DEVELOPING AN EVENT CORNER AND KNOWLEDGE SHARING SERVICES MOBILE APPLICATION FOR UTAR COMMUNITY

By
Teh Tze Yang

A REPORT
SUBMITTED TO
Universiti Tunku Abdul Rahman
in partial fulfillment of the requirements
for the degree of
BACHELOR OF COMPUTER SCIENCE (HONS)
Faculty of Information and Communication Technology
(Perak Campus)

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DECLARATION OF ORIGINALITY

I declare that this report entitled “DEVELOPING AN EVENT CORNER AND KNOWLEDGE SHARING SERVICES MOBILE APPLICATION FOR UTAR COMMUNITY” is my own work except as cited in the references. The report has not been accepted for any degree and is not being submitted concurrently in candidature for any degree or other award.

Signature : __________________________

Name : __________________________

Date : __________________________
Abstract

This project is a mobile application project for academic purpose. It will develop a knowledge sharing system which includes forum functions and event corner for the UTAR community app. To start with this project, several existing systems which provide forum or question & answer functions such as Quora, StackOverflow and Reddit are being reviewed to have an overall idea on the design or function specification of the UTAR community app. To manage the large amount of digital contents and knowledge, a content management system and knowledge sharing system is needed to implement. There are several software and API that are required to develop this project. The main language to develop this Android application is Java, XML and the main IDE will be using Android Studio 3.0. To develop the mobile application efficiently and orderly, Agile development methodology will be implemented to provide a development plan for this project. The output of this project will be an Android mobile application named “UTAR community app” which provides forum function and event corner.
Table of Contents

Chapter 1: Introduction .............................................................................................................. 1
   1.1 Introduction .................................................................................................................. 1
   1.2 Problem Statement ....................................................................................................... 1
   1.3 Project Scope ............................................................................................................... 3
   1.4 Project Objective ......................................................................................................... 4
   1.5 Impact, Signification and Contribution ...................................................................... 4

Chapter 2: Literature Review ..................................................................................................... 5
   2.1 Introduction .................................................................................................................. 6
   2.2 Existing system ........................................................................................................... 6
      2.2.1 Quora ................................................................................................................... 6
      2.2.2 Reddit .................................................................................................................. 9
      2.2.3 Stack Overflow .................................................................................................... 11
      2.2.4 Summary ............................................................................................................ 12
   2.3 Critical Remarks ......................................................................................................... 13
   2.4 Backend Options ...................................................................................................... 14
      2.4.1 Example of Custom Server ............................................................................... 14
      2.4.2 Example of Cloud Sever ................................................................................... 14

Chapter 3: System Design ......................................................................................................... 15
   3.1 Assumptions and Dependencies .............................................................................. 15
      3.1.1 Related Software and Hardware ................................................................. 15
      3.1.2 End User Characteristics ................................................................................ 15
   3.2 General Constraints .................................................................................................. 15
   3.3 Goals and Guidelines ............................................................................................... 16
   3.4 Development Methods ............................................................................................. 16
   3.5 Architecture ............................................................................................................... 17
      3.5.1 System Architecture .......................................................................................... 17
      3.5.2 Subsystem Architecture .................................................................................... 18
         3.5.2.1 Login .......................................................................................................... 20
         3.5.2.2 Register ...................................................................................................... 20
         3.5.2.3 PublishPost ................................................................................................. 21
         3.5.2.4 ViewPost .................................................................................................. 21
         3.5.2.5 LikePost .................................................................................................... 22
         3.5.2.6 FavouritePost ........................................................................................... 22
3.5.2.7 PostComment ................................................................. 23
3.5.2.8 LikeComment ............................................................... 23
3.6 Sequence Diagram ................................................................ 24
  3.6.1 Login ........................................................................ 24
  3.6.2 Register ..................................................................... 24
  3.6.3 PublishPost ................................................................. 25
  3.6.4 ViewPost ..................................................................... 25
  3.6.5 LikePost ....................................................................... 26
  3.6.6 FavouritePost ............................................................. 26
  3.6.7 PostComment .............................................................. 27
  3.6.8 LikeComment ............................................................... 27
3.7 Use Case Diagram ............................................................... 28
3.8 Flow and Activity Diagram of Events ...................................... 29

Chapter 4: Proposed Method/Approach ....................................... 34
  4.1 Design Specification .......................................................... 34
  4.2 Advantages of Agile Development Methodology .................... 34
  4.3 Disadvantage of Agile Development Methodology .................. 35
  4.4 Agile Development lifecycle .................................................. 36
    4.4.1 Planning phase ............................................................ 36
    4.4.2 Analysis phase ............................................................ 36
    4.4.3 Design phase ............................................................. 36
    4.4.4 Implementation phase .................................................. 37
    4.4.5 Technologies involved ................................................... 38
  4.5 Implementation Issues and Challenges ..................................... 44

Chapter 5: System Implementation and Testing ............................. 45
  5.1 Register Screen ............................................................... 45
    5.1.1 Screen description ....................................................... 45
    5.1.2 Test methods ............................................................ 46
  5.2 Login Screen ................................................................. 47
    5.2.1 Screen description ....................................................... 47
    5.2.2 Test methods ............................................................ 48
  5.3 Home Screen ............................................................... 49
    5.3.1 Screen description ....................................................... 49
    5.3.2 Test methods ............................................................ 50
List of Tables

Table 2. 1 shows the comparison and differences among reviewed systems .......... 12

Table 3. 1 shows the end user characteristics of UTAR Community Application...... 15
Table 3. 2 shows the components of the subsystem of UTAR Comunity Application
.......................................................................................................................... 19

Table 5. 1 shows the test methods for Register screen ........................................... 46
Table 5. 2 shows the test methods for Login Screen.............................................. 48
Table 5. 3 shows the test methods for Home Screen............................................. 50
Table 5. 4 shows the test methods for Publish Post Screen................................. 52
Table 5. 5 shows the test methods for Details Screen .......................................... 55
Table 5. 6 shows the test methods for Search Screen .......................................... 57
Table 5. 7 shows the test methods for Event Screen .......................................... 59
Table 5. 8 shows the test methods for Profile Screen........................................ 61
Table 5. 9 shows the test methods for History and Favourite Screen ............... 63
List of figures

Figure 2. 1 shows the feed of Quora ................................................................. 7
Figure 2. 2 shows the answer thread of a question ........................................ 8
Figure 2. 3 shows the popular feed of Reddit ............................................... 9
Figure 2. 4 shows the topics of subreddits .................................................... 10
Figure 2. 5 shows the questions feed of StackOverflow .............................. 11

Figure 3. 1 shows the architecture diagram of UTAR Community Application ... 17
Figure 3. 2 shows the component diagram of Login ...................................... 20
Figure 3. 3 shows the component diagram of Register ................................. 20
Figure 3. 4 shows the component diagram of Publish Post ............................ 21
Figure 3. 5 shows the component diagram of View Post .............................. 21
Figure 3. 6 shows the component diagram of Like Post ................................ 22
Figure 3. 7 shows the component diagram of Favourite Post ......................... 22
Figure 3. 8 shows the component diagram of Post Comment ....................... 23
Figure 3. 9 shows the component diagram of Like Comment ....................... 23
Figure 3. 10 shows the sequence diagram of Login ...................................... 24
Figure 3. 11 shows the sequence diagram of Register .................................... 24
Figure 3. 12 shows the sequence diagram of Publish Post ............................ 25
Figure 3. 13 shows the sequence diagram of View Post .............................. 25
Figure 3. 14 shows the sequence diagram of Like Post ................................ 26
Figure 3. 15 shows the sequence diagram of Favourite Post ......................... 26
Figure 3. 16 shows the sequence diagram of Post Comment ....................... 27
Figure 3. 17 shows the sequence diagram of Like Comment ....................... 27
Figure 3. 18 shows the use case diagram of Utar Community Application ....... 28
Figure 3. 19 shows the activity diagram of register ..................................... 29
Figure 3. 20 shows the activity diagram of publish post event ....................... 30
Figure 3. 21 shows the activity diagram of post comment ............................ 31
Figure 3. 22 shows the activity diagram of read post .................................... 32
Figure 3. 23 shows the activity diagram of check event ............................... 33

Figure 4. 1 shows the iterative lifecycle of Agile Development Methodology .... 35
Figure 4. 2 shows another example of the iteration lifecycle of Agile development 35
Figure 4. 3 shows the Gantt chart part 1 ......................................................... 39
Figure 4. 4 shows the Gantt chart part 2 ......................................................... 40
Figure 4. 5 shows the Gantt chart part 3 ......................................................... 41
Figure 4. 6 shows the Gantt chart part 4 ......................................................... 42
Figure 4. 7 shows the Gantt chart part 5 ......................................................... 43

Figure 5. 1 shows the screenshot of Register Screen ...................................... 45
Figure 5. 2 shows the screenshot of Login Screen .......................................... 47
Figure 5. 3 shows the screenshot of Home Screen ......................................... 49
Figure 5. 4 shows the screenshot of Publish Post Screen .............................. 51
Figure 5. 5 shows the screenshot of Details Screen ....................................... 53
Figure 5. 6 shows the screenshot of Search Screen ....................................... 56
Figure 5. 7 shows the screenshot of Event Screen

Figure 5. 8 shows the screenshot of Profile Screen

Figure 5. 9 shows the History and Favourite Screen
CHAPTER 1: Introduction

1.1 Introduction

This project is to develop a knowledge sharing system with forum function and event corner services for a mobile application which acts as a platform for UTAR student to hold discussion on interested topic and publish news and update on events. The application is named as UTAR community apps.

1.2 Problem statement

UTAR has no history in developing such application or system which allow students to discuss regarding academic topics or knowledges that they found interested in. Although there was a web application named “WBLE” which claim as a Web-Based Learning Environment created, it is merely used as a platform for lecturers to publish and update their education materials. WBLE is built by using Moodle which is an Open Source platform to provide education solution.

UTAR has implemented Moodle as a course management system (CMS) – a free Open source software package designed to help lecturers create effective online teaching in a private environment. However, WBLE is built with tedious functions which does not provides the functionality for students to interact with each other. Students can use WBLE to download latest learning materials, check the upcoming events such as date of tests and due date of assignments, upload softcopy of assignment, and check results of their course works that have been uploaded by their lecturers.

WBLE does provides a forum function which liaise with students’ and lecturers’ email but this forum function works more like an email based function because the lecturers only utilise it to make announcement and the post published is also sent as an email to students’ UTAR email. Besides that, WBLE discriminated the courses and subjects registered by students. It limits the opportunity of interaction for students across the different subjects and courses.

Therefore, students require a broader platform or application that allows them to make discussion and share knowledge among others from different courses. This application would be a place to gain and share knowledge which connects UTAR students in a meaningful way. Students can publish questions and contribute their useful insight and
knowledge by answering the questions. The application shall separate the questions asked by using tags or category to make the discussion more specific. This application shall also include lecturers as users and facilitators which can provide more accurate answers and clarified students’ question with their knowledge and experiences in their own professions.

Besides that, the application will include an event corner as a platform for students and lecturers to publish updates and notifications on upcoming events. The existing method for students to publicize their events is through sharing posts on a Facebook page known as “UTAR Kampar”. However, it is an unofficial and inefficient method to publicize because fake or inaccurate news can be published by people with bad intention. The application will authorise the rights to committee of the event to publish event information to UTAR students. More than that, notification system will assist in reminding students on the time and information regarding the event that they subscribed.
1.3 Project Scope

In this project, we implement a content management system to create a mobile application which acts as a platform for community of UTAR students to interact with each other. The users of this application are required to login with their UTAR student ID or staff ID. The application will provide function such as forum discussion and event corner in the application. The forum works like a Question and Answer function to allow discussion among UTAR students and lecturers. Users can post questions or answer other users’ questions. Users can upvote the answer that is most accurate or downvote inappropriate answer. The answer with the most upvotes will be pinned on top of other answers. Users can also suggest edit to the existing answer to modify and improvise it. The topics menu will classify different questions according to their topics for easier navigation. Besides that, the application provides an additional functionality which is the event corner. The organiser of events can publish their events to the event corner. The users of the application can make transaction such as buy ticket, contact the organiser, or turn on notification for the event that they are participating.
Chapter 1: Project Background

1.4 Project Objectives

1) To develop an application to create an interactive learning environment among UTAR community and allow students to exchange knowledge. It can build your online community by providing a place for your community to congregate, collaborate, discuss and share their ideas (Apricot, 2017).

Sub-objectives:
- Allow users to log in with their student ID or staff ID
- Create Q & A functions to allow students ask questions and provide their answers
- Allow users to upvote the answers which are accurate and appropriate
- Allow users to downvote the answers which are inaccurate
- Classify all questions according to the relevant topics

2) To become the main platform for event organisers to publicise their events.

Sub-objectives:
- Create function which allow organisers to post their event information
- Allow users to contact the organisers for booking of tickets
- Allow users to turn on notification to the event which they are participating

1.5 Impact, Signification and Contribution

This project can create a community where UTAR students can be more interactive and promptly in sharing knowledges. This consequence can catalyse a healthy competitive environment and improve the overall literacy standard of UTAR. More than that, an online discussion forum will encourage students to think critically and will prepare more time for students to formulate their responses and opinions since the application is always online (Cavanaugh, 2001). Besides that, the transaction of events can be managed more efficiently through the application compare to Facebook page. The UTAR community is developing as an expandable asset which has the potential to evolve into the mainstream application among UTAR students that provides diversified functions and conveniences to UTAR Students.
CHAPTER 2: Literature Review

2.1 Introduction

To handle the large amount of knowledge and content shared in the forum, Content Management System (CMS) and Knowledge Management System (KMS) are required to be implemented in the application. Content Management System is a system for information delivery systems, including web based systems, that organizes the content of the information separately from the appearance of the presented information. The pages of the information are organized into documents and borders (Baxter & Vogt, 2002). Content management system often apply to support the creation and modifications of digital contents. It is proven to be very useful for collaborative environment such as online forum. On the other hand, knowledge management system provides manipulation on the knowledge acquired within an organization. There are four broad types of Knowledge Management System initiatives which are creating knowledge repositories, improving knowledge access, enhancing knowledge environment, and managing knowledge as an asset (Davenport & Prusak, 1998). The features of content management system are very diversified. The UTAR community app will work on features such as Web-based publishing, format management, history editing, indexing, search and retrieval.

Although there are several collaborative environments which support knowledge sharing and web content discussion for educational purposes such as Quora, Ask.com, StackOverflow etc available in the form of web application and mobile application, an exclusive UTAR community app which supports similar functions as mentioned above is still recommended to be develop. The UTAR community app is reckoned to be available exclusively for UTAR students and lecturers only. The application is forum based which allow users to have interactive discussion and knowledge sharing. To improve the overall intellectual and literacy level of UTAR students, online forum is proposed to catalyse the process of knowledge sharing among students and lecturers. Students can post a question and answer other students’ questions. This interactive process can also improve students’ proactiveness in learning new knowledge that they are interested in or seek clarifications on academic topics. The involvement of lecturers
can expand the lecture and tutorial periods into almost every time whenever students browse and search for existing topics that have been discussed before.

Assessing source of information from social media and online forums such as Quora, Reddit or any other collaboration environment has become a norm for students. However, the difference in education level and age is becoming a gap which separates and causing communication issues on those platforms. Therefore, the UTAR community app can resolve the issue because the discussions are limited to students and lecturers. To create a content-based application, participation of users is a constant challenge. The 1% rule stated that only 1 out of 100 users on the internet creates content while the remaining 99 people only lurks. This implies that 99% of the users only view the forum without posting or contributing any contents or knowledges. Variants such as 1-9-90 rule state that in a collaborative website such as Quora, 90% of the participants of a community only view the content, 9% of the participants edit content, and 1% of the participants actively create new contents (Meier, 2015). Credit services or reward action is needed to encourage more users to post or share contents to form a more interactive community on the forum.

2.2 Existing system:

2.2.1 Quora

One of the most popular system which acts as a platform for collaborative discussion among user is Quora. Quora is a question-and-answer website where users can post questions to be answer by its community of users. Quora released an official iPhone app on September 29, 2011 and then released an official Android app on September 5, 2012 (refer to Figure 2.1 for the Home feed of Quora). As one of the fastest growing knowledge sharing application, Quora required users to register with their real names to maintain the credibility of the answers and questions posted by their users. However, there’s no verification of name during the registration process. The community can report any false name users if they encountered any bad experiences. There is a large collection of topics in Quora which allow users to follow. Quora will display questions regarding topics that users followed on their news feed. Besides being an application for users to seek information, Quora also recommend questions for users to answer. Community of users can upvote or downvote, suggest edits and share the answers as
shown in Figure 2.2. The answer with the most upvotes will be pinned on top of other answers. Quora also allow users to follow other users where they find is knowledgeable and with good credibility (Quora 2017).

Figure 2.1 shows the feed of Quora
As a programmer, do you keep notes, especially codes?

Sean Leary, Owns several books, has read most of them
Answered 6h ago

Many of the devs I work with keep lab notes. My memory being worse than most, I take a lot of notes during my workday. At my current job, according to wc, that comes to about .5m lines so far:

516263 2588087 21270038 total

That is a lot to search through, so I

Figure 2. 2 shows the answer thread of a question
2.2.2 Reddit

On the other hand, Reddit is an American web content rating, social news aggregation and discussion website. Reddit’s member can submit content according to the category of the topics. The content entries are categorized by topics of interests called “Subreddit”. Reddit released their official application called “Reddit: The Official App” on Google play store and iOS App Store in April 2016 (refer to Figure 2.3 for the popular feed on the Reddit app). The application is well known for its huge and diverse user community with broad range of contents as shown in Figure 2.4. The Reddit works similar to threaded forum as the users can reply their message to an existing comment. The replies are indented and placed below the post they reference to. Like Quora, the posts with the highest upvote will be feature at the front page of home feed or at the top of the relevant subreddit (Reddit 2017).

![Popular Feed of Reddit](image)

*Figure 2.3 shows the popular feed of Reddit*
Chapter 2: Literature Review

Figure 2. 4 shows the topics of subreddits
Chapter 2: Literature Review

2.2.3 Stack Overflow

Another existing system which provides discussion platform is Stack Overflow. Stack Overflow features questions and answers on a wide range of topics in computer programming (refer to Figure 2.5 for the layout of the home feed of Stack Overflow). Stack Overflow also allow users to upvote or downvote, edit question and answers like Quora and Reddit. However, Stack Overflow only provides opportunity for discussion regarding computer programming (StackOverflow 2017).

![Questions feed of StackOverflow](image)

*Figure 2.5 shows the questions feed of StackOverflow*
2.2.4 Summary

Among all the existing system discussed above, to maintain the credibility and value of the questions and answers on the site, they have all implemented the function to upvote, downvote and suggest edit for changes in answer to improvise the solution. This is somehow a great idea to maintain the accuracy and credibility of the answers. However, as mentioned in the description of similar system above, they all have their flaws (refer to Table 2.1) to emerge as the most suitable discussion forum or Q&A application for UTAR students. Therefore, it is recommended to create an application which has the functions as the existing systems and remove the unwanted or non-suitable features.

<table>
<thead>
<tr>
<th>Features/Functions</th>
<th>Quora</th>
<th>Reddit</th>
<th>Stack Overflow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upvote/Downvote feature</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Menu of categorized topics</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Profile Credential</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

**Good features**

- Adds credibility and security to user accounts by editing profile credential
- Provides variety of topics for discussion
- Make the comments indented
- Provides “Developer Jobs” corner which recruit for developers

**Drawbacks**

- No menu of topics for users to select
- Lack of surveillance of obscene and sensitive contents
- Narrow range of topics

*Table 2.1 shows the comparison and differences among reviewed systems*
Chapter 2: Literature Review

2.3 Critical Remarks

There are several limitations for the existing system which we'll be looking to overcome in this project. For example, Quora does not categorise the posts where users can only search for the questions instead of browsing through a menu with classified topics’ questions. There’s several complains on the feed algorithm of Quora. For example, the feed of Quora tends to show contents which is related to the topics that the users upvoted recently. This creates a cycle as the users starts to upvote more contents related to the specific topics and the feed is getting more monochromatic as the users are only shown with contents in that topic. Besides that, the search function in Quora is difficult in sorting for the users as the quality signals are obscured to view by the users. Therefore, the users are required to sort through unwanted stuff to find the desired answers (Tran, 2014).

Besides that, there’s a concern on the credibility and security issue on reddit. Users’ identity is not verified with their real name and due to wide and broad range of subreddits which include obscene contents, it may not be the best collaborative environment for UTAR students to look for information and knowledge. StackOverflow isn’t a suitable discussion forum for UTAR student due to its narrow range of contents.

To address the issue on navigation like Quora, it is recommended to include a menu bar which classified the topics according to relevant category. The feed is required to be improvised to show diversified topics of contents which has been followed by the users. More than that, the search function is required to provide quality information in the search result to allow users to minimise the sorting process. Besides that, to maintain the credibility of questions and answers in the forum, users are required to log in with their student ID or staff ID. If there’s any sabotage or malevolence discussions or replies, it is easier to track and penalise the users as their account is tie with their student ID or staff ID.
2.4 Backend options

A backend is required in this mobile application to store information and manage content. There are two types of popular backend options which are cloud servers and custom server (Ryan Daws, 2013). Custom server is a server which can be set up and host it on our own. It is relatively more complicated and scalable compare to cloud because custom server needs to be monitor and maintain over time. Custom server also provides more control as user can set up according to their requirement of the systems. On the other hand, cloud server is a more popular option nowadays due to its ability to cater general requirements. Cloud server is also more flexible and requires no hardware specification as it resides in a virtual environment and accessible remotely from cloud service provider (Technopedia, 2017).

2.4.1 Example of Custom Server

An example of custom server would be Java Servlet. Java Servlets are a key component of server-side Java development. A servlet is a pluggable, small extension to a server that enhances the server’s functionality. Servlets allow developers to extend and customize any Java-enabled web or application-server with a hitherto unknown degree of portability, flexibility and ease (Jason Hunter, 2001). Servlets are basically classes that can respond to common network request – HTTP request.

2.4.2 Examples of Cloud Server

Google firebase is an example of cloud server. Firebase provides mobile backend services using Google Cloud Platform. Firebase provides services such as cloud authentication, cloud messaging which is a cross-platform for notifications for Android and iOS, real-time database etc. (Google, n.d.)
Chapter 3: System Design

Chapter 3.0 System Design

3.1 Assumptions and Dependencies

The assumptions and dependencies of UTAR Community App are as follows:

3.1.1 Related Software and Hardware

UTAR Community App is a mobile application which only runs on an Android mobile device.

3.1.2 End User Characteristics

There is only one main role targeted by UTAR Community App, which is the user. The following table (Table 1.0) shows the expected level of knowledge for the role.

<table>
<thead>
<tr>
<th>Role</th>
<th>Description</th>
<th>Required Knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>User</td>
<td>General individual who uses the UTAR Community App</td>
<td>Basic knowledge on using mobile device and application. Users also required to know how to create an account, login and possess knowledge if they wish to provide comments on questions post by others.</td>
</tr>
</tbody>
</table>

*Table 3.1 shows the end user characteristics of UTAR Community Application*

3.2 General Constraints

UTAR Community App is built as an Android mobile application and can only runs on Mobile Device which is using Android OS. UTAR Community App can only perform most of its functions while having an active connection with the Apache Tomcat Server.
3.3 Goals and Guidelines

The major goal of the UTAR Community App is to provide a platform to make discussion and share knowledge which connects UTAR students in a meaningful way. Students can publish questions and contribute their useful insight and knowledge by answering the questions. The application shall separate the questions asked by using tags or category to make the discussion more specific. Besides that, the application will include an event corner as a platform for students and lecturers to publish updates and notifications on upcoming events.

3.4 Development Methods

The Object-Oriented Analysis and Design (OOAD) was identified as the most desirable approach and therefore adopted for the system design. The process method is as follow:

1. Analyzing requirement
2. UML design (Use Case Diagram)
3. Analyzing the classes diagram, sequence diagram and state charts
4. Designing the class diagram, sequence diagram and state charts
5. Detailed design and implementation
6. Testing
7. Maintenance
3.5 Architecture

3.5.1 System Architecture

The architecture used for UTAR Community App consists of two layers of classes. The “top-level classes” are the frontend of the mobile application where the “lower-level classes” are the backend of the mobile application. Both classes are integrated to be run as an application. The backend of UTAR Community App consists of servers, web services and databases. The frontend of UTAR Community App consists of functions and methods which provide GUI to the users and allow users to access functions. The functions accessed in the frontend will be connected to the server in the backend and calls the web service API which will process transactions by accessing the database. The backend of the system will return objects to the frontend according to the requests made. For examples, users can fill up the form in registration screen in the frontend of the systems. When users click “Register”, the application will connect to the server and make HTTPRequest which will create new row in the “Users” table in the database.

Figure 3.1 shows the architecture diagram of UTAR Community Application
3.5.2 Subsystem Architecture

This section illustrates the components within each subsystem of UTAR Community App using component diagrams.

The subsystems of UTAR Community App are listed in the table below (Table 2.0), along with their tasks:

<table>
<thead>
<tr>
<th>Component</th>
<th>Tasks</th>
</tr>
</thead>
</table>
| Apache Tomcat Server | - Allow connections to be made from frontend of the application to access the web service.  
                        - Acts as a medium to make HTTPRequest and send response back to frontend. |
| HTTP Web Service     | - Process the HTTPRequest made by the frontend.                       
                        - Makes connection for transaction on database according to request made from frontend. |
| MySQL Database       | - Receive transactions from Web Service to update/create/delete the database.  
                        - Return result of queries to the frontend. |
| Login                | - Component which provides the function to authenticate users and log users into the application. |
| Register             | - Component which allows users to create new account to access the application. |
| PublishPost          | - Component which allows users to post new questions or discussion topics according to category of topics. |
| ViewPost             | - Allows users to view the posts published in the application.          
                        - Allows users to select category of posts to view. |
### Table 3: 2 shows the components of the subsystem of UTAR Community Application

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LikePost</td>
<td>Allows users to like the post which they find interesting or useful. The number of likes of that post will be display in the details page of the post.</td>
</tr>
<tr>
<td>FavouritePost</td>
<td>Allows users to favourite the post which they wish to save to their favourite list. Users can then view the posts which are added to their favourite lists to keep an eye on the comment section.</td>
</tr>
<tr>
<td>PostComment</td>
<td>Allows users to post their comments/ feedback on a post.</td>
</tr>
<tr>
<td>LikeComment</td>
<td>Allows users to like the comments which they think is relevant or helpful on the discussion. The number of likes on a comment will be display in the comment header.</td>
</tr>
</tbody>
</table>
## 3.5.2.1 Login

![Component Diagram for Login]

*Figure 3.2 shows the component diagram of Login*

## 3.5.2.2 Register

![Component Diagram for Register]

*Figure 3.3 shows the component diagram of Register*
3.5.2.3 PublishPost

Figure 3.4 shows the component diagram of Publish Post

3.5.2.4 ViewPost

Figure 3.5 shows the component diagram of View Post


Chapter 3: System Design

3.5.2.5 LikePost

Figure 3.6 shows the component diagram of Like Post

3.5.2.6 FavouritePost

Figure 3.7 shows the component diagram of Favourite Post
Chapter 3: System Design

3.5.2.7 PostComment

Figure 3. 8 shows the component diagram of Post Comment

3.5.2.8 LikeComment

Figure 3. 9 shows the component diagram of Like Comment
Chapter 3: System Design

3.6 Sequence Diagram

3.6.1 Login

Figure 3.10 shows the sequence diagram of Login

3.6.2 Register

Figure 3.11 shows the sequence diagram of Register
Chapter 3: System Design

3.6.3 PublishPost

Figure 3. 12 shows the sequence diagram of Publish Post

3.6.4 ViewPost

Figure 3. 13 shows the sequence diagram of View Post
Chapter 3: System Design

3.6.5 LikePost

Figure 3. 14 shows the sequence diagram of Like Post

3.6.6 FavouritePost

Figure 3. 15 shows the sequence diagram of Favourite Post
Chapter 3: System Design

### 3.6.7 PostComment

![Sequence Diagram](image-url)

*Figure 3. 16 shows the sequence diagram of Post Comment*

### 3.6.8 LikeComment

![Sequence Diagram](image-url)

*Figure 3. 17 shows the sequence diagram of Like Comment*
3.7 Use Case Diagram

Figure 3. 18 shows the use case diagram of Utar Community Application
3.7.1 Flow and Activity Diagram of Events

1. Register
   i. User creates new account by using Google Account.
   ii. User fills in username, email number and phone number to register.
   iii. System updates the user information.
   iv. System stores the user information.
   v. User can access the forum and event corner now.

Alternatives

- (i) If existing user, jump to step (iii)

![Activity Diagram of Register]

*Figure 3. 19 shows the activity diagram of register*
Chapter 3: System Design

2. Publish new post
   i. User logs in to existing account
   ii. User clicks on the publish new post button
   iii. User types in the title of the post
   iv. User types in the description of the post
   v. User uploads attachments of pictures or documents
   vi. User selects the category of the topic
   vii. User publishes the post

Alternatives

- (v) If user does not have any attachments, jump to step (vi)

Figure 3.20 shows the activity diagram of publish post event
Chapter 3: System Design

3. Post comment
   i. User clicks into the post
   ii. User clicks on the reply button in the other users’ comment
   iii. User writes down the comments
   iv. User clicks on the post button

Alternatives

- (ii) If user does not want to reply to other user’s comment, he/she can click on the comment button at the bottom of that post page

Figure 3.21 shows the activity diagram of post comment
Chapter 3: System Design

4. Read post
   
   i. User selects the category of topic
   ii. User selects the post that he/she wishes to read
   iii. User clicks the upvote button at the comment which is accurate and credible

Alternatives

- (iii) If user thinks that the comment is inaccurate and false, he/she can click on the downvote button

*Figure 3. 22 shows the activity diagram of read post*
5. Check Event
   i. User clicks on the event at the bottom navigation tab
   ii. User selects the event he/she is interested in
   iii. User clicks on the phone number of event organizer which is highlighted in the details of the event
   iv. User clicks call at the dialler of mobile phone to contact the organizer

Alternatives

- (iv) If user does not want to call the organizer, he/she can click the favourite icon to bookmark the event
CHAPTER 4: Proposed Method/Approach

4.1 Design Specification

The methodology that will be implemented in this project will be Agile Development methodology. It is a relatively new approach to software development which became wide-spread in the last 10 years. Agile Development methodology is a programming-centric approach which eliminate much of documentation and modelling time spent. The software is delivered at the early stage and continuously though the development process. One of the advantage of Agile development is that it embraces the change of user requirement regardless of when the request of change occurs in the development process. In overall, the project is developed and released in incremental stages or ‘iterations’. At the end of every iteration or release of a system, the developers can evaluate the current system and ensure that the mobile application is developing in the correct direction or cater to a new requirement according to the customers’ request (refer to Figure 3.1 and Figure 3.2 for the illustration of the lifecycle). This project will be developed in 4 phases which are: planning, analysis, design and implementation. The further elaboration of these 4 phases will be discuss in section 3.4.

4.2 Advantages of Agile Development Methodology

1. Suitable for small project
2. Save more time compare to Waterfall methodology
3. Reduce the time spent on documentation
4. Embrace change of requirement amid development process
5. Continuous Evaluation of project (make sure project is developing in the right direction)
6. Allow many scopes of amendments throughout the complete life cycle of app development (Rajput, 2017)
7. Regular updates to fix bug and release of new features (Rajput, 2017)
4.3 Disadvantage of Agile Development Methodology

1. Lack of documentation (ISTQB, 2017)
2. Easy to devolve into prototyping approach
3. Can easily derail if the customer representative is unclear on the expected outcome (ISTQB, 2017)

Figure 4. 1 shows the iterative lifecycle of Agile Development Methodology

Figure 4. 2 shows another example of the iteration lifecycle of Agile development
Chapter 4: Proposed Method/Approach

4.4 Agile Development lifecycle

4.4.1 Planning phase

In the planning phase, there’re two sub phases which are project initiation and project management. In the project initiation phase, the objective of this project will be identified and evaluate. Besides that, the feasibility analysis will be carry out to determine from two aspects (technical, economic) to make sure that the new system is achievable and the expected difference from the existing system.

Next, in the project management phase, a work plan will be developed to provide a schedule on developing this project. In this project, a Gantt Chart is drawn to provide an insight to the estimated time and schedule each task (refer to Figure 4.3 and Figure 4.4).

4.4.2 Analysis phase

Several existing systems is being reviewed to identify the strengths and weaknesses of each system. The outcome of this process is being documented to recognise the features or functions that could be improvise or integrate in this project to make the system better or satisfy the user’s requirements. The outcome of this phase is the system proposal.

4.4.3 Design phase

In the design phase, the detailed requirement and documented data will be transformed into different kind of models and architecture. The features and functions of the system will be represented by entity-relationship diagrams with data dictionary and use case diagram. In this project, flow of events and activity diagram for the events is drawn to ease the implementation phase. (refer to Chapter 3: System Design)
4.4.4 Implementation phase

This is the part where the mobile application is being coded. This is a construction and programming phase. The UTAR community app is proposed to develop as an android application. Since the official language for Android development is Java, the application and API implementation will be coded with Java language. Since Agile is an iterative development approach, we’ll be testing the application at the implementation phase of each iteration. Support and bug fixes will be release and provided at the end of every cycle. More than that, a new features or functions can be include in every iteration according to the users’ feedback.

The frontend of the system is built on Android Studio as the main IDE. The application is being compiled and installed on an Android Mobile Phone. Besides that, the apk file of the application is also being generated as an alternative to install on an Android Phone. The backend of the system includes the server side and database. The server is set up using Apache Tomcat server and code on Netbeans as the main IDE. All the Java servlets and Sessions are being coded on Netbeans to response to the HTTP Request called by the frontend. The database is being maintain using MySQL and MySQL workbench is used as the high level tool to maintain the database. The Apache Tomcat Server are connected to the database and update the tables in database according to the type of request. After each iteration, the system is being tested. Each test methods and test cases are being described in Chapter 5: System Implementation and Testing.
4.4.5 Technologies involved

Hardware:

- Laptop
- Android mobile phone

Software:

- Android Studio 3.0 as the main IDE and compiler
- Firebase as the Backend server (included functionalities such as user authentication, management and push notifications)
- Google Analytics API to set up and manage tracking data of the app (Shah, 2015)
- Netbeans IDE 8.2 as the main IDE for Server
- MySQL Workbench for maintaining the database
Chapter 4: Proposed Method/Approach

Figure 4.3 shows the Gantt chart part 1
Figure 4. 4 shows the Gantt chart part 2

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Faculty of Information and Communication Technology (Perak Campus), UTAR.
Chapter 4: Proposed Method/Approach

Figure 4. 5 shows the Gantt chart part 3
Chapter 4: Proposed Method/Approach

Figure 4. 6 shows the Gantt chart part 4
Chapter 4: Proposed Method/Approach

Figure 4. 7 shows the Gantt chart part 5
4.5 Implementation Issues and Challenges

Some difficult issues that I predicted to face in the development phase of the project is the challenges in building my own server and database to maintain and store all the account information, posts, comments and event details. This project is planned to build the backend server using the Firebase service and access the web service by calling the API built in Firebase service. However, other alternative such as Java Servlet, Apache Tomcat is a backup plan if the implementation of Firebase service is not scalable or customizable enough. It is a challenge due to the lack of knowledge in Server-side Web Application Development. If the decision is to build a custom server like Java Servlet, Apache Tomcat, there is more coding processes required to set up the server. Static IP address needs to be assigned and the server needs to monitor over time which requires more resources. Besides that, another difficulty would be the implementation of content management system which is required for event organizer to post or edit their event details. This implementation would require more labour to develop as it is another system which a website application is most probably. More than that, one of the implementation issues faced is the security concern on users’ login information. The users’ login password will be a target for packet sniffer during session hijacking. Therefore, a solution must be carry out to prevent the information from being stolen. The solution being used is to perform MD5 hashing on password when users register an account or login.
Chapter 5: System Implementation and Testing

5.1 Register Screen

![Register Screen Screenshot]

Figure 5.1 shows the screenshot of Register Screen

5.1.1 Screen Description

1) This is the registration screen for new user.

2) Users are required to fill in all the fields to sign up.

3) The username fields must consist at least 5 alphanumerical characters. The password must consists of minimum 7 alphanumerical characters and email must be in valid format such as abc@gmail.com.

4) Users can select their course by selecting the faculty in a dropdown list. The faculty will then filter the courses for selection.

5) The last information needed will be the gender of the user.
## 5.1.2 Test Methods

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<thead>
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<th>Test Items</th>
<th>Test Input</th>
<th>Expected Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Username</td>
<td>abc</td>
<td>Message to prompt users to enter minimum 5 alphanumerical characters.</td>
</tr>
<tr>
<td>Password</td>
<td>Hello12</td>
<td>Message to prompt users to enter minimum 7 alphanumerical characters</td>
</tr>
<tr>
<td>Email</td>
<td>gg.email.com</td>
<td>Message to prompt users to enter a valid email format, e.g <a href="mailto:abc@gmail.com">abc@gmail.com</a></td>
</tr>
<tr>
<td>SignUpButton</td>
<td>Click on the Sign Up Button</td>
<td>Toast Message to inform users that he/she has logged in successfully and open the Home Screen.</td>
</tr>
</tbody>
</table>

*Table 5.1 shows the test methods for Register screen*
Chapter 5: System Implementation and Testing

5.2 Login Screen

![Login Screen Image]

Figure 5. 2 shows the screenshot of Login Screen

5.2.1 Screen Description

1) Users are required to fill in email and password to login.

2) After users click the Login button, the application will process the validation and return the response.

3) Users can click on the Sign Up button to enter the Register Screen.
### 5.2.2 Test Methods

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<tr>
<th>Test Items</th>
<th>Test Input</th>
<th>Expected Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Validation of login info</td>
<td>Invalid username and password</td>
<td>Toast message which informs users that the username and password are incorrect</td>
</tr>
<tr>
<td>SignUpButton</td>
<td>Click on the Sign Up Button</td>
<td>Open the Register Screen</td>
</tr>
</tbody>
</table>

*Table 5.2 shows the test methods for Login Screen*
5.3 Home Screen

Figure 5.3 shows the screenshot of Home Screen

5.3.1 Screen Description

1) The posts are displayed in the home screen. Details such as the Post Title, Post User, Post Category, Number of Post’s likes, and one line of Post Description are displayed in the home screen.

2) There is an Add Post Button in the right bottom corner of the screen.

3) At the bottom of the screen, there is a navigation tab menu.

4) On the right side of the action bar, there is a Logout Button.
### 5.3.2 Test Methods

<table>
<thead>
<tr>
<th>Test Items</th>
<th>Test Input</th>
<th>Expected output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post</td>
<td>Click on a post</td>
<td>Open the details screen of the post</td>
</tr>
<tr>
<td>AddPostButton</td>
<td>Click on the Add Post Button</td>
<td>Open the publish post screen</td>
</tr>
<tr>
<td>SearchTab</td>
<td>Click on the Search Tab in the navigation menu</td>
<td>Open the Search Screen</td>
</tr>
<tr>
<td>EventTab</td>
<td>Click on the Event Tab in the navigation menu</td>
<td>Open the Event Screen</td>
</tr>
<tr>
<td>ProfileTab</td>
<td>Click on the Profile Tab in the navigation menu</td>
<td>Open the Profile Screen</td>
</tr>
</tbody>
</table>

*Table 5.3 shows the test methods for Home Screen*
Chapter 5: System Implementation and Testing

5.4 Publish Post Screen

![Publish Post Screen](image)

*Figure 5.4 shows the screenshot of Publish Post Screen*

5.4.1 Screen Description

1) Users must fill in the title of the post.

2) Users can select the category of the post in a drop down list.

3) Users can fill in the description of the post if they want to elaborate more on the post.

4) There is a post button on the right side of the action bar.
### 5.4.2 Test Methods

<table>
<thead>
<tr>
<th>Test Items</th>
<th>Test Input</th>
<th>Expected Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post Title</td>
<td>Click the Post Button without filling the Post Title</td>
<td>Toast message will appear to ask users fill in the post title</td>
</tr>
<tr>
<td>Post Description</td>
<td>Click the Post Button without filling the Post Description but fill up the Post Title</td>
<td>Post is published successfully</td>
</tr>
<tr>
<td>PostButton</td>
<td>Click the Post Button</td>
<td>Post is published successfully and open the Home Screen.</td>
</tr>
</tbody>
</table>

*Table 5. 4 shows the test methods for Publish Post Screen*
Chapter 5: System Implementation and Testing

5.5 Details Screen

Figure 5. 5 shows the screenshot of Details Screen

5.5.1 Screen Description

1) The Post Title, Post User, Post Category, Post Descriptions, Number of Likes and Comments are displayed.

2) There is a view which counts the number of comments in this post.

3) There is a Like Button where users can click to like this post.

4) There is a Favourite Button in star shape where users can click to add this post to their Favourite Posts.

5) There will be an Edit Button in a pen shape if the user is the author of this post.

6) In the comment section, the Comment, Comment Author, and the Comment Rate is displayed.
Chapter 5: System Implementation and Testing

7) At the right side of each comment, there is a Rate Button which users can click to rate if the comment is useful or appropriate.

8) At the bottom of the screen, there is an Add Comment Button which allows users to add comments to the post.

9) There is also a Sort By button which allows users to sort the comments according to their rate.
### Test Methods

<table>
<thead>
<tr>
<th>Test Items</th>
<th>Test Inputs</th>
<th>Expected Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>LikeButton</td>
<td>Click on the Like Button</td>
<td>The Like Button will turn to Red Colour from Grey Colour and the number of likes will increase by 1.</td>
</tr>
<tr>
<td>FavouriteButton</td>
<td>Click on the Favourite Button</td>
<td>The Favourite Button will turn to Yellow Colour and a Toast message will inform users that he/she has favourite this post successfully.</td>
</tr>
<tr>
<td>SortByButton</td>
<td>Click on the Sort By Button</td>
<td>There will be a dialog which has two radio buttons appear. The buttons are Sort By Rating and Sort By Chronological.</td>
</tr>
<tr>
<td>RateButton</td>
<td>Click on the Rate Button</td>
<td>The Rate Button will turn to Red Colour from Grey Colour and the rating of the comment will increase by 1.</td>
</tr>
<tr>
<td>AddCommentButton</td>
<td>Click on the Add Comment Button</td>
<td>There will be a dialog appears on screen which allows users to add in new comment.</td>
</tr>
</tbody>
</table>

*Table 5.5 shows the test methods for Details Screen*
5.6 Search Screen

Figure 5.6 shows the screenshot of Search Screen

5.6.1 Screen Description

1) There is a Search Button in the middle of screen.

2) Click on the Search Button will expand into 7 navigation buttons which represents the 7 categories of posts which are: Business and Economy, Science, Technology, Mamak Corner, About Utar, Sports and Entertainment.

3) Click on each of the navigation button will display the posts of that category selected.

4) The Logout Button will be located on the right side of the action bar.
## 5.6.2 Test Methods

<table>
<thead>
<tr>
<th>Test Items</th>
<th>Test Input</th>
<th>Expected Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>SearchButton</td>
<td>Click on the Search Button</td>
<td>The Search Button will expand into 7 Navigation Buttons.</td>
</tr>
<tr>
<td>NavigationButtons</td>
<td>Click on the Technology Navigation Button</td>
<td>The application will open new screen and display the posts under the Technology category.</td>
</tr>
<tr>
<td>LogoutButton</td>
<td>Click on the Logout Button</td>
<td>Toast message will inform users that he/she has logout successfully and open the Login Screen.</td>
</tr>
</tbody>
</table>

Table 5.6 shows the test methods for Search Screen
5.7 Event Screen

Figure 5.7 shows the screenshot of Event Screen

5.7.1 Screen Description

1) This screen will display the Event Poster, Event Title, Event Date, Event Time, Event Venue, Event Fees, and Event Contact Number.

2) Users can click on the Contact Number which will open the Phone App to call the Event Admin.

3) The Logout Button is located at the right side of the action bar.
### 5.7.2 Test Methods

<table>
<thead>
<tr>
<th>Test Items</th>
<th>Test Input</th>
<th>Expected Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>ContactNumber</td>
<td>Click on the Contact Number</td>
<td>Open the Phone App with the contact number entered automatically.</td>
</tr>
<tr>
<td>LogoutButton</td>
<td>Click on the Logout Button</td>
<td>Toast message will inform users that he/she has logout successfully and open the Login Screen.</td>
</tr>
</tbody>
</table>

*Table 5. 7 shows the test methods for Event Screen*
5.8 Profile Screen

Figure 5.8 shows the screenshot of Profile Screen

5.8.1 Screen Description

1) In this screen, users can check their Username, Email, Course, Gender and Profile Picture.

2) In the right bottom corner of their Profile Picture, users can click on the Change Profile Picture Button to select new Profile Picture.

3) There is also a button which opens the History and Favourite Screen under the Gender section.

4) The Logout Button is located on the right side of the action bar.
### 5.8.2 Test methods

<table>
<thead>
<tr>
<th>Test Items</th>
<th>Test Input</th>
<th>Expected Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>ChangeProfilePictureButton</td>
<td>Click on the Change Profile Picture Button</td>
<td>The application will open the Gallery App to select the new Profile Picture.</td>
</tr>
<tr>
<td>HistoryAndFavouriteButton</td>
<td>Click on the History and Favourite Button</td>
<td>The application will open the History and Favourite Screen.</td>
</tr>
<tr>
<td>LogoutButton</td>
<td>Click on the Logout Button</td>
<td>Toast message will inform users that he/she has logout successfully and open the Login Screen.</td>
</tr>
</tbody>
</table>

*Table 5. 8 shows the test methods for Profile Screen*
Chapter 5: System Implementation and Testing

5.9 History and Favourite Screen

![Image of History and Favourite Screen]

Figure 5. 9 shows the History and Favourite Screen

5.9.1 Screen Description

1) There is a Tab menu under the action bar which display History and Favourite.

2) In this screen, the History Tab will display all the posts that were published by the users while the Favourite Tab will display all the posts that were favourite by the users.
5.9.2 Test Methods

<table>
<thead>
<tr>
<th>Test Items</th>
<th>Test Input</th>
<th>Expected Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>TabMenu</td>
<td>Click on the Favourite Tab</td>
<td>Displays the favourite posts of the users.</td>
</tr>
<tr>
<td>Post</td>
<td>Click on the Post</td>
<td>Opens the Details Screen of the post clicked.</td>
</tr>
</tbody>
</table>

Table 5.9 shows the test methods for History and Favourite Screen
CHAPTER 6: Conclusion

With the introduction of the UTAR community apps, students will be connected as a community where the sharing of knowledge are taking place. This could also allow the students to be more interactive and promptly than before on questions that they wish to understand and learn new knowledge. The sharing of knowledge among UTAR students can also catalyse a healthy competitive environment and improve the overall standard of UTAR. Students can use the forum functions on a more portable device. The transaction of events can be managed more efficiently through the application compare to Facebook page. The UTAR community apps will be developing as an expandable asset which has the potential to be the mainstream mobile application that provides diversified functions and conveniences to UTAR students.

This end product of this project has achieved the objectives stated which are creating an interactive learning environment among UTAR community and allow students to exchange knowledge and provide a platform for event organisers to publicise their events. However, this end product has encountered a few problems in the development process. One of the problem is the difficulties faced in verification of UTAR student email. The application was originally designed for UTAR students and lecturers only which required users to sign up an account with their UTAR email. However, due to the lack of access to the UTAR database, this is unable to achieve in this project. Besides that, another problem faced is the lack of manpower and time in creating a platform for event organisers to post their events. An additional web application is required to be built as a platform for event organisers to publish new events to the database.

More than that, this UTAR Community Application has the potential to be the daily driving application for UTAR students to seek for knowledge and collect opinions from their peers. It could also become a catalyst to improve the overall literacy and connect the students in a beneficial way. Users can look for events to participate easier by using this application than the conventional way which is looking on the Facebook pages. Users can also invite their peers to join the same event by sharing the interested event in the application.
Despite the UTAR Community Application does not have many functions or features after this iteration of development, it is an expandable asset which has the potential to be a necessary application for all UTAR students. For example, “Chat” function can be added in the future to provide a communication channel for students to organize a discussion session or carpool. Besides that, another function for improvement is notification service for lecturers. Course lecturers can use this application to notify their students with notifications which is a more effective way than WBLE. In conclusion, this project shall be continuing for more iterations of development in the future to become a mobile application which bring conveniences and advantage to UTAR students.
References


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UTAR COMMUNITY

A community which unites the UTAR student and congregate, collaborate and share their ideas

Post questions and discussions
Upsvote and Downvote on comments
Check on events organized in UTAR

By Teh The Yang, Supervised by Phan Koo Yuen
Plagiarism Check Summary

CHAPTER 1: Introduction

1.1 Introduction

This project is to develop a knowledge sharing system with forum function and event corner services for a mobile application which acts as a platform for UTAR student to hold discussion on interested topic and publish news and update on events. The application is named as UTAR community apps.

1.2 Problem statement

UTAR has no history in developing such application or system which allow students to discuss regarding academic topics or knowledges that they found interested in. Although there was a web application named "WILE" which claims to a Web-Based Learning Environment, it is mostly used as a platform for lectures to publish and update their education materials. WILE is built by using Moodle which is an Open Source platform to provide education solution.

UTAR has implemented Moodle as a course management system (CMS) - a free Open source software package designed to help lecturers create effective online teaching in a private environment. However, WILE is built with tedious functions which does not provide the functionality for students to interact with each other. Students can use Wiki for downloading reading learning materials, check the upcoming events such as dates.
### FYP 2

**Originality Report**

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#### Primary Sources

1. **Submitted to Universiti Tunku Abdul Rahman**  
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