Android Mobile Application: UTP Football League Verification

By

Muhammad Bin Abdul Manan

16298

Dissertation submitted in partial fulfilment of

The requirements for the

Bachelor of Technology (Hons)

(Business Information System)

MAY 2015

Universiti Teknologi PETRONAS

Bandar Seri Iskandar

31750 Tronoh

Perak Darul Ridzuan

CERTIFICATION OF APPROVAL

Android Mobile Application: UTP Football League Verification

By

Muhammad Bin Abdul Manan

A project dissertation submitted to the
Business Information System Programme
Universiti Teknologi PETRONAS
In partial fulfillment of the requirement for the
BACHELOR OF TECHNOLOGY (Hons)
(BUSINESS INFORMATION SYSTEM)

Approved by,

_____

(Assoc. Prof. Dr. Mohd Fadzil Hassan)

UNIVERSITI TEKNOLOGI PETRONAS
TRONOH, PERAK
May 2015

CERTIFICATION OF ORIGINALITY

This is to certify that I am responsible for the work submitted in this project, that the original work in my own except as specified in the references and acknowledgement, and that the original work contained herein have not been undertaken or done by unspecified sources or persons

_____

MUHAMMAD BIN ABDUL MANAN

ABSTRACT

Football or commonly known as soccer, can be said as the most popular sport in many countries including Malaysia. It is a sport that people often talk about and play the whole time. However, scandal such as cheating has become one of the common issues in sport like football. Even at the professional levels, there were many scandals reported regarding the cheating issues in football. For instance, using an illegal players or performing the rolling substitution between the players without the knowledge of higher authorities can be said as the main concerns of cheating issues in the world of football nowadays. Therefore, for that reason, the objectives of this project is to provide a solution to the above mentioned issue by using the technology of mobile application as well as the barcode scanner. This project will be specifically focused on developing the mobile application that has the ability to verify the identity of players involved. With this solution, the management will be able to store, update and verify each of the player's information, who have been registered or participate in any football league or tournament. Hence, it will help the management to reduce the cheating issues in football as well as increasing the efficiency of management in handling a sport event or competition. As a result, several of preliminary studies and analysis have been performed throughout this paper in order to achieve the project objectives.

ACKNOWLEDGEMENT

"Praise to Allah, the most Gracious and the most Merciful"

First of all, praises and thanks to Allah the Almighty for His guidance and showers of blessings throughout my entire Final Year Project (FYP). You have given me the power to believe in myself in order to pursue my dreams.

Furthermore, special appreciation and gratitude is extended to my UTP supervisor, Assoc. Prof. Dr Mohd Fadzil Hassan for guiding, monitoring and teaching me throughout the whole period of Final Year Project. His dynamism, vision, sincerity and motivation have deeply inspired me. It was a great privilege and honour to work under his guidance. I am extremely grateful for all his help in order for me to perform well and for my future growth.

My appreciation would be incomplete without giving credit to the FYP Coordinator, Dr Ahmad Sobri Hashim as well as Computer Information Science (CIS) Department for managing and opportunities given to perform this individual project to enhance the students' knowledge and skills. All of the briefings, talks and sharing session have given me better understanding to carry out the final year project.

Furthermore, I would like to thank to my beloved family and friends for all their support, ideas and advice throughout my Final Year Project. I am very grateful to my parents for their love, prayers, caring and sacrifices for educating and preparing me for my future. Without them, this report would not have been possible.

Finally, my thanks go to all the people who willing to helped me in completing the survey questionnaire, which all of the responses captured have assisted me to gained all the require information and data in order to complete this report with success.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

CHAPTER 1: INTRODUCTION

1.1 BACKGROUND STUDY

Nowadays, sports have been more than an entertainments (Kendall, Knust, Ribeiro and Urrutia, 2010). It is an industry with millions of fans worldwide, which turning as a promising money machine venture to jump in. Football or commonly known as soccer in certain countries, is one of the most popular sports in the world. It is performed by men, women as well as children with different levels of expertise. According to Simon Chadwick (2010), football is a sport that often referred as the ‘’Global Game”, which it is a game that countless people play and talk about it the whole time. For a country like Brazil, they often said that soccer is not just a sport, but it is like their religion to their country (The New York Times, 2001).

Whenever a football league or tournament is organized, there will be a need of a proper sport management in order the competition to run with successful and efficient. The benefits of a good management in sport competition are many. For instance, one of the benefits is that, it will help the organizer or management to avoid any unwanted incident including fights, cheating, etc. Therefore, management plays a vital role in any sport competition as it will gives many advantage in different aspects thus provide a positive impact to the people and community (Kosmo! Online, 2015).

For this project, the focus would be the football management itself. Jere Longman (2012) stated that, in certain countries, the sport of football is not unlike driving, where the laws and regulations are treated merely as suggestions. He further added that, these days football is culturally backward in many aspect. First and foremost, it seems incapable of scraping out the improper contaminations. Scandal involving cheating in football matches have sprouted like mushrooms. The image of the beautiful game in football is being sullied by a rapidly spreading cheating and corruption scandal, which also have produced convincing

evidence of dishonesty, deception, arrogance and incompetence (Larry Rohter, 2001). Let us take an example of UTP Football League in 2014, where there was two teams was involved in cheating issue as one of the teams was using unregistered player throughout the competition. Meanwhile, the other one was involved in the issue of rolling substitution. Or in other words, they was using a player who has been substitute during the first half of the football match.

MEMORANDUM

To	**Zamri B Yusof** Senior, Human Resources Management & Administration
Through	**Azrizal B Hashri** Executive, Student Support Services
From	**Tuan Iskandar Maha Aziz B Tuan Ismail** Undergraduate student, Computer Information Science
Date	**22nd November 2014**

VERIFICATION ON MOHD AMRU ASYRAF AS UTP STAFF/LECTURER

Referring to above matter, I would like to request your kind approval to verify the mentioned name above as UTP Staff.

We have encounter a conflict that required us to provide an evidence that the mentioned name is not an UTP Staff.

We are currently filing a complaint to UTP Football League on the allegation of Staff FC over importing an external individual in their team.

I hope this application will reach to your kind attention and consideration.

Thank you,

Figure 1: Screenshot Memorandum of cheating issue in UTP Football League 2014

For that reason, this project will develop an Android Mobile Application, called "UTP Football League Verification Mobile Apps" for the committee or organizer of the UTP Football League, where it will give them the ability to verify the identity each of the participants of the Football League and store the required information for each players. Furthermore, this apps will be divided into three man functions and it is intended to provides user-friendliness in term of its features and interface thus have an up-to-date and comprehensive information's for the target users. Further particulars of the mobile application will be discussed in Chapter 4: Result and Findings.

This chapter is organized as follows. In the next section, the author will define the problem statement of this project and will be followed by the project objectives, scope of study and relevancy of the project as well as the feasibility of the project.

1.2 PROBLEM STATEMENT

There were many issue and scandal reported in sport industry like football. However, cheating in football is one of the common problems facing by many national football organization. For this part, the author himself has examined on how the UTP Football League was being organized in every single year. Based on the cheating issue faced in UTP Football League 2014, the author has come up with an idea of creating an Android Mobile Application that will enhance the management process in organizing the soccer tournament. As mentioned before, this project will focuses on the management of the UTP Football League (organizer), as a good management is required for any event to be run with efficiently and effectively. Below are some of that problems and concerns that have been identified and hoped to be tackled with the establishment of this application:

i. Verification

   The participants of UTP Football League may use illegal players (non UTP Student/Staff) throughout the tournament or they could perform continuous replacement of one player by another throughout the match without the knowledge of the organizer. Therefore, with this mobile apps, it will help the committee of the tournament to verify each of the player identity that have been registered or substituted at the real time.

ii. Time Management

   The organizer of UTP Football League require lot amount of time to verifies each of the players identity that have been registered within the tournament by checking the registration form, participants matric id and identification card (NRIC) before any matches begin.

1.3 PROJECT OBJECTIVES

The main objective of this project is to provide a solution for the management of Football League in UTP by come out with an Android Mobile Application that capable to verify the identity of each player as well as providing all the players information throughout the tournament. In addition, the mobile apps aims to ease all the process involved related to the management of the Football League. And the specific objectives for this project are listed as below:

- To study and analyze the requirements for adopting android-based mobile platform to accommodate real-time verification of football players

- To design and develop the application highlighted in objective 1 with the following functionalities:
    - Ability to register and store each of the participant identity into the system database
    - Ability to verify each of the player identity through the use of barcode technology
    - Ability to ease the process of the management in disseminating all the relevant information such as, a list of players that have been registered.

- To validate and test the application developed in objective 2

1.4 SCOPE OF STUDY

In the process of developing this mobile application, the UTP Football League will be used as the case study and the scopes covered for this project can be classified into three main categories which are: the current issue of UTP Football League, the targeted users of this project as well as the required tools in developing the mobile apps.

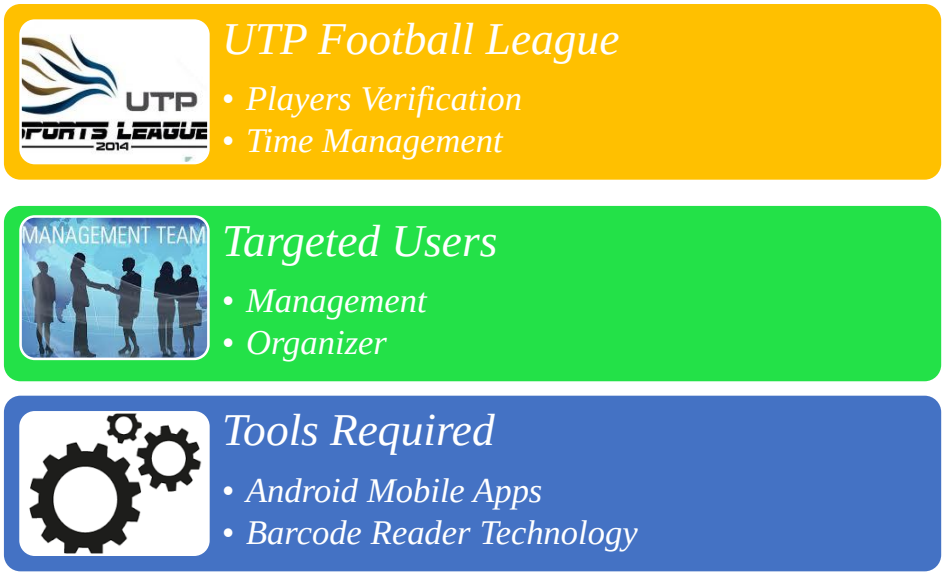

Figure 2: Scope of studies for this project

1.5 RELEVANCY OF THE PROJECT

For this section, the relevancy of the project can be find from the different perception as stated below:

1) User / Management

   As mentioned, this project will help the user / management to be able to verify each of the students and staffs identity, who have been registered or replaced throughout the match game. Thus, it will also help them to improve the time management as they were no longer require checking each of the registration form, participants matric cards and identification cards.

2) Community / University

   Furthermore, this project will assist the community / university to increase the efficiency of managing external or internal sport events through the use mobile application and other technology such as matric id barcode scanner reader.

3) Researcher

   This project is expected to develop a mobile application that will able to validate the identity of each participants involved. Therefore, it can be said that this project is relevant as the researcher himself was from the computer science background. Besides, the researcher will be able to gain some knowledge regarding thr sport management as well as development process involve in this project.

1.6 FEASIBILITY OF THE PROJECT

Feasibility study can be define as an evaluation and analysis of the project. Therefore, project feasibility is require before the initial stage of the project initiate as it will determine whether project is possible to achieve as well as to simplify the process of development involve within the project. For that reason, the project feasibility can be categorize as stated below:

1) Technical Feasibility

   As stated before, this project require the developer to create a mobile application that integrates with technology of smartphone camera as matric id barcode reader that will be able to store and authenticate the identity of each person. From the technical point of view, this project can be seen as achievable due to the author experienced and knowledge regarding programming.

2) Financial Feasibility

   In term of the financial, there was no cost involve within this project. This is because, there will be only one hardware require in this project which is the android device itself. And for that reason, the developer will be using his own android device and the device camera for the mobile apps to be testing and running with successful.

3) Scope Feasibility

   For this project, the author will be concentrating on the usage of mobile application to increase the efficiency of managing a sport event as well as improving the time management. For that reason, this project will be highlighting on the issue faced by UTP Football League and to gather more information regarding the issue, a list of questionnaire have been distributed to the target users, which are the organizer, participants as well as the viewer of the UTP Football League.

4) Schedule Feasibility

For the initial stage of this project, several of method will be apply in order to collect and gather all the requirement planning, which it will take approximately about 1 month to complete. Once all the requirement have been identified, the author will initiate the analysis phase and follow by the development phase. During the stage of the development, the author will be using an online software called Android Studio to speed up the development process as it only require drag and drop method in building the mobile application. Therefore, with the total of 8 month, all the activities involve in this project are expected to be complete.

CHAPTER 2: LITERATURE REVIEW

In general, the advancement of technologies that have been used in industry of sports have bring many benefits to the organizers, officials as well as the athletes. For this project, the author will be focusing on the development of the mobile application that will integrates with the technology of barcode reader in order to verify each of the participant identity. For that reason, the author is required to prepare the Literature Review section in order to identify the terminology, case studies to support the proposed project title. Therefore, this section is organized as follows. In the next section, the author will define the technology usage in sports and follow by the issues in football, barcode technology as well as the android mobile application platform.

2.1 TECHNOLOGY USAGE IN SPORTS

Sport is generally considered as any competitive physical activity, experience or business enterprise that either focused on athletics, recreation, fitness or leisure (Pitts, Fielding & Miller, 1994). In some cases, sport is not only about physical competition, but it also been view as an entertainment to the participants involved and viewers around the globe. Therefore, it is important for any sport competition to make the activities involved are interesting to be watch. For that reason, technology plays a vital role in the efficiency of today modern sports. Nowadays, some of the sports like motorsport, are using the technologies as part of it necessary. Meanwhile, the others, are using the technology to improve the performance of the athletes or the management itself. There were many types of sport worldwide that was using the sporting technologies to improve their performance. This include football, rugby, golf, tennis, badminton, snooker, hockey, etc. According to Dr. Eric Wallace (2009), technology in sports can be defined as an application and knowledge of using a specialized items or equipment as well as the latest technologies to perform the sport task and management more effective and efficient. In other words, it is an attempt of the sport management/athletes to improve their competitive surrounding thus enhance the overall athletic performance.

2.1.1 TECHNOLOGY FOR SPORT MANAGEMENT

Based on Samuel Iheanacho, Okor Rufus and Charles Bassey (2013), management is considered as one of the most importance human activities that take place in organizing sport events. It is the responsibilities for every committee members to put their best effort in achieving the set goals of the organization. Chuang Li and Zhen Wang (n.d) further add that, sport management involve many areas of aspect including games record, athlete's information, sport equipment, etc. Therefore, with the rapid growth of sport industry worldwide, the traditional management method is no longer the best way in organizing any sport events. It is suitable for the modern community to use the sport technology in conducting the sport events as it is proven to have the ability to improve the work and management efficiency significantly. (Chuang Li and Zhen Wang, n.d).

Nowadays, there were thousands of different kind technology used in sport management area such as the Hawkeye (Sensor System), EyeVision (Camera Rotation), BodyByte (Fitness Software) and many more. However, to specific the scope of technologies used in managing sport events, LeagueOne is the most common software that have been used in today's modern sport. It is online software that is built for the sport organizers to automate their administrative work thus manage their participants. The software itself was easy and simple to use as it will help the sport organizers to collect the registration of the participants, build schedules as well as communicate with the participants.

2.1.2 TECHNOLOGY USED IN FOOTBALL

Due to many controversial goals that were never been given in soccer sport, the introduction of the goal-line technology was the obvious one in the history of football (TechnologyInSport, 2013). According to Wikipedia (2015), goal-line technology or known as goal decision system is a technology used by the sport of football to determine whether the ball has completely cross over the goal line and at the same time will instantly send a signal to

the referee watch to assist them in making the final decision in awarding the goal. The main purpose of this technology was not to replace the role of the officials involved, but rather to support them in making the decision during the match. In addition, this technology was not only being used by sport of football, but it is also plays a vital role on other type of sports such as tennis, cricket and snooker in making the right decision.

Figure 3: Goal-Line Technology in Football

While the purpose of the goal line technology is to reduce the number of mistakes made during the match, however there were also several criticism reported regarding the necessary of this technology especially from the participants itself (Jack Williams, 2013). For instance, in the early of 2014, there was a criticism reported by the football team in Germany regarding the cost of using such technology. The cost is very high as it would cost from 250,000 Euro up to 500,000 Euro and it is not acceptable for certain teams to apply it (Leslie Sequira, 2013). Leslie Sequira (2013) further add that, the implementation of the goal-line technology may impact on the human element of the game as well as reducing the role of the referee in football match. Hence, threatens the integrity of the football and remove the enjoyment of debating mistakes. According to the President of the FIFA, Sepp Blatter, "normally the laws of the game in any sport are changing when there is an implementation of new technology".

However, in reality, goals are the most important thing in football nowadays, so the desire for accuracy in making decision is reasonable and understandable (Neville Darangwa, 2012). Neville Darangwa (2012) also highlighted that, with the amount of money that already been spent in football, it is too naïve for the organizer or officials to ignore the fans and viewers, whose desire for the correct decision to be made. This is the one of the main reason why technology such as goal-line technology is needed in sport. This also proves that technology plays an important role in the industry of football as it already gives a massive help for the football officials making a correct decision (TechnologyInSport, 2013). For this project, the author will be focusing on the technology usage such as mobile apps and barcode scanner that will help the organizers of UTP Football League to verify the identity for each participants involved.

2.2 ISSUES IN FOOTBALL

In general, professional sports league is not only about individual physical ability or low-cost entertainment (Kendall, Knust, Ribeiro, & Urrutia, 20l0). For some people, it was a multimillion business as there was a great deal of money has been invested in term of advertising, media, players, teams and so on (Wei, Fujimura, Wei, & Ding, 2010). For that reason, it has increases the needs as well as the importance for the leagues to be manage and organize with efficiently. Managing a sport league is not an easy task. Even for professional football league, there were many constraints involved including fighting, cheating, corruption and etc.

In this section, the author himself will be highlighting on the cheating issue in term of the player's verification. In Malaysia Super League 2014, there was several of issue reported regarding cheating. For instances, in the early of the 2014 league season, Kelantan Football Club will make appeal to the Football Association of Malaysia (FAM) after they was found guilty of using a suspended player, Mohd Fitri Omar in the league match against

the Terrengganu Football Club on March 29, 2014 (Mazram Idzam Ridzal, 2014). Moreover, in Jun 2014, there was same issue reported according to Metro Harian newspaper, where the Selangor Football Club was using their import player from Liberia, who also are being suspended against the Angkatan Tentera Malaysia (ATM) in league match of 2014 (Azlan Muhammad Zain, 2014). Meanwhile, for the international league such Australia Soccer League, there was scandal of the identity has been reported in 2003, where the state league soccer club of Melbourne City was caught cheating of using unregistered player all the way the season and for that, the team was fined with $16,500 (Micheal Lynch, 2003).

However, for this project, the author will take an example of UTP Football League 2014 cheating issue, where by there was issues have been reported regarding the players identity. As mentioned before in the introduction of this report, there was two teams involved in this kind of issue. For the first team, Staff FC they was caught guilty after using unregistered player throughout the competition and because of this, the team has been disqualified from the tournament. Meanwhile, for the second issue of UTP Football League 2014, there was an issue of rolling substitution reported by the participants of the tournament, where by a team called "RealMay FC" was using a player who has been substitute at the first half of the match during the second half of the match. As mentioned by the organizers of UTP Football League within the rules and regulation of football, rolling substitution are completely illegal in sport like football and the team involved should be disqualified and get 0 point for that match. Therefore, based on those issues, the author has come out with an idea to develop a mobile application for the organizers of the tournament, where it will help them to identify the identity of each players at the beginning of any match by using the technology of barcode reader.

Real May FC
Universiti Teknologi Petronas,
Bandar Seri Iskandar,
31750 Tronoh,
Perak.

Curriculum Unit,
Universiti Teknologi Petronas,
Bandar Seri Iskandar,
31750 Tronoh,
Perak.

26th November 2014

Dear Sir/Madam,

We are writing this letter to express our protest on Staff FC allegation on importing foreign player on previous three group matches.

We would love to draw your fair attention on the incident below:

Staff FC has imported a foreign (non student/staff) player for their previous three group fixtures. Hence, they have violated the tournament rules and should been disqualified from the tournament.

However, the call is on the organizer and we do hope the true and fair decision to be taken out.

Your consideration on above matter is highly appreciated. We hope Real May to be treated fairly.

Sincerely,

Tuan Iskandar Ismail (16333)
Real May Manager

Figure 4: Screenshot of protest letter in UTP Football League 2014

2.3 BARCODE TECHNOLOGY

According to Jerry Swartz (2012), the use of barcode technology have spread into many industries nowadays. This includes retailers, medical field, airlines, military and any business operations where monitoring, storing and tracking are involved. The reason why this kind of technology were used in many business is due to it numerous benefits to wide area of the business operations itself. For examples, it could improve the speed, accuracy and efficiency of business operations without required any high expenses and hence, may create a better customer service for the business operations (Keith Evans, n.d). Currently, there were two types of barcode that are widely used in many industries. This includes

linear (1D) barcode and QR (2D) barcode. And below figure shows the difference pattern between these two barcodes.

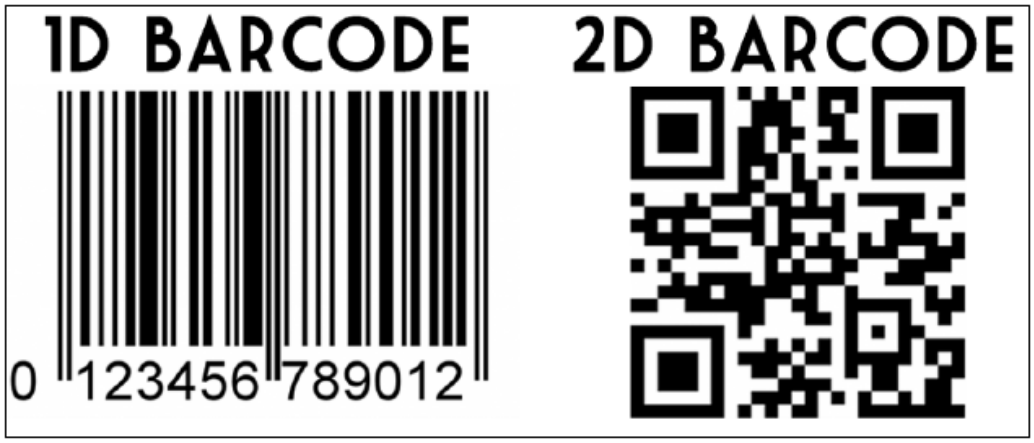

Figure 5: Differences of pattern between 1D and 2D barcode

However, it can be said that most of the industries are using the linear barcode or commonly known as 1D barcode on their product in order to ease the business transaction (Kevin Gao, 2013). According to Margaret Rouse (n.d), 1D barcode can be defined as a printed series of parallel bars or line with different size of width that are used to capture and store data or key information related to the product itself. Commonly, this type of barcode can only hold a few dozen of characters. Furthermore, various size of barcode lines indicates different number or code of a particular products. And not all the 1D barcode consists of number below it as shown in the above figure. However, with a scanner device, the user will have the ability to retrieve the number or characters based on the pattern of the barcode itself.

In the meantime, for 2D barcode or sometimes called as matrix codes, are the latest and advance technology of the barcode. Currently, advertising businesses have widely used this kind of barcode technology due to its capability of holding a much larger information compare to the 1D barcode. According to D. Mike (2015), 2D barcodes use patterns of dots, squares, hexagons and others shapes as well in order to encode the data. He further add that, these 2D barcodes does not only hold characters information like the 1D barcode,

however these codes can also contain images, website addresses, voice, and any other types of binary data as well.

With the rapid growth of smartphone market these days, millions of user have the ability of scanning the 1D barcodes and 2D barcodes by using their camera smartphone as the barcode reader device. Many smartphones now have included the applications that can scan and interpret these barcodes for free, where they can download it from numerous source (Keith Evans, n.d). According to Alex Rode (2013), there was no right answer of selecting which barcode is better. However, it depends on the barcode types or the purpose of using the barcode and the application on it. For this project, the type of barcode that will be using is 1D barcode, where the target users will have the ability to verify each of the participant identity by scanning the 1D barcode at the back of their matric id as shown in below figure.

Figure 6: 1D barcode of participant matric ID

2.4 ANDROID MOBILE APPLICATION

Based on the history of technology, smartphone has been introduced into the market since 1993 (Muhammad Sarwar & Tariq Rahim, 2013). Since that, smartphones are the leading devices that taking the front end and playing an important role in today technologies. According to the articles that is written by Nicole (2010), any smartphone will require a third party operating system such as Android and iOS to be running. With this system, the device will has the ability to run the third party software called mobile apps, which it is a computer program that is designed for the people who have the mobile devices such as tablet and smartphone.

Generally, there are several types of mobile operating system. That includes Android, iOS, Blackberry, Windows and etc. However, based on the Gartner Analysis, Android has controls the overall market of smartphones, whereby they were holding the percentage of 43% compare to others in the market (Casaretto, 2011). The reason why Android control such percentage is because, the Android platform itself was able to be implement in many phones brand such as Samsung, Nexus, HTC and many more. Basically, Android was developed by a world known company called Google and it is primarily designed for the touchscreen devices like tablets or smartphones (Ahmed Daud, 2013). According to Constine (2013), there were many benefits of using Android Operating System. One of its great benefits is that is it the only open source software that offers developers to make their own application and easy to be customizable when compared to others.

CHAPTER 3: RESEARCH METHODOLOGY

For this research, there was two research methodology that have been applied. During the initial stage of this project, the quantitative method research has been carried out in order to get the response regarding people opinions, experiences, and behavior, where by the developer has distribute a list of questionnaire to the target users for data gathering. In order to get the precise information from the users, the question of the survey has been divided into several categories which are: personal background, user opinions as well as user awareness regarding the technology usage in sport industry. Further elaboration of the survey will be discussed in the next chapter of this report.

For the second part of the research methodology, a constructive research have been carried out within this project, where it is aim to provide a solutions to both of the practical and theoretical problems. These approach is considered as a procedure of producing an innovative constructions and it is expected to provide the solution through the design diagram such as use case diagram and activity diagram. Moreover, the graphical interface of the mobile application will be designed based on the planning requirements. And the details of these approach will be discuss further in the next section of this chapter.

3.1 PROJECT METHODOLOGY

In order to develop UTP Football League Verification Mobile Application, several research of project methodologies have been carried out in order to select the best methodology for this project so that the author will able to map out the project work plan. Based on the findings, Rapid Application Development or commonly known as RAD has been selected as the system methodology for this project. First of all, this method is chosen due to the project time constraints which the author was require to complete the project approximately about 6 months. For that reason, RAD process is chosen as it is the only software development process model which emphasizes on a short development cycle as

well as creating a high-quality products. Within a short period of time, the RAD process will enable the development team to create a fully functional system.

According to Bhardwaj (2013), RAD lifecycle emphasize on the rapid prototyping, where the development process could be done within the early stages of the process. Generally, this kind of methodology should be used when there is a high availability of the developers in term of project modelling. Apart from that, the phases included in RAD process can be categorized into 4 main areas which are: Requirements Planning, System Design, Development and Cutover.

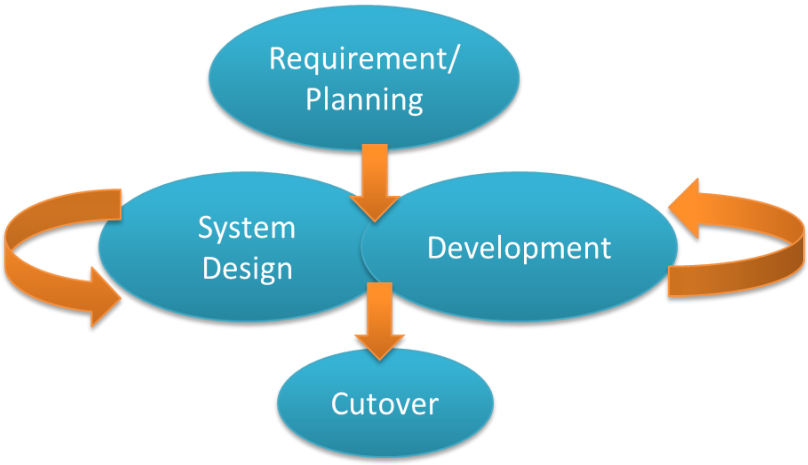

Figure 7: Rapid Application Development (RAD) process

3.2 PROJECT ACTIVITIES

3.2.1 REQUIREMENTS PLANNING

As mentioned before, during the requirement planning, the author himself have conducted several of research regarding issues that related to the verification of players in football sport industry. And the main deliverables of this research can been seen at Literature Review section, where the developer has list out the issues related to this topic. Moreover, the targeted users of this project is the organizer / committee members of UTP Football League. Therefore, a preliminary survey was conducted to gather the early stages of data requirements and obtain the users feedback regarding the project topic. And it was conducted due to the importance of user requirements before the development stages could be start.

3.2.2 SYSTEM DESIGN

Generally, the design of a system can been seen as the application research theory to application development. As stated by Wikipedia (2015), it can defined as a process to identify the system architectures, components, modules, interfaces and data for the application to satisfy the gathered requirements. In other words, it is how the application will operate in the future. Therefore, for deliverables of this part, the author have come out with several of design, including the system architecture, use case diagram, activity diagram and finally, the graphical interfaces of the application.

3.2.3 DEVELOPMENT

During this stage, the developer will begin to develop the prototype of the mobile application. Application prototyping can been seen as an incomplete version of the application that are being developed. In other words, it is the sample implementation of the real system. And the purpose of this stage is to get the valuable feedback from the users as well as the supervisor and thus make necessary changes for improvements in the future. From the suggestions, the developer will make require improvements as it is very important for the developer to meet the target users expectations as well as project objectives during the final stages of this project.

3.2.4 CUTOVER

Cutover is the final phase of Rapid Application Development (RAD) process. During this phase, there were several of activities are being performed, including data conversion, testing and user training. Furthermore, for this project, the author is require of submitting the finalize report to the FYP supervisor & coordinator as well as presenting the real application system to the examiners.

3.3 KEY MILESTONE

No	Deliverables/Activities	Schedule
1	Proposed Topic and Project Proposal Submission	Week 2 – 3
2	Project Approval	Week 4
3	Literature Review	Week 5 – 7
4	Data Requirements (Questionnaires)	Week 8
5	Process and System Modeling	Week 9
6	Develop User Interfaces	Week 10
7	Submission of Interim Report	Week 11
8	Proposal Defense	Week 13
9	Development of Mobile Application (Coding)	Week 15 - 21
10	Testing (System Testing, User Acceptance Testing)	Week 22 - 24
11	Pre-Sedex Presentation	Week 25
12	Technical Report Submission	Week 26
13	Final Dissertation Submission	Week 26 - 27
13	Viva	Week 28

Table 1: Project Milestone

3.4 GANTT CHART

	FYP1														FYP2														
Schedule (week)	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**
Planning phase																												
Problem Identification & Feasibility Study																												
Selection of Project Title																												
Project Approval																												
Initial Background Study																												
Literature Review																												
Data Gathering & Analysis Phase																												
Survey Distribution																												
Data Analysis																												
Design Phase																												
Modelling and Simulation of Business Process																												
Preliminary Interface Design																												
System Architecture																												
Design																												
Implementation Phase																												
System Development																												
System Testing																												
System Improvement																												
FYP Submission Requirements																												
Submission of Interim Report																												
Proposal Defense																												
Pre-Sedex Presentation																												
Technical Report Submission																												
Final Dissertation Submission																												
Viva																												

Table 2: Gantt Chart

CHAPTER 4: RESULT AND FINDINGS

4.1 DATA GATHERING AND ANALYSIS

During the initial stage of the project development, an online survey have been conducted in order to identify the existing problem that is faced by the participants and committee members of any sport events. Through the survey, the author himself was able to gather a valuable info for the preliminary analysis as well as captured the user feedbacks and opinions regarding the usage of technology in sport industry.

The online survey was designed through the use of Google Survey Documents and there were 12 question that have been included within the survey. Furthermore, as suggested by the supervisor, the survey was divided into several section, which are: section 1 (personal background of the respondent), section 2 (perception of the respondent) and last but not least, section 3 was focusing on the awareness of the respondent regarding the technology used in sport. As a result, there were total of 30 respondent, who have completed and submit their feedback on the distributed survey. The result of the survey can be find as below:

Question 1

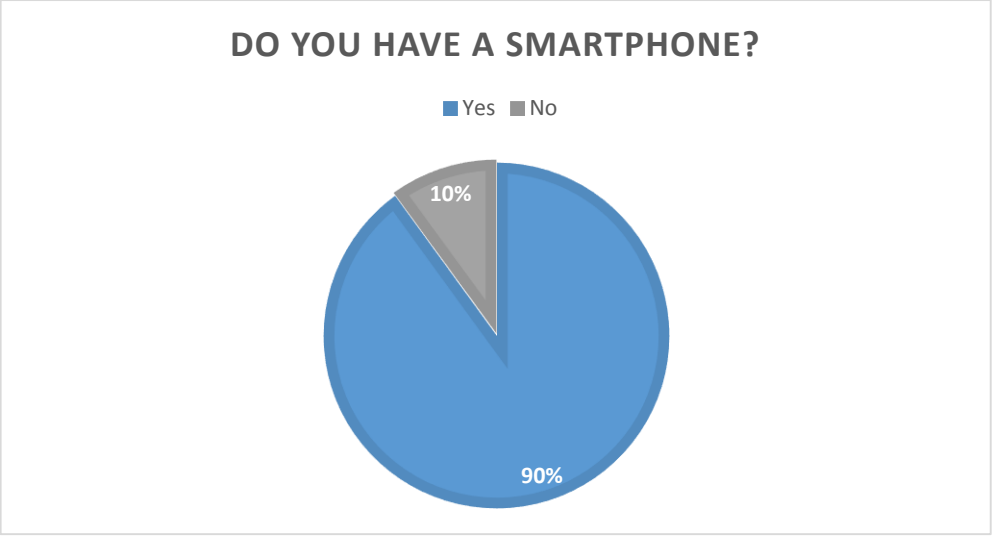

Figure 8: Result of Survey Question 1

Nowadays, there were a many brands and types of smartphone in the current market right now. Smartphone can be consider as part of human necessary in today's modern world. However, based on the finding of the first question, it shows that most of the respondents have their own smartphone, meanwhile there was one person do not own or using any smartphone.

Question 2

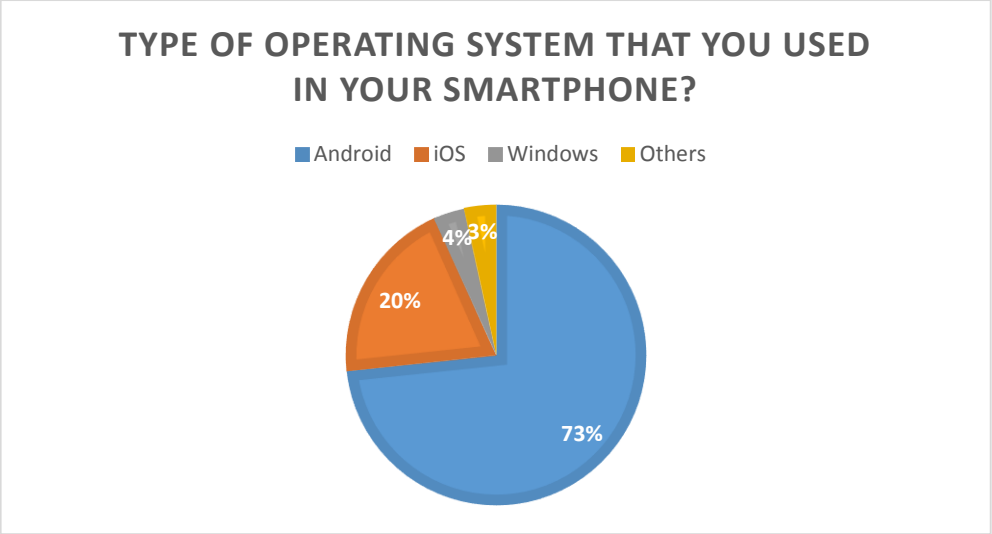

Figure 9: Result of Survey Question 2

This question was designed to identify what are the most mobile platform that are being used by the respondents. According to the result, it shows that the Android platform was the most platform that are being used, where it has a total of 21 respondent who used it. Meanwhile, for iOS operating system, there was 5 respondent who use it. And followed by windows and blackberry (others) platform, which there was 1 respondent who used both of the operating system within their smartphone.

Question 3

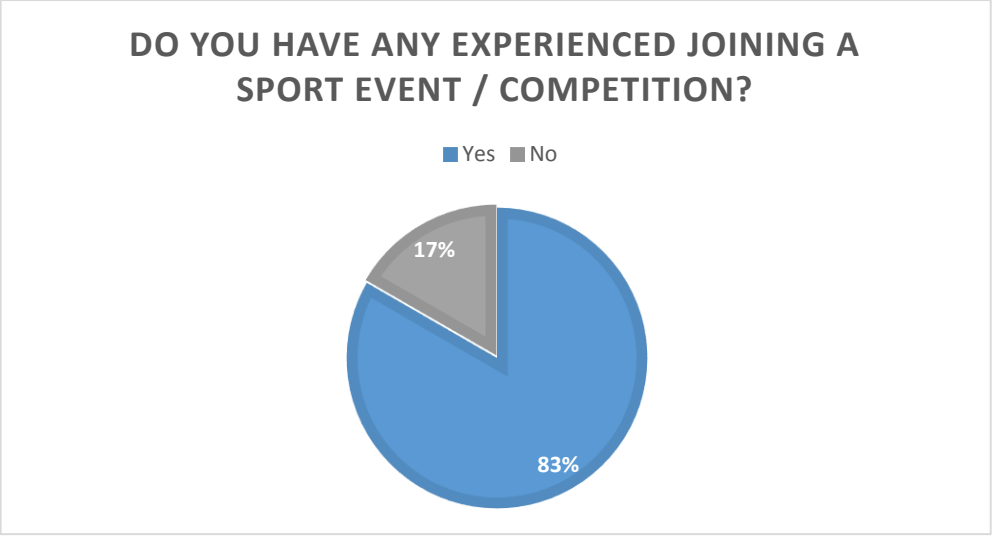

Figure 10: Result of Survey Question 3

For this question, there was 25 respondent who already have the experienced of joining the sport event or competition before. Meanwhile, the other 5 respondent does not have any experienced of joining any sport event before.

Question 4

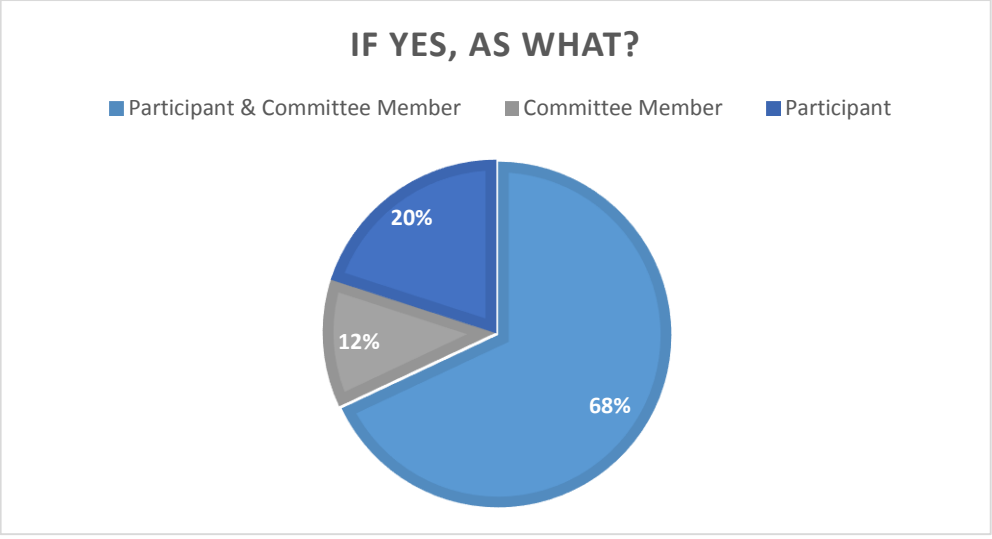

Figure 11: Result of Survey Question 4

For this question, it was related to the question 3, where it can only be answer if the respondents have the experienced of joining any sport event or competition before. Based on the result, there were 17 respondent have joining the sport event, both as a participant and committee member before. Meanwhile, the other 3 respondent have been joining the sport event as the committee member only. And the rest of the respondent (5 person), have the experienced of joining the sport competition only as a participant.

Question 5

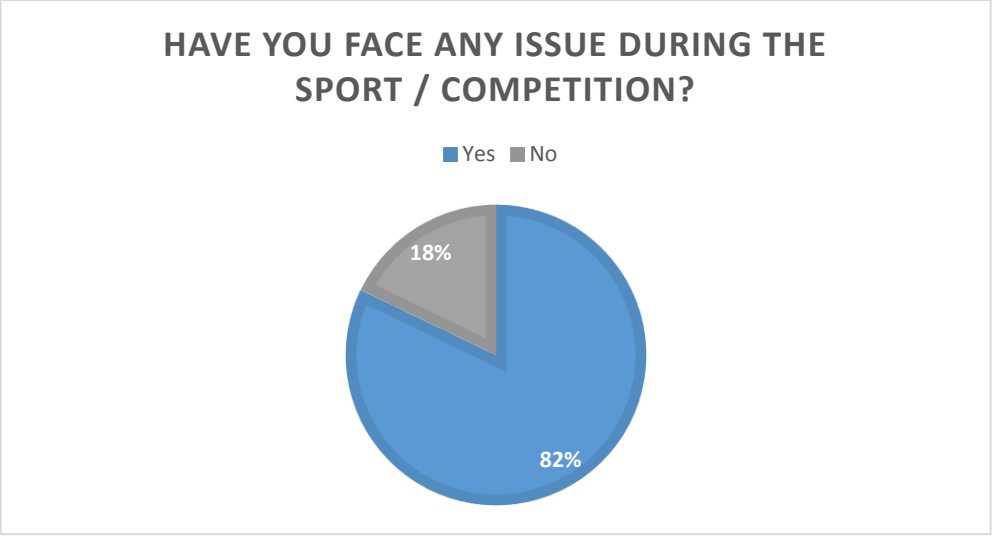

Figure 12: Result of Survey Question 5

In question 5, this question is intended to identify the number of respondent who have been facing any issue throughout the sport competition. And according to the outcome, it shows that there were 23 respondent who have the experienced of facing issues throughout the sport event.

Question 6

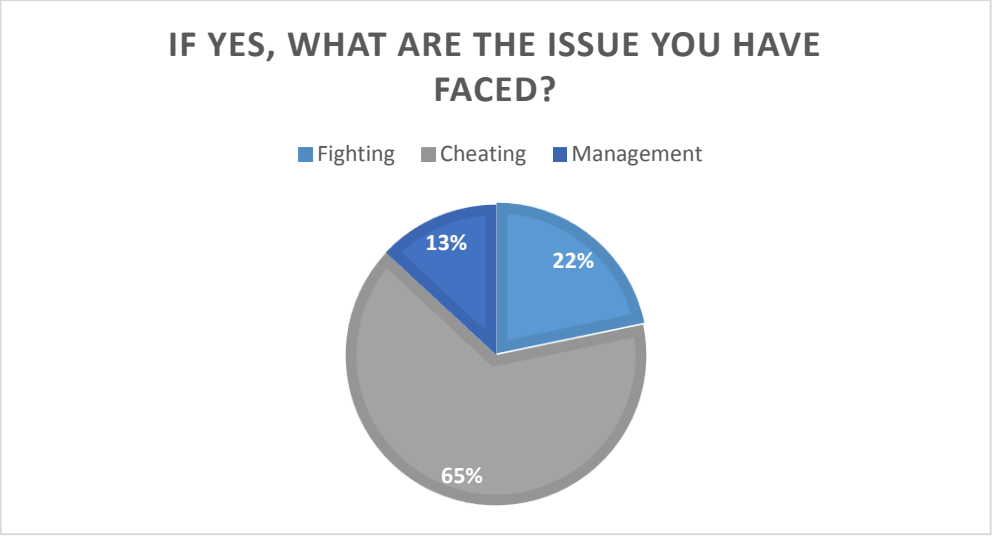

Figure 13: Result of Survey Question 6

Question 6 is designed to identify what are the types of the issue that have been facing by the respondents. According to the findings, it indicates that, 15 of the respondent have facing cheating issue, 5 person have facing fighting issue and the other 3 has the experienced of facing a management issue during the sport competition.

Question 7

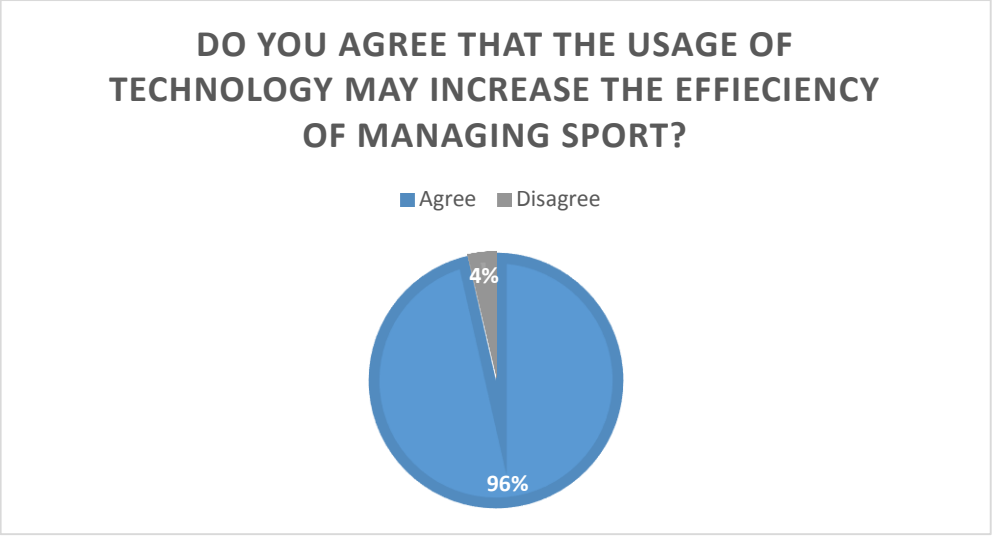

Figure 14: Result of Survey Question 7

Question 7 is to check whether the respondent are positively agree or disagree on the usage of technology may increase the efficiency of managing sport. Based on the answers, 27 of the respondent agree that the technology usage in sport may increase the sport management efficiency, meanwhile the other 3 respondent are strongly disagree.

Question 8

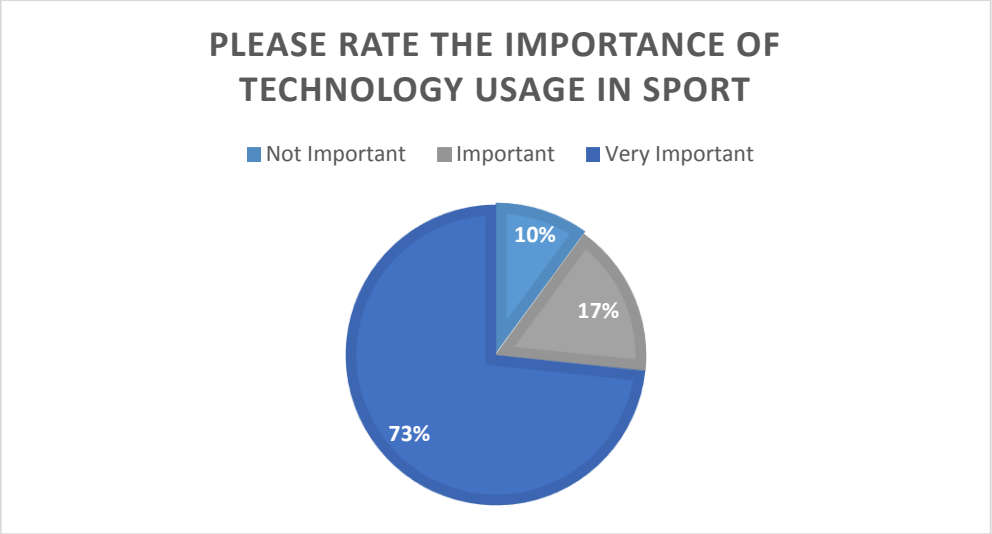

Figure 15: Result of Survey Question 8

Based on the result of question 8, there was 3 person have chosen "not important" regarding the importance of technology usage in sport. Meanwhile, the others have choose "Very Important" and "Important" to rate the importance of technology usage within sport.

Question 9

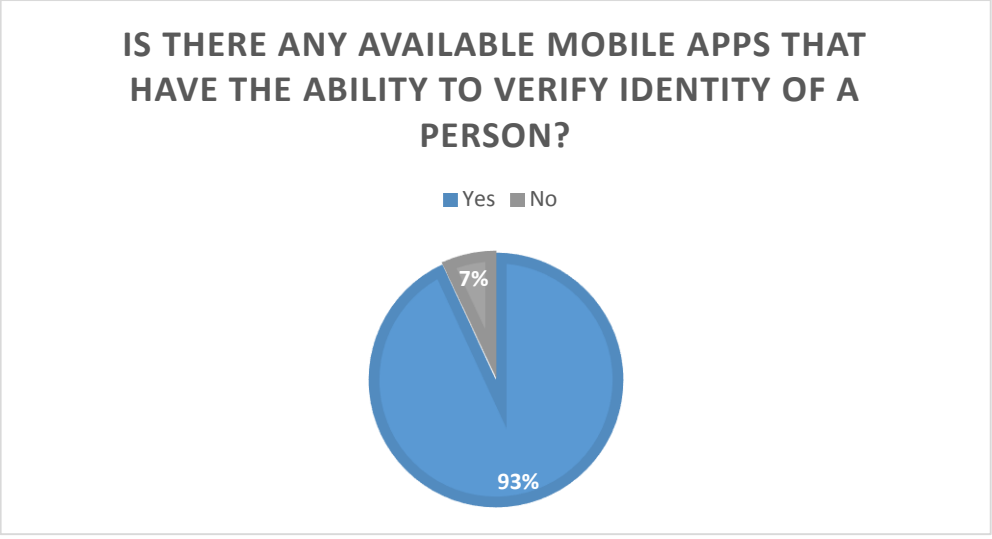

Figure 16: Result of Survey Question 9

Question 9 was relate to the respondent awareness, whether to check if there is any available mobile application that have the ability to identity the identity of a person. As a result, most of the respondents select “no” as their answer to for this question.

Question 10

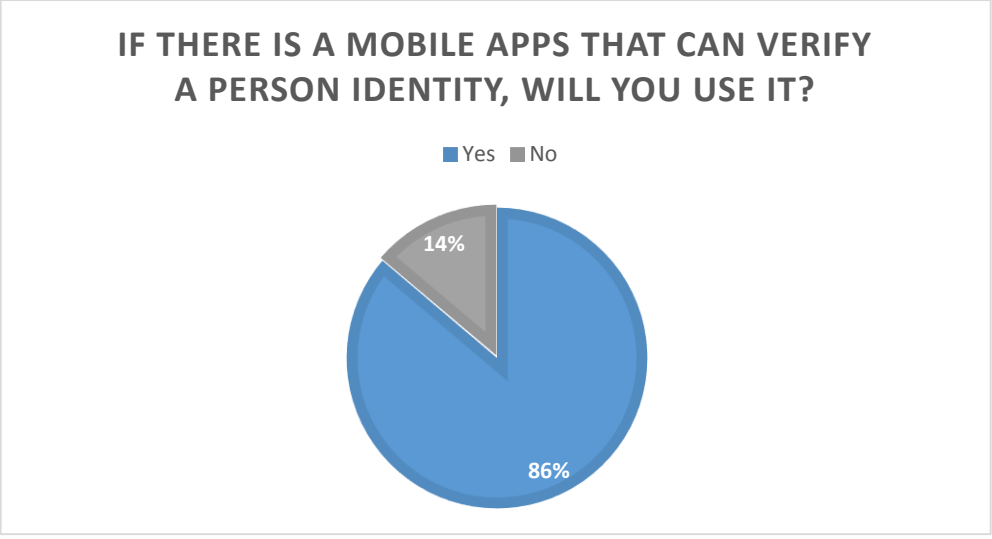

Figure 17: Result of Survey Question 10

In the above figure, the result illustrate that most of the respondents have agree to use the mobile application that have the ability to verify the identity of a person as it may give lots of advantage to the people who will be using it.

4.2 SYSTEM DESIGN

Upon the completion of data gathering and analysis, the developer is require to come out with several of system design in order to describe on how the application will be operating in the future. Therefore, in this part, several of system design have been designed, which includes the system architecture, use case diagram, activity diagram and follow by the system interface design of the mobile application.

4.2.1 SYSTEM ARCHITECTURE

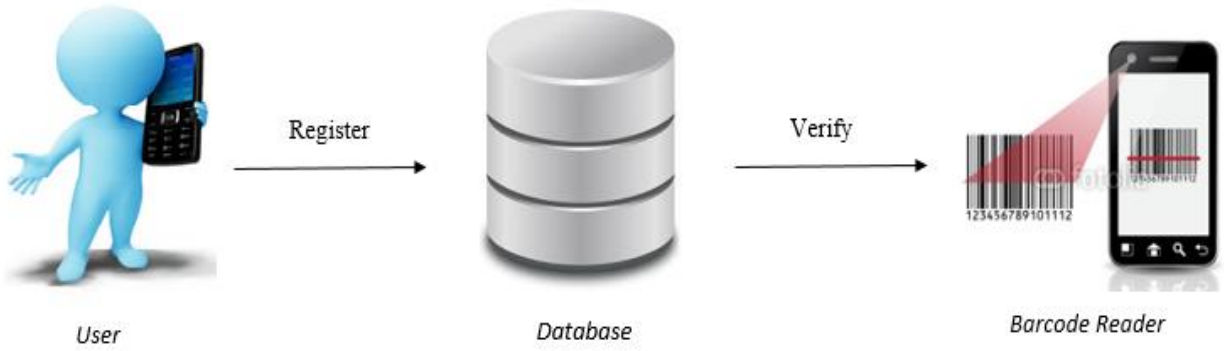

Figure 18: Project System Architecture

System architecture can be defined as a set of customer requirements and specifications, rules, and standards employed within the technical framework of the system, where the system developer follows in designing the system various components such as software, hardware and networks. Above figure shows the system architecture of this project. First of all, in order to install the UTP Football League Verification Mobile Application, the user are required to have a smartphone device with an Android operating system as the developed mobile application was built only for Android users. Other operating system than Android such as iOS and Windows, are not able to install the mobile application. Once installed, they can launch the mobile apps and it will direct them to the home layout of the application. From there, they will see the three main application features which are: Registered Players, Verify Player and Admin Login. Each of these features will have different of functionality. So, as shown in the above figure, the user are required to register

each of the participants first into the system database in order to use the mobile apps. Once registered, they will have the ability to verify all the player identity through the use of barcode technology by scanning the 1D barcode at the back of participant's matric id. Besides, once registered, they also will have the ability to view and manage of all the registered players as it will record and display all the player information which have been registered into the system database.

4.2.2 USE CASE DIAGRAM

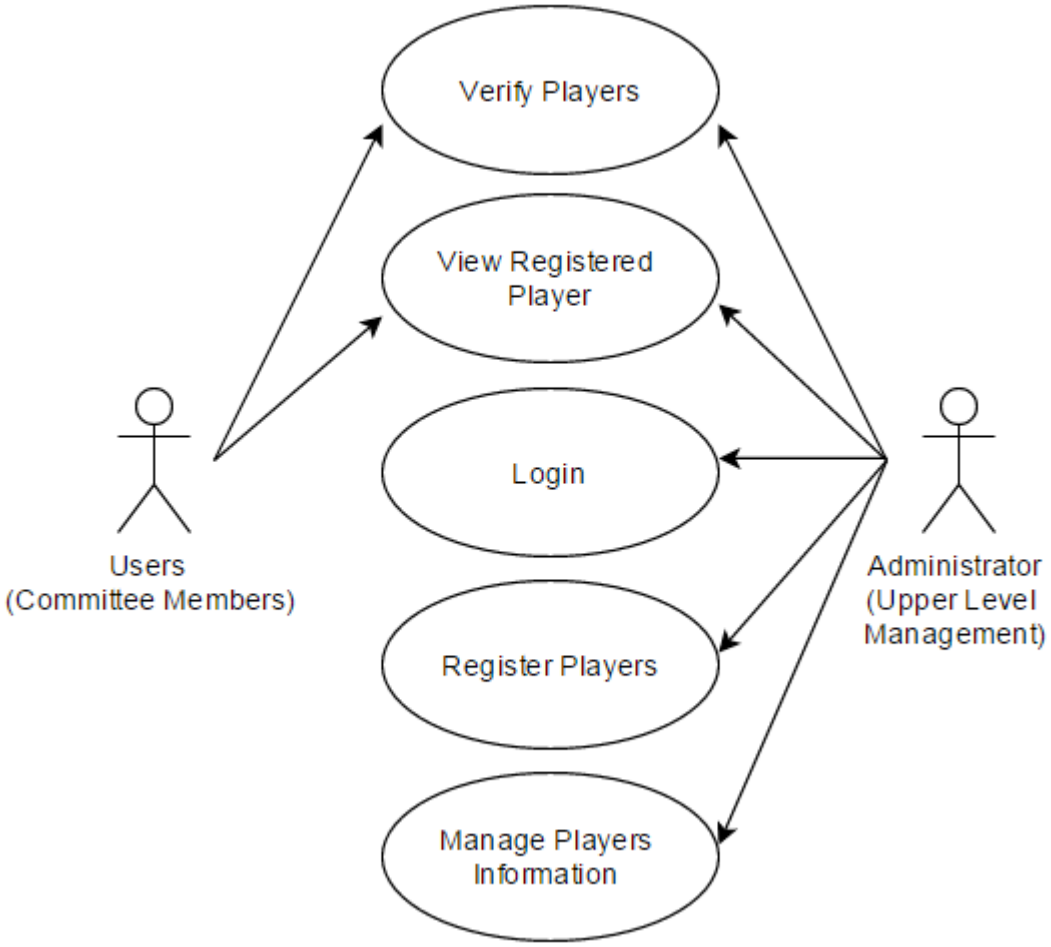

Figure 19: Use Case Diagram

Above figure shows the use case diagram of this project and in this diagram, there are 2 actors (target users) involved, which are the user (committee members) and administrator (higher authorities). For the committee members of UTP Football League, they will only

have the ability to view the list of registered players as well as to verify the players that have been registered. Meanwhile, to register a new players or to manage the list of registered players, the user will need to login with admin credential due to security purpose, which in this case it is designed for the upper level management or higher authorities of UTP Football League.

4.2.3 ACTIVITY DIAGRAM

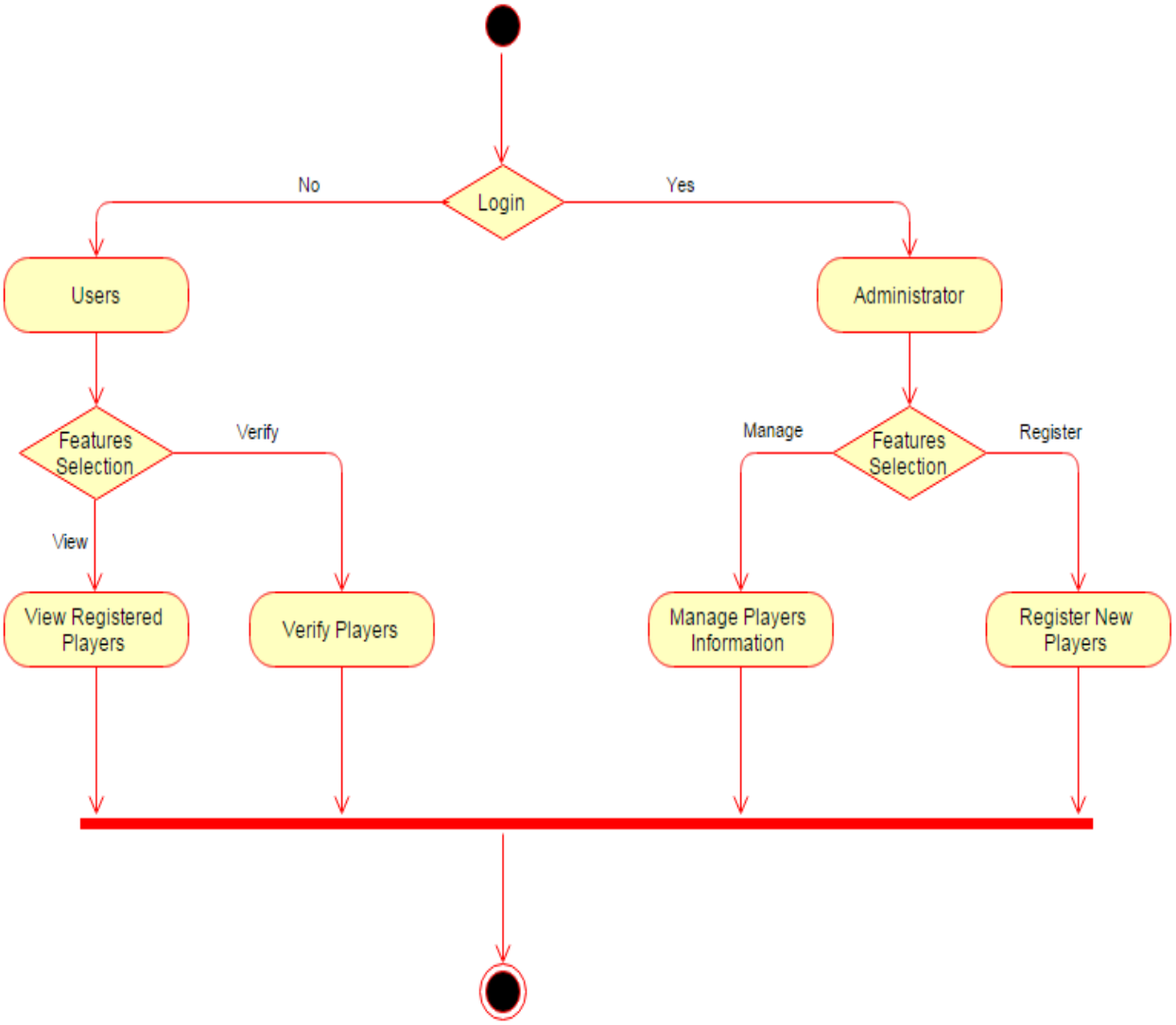

Figure 20: Activity Diagram of UTP Football League Verification Mobile Apps

Based on the activity diagram shown in figure 20, the target users (management of UTP Football League), will require to login as administrator in order to register the new players or to manage the list of the registered players. However, if there is no credential has been entered, the user can only verify the registered players by using the smartphone camera to scan the barcode of participant's matric id. Furthermore, without the admin login, they will have the ability to view the list of the all players within the system database for checking purpose.

4.2.4 SYSTEM INTERFACE DESIGN

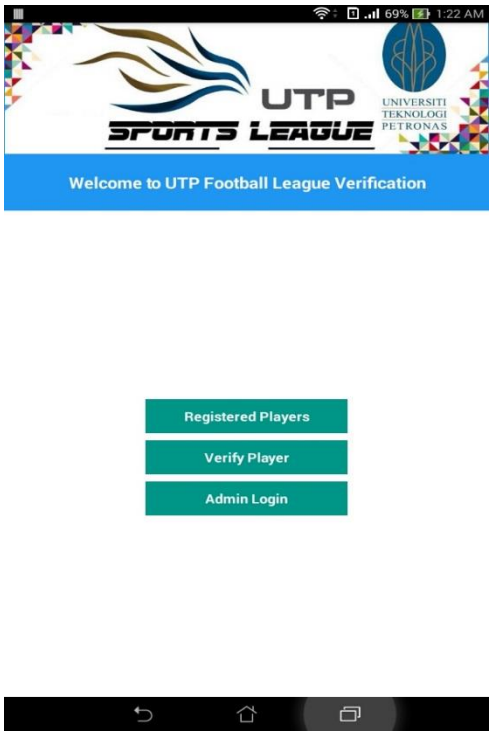

Figure 21: Application Homepage

Above figure shows the home page of the UTP Football League Verification Mobile Application, where it will have three main features, which are:

- Verify Players
- Registered Players
- Admin Login

“Admin Login” Function

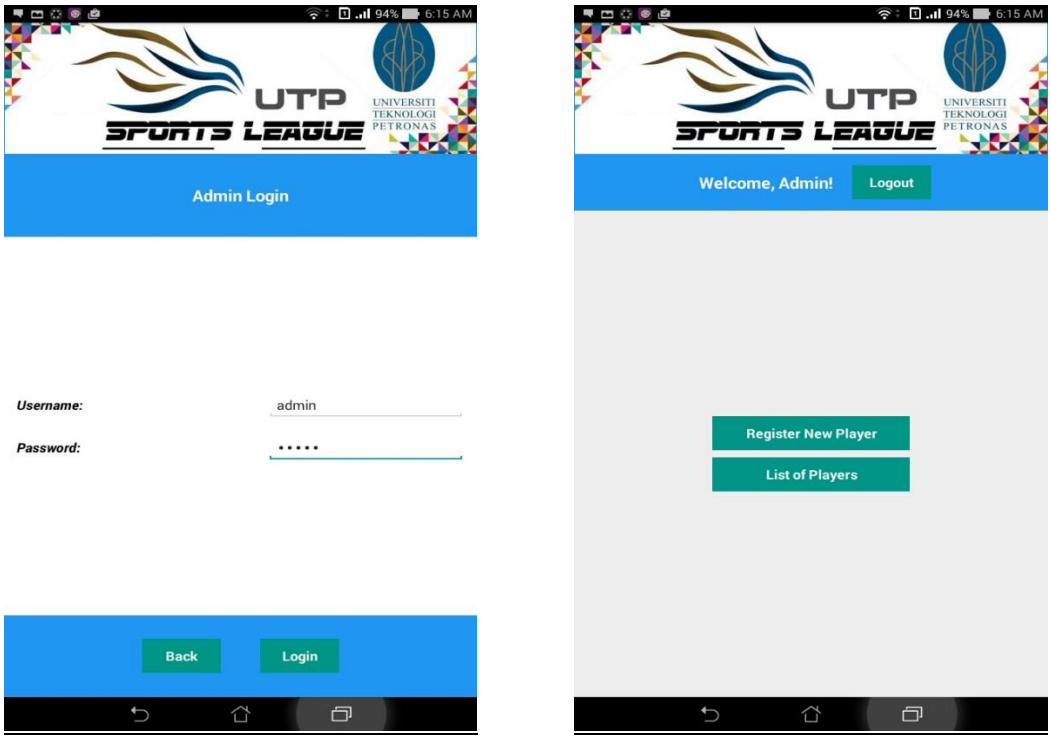

Figure 22: Admin Login Function

As mentioned before in this report, the user are required to register each of the participants first into the system database in order to use the mobile application. For security purpose, the new player registration can only be done by the higher authorities, which it will require the upper level management to login as administrator under this page. Once admin credential has been entered correctly, it will navigate them to the admin page as shown in the above figure, where they will have the ability to perform the new player registration as well as to manage the players list within the system database. In addition, if the admin credential has been entered wrongly or there was no credential has been entered, the alert message will pop up in order to inform the user.

“New Player Registration” Function

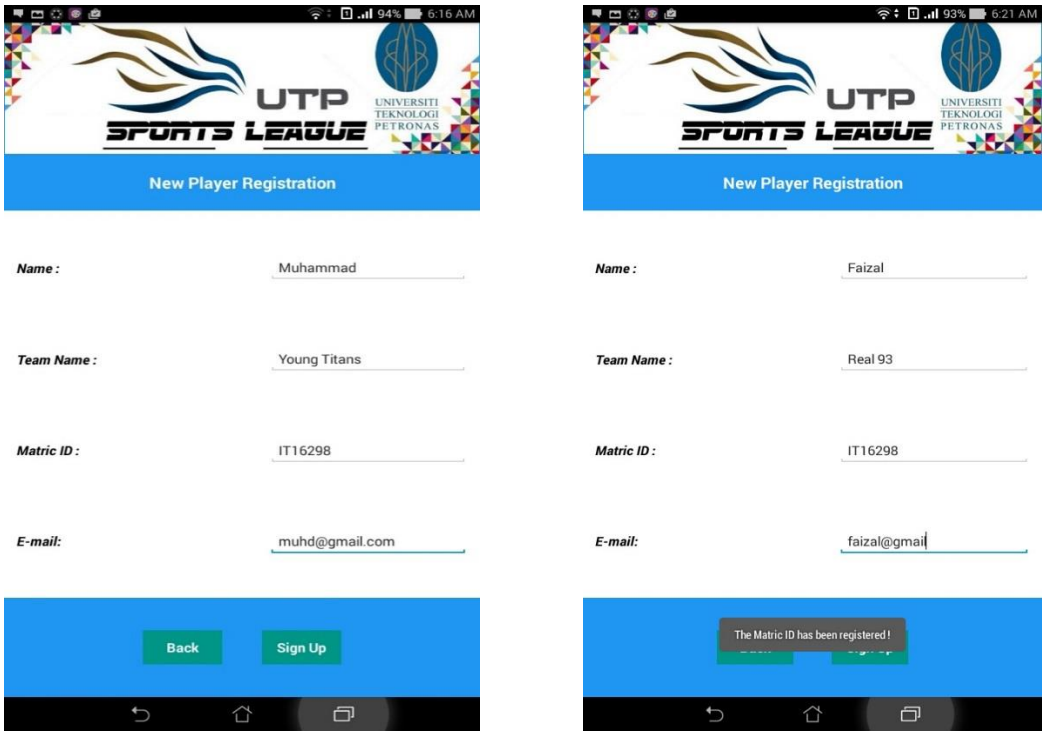

Figure 23: New Players Registration

In order to be able to verify the players, the higher level authorities will require to register all the participants through the “New Players Registration” section first. Based on the above figure, the user will need to manually key-in several of important information regarding the player background such as player name, team name, matric id, and email. Once complete, the user may click “Sign Up”, and it will stored all the given information into the system database for verification purpose. Apart from that, to avoid any duplicate info within the system database, the message alert “The Matric ID has been registered” will pop up whenever the same matric id of the player has been registered before.

“List of Players” Function

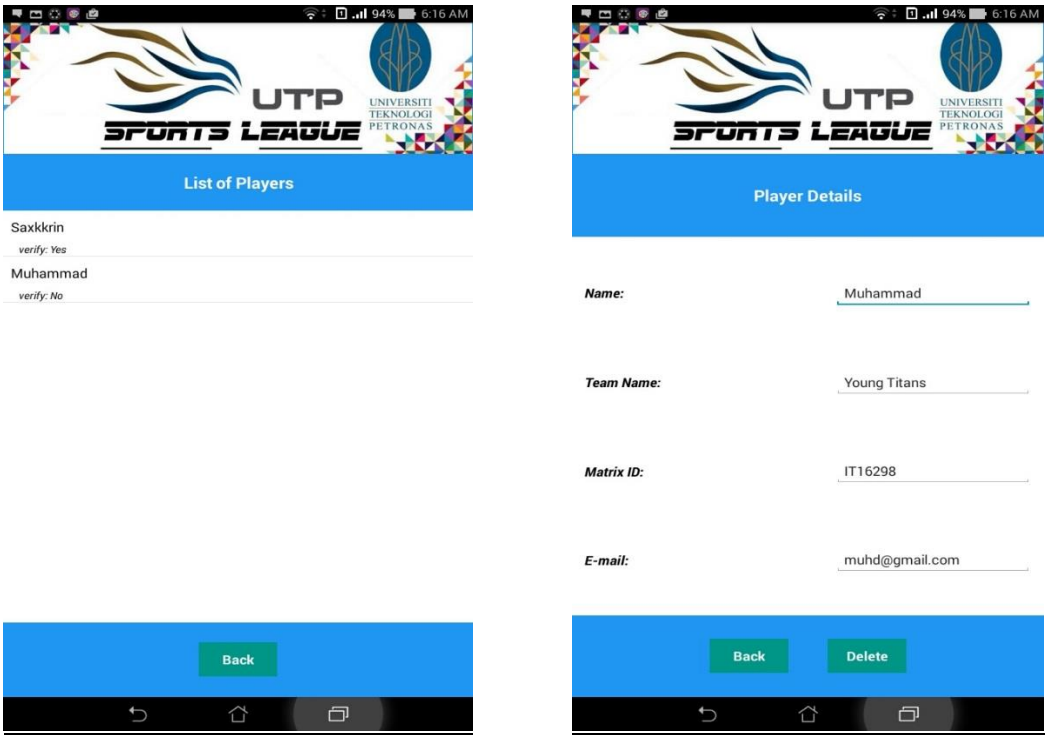

Figure 24: List of Players (Admin View)

The other sub-function for administrator is called “List of Players”, which it is a feature that can only be used once all the players that participate in this league have been registered into the system database. Generally, with this function, the administrator or upper level management may view or manage the list of the registered players once they login into the application. For instances, as shown in figure 24, the administrator may delete the player information from the system database by choosing the “Delete” button under this features.

“Verify Player” Function

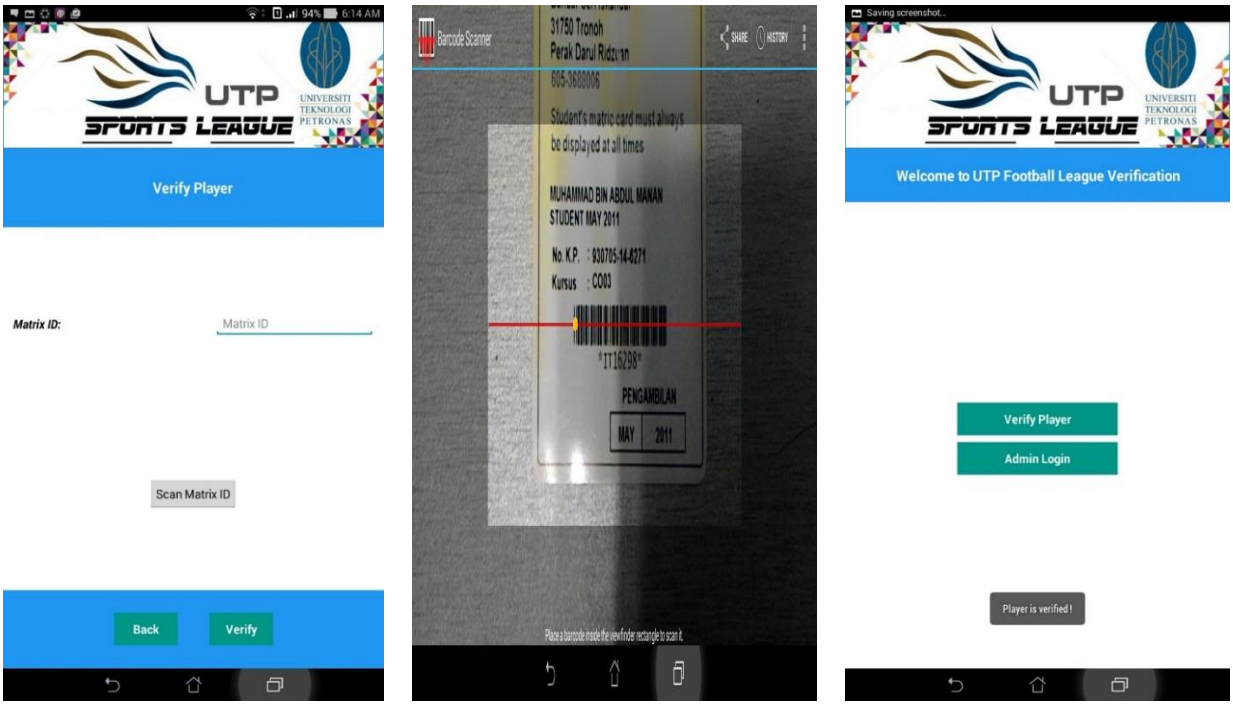

Figure 25: Verify a player

Once the players involve have been registered, the committee members of the tournament may choose a function called “Verify Player” under the home page to verify each of the players identity. Basically, in this part, there is no credential required and the process is quite simple and easy, where the users are only require to scan the barcode of players matric id before any match begin through the smartphone camera and the application will determine whether the player has been registered or not. If the verification is successful, the application will show “Player is verified” to indicate that the player have been registered before as shown in above figure. Meanwhile, if there is no player’s identity has been detected within the application, it will show a message such “The player is not registered” to indicate that the player was not the participant of UTP Football league and thus he is not allowed to play the any match during the whole tournament.

“Registered Player” Function

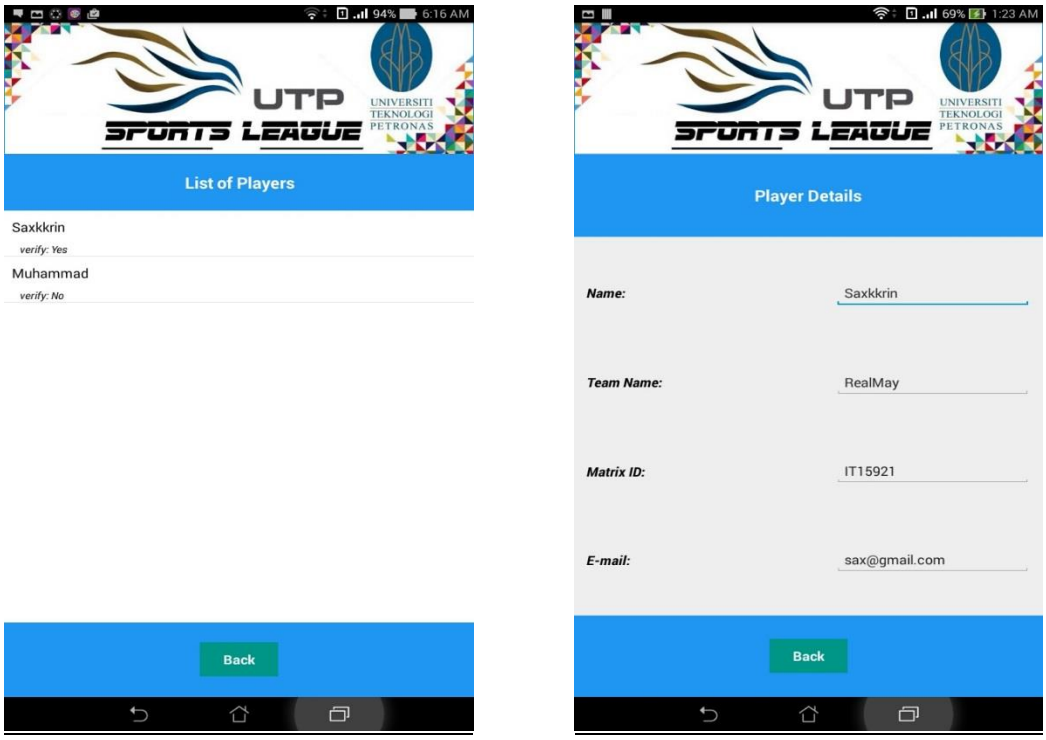

Figure 26: List of Registered Players

As shown in above figure, the “Registered Players” function has been designed for the committee members of UTP Football League, where in this function it will show a full list of player that have been registered into the system database. By this, they will have the ability to view the registered players for their checking purpose. However, as mentioned before, to manage or edit the list of registered players, the users will required to login with administrator credential under the “Admin Login” function.

4.3 TOOLS AND EQUIPMENT REQUIRED

a) Android Studio Software

- Android Studio is an integrated development environment (IDE) for developing a mobile application under android platform that is established by the Google Company. Android Studio is one of the most common software that are being used by developer nowadays in order to develop an android based mobile application as it is easy to be use and can be free downloaded from many sources in the internet. Therefore, the software was chosen in this project in order to develop the UTP Football League Verification Mobile Application.

b) Android Smartphone / Device

- In order to validate and test the developed system, an android device is required within this project. Therefore, the developer will be using his own android device called "ASUS Fonepad 7" tablet in order to perform the validation and testing of the developed application.

c) Android Operating System

- As mentioned before, an ASUS tablet will be using within this research in order to run the developed system. And it has already come up with an Android operating system version 4.4.2 "KitKat" running within the device.

d) Personal Laptop / CPU

- The developer has been using his personal laptop, "Acer Aspire 5750G" which running a Windows 7 operating system, in order to complete the whole project.

4.4 SYSTEM TESTING

The main purpose of the system testing is to check whether the functionalities of the system are working or not. This kind of testing is required to be implement in order to ensure that each component of functionalities are working before proceed with User Acceptance Testing (UAT). Therefore, for this project, the system testing is done solely by the developer himself and below table shows the testing result of each functions within the UTP Football League Verification Mobile Application.

Table 3: System Functional Testing of mobile application

Functions	Expected Outcome	Testing Frequency	Testing Result		Remark
			Success	Failure	
"Verify Player" button	Navigate to verification page	10	10	0	
"Scan Matric ID" button	Navigate to barcode scanning page	10	10	0	
Barcode Scanner Function	Captured the matric id of participants (1D Barcode)	10	8	2	Failure due to focus error in capturing the barcode
					Failure caused by the integrated barcode apps
"Verify" button	Verify players id that have been registered into the system database	10	10	0	
"Registered Players" button	Navigate to list of players that have been registered	10	10	0	
"Admin Login" button	Navigate to admin login page	10	10	0	
'Login" page	Navigate to admin page if credential has been entered correctly	10	9	1	Failure due to wrong credential

Alert (Login) – When there is no credential has been entered	Alert message will pop up	10	10	0	
Alert (Login) – When password entered is wrong	Alert message will pop up	10	10	0	
"New Player Registration" button	Navigate to registration page	10	10	0	
"Sign Up" button	Store the participants information into the system database	10	9	1	Failure due to coding error
"Back" button	Navigate back to admin page	10	10	0	
Notification (registration) – When successfully registered players information	Successful Notification will pop up	10	10	0	
Alert (registration) – When there is no information has been entered	Alert message will pop up	10	10	0	
Alert (registration) – When there is a duplicate matric ID has been entered	Alert message will pop up	10	10	0	
"List of Players" button	Navigate to list of players that have been registered	10	10	0	
"Delete" button	Delete the players information from the system database	10	10	0	
"Logout" button	Navigate to admin login page	10	10	0	

4.5 USER ACCEPTANCE TESTING (UAT)

User Acceptance Testing (UAT) can be said as a phase of software development in which the software itself is tested in the real world by the target users in order to ensure that the developed systems or mobile applications does actually meet the user requirements and expectations. Furthermore, it is one of the final and critical software project procedures that must occur before newly developed software can be rolled out to the users. Therefore, in this project, the User Acceptance Testing have been perform by the target users itself, which is the management of UTP Football League, in order to evaluate the developed mobile application before proceed to the system deployment phase. And there were three aspect that are being tested, which are:

- Ease of management process in handling the sport event
- Increase time management
- Functionality performance of the Mobile Application

17 users from the UTP Football League management have been selected to perform the user acceptance testing, which mainly are the students and staffs of Universiti Teknologi PETRONAS (UTP). Each of the user has been provided with UTP Football League Verification Mobile Application setup on the developer ASUS Fonepad 7 tablet in order to test the mobile application. Upon completing the UAT, the users are required to answer the questionnaire as shown in the **Appendix section.** And the results of the user acceptance testing are recorded as displayed in below figure.

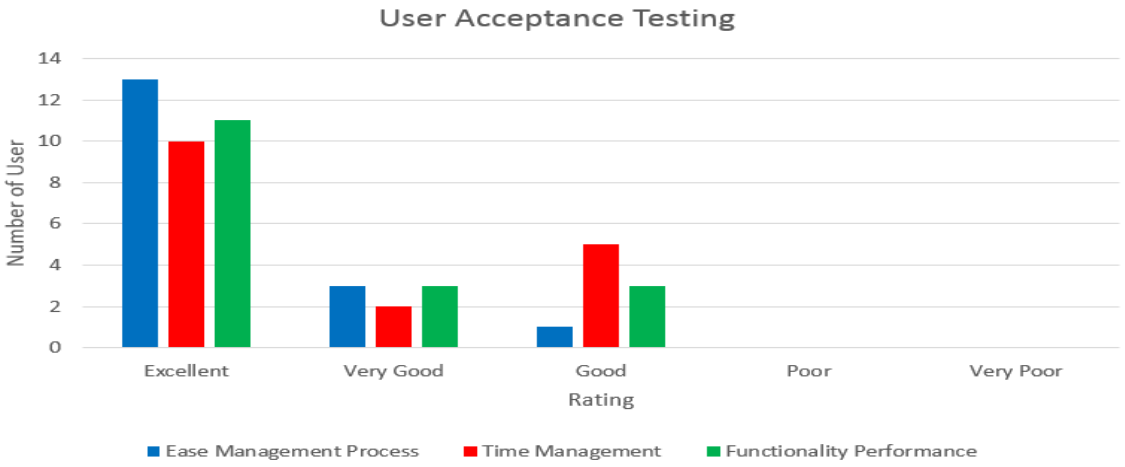

Figure 27: Results of User Acceptance Testing (UAT)

CHAPTER 5: CONCLUSION AND RECOMMENDATION

In conclusion, the UTP Football League Verification Mobile Application has been designed based on several of issues faced by the sport management in UTP Football League. And this system.is expected to provide the solution to the case issue and thus increase the efficiency of football management through the use of technologies such as mobile application and barcode scanner. Besides, as mentioned before in the project objectives, this application is also predictable to beneficial the target users to be able to increase their time management in handling the sport events by giving them the ability to store, update and verify each of the participants involved by using their smartphone. Last but not least, in general, this project also is expected to increase the image of football by reducing the number of scandals involving cheating in the future.

Other than that, as for the recommendation for this project, UTP Football League Verification Mobile Application can be further improve by several of additional features that may bring greater satisfaction to all the user especially the participant involved. For example, this may include the ability for the users to organize the match fixtures throughout the tournament as well as the ability for the viewers and participants to view all the match news and rules & regulation of the tournament. Apart from that, the future developer may also add value into the system application by focusing on expanding the mobile application platform into other available operating system platform such iOS, Blackberry and Windows in order to attract a greater number of user in the future.

Finally, in the future, the author also believes that this project can be extend to other field as well such as security. As this application was using the technology of barcode scanning in order to verify and identify the identity of UTP students involved. Therefore, for other field like security, this type of technology can be said as the most suitable technology to be used as it will give them the ability to verify the identity of a person by only using their smartphone and thus, no high expenses are required.

REFERENCES

[1] Chadwick, S. (2010). *Managing football an international perspective*. Amsterdam: Elsevier/Butterworth-Heinemann.

[2] D., M. (2015, January 28). *The Difference Between 1D (Linear) and 2D Barcode Scanning.* Retrieved February 14, 2015, from http://www.lowrysolutions.com/blogs/difference-1d-linear-2d-barcode-scanning/

[3] Sarwar, M., & Rahim Soomro, T. (2013, March 2). *Impact of Smartphone's on Society*. Retrieved February 27, 2015.

[4] Kendall, G., Knust, S., Ribeiro, C., & Urrutia, S. (2010). *Scheduling in sports: An annotated bibliography.* Computers & Operations Research, 37(1), 1-19.

[5] Stolen, T., Chamari, K., Castagna, C., & Wisloff, U. (2012, September 23). *Physiology of Soccer.* Retrieved February 18, 2015, from http://link.springer.com/article/10.2165/00007256-200535060-00004#page-1

[6] Ridzal Mahmud, M. (2014, May 2). *Kafa Kemukakan Rayuan*. Retrieved February 15, 2015, from http://www.sinarharian.com.my/mobile/edisi/kelantan/kafa-kemukakan-rayuan-1.276063

[7] Wallace, D. (2009). *The Role of Technology in Sport.* Retrieved February 25, 2015, from http://www.ulster.ac.uk/scienceinsociety/technologyinsport.html

[8] Matthews, D. (2011, February 16). *Jewish Soccer League in England Rocked By Identity Scandal*. Retrieved February 17, 2015, from http://www.ibtimes.com/jewish-soccer-league-england-rocked-identity-scandal-267831

[9] Casaretto, J. (2011, October 20). Smartphone Trends Show Android Dominance. Retrieved February 26, 2015, from http://siliconangle.com/blog/2011/10/20/smartphone-trends-show-android-dominance/

[10] Longman, J. (2012, June 2). *Stain of Scandal Again Taints Italian Soccer*. Retrieved February 18, 2015, from http://www.nytimes.com/2012/06/03/sports/soccer/stain-of-scandal-again-taints-italian-soccer.html

[11] Darangwa, N. (2012, September 30). *Goal-line Technology Would Harm Football*. Retrieved February 22, 2015, from http://www.theroar.com.au/2012/09/30/goal-line-technology-would-harm-football/

[12] Li, C., & Wang, Z. (n.d.). *Research on the Applications of Information Technology in Sport Management*. Retrieved February 20, 2015, from http://link.springer.com/chapter/10.1007/978-3-642-29087-9_37#page-1

[13] Gao, K. (2013, July 28). *Code Pool*. Retrieved February 18, 2015, from http://www.codepool.biz/how-to-implement-a-simple-barcode-scan-application-on-android.html

[14] Rohter, L. (2001, March 24). *Huge Soccer Scandal Taints National Obsession of Brazil.* Retrieved February 19, 2015, from http://www.nytimes.com/2001/03/24/world/huge-soccer-scandal-taints-national-obsession-of-brazil.html

[15] Williams, J. (2013, April 19). *The Case Against Goal-Line Technology*. Retrieved February 21, 2015, from http://goal.blogs.nytimes.com/2013/04/19/the-case-against-goal-line-technology/?_r=0

[16] Rode, A. (2013, February 11). *1D vs 2D barcodes - Panatrack.* Retrieved February 19, 2015, from http://www.panatrack.com/1d-vs-2d/

[17] Constine, J. (2013, January 4). *Facebook Mobile User Counts Revealed: 192M Android, 147M iPhone, 48M iPad, 56M Messenger*. Retrieved February 22, 2015, from http://www.techcrunch.com/2013/01/04/how-many-mobile-users-does-facebook-have/

[18] Rouse, M. (n.d.). *Fundamentals of Barcode.* Retrieved February 19, 2015, from http://searchmanufacturingerp.techtarget.com/definition/bar-code

[19] Daud, A. (n.d.). *Report on Android*. Retrieved February 17, 2015, from http://www.academia.edu/6169082/Report_on_Android

[20] Evans, K. (n.d.). *What Are the Benefits of Using Barcode Technology?* Retrieved February 17, 2015, from http://smallbusiness.chron.com/benefits-using-barcode-technology-58387.html

[21] Swartz, J. (2012). *Bar code scanning.* Retrieved February 20, 2015, from http://www.scholarpedia.org/article/Bar_code_scanning

[22] Muhammad Zain, A. (n.d.). *FAS Terima Surat Kelmarin: Hamidin*. Retrieved February 15, 2015, from http://www2.hmetro.com.my/myMetro/articles/FASterimasuratkelmarin_Hamidin/Article/article_print

[23] Lynch, M. (2003, October 17). *Impostor Costs City a Packet*. Retrieved February 17, 2015, from http://www.theage.com.au/articles/2003/10/16/1065917549256.html?from=storyrhs

[24] *THE IMPACT OF TECHNOLOGY IN SPORT.* (2013, March 15). Retrieved February 25, 2015, from https://technologyinsport.wordpress.com/page/2/

[25] Bhardwaj, M. (2013, December 5). *A beginners guide to various Software development methodologie.* Retrieved February 26, 2015, from http://manasbhardwaj.net/a-beginners-guide-to-various-software-development-methodologies/

APPENDIX

Survey Questionnaire

UTP Football League Verification Mobile Apps

Salam / Good day.

I'm currently working on my FYP project to develop a mobile apps regarding the players verification in UTP Sport League. And the main objective of this project is to develop a mobile apps that will help the management to verify each of the participants identity through the technology of fingerprint recognition. For that reason, this survey was conducted to gather some valuable info for my preliminary analysis as well as obtaining your feedback on the usage of technologies in managing sport league.

Your feedback would be really appreciated. Thanks.

* Required

Section A

This section will gather participant personal background information

Do you have a smartphone? *

- ○ Yes
- ○ No

Type of operating system that you used in your smartphone? *

- ○ Android
- ○ iOS
- ○ Windows
- ○ Other: _____

Do you have any experienced joining a sport event or competition? *

- ○ Yes
- ○ No

If yes, as what?

- ☐ Participant
- ☐ Committee Member
- ☐ Sponsor
- ☐ Other: _____

Have you face any issue during the sport event / competition?

- ○ Yes
- ○ No

If yes, what are the issue you have faced?

- ○ Fighting
- ○ Cheating
- ○ Management
- ○ Other:

Section 2

This section will gather the participant perspective about the usage of technology in sport

Do you agree that the usage of technology may increase the efficiency of managing sport? *

- ○ Agree
- ○ Disagree

Please rate the importance of technology usage in sport *

- ○ Not Important
- ○ Slightly Important
- ○ Quite Important
- ○ Important
- ○ Very Important

Based on the previous answer, can you please state the reason of choosing it (Why)? *

Section 3

This section is to gather the participant awareness regarding the use of technology in sport

Is there any available mobile apps that have the ability to verify identity of a person? *

- Yes
- No

If yes, please state the name of the mobile apps

If there is a mobile apps that can verify a person identity, will you use it? *

- Yes
- No

Questionnaire of User Acceptance Testing

User Acceptance Testing (UAT)

How much do you rate that the application will help to ease management process in handling the sport event?

- Excellent
- Very Good
- Good
- Poor
- Very Poor

How much do you rate that the application will help to increase the time management in handling sport event?

- Excellent
- Very Good
- Good
- Poor
- Very Poor

How much do you rate the functionality performance of the mobile application?

- Excellent
- Very Good
- Good
- Poor
- Very Poor