugin API
5. Project-specific preferences
6. Extensive customizability via JSON settings files, including project-specific and platform-specific settings
7. Cross platform (Windows, OS X, Linux)
8. Compatible with many language grammars from TextMate

Chapter 5

Manual

5.1 Overview

This chapter has been prepared by following the standard manual writing procedure. The main features of our application have been presented by using this style in the following.

5.2 Home Page

When a user go to the root directory of the website this brings him to the Home Page. The Home Page contains the latest ongoing international matches, local matches, latest news updates,the questions asked by users and the blog contents. Figure 5.1 illustrates the Home Page.

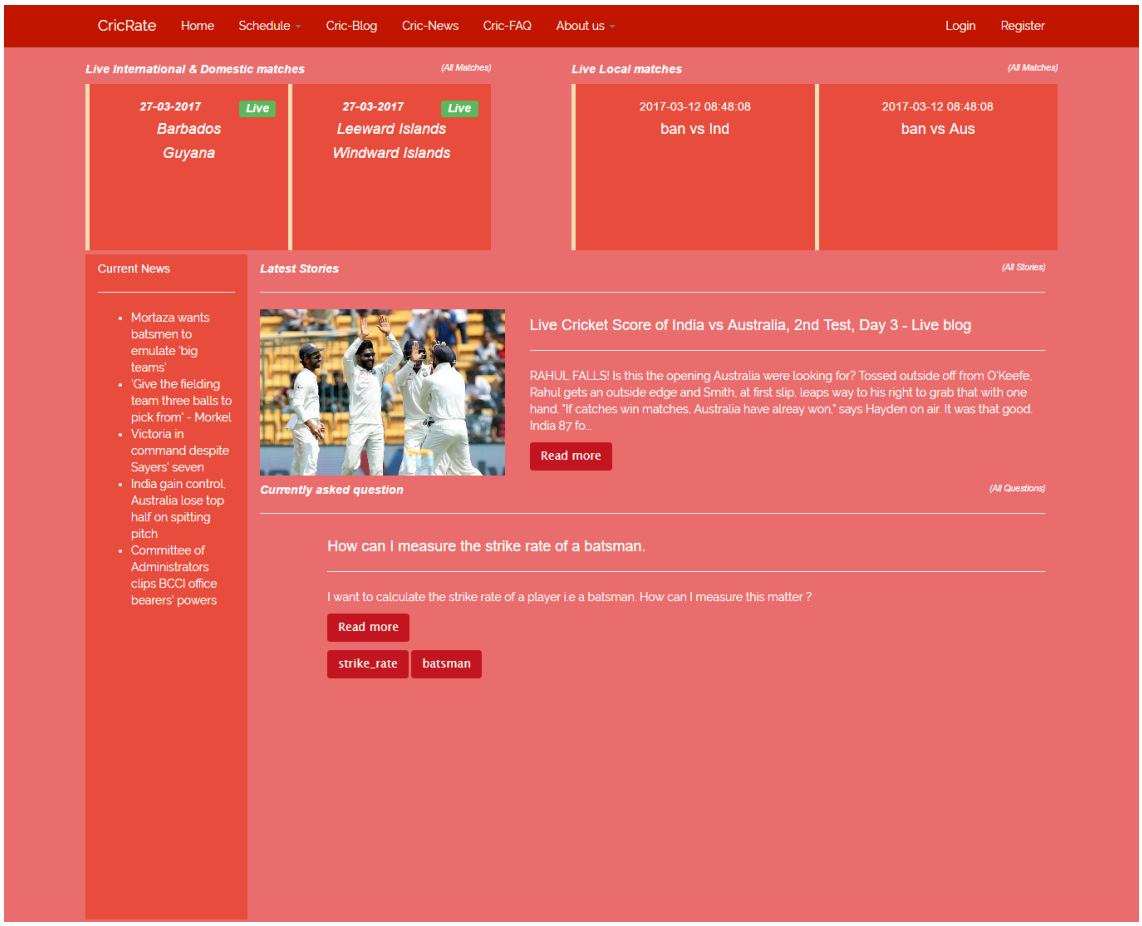

Figure 5.1: Home page

5.3 Navigation

The navigation panel provides the menu of the website and links to go different pages or features.

There are two variations of navigation panel. One for unregistered mode and another for register mode. The unregistered mode displayed at Figure 5.2

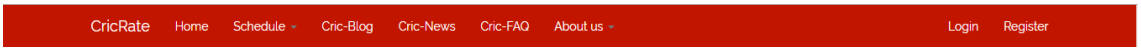

Figure 5.2: Navigation panel (Unregistered mode)

The navigation panel contains the following menu-

1. Home
2. Schedule
   (a) International Matches
   (b) Local Matches
3. Cric-Blog
4. Cric-News
5. Cric-FAQ
6. About Us
   (a) Our Info
   (b) Features
7. Login
8. Register

The registered mode displayed at Figure 5.3.

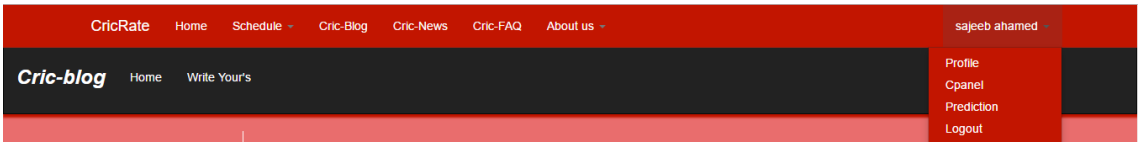

Figure 5.3: Navigation panel (Registered mode)

The contents or menu are same listed at the list provided before excepts last two. For the registered user the last two menu are disappeared and the user name took place instead of them.

5.3.1 Schedule

The "Schedule" option provides two sub menus. Which are Schedule for International matches and local matches. We can see the current matches schedule for both international and local matches by using this option. Figure 5.13 and 5.14 pictured the current scheduled matches.

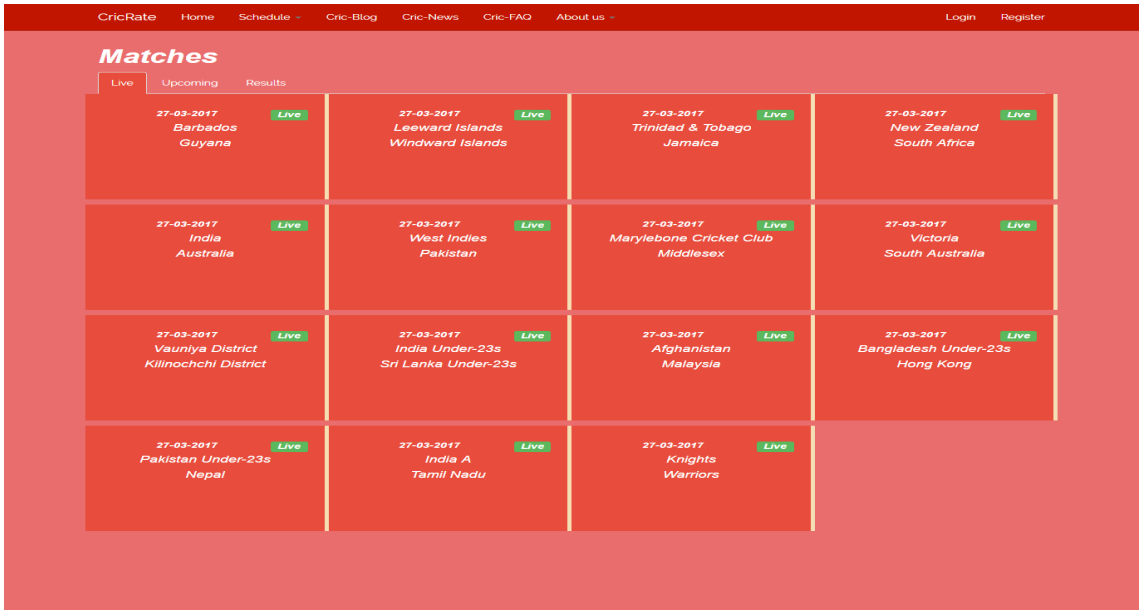

Figure 5.4: Scheduled International Matches

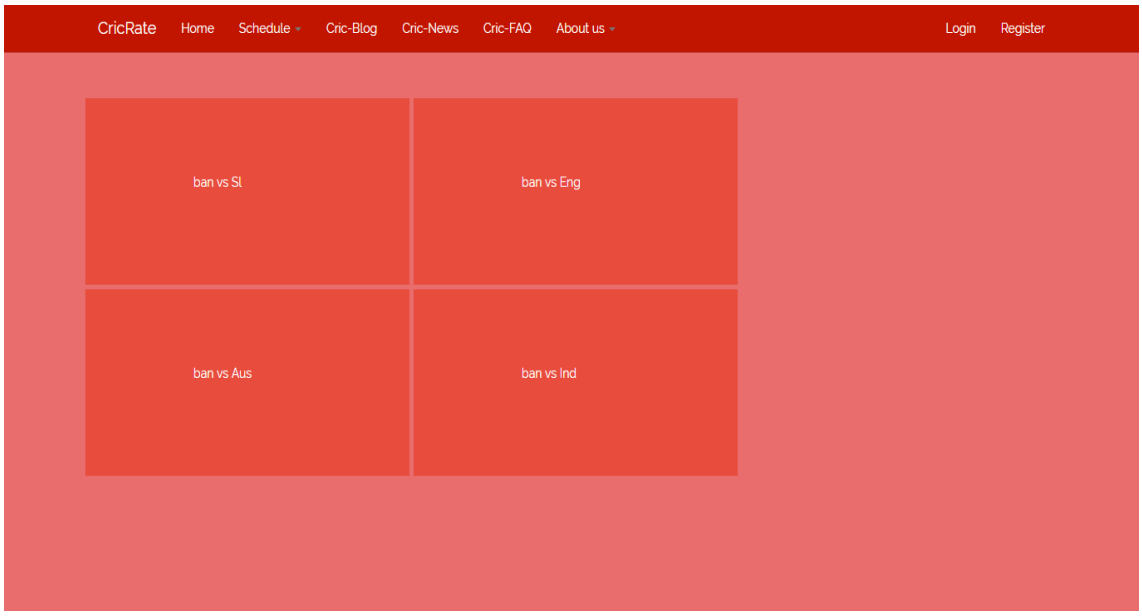

Figure 5.5: Scheduled local matches

5.3.2 Cric-Blog

Cric-blog is another feature of our website. Which basically contains the posted blog contents which are actually posted by registered users. The anonymous users can only read the blog but the register users can comment on them and reply on the comments. The blog must be related of cricket. That means there must be some words which are related to cricket. The system judge the posted story. If the story contains a minimum number of cricket related words such as, Cricket, Ball, Bat, Umpire, DRS, LBW etc. If it satisfies the system then the system permits to publish it. The Cric-blog is depicts at Figure 5.6

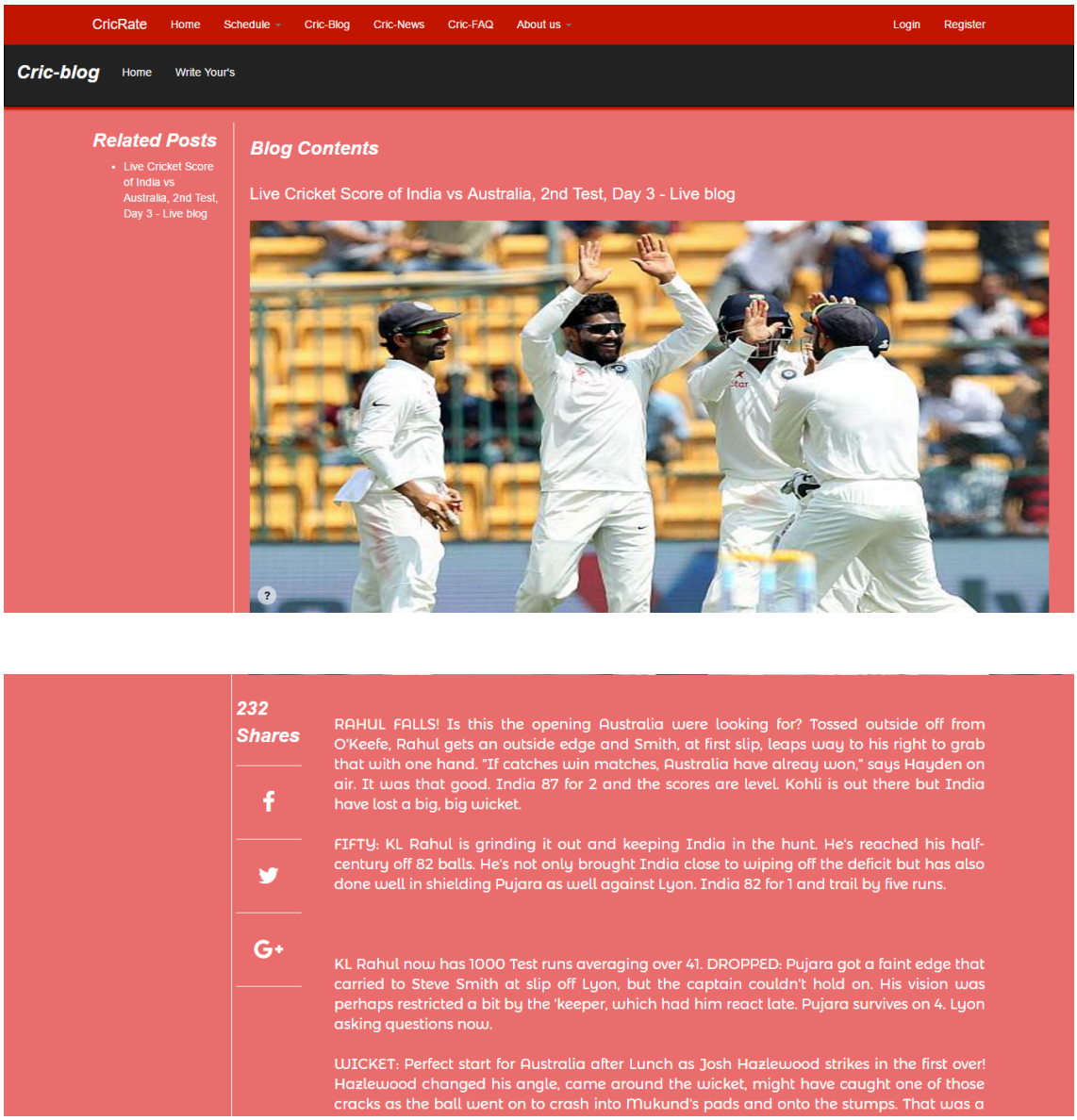

Figure 5.6: Cric-Blog

N.B:- The register user can write post on blog by clicking ***Write Your*** option.

5.3.3 Cric-News

The Cric-News section contains the news of current cricket. One can figure it out that what is happening currently at cricket world by this News section. This is illustrated at Figure 5.7

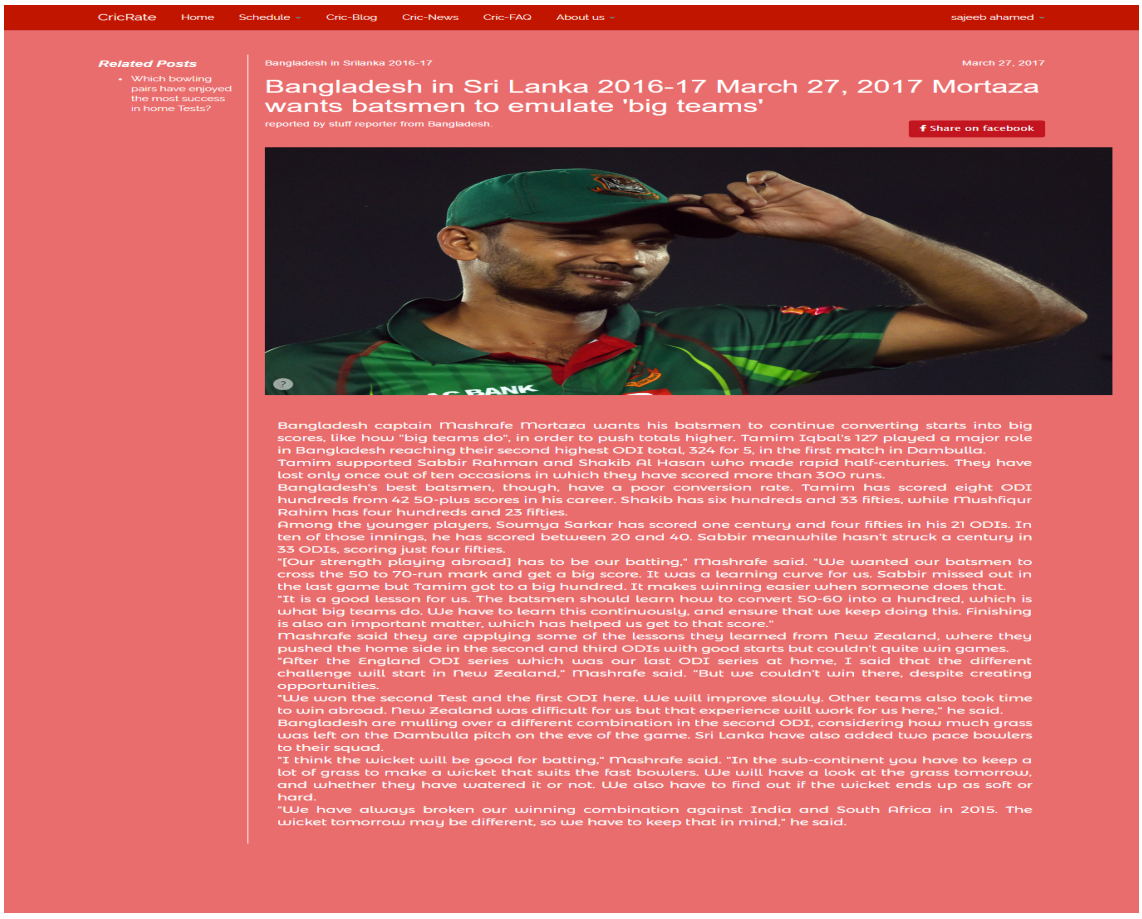

Figure 5.7: Cric-News

5.3.4 Cric-FAQ

Any register user can ask any question about cricket. And also can answer on any question, comment on any answer and can vote any question and answer. The votes are categorized at two classes. That is up vote and down vote. Up vote add +1 point to the owner who ask the question or the owner who answer the question (if the vote on the answer section). Similarly the down vote means -1 point. One use only can vote once. And the owner can not vote to own. The Figure 5.8 illustrates the FAQ page.

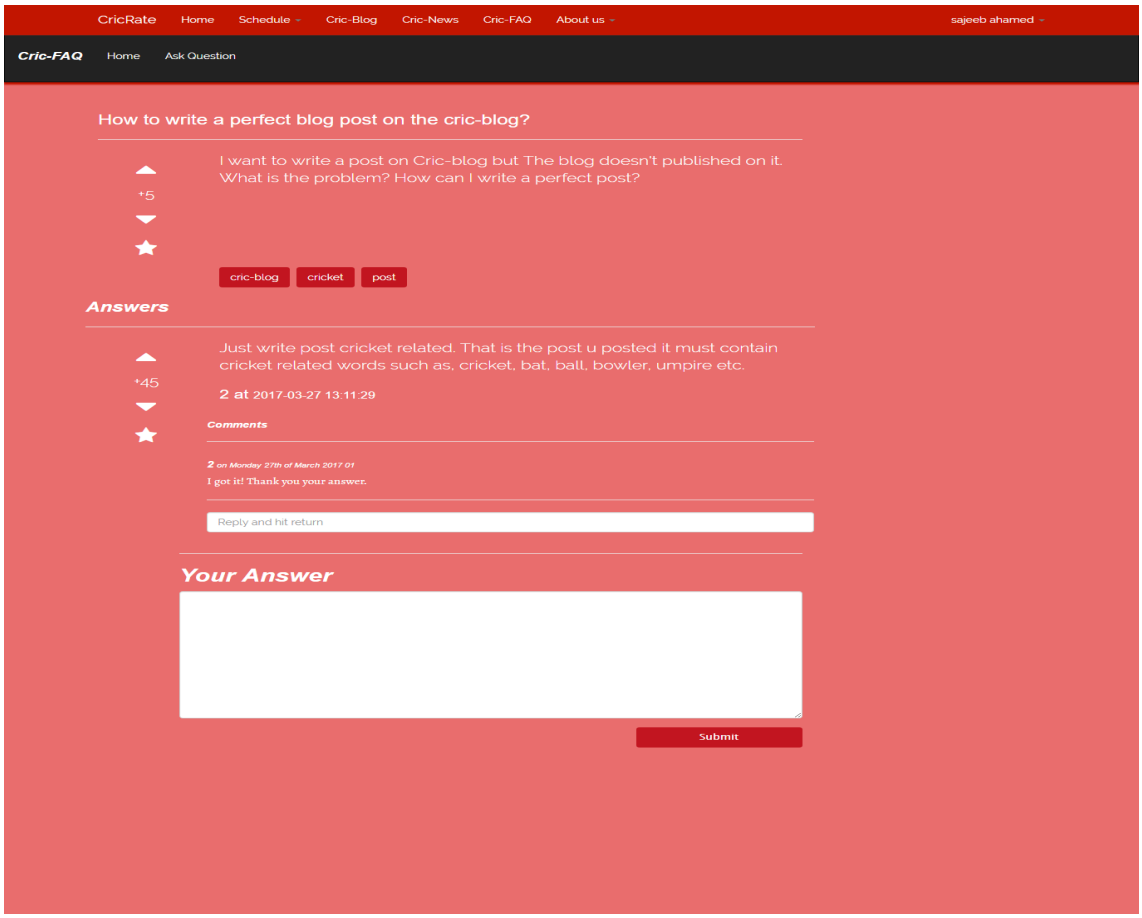

Figure 5.8: Cric-FAQ

5.3.5 Score Prediction

You can predict score by using two teams. After logging in the website click your user name. Here you find a sub menu where you find an option named prediction. This will bring you the prediction page. Where you can select two team which you find there. Then select two team then click predict. The system predict you a score with help of the records of the players of those teams.

5.4 Creating a Local Match and Conduction Method

Creating a Local Match is an easy task. Follow the instruction step by step for doing the job.

Step 1: First Login to the system. If you are not registered i.e. not have any account then register.

Step 2: Click on the user name placed on the right top corner or the right side of navigation panel and then click "Create Your Own Match" (See at Figure 5.3)

Step 3: The previous step send you to the team Selection page. Select first team and second team. If you don't find your team then make your team by clicking "Add a new team" option. Then proving you information create a team. Use same procedure for selecting second team. If not situated then create a team and then select the two teams ant press "Go". See Figure 5.9

Step 4: Then you are brought to squad selection page. Here you select 11 players for each team and press "Go to Score Control panel". See Figure 5.10

Step 5: The Score Control Panel you find option to add batsmen and bowlers. At first add two batsmen and one bowler to start the match. After finishing selection

you shall get the option for run control and see the scoreboard. You can out a batsman by clicking “out” link situated at right side of scoreboard. After clicking this you shall get options for out. See Figure 5.11

Step 6: After finishing an innings that is after finishing 50 overs or losing 10 wickets of batting side there will be a link named end innings. That will finished the innings.

Step 7: You can see your created matches at your profile page.

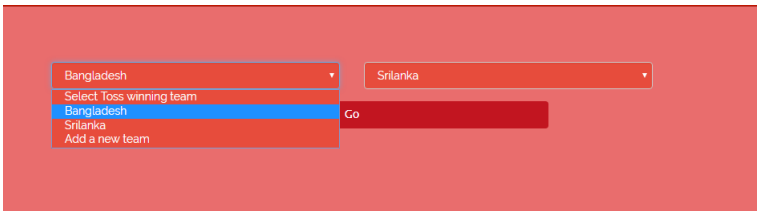

Figure 5.9: Team Selection

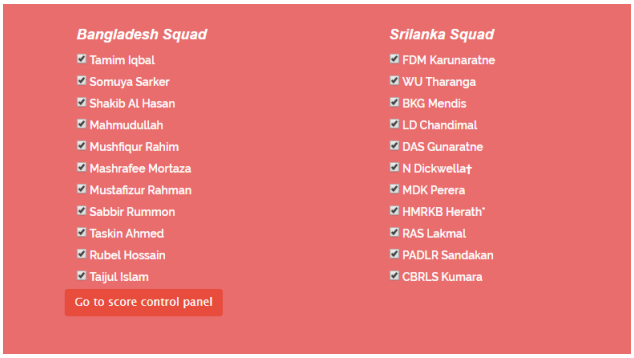

Figure 5.10: Team Creation

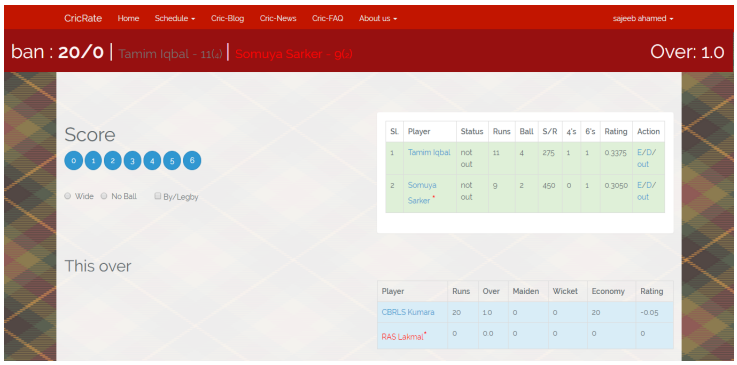

Figure 5.11: Control Panel

Figure 5.12: Bastman Selection Popup

5.5 Scoreboard

The One Day International match's scoreboard can be showed in our website. An API named CricAPI which provides the running games data of cricket in JSON format. From the JSON we display the scoreboard at our website. The display of Local match is not same as international match. The pictorial depiction of the international and local

scoreboard are illustrated at Figure 5.13 and 5.14.

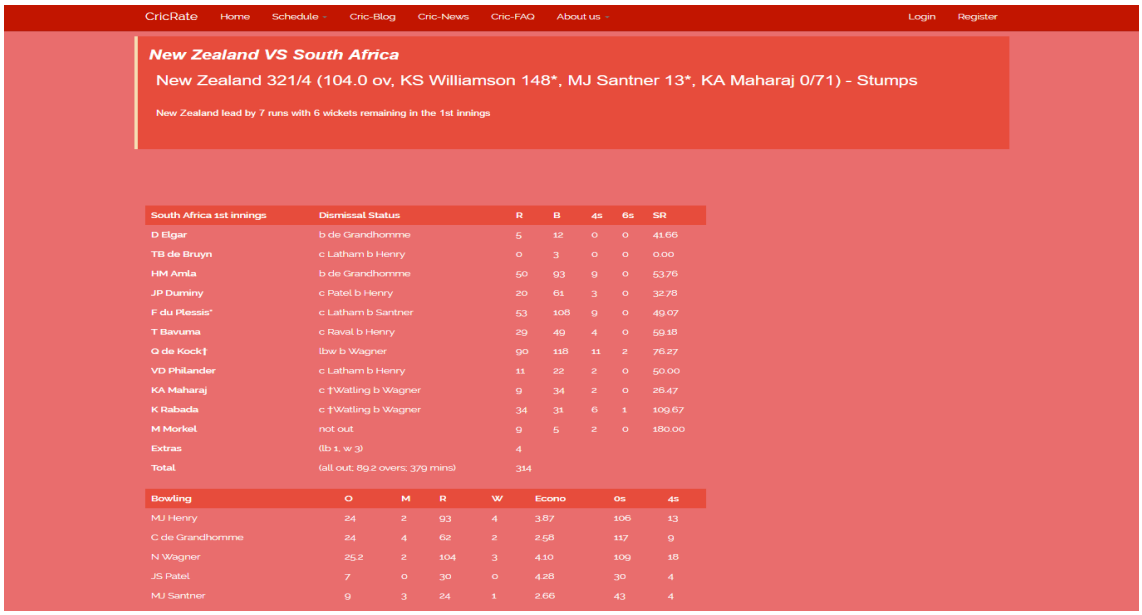

Figure 5.13: Scoreboard for International Match

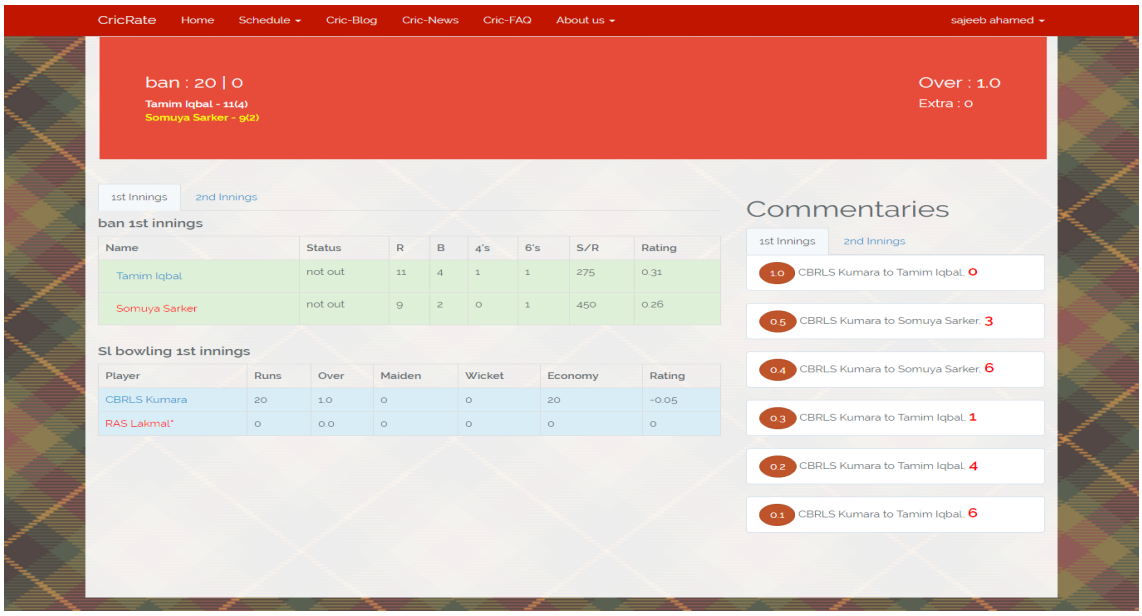

Figure 5.14: Scoreboard for Local Match

5.6 Registration and Login

5.6.1 Registration

It is clearly recognized from the previous discussion that a registered user can use more privilege than general unregistered users. So it needs to be a member in our website to take those privileges. Registration process is very simple and it takes not more than a minute to complete. Figure 5.15 depicts the registration system.

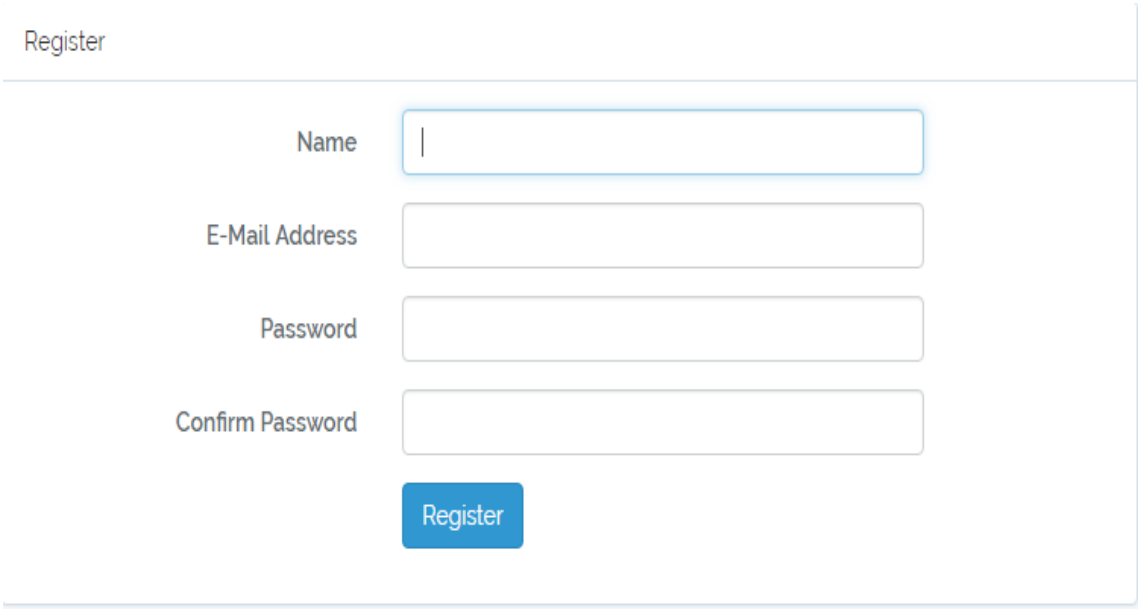

Figure 5.15: Registration Panel

5.6.2 Login

The login system is for those users who are already registered in the system. Figure 5.16 shows the login panel.

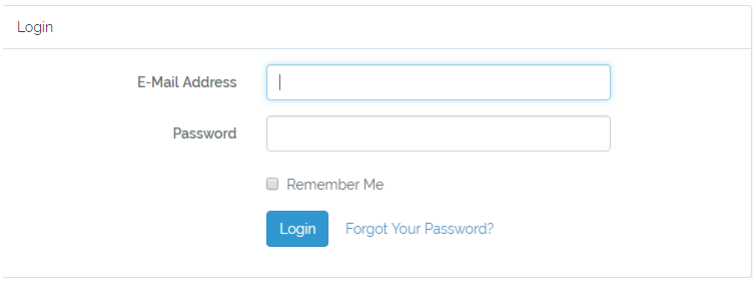

Figure 5.16: Login Panel

5.6.3 Logout

If a user wants to get out of the system then he just click logout which is situated at the right side of the navigation bar inside the user name. By logging out a user becomes like an anonymous user and deprived of all the special privileges.

Chapter 6

Conclusions

6.1 Conclusions

This web application provides us a well organized score management system of cricket. One can operate any local match by registering on the website. Player quality analysis is very much possible by using this web application. Score prediction adds an additional dimension by which one team can judge their position and can change their playing methodology to win a match. This application provides us the valuable batsman and bowler of a match so we can generate man of the match by the help of this method.

6.2 Limitations

We have been hardly trying to make the web application full-fill. But though there are some limitations of the website.

The system can predict score by using the player statistics but it doesn't take the pitch condition, weather condition into account.

6.3 Scope for Future Works

There are some scopes for further improvement and enhancement into the total implemented system. The content of the web site can be healthier by evolving more information and adding new features. We will add a wagon wheels and partnership breakdowns features for any ongoing match. We will provide a well oriented squad for each and every

match depends on the field condition. We will develop a system which will give more accurate score prediction depends on the weather, field condition and match situation. We will also ensure that the prediction can work on any over loss which is effected a match score board. We will add a feature for details of future tournaments, individual teams and records information about match officials, teams, and cricket boards.

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Appendix A

List of Acronyms

I_G	Global Index (Batsman and Bowler)
G_{Avg}	Global Average (Batsman and Bowler)
G_{Sr}	Global Strike Rate (Batsman only)
I_{LTM}	Last Ten Matches Index
LTM_{Avg}	Last Ten Matches Average (Batsman and Bowler)
LTM_{Sr}	Last Ten Matches Strike Rate (Batsman only)
I	Index value
E_v	Evaluated Value
G_{Ec}	Global Economy (Bowler only)
LTM_{Ec}	Last Ten Matches Economy (Bowler only)
Bt_i	i^{th} Batsman
Bt_{iTR}	i^{th} Batsman's Total Run
RP_i	i^{th} Batsman or Bowler's Rating Point
PP_j	j^{th} ball's primary point
R_j	j^{th} ball's Run
PB_j	j^{th} ball's Primary Bonus
Bw_{cE_v}	Current bowler's Evaluating Value
B_j	j^{th} ball's Bonus point
Bt_{cE_v}	Current batsman's Evaluating Value

Bw_{iTw}	i^{th} bowler's Total wicket
TB	Total Ball Faced
$BtCFB_i$	i^{th} batsman Can Faced Ball
Avg_{Bt_i}	i^{th} Batsman's Average
SR_{Bt_i}	i^{th} Batsman's Strike rate
TWT	Total Wickets Fallen
$BwCTW_i$	i^{th} Bowler Can Taking Wickets
TBD_{Bw_i}	i^{th} Bowler Total Ball
$TBBwD$	Total Balls Bowlers Done
BoP	Bonus or Penalty
FPR	Final Predicted Run

Appendix B

Sources Codes for system algorithms

```php
<?php
    public function predict(Request $request){
        $bat = new Batsmenrecord;
        $ball = new Bowlerrecord;

        $batting = $bat->where('country',$request->first)->orderBy('value','DESC')->get();
        $bowling = $ball->where('country',$request->second)->orderBy('value','DESC')->get();
        //return $batting;
        // Calculate the prediction of batsman facing balls
        $batsman_can_facing_balls = [];
        for( $i = 0; $i < 11; $i++){
            $batsman_can_facing_balls[$i] = ($batting[$i]->Gavg * 100)/($batting[$i]->Gsr);
        }
        //Calculate how many wickets could be fallen of batting team
        $sum_of_balls_facing_by_batsmen = 0;
        $number_of_wicket_fallen_predicted_by_batting_side = 0;
        for( $i = 0; $i < 11; $i++){
            $sum_of_balls_facing_by_batsmen += $batsman_can_facing_balls[$i];
            if($sum_of_balls_facing_by_batsmen >= 300){
                $number_of_wicket_fallen_predicted_by_batting_side = $i;
                break;
            }
        }
        // Check if the batting side can face all the 300 balls or not
        $total_number_of_balls_can_face_by_batting_side = 0;
        if($sum_of_balls_facing_by_batsmen < 300){
            $total_number_of_balls_can_face_by_batting_side = $sum_of_balls_facing_by_batsmen;
        }else{
            $total_number_of_balls_can_face_by_batting_side = 300;
        }
```

```
31          //Calculate how many wicket could be taken by bowling side
32          //first valueable 4 players can do 10 overs each and last 2 can 5 overs each
33          $bowling_side_can_take_wickets = [];
34          for($i = 0; $i < 6; $i++){ // This structure is static now. This will be changed after
35              if($i < 4){
36                  $bowling_side_can_take_wickets[$i] = (60 / $bowling[$i]->Gavg);
37              }else{
38                  $bowling_side_can_take_wickets[$i] = (30 / $bowling[$i]->Gavg);
39              }
40          }
41          //Number of wicket could be taken by the bowling side
42          $temp_wicket_counter = 0;
43          $number_of_wicket_taken_predicted_by_bowling_side = 0;
44          $number_of_bowler_need_to_take_ten_wickets = 0;
45          for( $i = 0; $i < 6; $i++){
46              $temp_wicket_counter += $bowling_side_can_take_wickets[$i];
47              if($temp_wicket_counter >= 10){
48                  $number_of_wicket_taken_predicted_by_bowling_side = 10;
49                  $number_of_bowler_need_to_take_ten_wickets = $i;
50                  break;
51              }
52              if($i >= 5 && $temp_wicket_counter < 10){
53                  $number_of_wicket_taken_predicted_by_bowling_side = $temp_wicket_counter;
54              }
55          }
56          //Calculate how many balls it takes to take all 10 wickets or
57          //Should they need to ball totlal 300 balls
```

```
        $number_of_balls_need_to_do_by_bowling_side = 0;
        if($number_of_wicket_taken_predicted_by_bowling_side < 10){
            $number_of_balls_need_to_do_by_bowling_side = 300;
        }else{
            $count_wickets_before_last_bowler = 0;
            for($i = 0; $i < $number_of_bowler_need_to_take_ten_wickets; $i++){
                $count_wickets_before_last_bowler += $bowling_side_can_take_wickets[$i];
            }
            $number_of_balls_need_to_do_by_bowling_side = 300 - ((10 - $count_wickets_before_last_bowler) * $
                bowling[$number_of_bowler_need_to_take_ten_wickets]->Gavg);
        }
        $average_wicket_fallen = round(($number_of_wicket_fallen_predicted_by_batting_side + $
            number_of_wicket_taken_predicted_by_bowling_side) / 2);
        $average_balls_faced = round(($total_number_of_balls_can_face_by_batting_side + $
            number_of_balls_need_to_do_by_bowling_side)/2);
        $temp_sum = 0;
        for($i = 0; $i <= $average_wicket_fallen; $i++){
            $temp_sum += $batsman_can_facing_balls[$i];
        }
        $penalty_or_bouns = ($average_balls_faced - $temp_sum)/$average_wicket_fallen;
        $batsman_runs_after_penalty_or_bonus = [];
        for($i = 0; $i <= $average_wicket_fallen; $i++){
            $batsman_runs_after_penalty_or_bonus[$i] = (($batsman_can_facing_balls[$i] + $penalty_or_bouns) *
                 ($batting[$i]->Gsr))/100;
        }
        $final_predicted_run = 0;
        for($i = 0; $i < $average_wicket_fallen; $i++){
            $final_predicted_run += $batsman_runs_after_penalty_or_bonus[$i];
        }
        $final_predicted_run = round($final_predicted_run);
        return $final_predicted_run;
    }
}
?>
```

Figure B.1: Source code for Score Prediction

```
    public function store(Request $request)
    {
        $record  = new Batsmenrecord;
        $record->player = $request->player;
        $record->Gavg = $request->Gavg;
        $record->Gsr = $request->Gsr;
        $record->LTavg = $request->Lavg;
        $record->LTsr = $request->Lsr;
        $indexG = $request->Gavg * $request->Gsr;
        $indexLT = $request->Lavg * $request->Lsr;

        $mappedIndexG = map($indexG,0,30000,0,10);
        $mappedIndexLT = map($indexLT,0,30000,0,10);
        $value = ($mappedIndexG+$mappedIndexLT)/2;
        $record->value = $value;
        $record->country = $request->country;
        $record->save(); // Save data to the databse.
        return redirect()->back();

    }
```

Figure B.2: Source code for Player Evaluation Value Generation

```
156             //calculate the point of a batsman get
157             $pp = $run * (1/36);
158             $bonus = map($bowlers->value * $run,0,60,0,(1/36));
159             $FR = $pp + $bonus;
160             $striker->rating += $FR;
161             $striker->save();
162
163
164             // Calculate the rating point for bowlers
165             $pp = (3-$run) * (1/36);
166             $bouns = map($batsmanrecords->value * (3-$run), 0, 30, 0, (1/36));
167             $FR = $pp + $bouns;
168             $currentBowler->rating += $FR;
169             $currentBowler->save();
170
171         }
172
```

Figure B.3: Source code for Ball by Ball Rating Point