Porting of ProxyMITY
On
Aakash Tablet

Summer Internship 2012

Submitted in fulfillment of internship project
By

Development on Aakash Platform Team

Under the Guidance of
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Acknowledgement

We the summer interns team of Development on Aakash Platform are over helmed in all humbleness and gratefulness to acknowledge our depth to all those who have helped us to put our ideas and assigned work, well above the level of simplicity and into something concrete.

We all thank whole heartedly **Prof. D.B. Phatak** for selecting us a part of his valuable project, constantly motivating for doing better and showing complete confidence in our work.

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Team Members

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Abstract

As the name suggests, "ProxyMITY" serves as a "proxy", i.e. it provides virtual closeness (proximity) without the actual classroom. It is a "proxy Multimedia Integration Tool for You", that helps teachers create dynamic rich-media lectures.

"ProxyMITY Lectures viewed on Aakash" is an Open source software product. Published lecture that are released under **the Creative Commons License by Attributions 2.5** are edited and prepared for distribution using ProxyMITY.

The main goal of this tool is to develop the ProxyMITY tool on Android Platform using Eclipse, android SDK and ADT Plugins to view the video lectures present in the SD-Card or on a Server using Aakash tablet. Features such as Bookmarking a video and playing subtitles along with the video have been added. Android SQLite database is used for storing the bookmarked videos. The user will be able to update the bookmarks. The srt files for the videos can also be played by choosing from a list of srt files.

ProxyMITY is an Open Source software. Therefore it is going to be freely available. It is Platform Independent, easy to operate and maintain.

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Introduction

1.1 Purpose

As the name suggests, "ProxyMITY" serves as a "proxy", i.e. it provides virtual closeness (proximity) without the actual classroom. It is a "proxy Multimedia Integration Tool for You", that helps teachers create dynamic rich-media lectures.

Porting of ProxyMITY on Aakash Tablet helps users to get access to quality lectures of reputed teachers, for effective personalized learning. They have the flexibility of studying anytime, anywhere, and at their own pace. They can also navigate through the topics within the lecture. They can also play the subtitles with the video for better understanding. Bookmarking feature helps users to create and update the bookmarks on the videos.

1.2 Scope

"ProxyMITY Lectures viewed on Aakash" is an Open source software product. Published lectures that are released under **the Creative Commons License by Attributions 2.5** are edited and prepared for distribution using ProxyMITY.

The main goal of this tool is to view the video lectures present in the SD-Card or on a Server using Aakash tablet.

ProxyMITY is an Open Source software. Therefore it is going to be freely available. It is Platform- Independent and easy to operate and maintain.

1.3 Existing System

ProxyMITY is available either as a desktop standalone application, or as html contents to be viewed with a web browser. Students are able to view the published lectures, and can navigate to specific topics within the lecture, based on the lecture themes.

1.4 Proposed System

Developing the ProxyMITY tool on Android Platform using Eclipse, Android SDK and ADT Plugins. Adding features for bookmarking the videos, storing the bookmarks in SQLite database and updating the bookmarks. Also the user can play the video along with the subtitles browsing through the list of srt files for better understanding.

Software Requirement Specification

2.1 Introduction

The document aims at defining the overall software requirements for "porting of proxyMITY on Android Devices". Efforts are being made to define the requirements exhaustively and accurately. The final product will be having only features/functionalities mentioned in this document and assumption for any additional functionality/feature should not be made by any of the parties involved in developing /testing/implementing the products. In case it is required to have some additional features, a formal change request will need to be raised and subsequently a new release of this document and/or product will be produced.

Document Purpose

The purpose of this document is to present a detailed description of the **"porting of proxyMITY on Android Devices"**. It will explain the purpose and features of the system and what the system will do. This document is intended for both the students and the teachers.

Product Scope

"ProxyMITY Lectures viewed on Aakash" is an Open source software product. Published lectures that are released under **the Creative Commons License by Attributions 2.5** are edited and prepared for distribution using ProxyMITY.

The main goal of this tool is to view the video lectures present in the SD-Card or on a Server using Aakash tablet.

ProxyMITY is an Open Source software. Therefore it is going to be freely available. It is Platform- Independent and easy to operate and maintain.

Intended Audience

Our project will target all users including:-

- Students
- Teachers.

References and Acknowledgments

IEEE recommended practice for software requirements specifications-IEEE standard 830-1993.

2.1 Overall Description

2.1.1 Product Functionality

- User can easily view the video lecture present in the SD-Card or on a server.
- The user can easily navigate through the video lecture using the tree functionality of this product.

2.1.2 Operating Environment

- Any android operating system supported device.
- Android 2.2 or greater version of android operating system.

2.1.3 Design and Implementation Constraints

Video format MP4(H.264) is not compatible with this software running on Android 2.2 OS.

2.1.4 User Documentation

User will be provided with the user manual along with the software.

2.1.5 Assumptions and Dependencies

- The deadline must be met.
- The product must be reliable.
- The architecture must be open so that additional functionality may be added later.

The product must be user-friendly.

- Tools we are going to use
  - JDK 1.6 or later
  - JRE 1.6 or later
  - Eclipse
  - Android SDK
  - ADT Plugins.

- From the very start of this project we are aware of time constraints so the main emphasis is on extensibility and parallel development. We shall try our best to ensure that project deadlines are met.

2.3. Specific Requirements

2.3.1 External Interface requirements

User Interfaces

User interface must be user-friendly. The user interface shall be designed using various components available in ADT plugins such as videoview for playing video lecture, expandablelist view to display the tree structure to navigate through the video lecture, sliding drawer for hiding and showing the content etc.

Hardware Interfaces

- Any android operating system supported device
- SD-Card to view the video lecture.

Software Interfaces

- The Eclipse Indigo 3.7 shall be used as development environment for implementing the modules.
- Designing of modules and diagrams is done using YUML.

Communications Interfaces

- WI-FI connectivity will be required to view video lecture present on the server.

2.3.2 Functional Requirements

Navigate through the lecture: This software shall help the user to navigate through the video lecture so that user can jump to any desired position in the video lecture.

BookMark: This software shall help the user to bookmark the particular part of the video lecture which is then stored in database so that the user can watch that video lecture again from that particular time.

Subtitles: This module of the software helps user to choose subtitles and play them in synchronization with the lecture video.

2.3.3 Behavioural Requirements

Use Case View

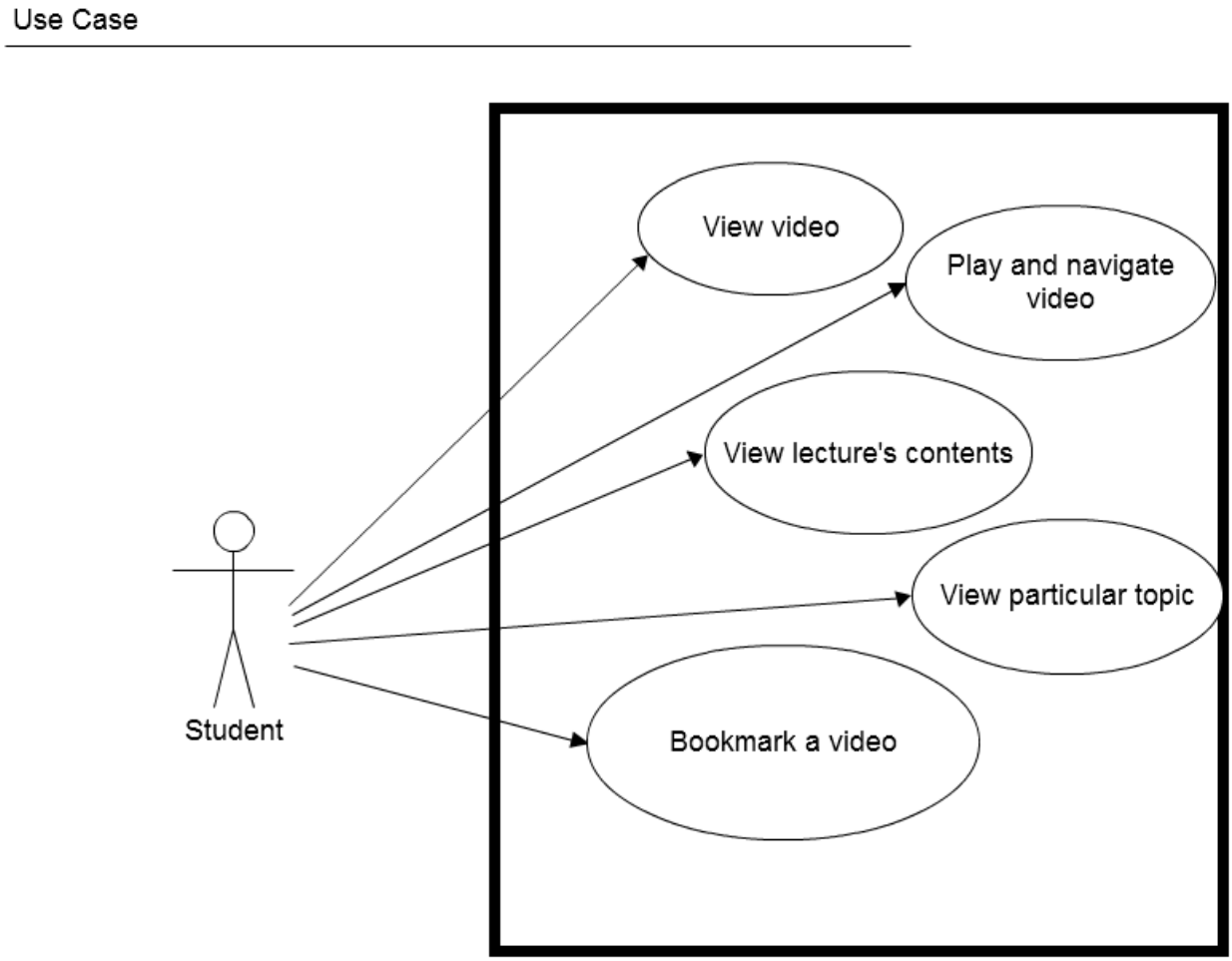


Fig.2.1 Use case diagram for application

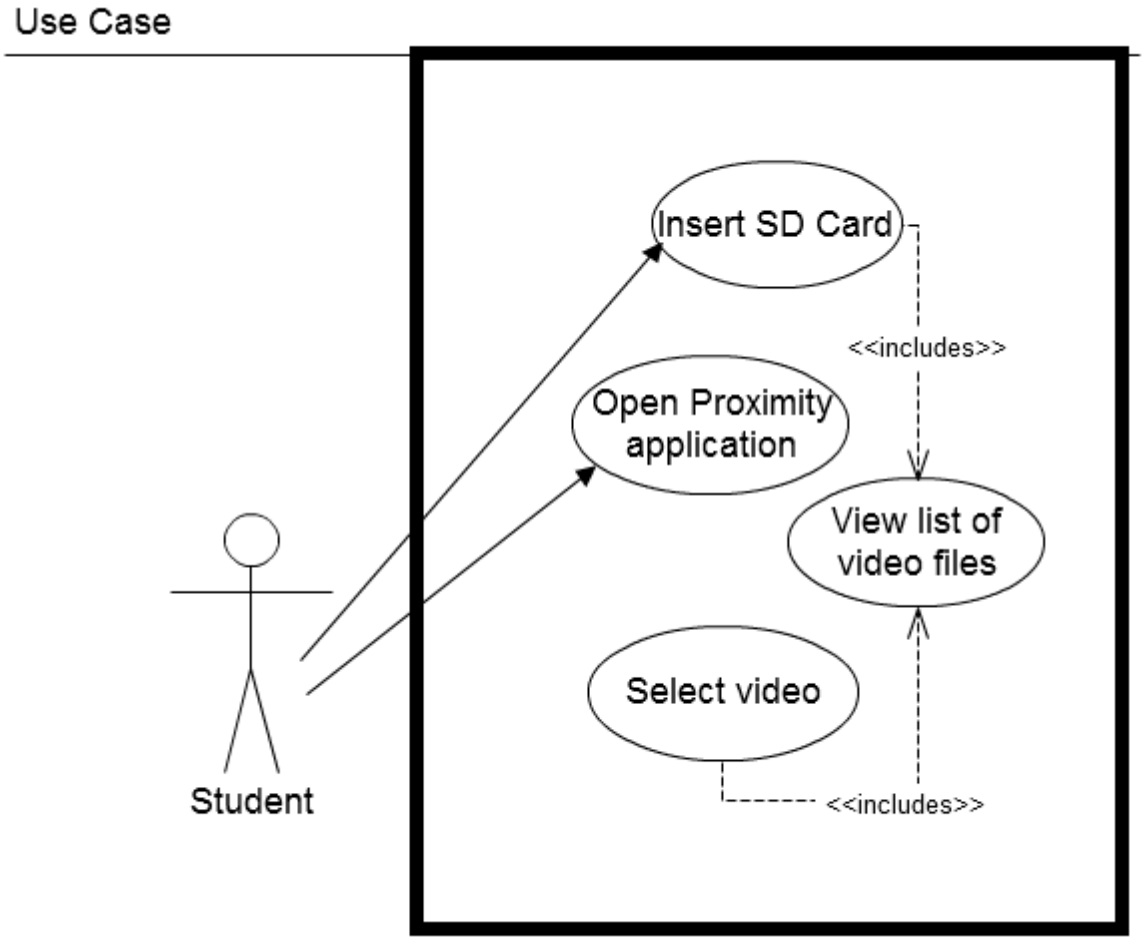


Fig.2.2 Use case diagram to start the video lecture

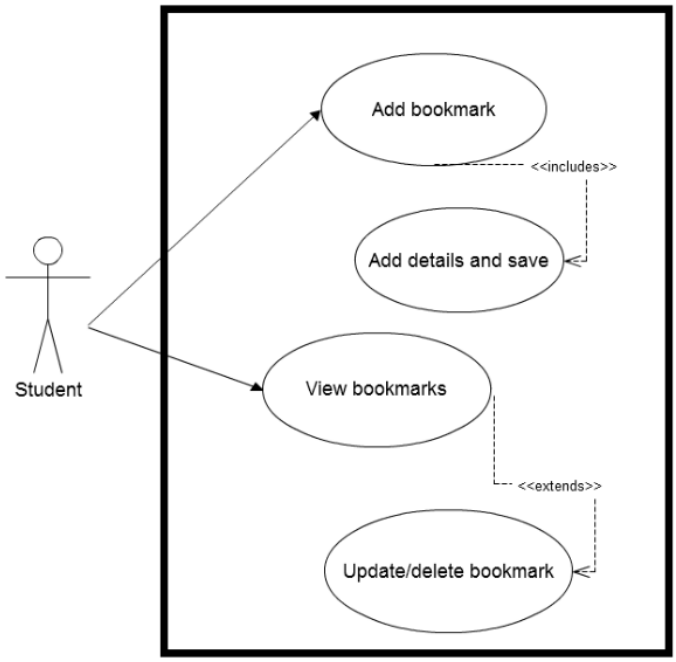
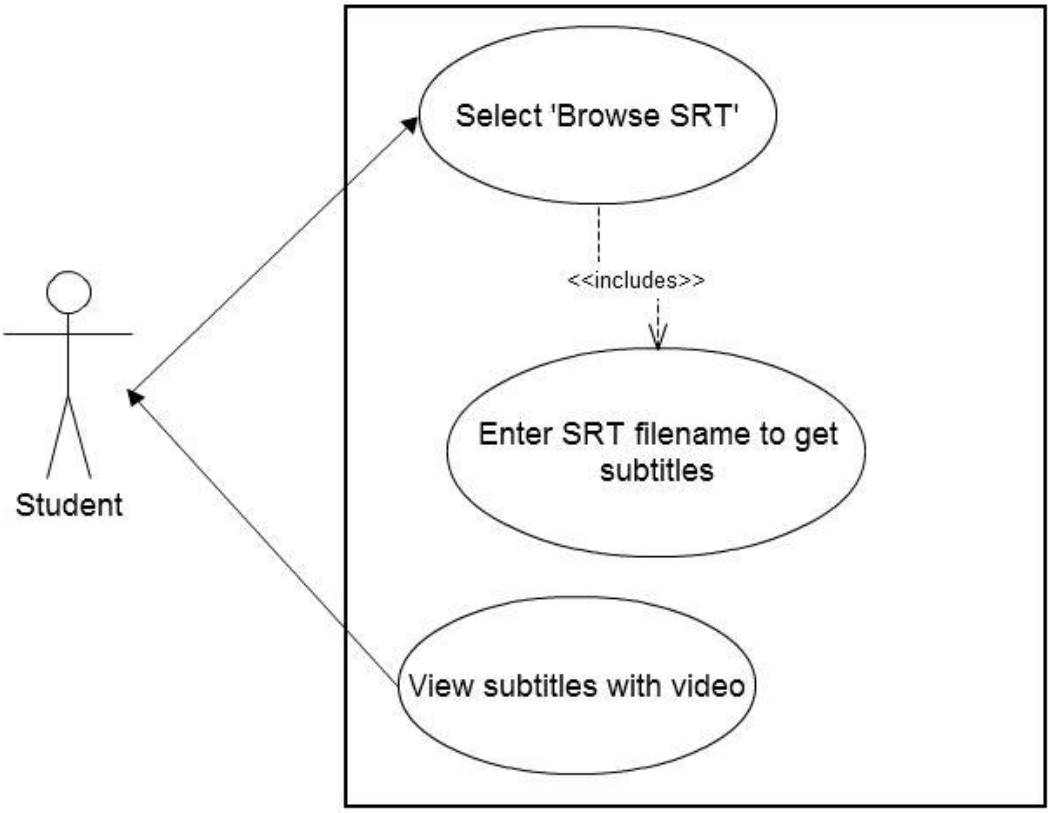


Fig.2.3 Use case diagram for bookmarking



Use case diagram for viewing videos with subtitles

2.4 Other Non-Functional Requirements

Maintainability: Software needs to be upgraded if required in future.
Reliability: System must be reliable and data should persist even after suffering some system crashes or booting of android supported devices.
Portability: We are using Java to make the software more portable so that it can run on any java enabled mobile phone.

3. Design Document and Implementation

INTRODUCTION

Purpose of this document

The purpose of this document is to present project design, to give detail on project architecture and layout of project database.

Background

Aakash, the low cost Indian tablet, can be used in a variety of ways to spread literacy and education in the country. It is an excellent device which can be used by Indian students and teachers to cater their needs. There are many efforts going on in IIT Bombay to make the device more powerful and enhance the utility of the tablet.
In this project we have tried to play video lectures of the professor in the proxyMITY software. The video lectures are played using lectures present in the SD-Card/pen drive or played from the server using the Wi-Fi.

Intended Audience

This document is intended for

- internal team usage to guide team members on the implementation
- Supervisors to see how the project will be structured.

Scope

This document will abstract implementation details on the level of modules, so we will not deal with the details of how every module will be implemented, but rather specify each of the modules purpose, interface and function.
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The main goal of this tool is to view the video lectures present in the SD-Card or on a Server using Aakash tablet.

ProxyMITY is an Open Source software. Therefore it is going to be freely available. It is a Platform Independent.Easy to operate and maintain.

3.1 Resource Requirement

3.1.1 H/W Requirement

- Any android operating system supported device
- SD-Card to view the video lecture.

3.1.2 S/W Requirement

- The Eclipse Indigo 3.7 shall be used as development environment for implementing the modules.
- Designing of modules and diagrams is done using YUML.

3.2 Model Used (Iterative Model)

The iterative lifecycle model does not attempt to start with a full specification of requirements. Instead, development begins by specifying and implementing just part of the software, which can then be reviewed in order to identify further requirements. This process is then repeated, producing a new version of the software for each cycle of the model , until the product is accepted as shown below:

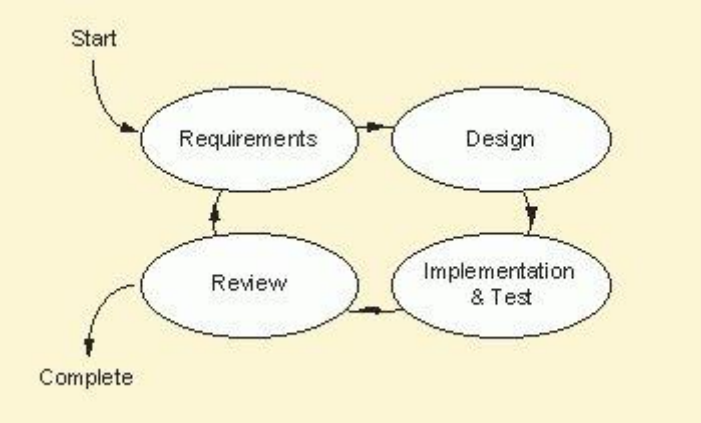


Fig. 3.1

A **Requirements** phase- in which the requirements for the software are gathered and analyzed. Iteration should eventually result in a requirements phase that produces a complete and final specification of requirements.

A **Design** phase- in which a software solution to meet the requirements is designed. This may be a new design, or an extension of an earlier design.

An **Implementation and Test** phase- when the software is coded, integrated and tested.

A **Review** phase- in which the software is evaluated, the current requirements are reviewed, and changes and additions to requirements proposed.

3.3 High Level Design Document

3.3.1 Use Case Diagram

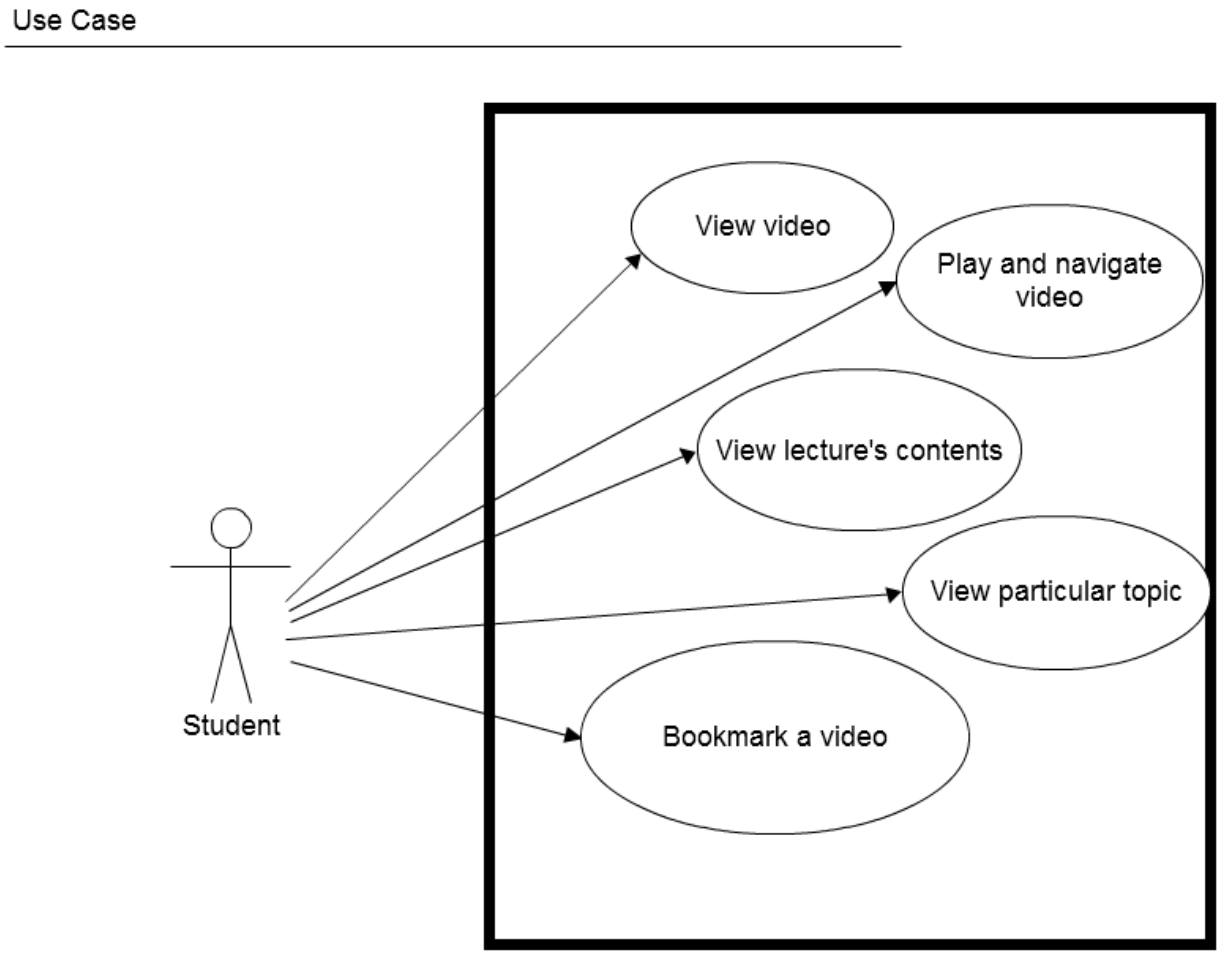


Fig 3.2 Use case diagram of the application

3.3.2 Class Diagram

Class Diagram

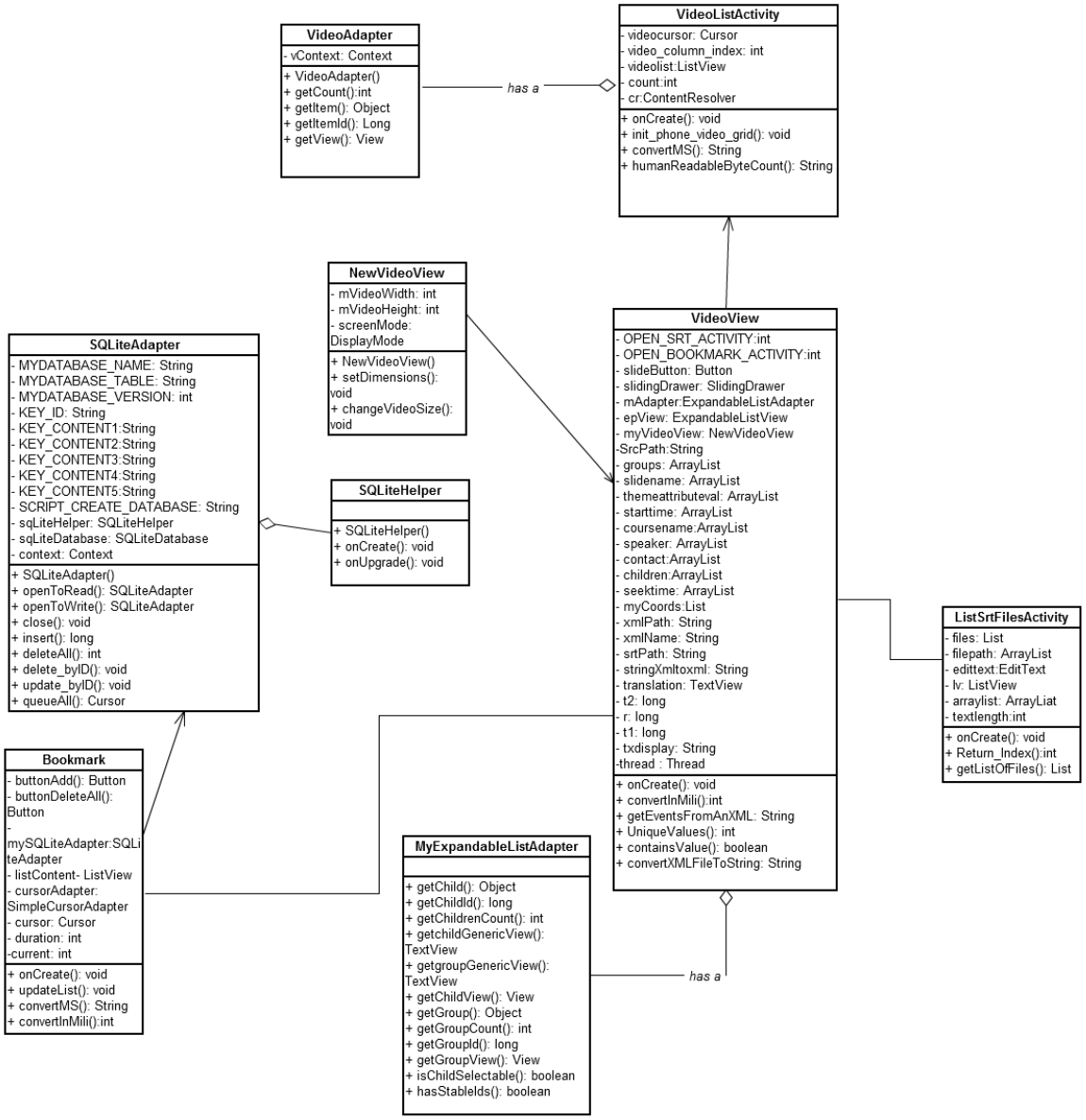


Fig 3.3

3.3.3 Activity Diagram

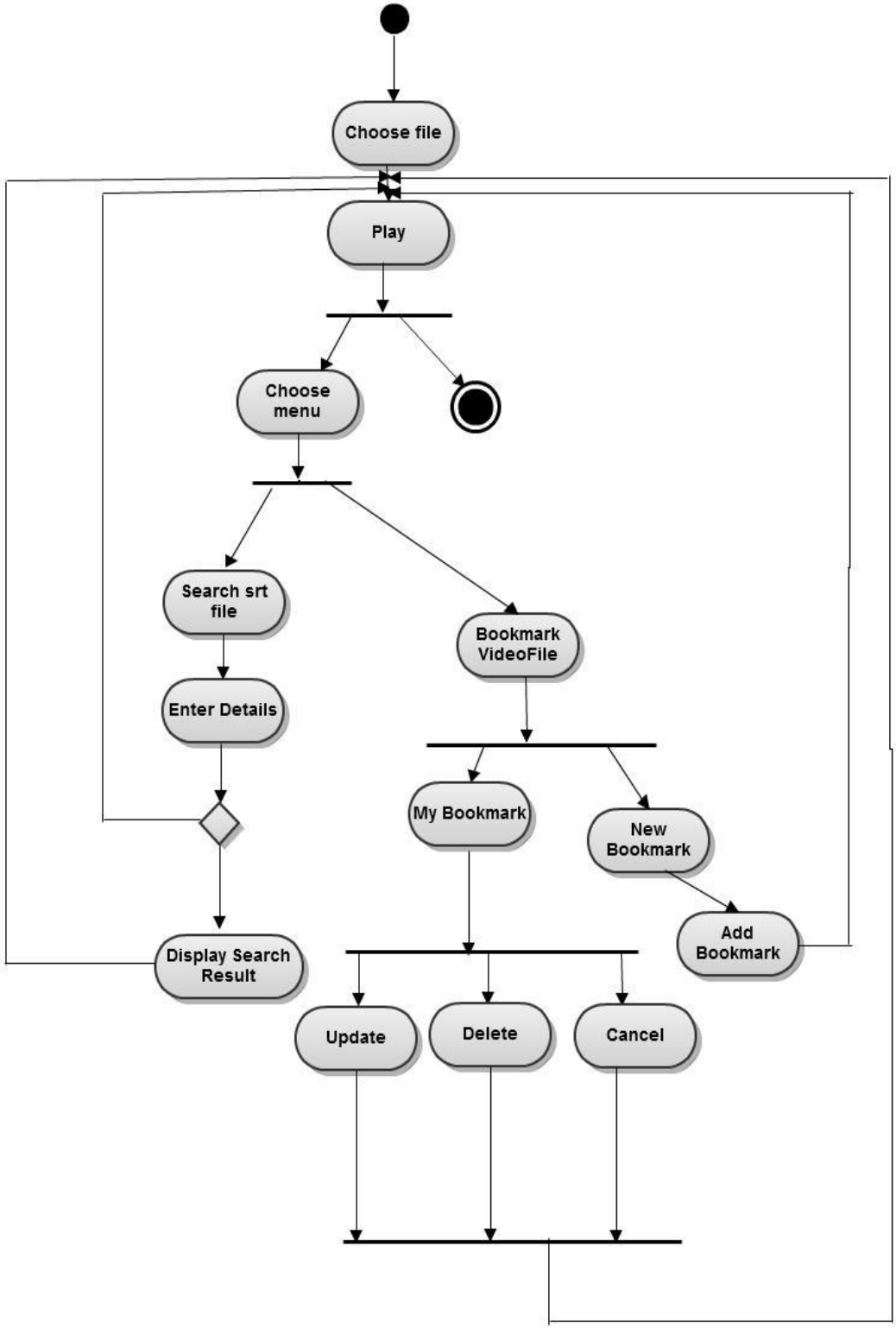


Fig 3.4

3.3.4 Data Flow Diagram

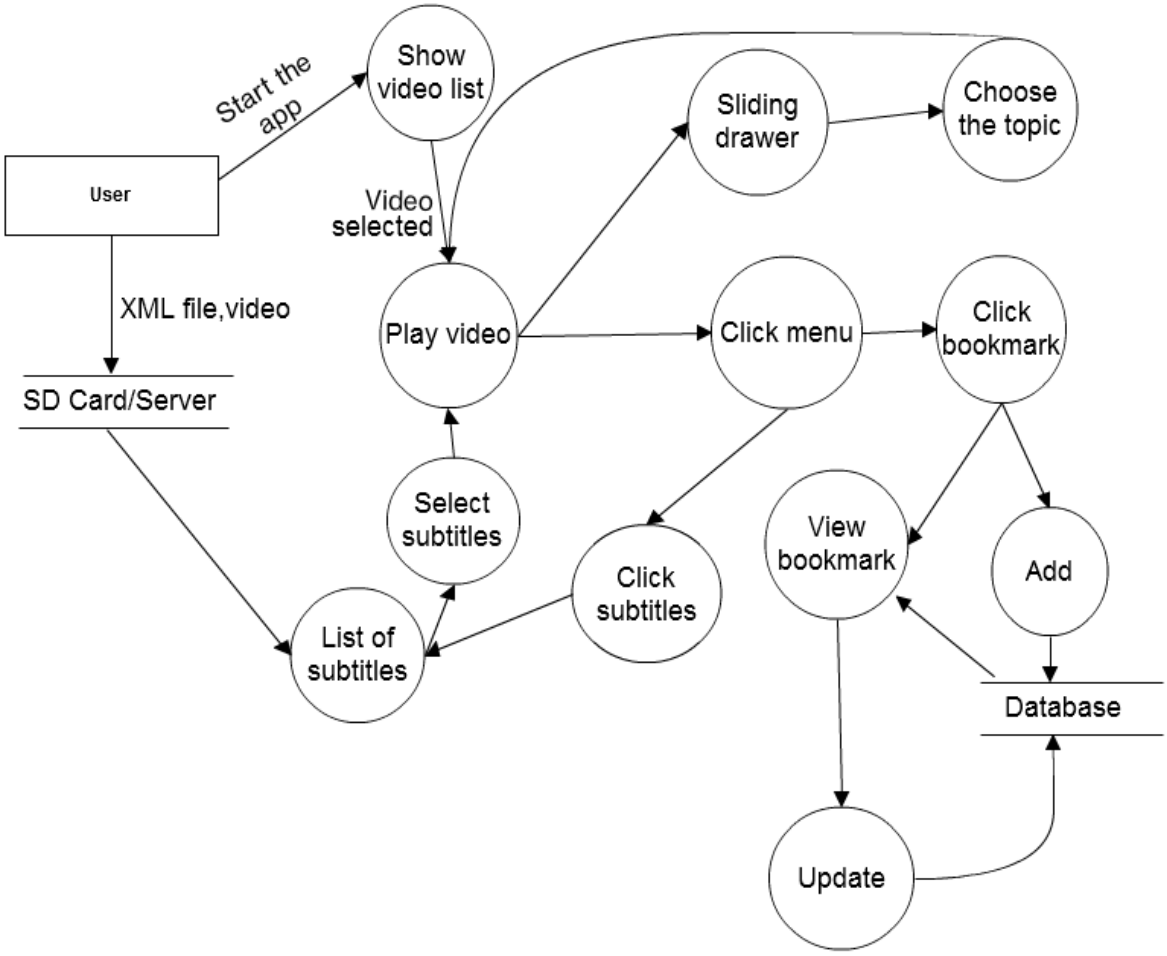
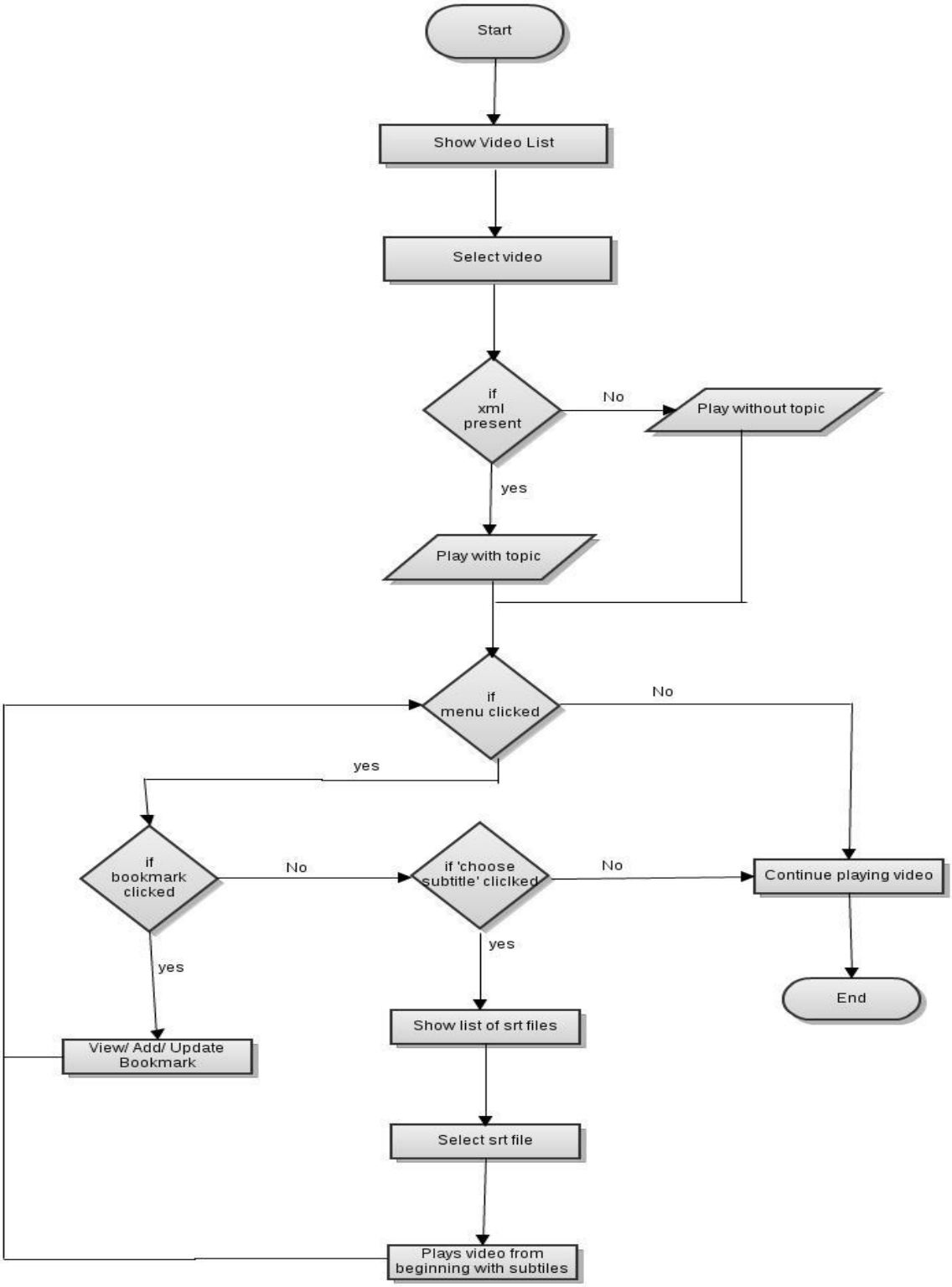


Fig 3.5

3.4 Low Level Design Document

3.4.1 Flow-chart (Fig 3.6)



4. USER MANUAL FOR proxyMITY

4.1 Introduction

- **proxyMITY** is an open source software product.
- Published lecture that are released under the **Creative Commons License by Attributions 2.5** are edited and prepared for distribution using **proxyMITY**.

4.1.1 Open proxyMITY

- When you switch ON the tablet you will see on the screen, the display similar as shown in the figure(4.1) below.

figure (4.1)

- Click on the launcher icon provided on the right hand side of the screen of the tablet as shown in the figure (4.2) below.

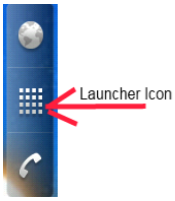


figure (4.2)

- Then you will see on the screen all the application present in the tablet.
- Then click on the **Aakash Applications** icon present in the tablet as shown in the figure (3) below.

figure (4.3)

- On click of the **Aakash Applications** icon you will see the icons of all the applications present in the **Aakash Applications** as shown in the figure(4.4) below.

figure(4.4)

- To view the lecture using SD card/pendrive, select the **ProxyMITY** icon present in the **Aakash Applications** as shown in the figure (4.5) below.

figure(4.5)

- To view the lectures using Wi-Fi , select the **proxyMITY-WiFi** icon present in the **Aakash Applications** as shown in the figure(4.6) below.

figure(4.6)

4.1.2 View lecture from proxyMITY

- **View lecture using SDCard/Pendrive**

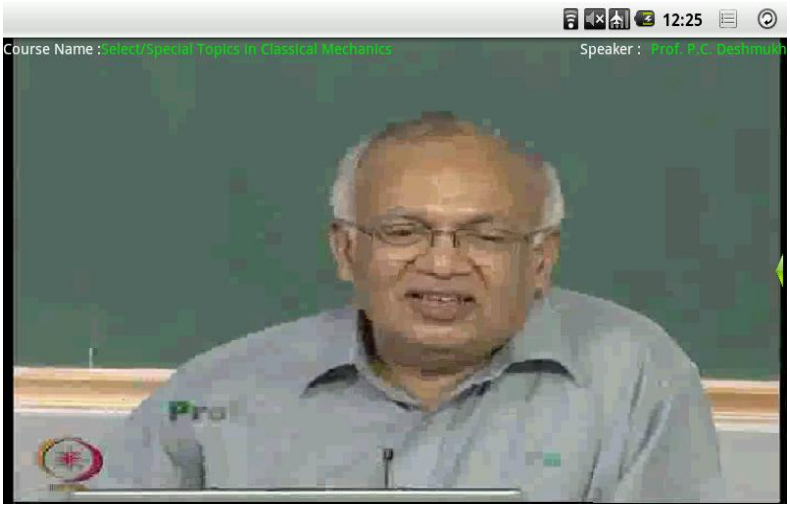
- The lectures videos which are to be viewed using proxyMITY must be present in the SDCard/pendrive.
- Insert the pendrive/SD card in the USB slot provided on the top right hand side of the Aakash tablet.
- Wait for 10 seconds for the pendrive/SD card to be detected by the Aakash tablet.
- A message stating **PREPARING SD CARD** will be displayed on the notification bar on the top of the Aakash tablet screen as shown in the figure(7) below. This means the pendrive/SD card is ready for use.

figure (4.7)

- Now in the **Aakash Applications** select the **proxyMITY** icon as shown in the figure(5).
- A list of lectures will be displayed as shown in the sample figure (8) below.
- The lectures will be played automatically from SDCard/pendrive.

figure (4.8)

- An example video is shown in the figure(4.9) below.



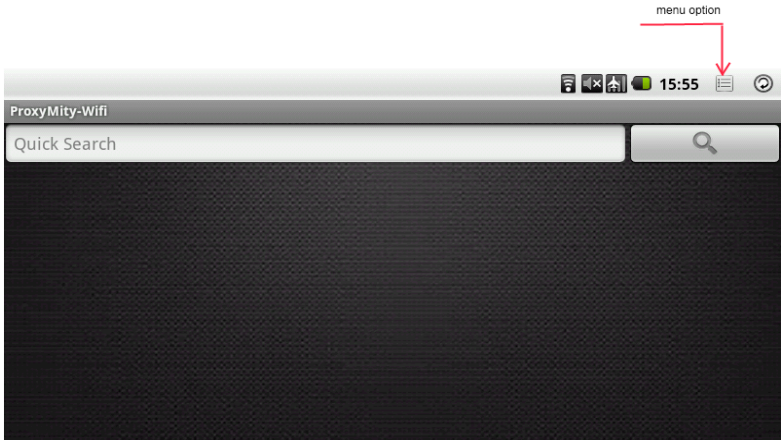
figure(4.9)

- **View the lecture using Wi-Fi connectivity.**

- Connect Aakash Tablet with Wi-Fi.
- You can see an icon for Wi-Fi connection on top of the screen of tablet as shown figure (4.10) below. This means that tablet is connected with Wi-Fi.

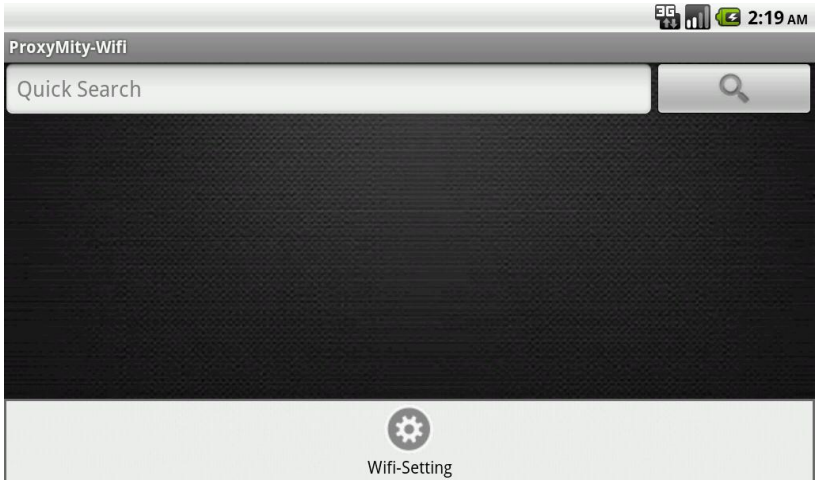
figure (4.10)

- Now in the **Aakash Applications** click on the **proxyMITY-WiFi** icon as shown in the figure(4.6)
- Select the menu button present on top as shown in figure(4.11) below .



Figure(4.11)

- Then 'Wifi-Setting' option in menu is displayed as shown in the figure (4.12) below.



Figure(4.12)

- A dialog box is displayed with an input text field as shown in figure (4.13).

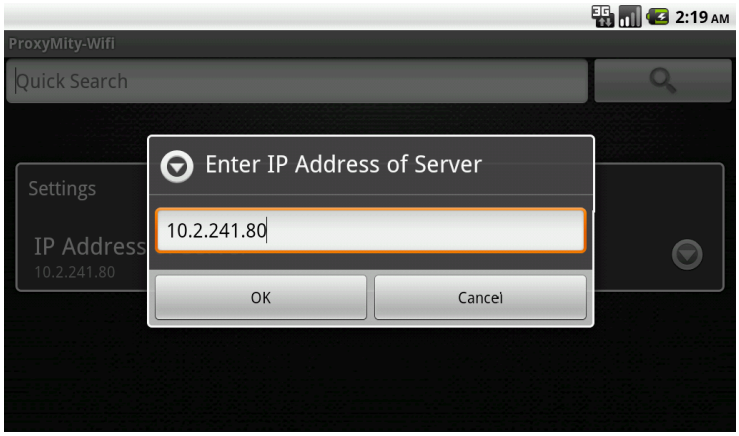
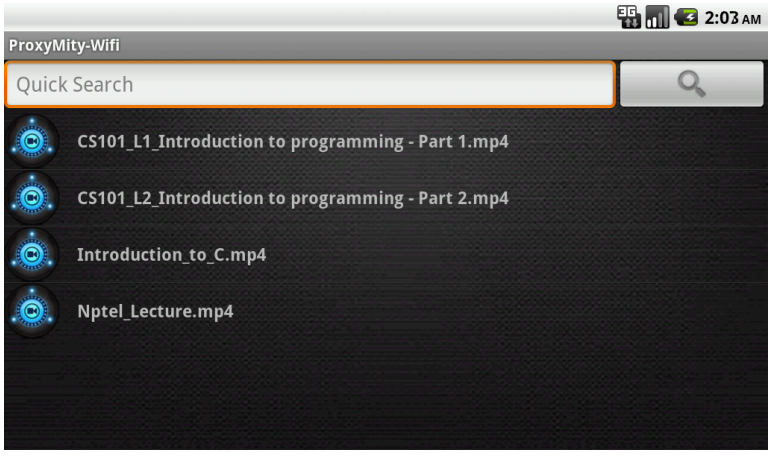


figure (4.13)

- Enter the IP address of the server from where you want to fetch the video lecture.
  (eg: *10.105.14.224***)**
- Select OK to confirm.
- Then you will a list of video lectures present on the server as shown in the figure(4.14) below.



Figure(4.14)

4.2 FUNCTIONALITY

4.2.1 NAVIGATION

- To navigate through the video lecture select the arrow button placed on the extreme right hand side of the video lecture display as shown in the figure (4.15) below.

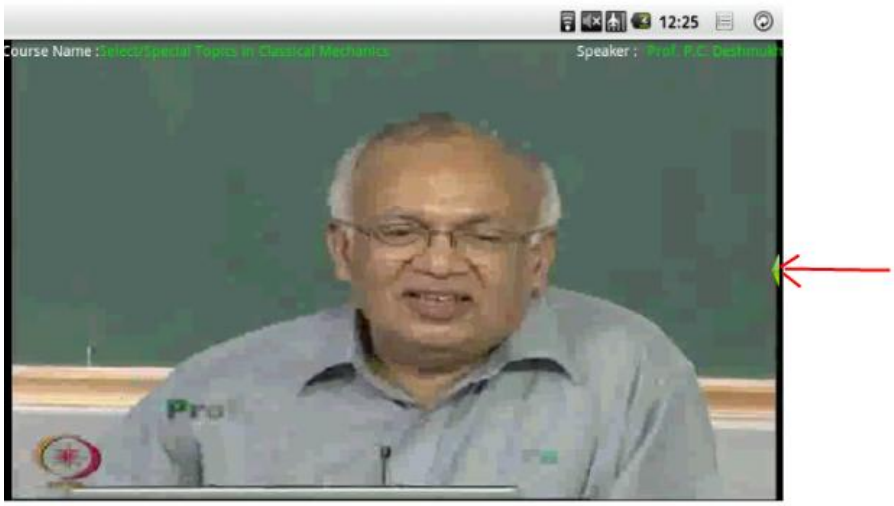


figure (4.15)

- A list of topics will be displayed on the extreme right.
- Select the desired topic to view.

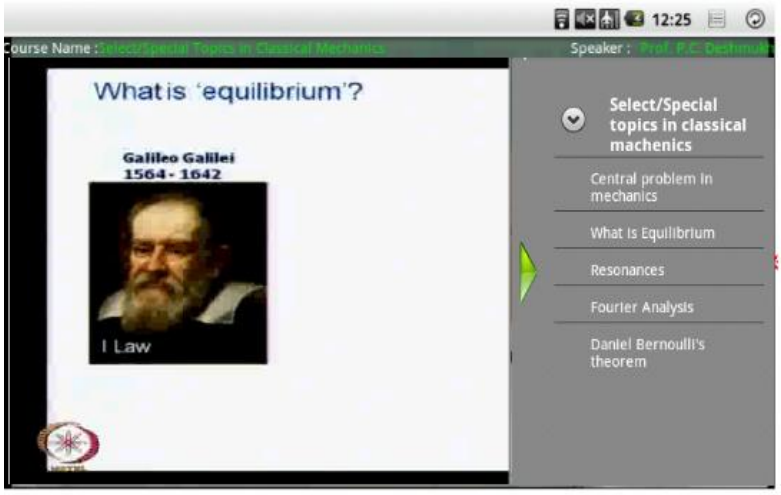


figure (4.16)

4.2.2 Bookmark

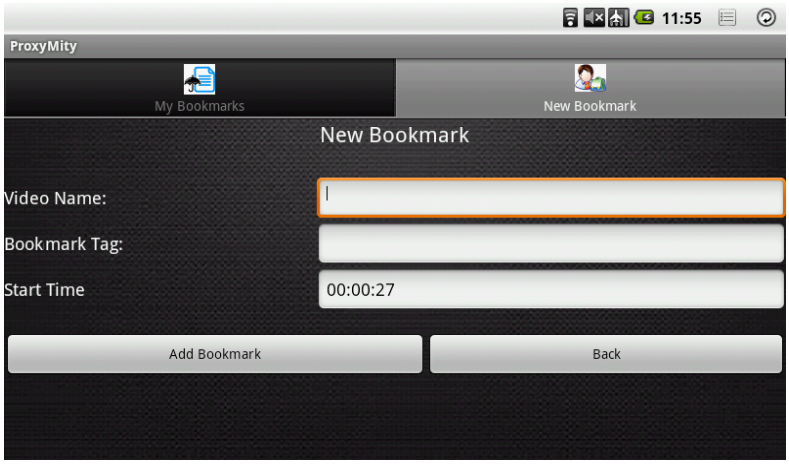
- To bookmark from particular time in the video lecture select the menu button present on top as shown in figure(4.17) below.

Figure(4.17)

- Then BookMark option and Choose Subtitle in menu is displayed as shown in the figure (4.18) below.

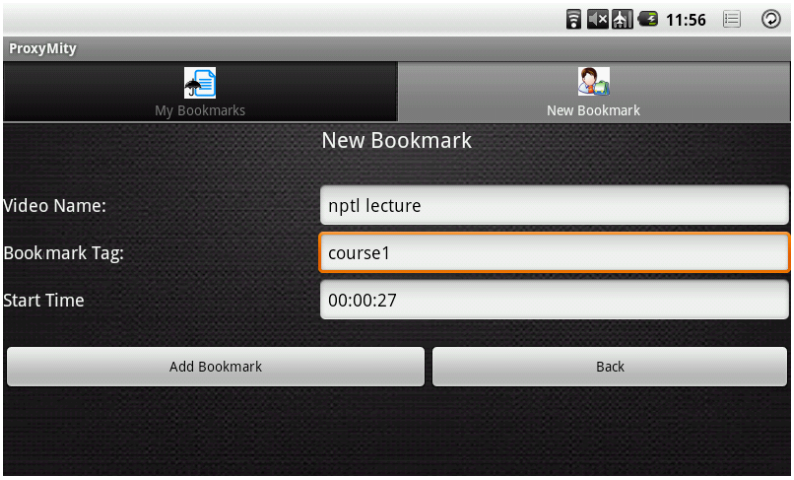
Figure(4.18)

- Then select the BookMark option.
- Then in the New Bookmark tab you will see the display as shown in the figure (19) below.



Figure(4.19)

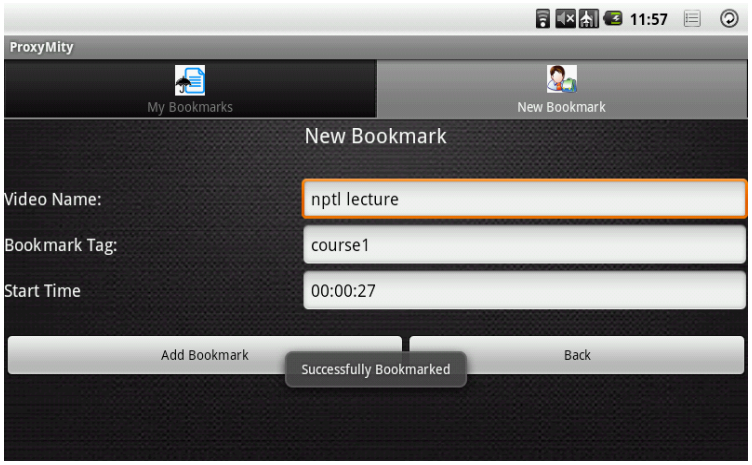
- Then you have to enter the Video name and the Bookmark Tag as shown in example figure (20) below.
- The start time is the time of the video lecture when you selected the bookmark option from menu.



Figure(4.20)

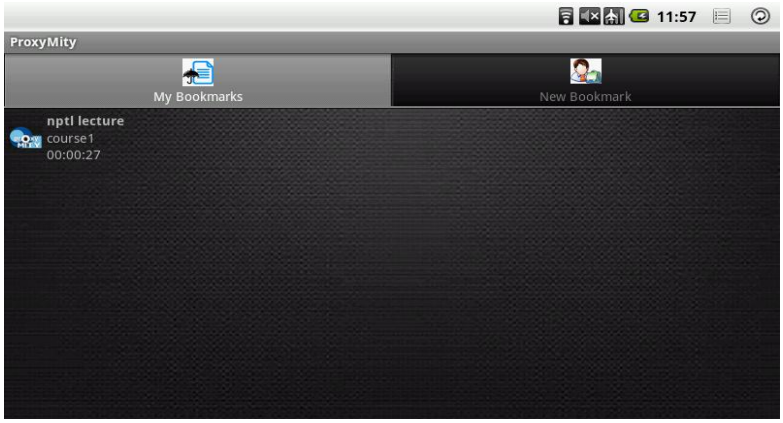
- Now select Add Bookmark button to save the bookmark.

- When bookmark is saved, a message is displayed as shown in the figure (4.21) below.



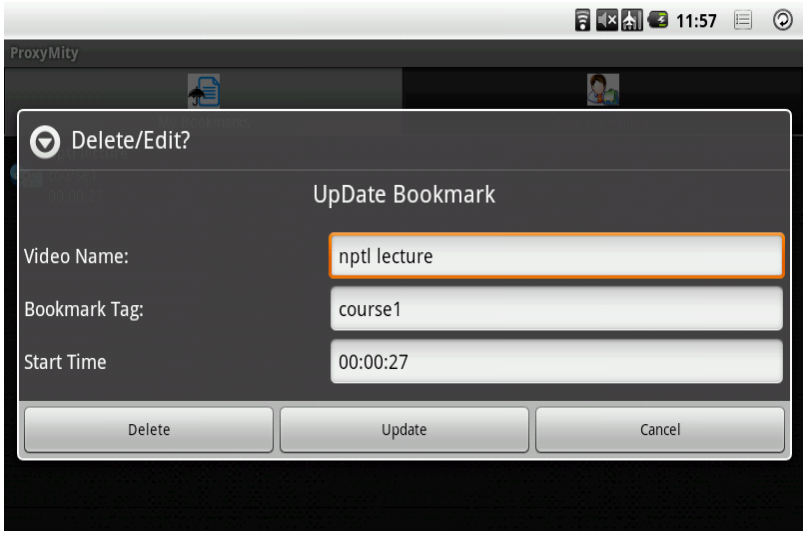
Figure(4.21)

- The bookmark is the saved in the My Bookmarks tab as shown in the figure (4.22) below.



Figure(4.22)

- You can select the bookmark from My Bookmarks tab to view the video lecture present in the SD-card/pendrive/server from the time as saved in the My Bookmark.
- To update/delete the bookmark in the My Bookmark tab keep that particular bookmark pressed till you see a dialog box as shown in the figure(4.23) below.



Figure(4.23)

- Now you can update/delete that particular bookmark.

4.3 Play video with Subtitles

- To play video with subtitles select the menu button present on top as shown in figure (4.17).
- Then option for Choose Subtitle and BookMark in menu is displayed as shown in the figure (4.18).
- Then select the Choose Subtitle option.
- Then in the Choose Subtitle option you see display as shown in the sample figure (4.24) below.
- Figure (4.24) shows a list of .srt files which is retrieved from SD-card/pen drive/server.

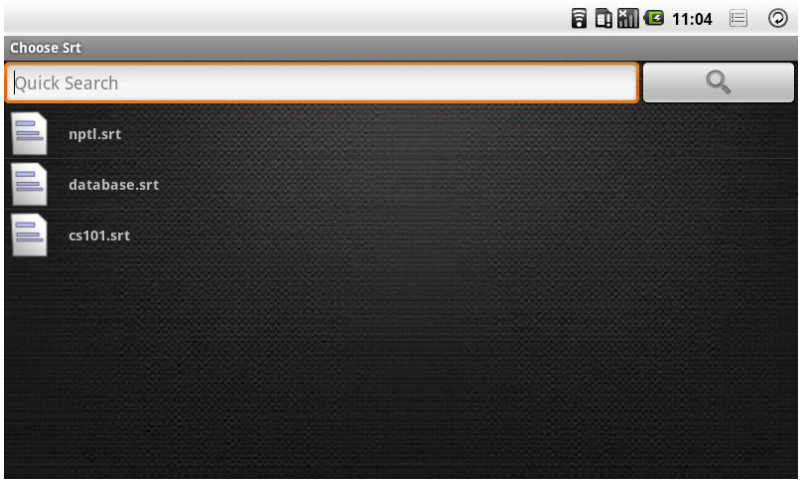


Figure (4.24)

- On select of the desired .srt file, the video lecture will be played from beginning along with subtitles displayed at the bottom, as shown in the figure (4.25) below.

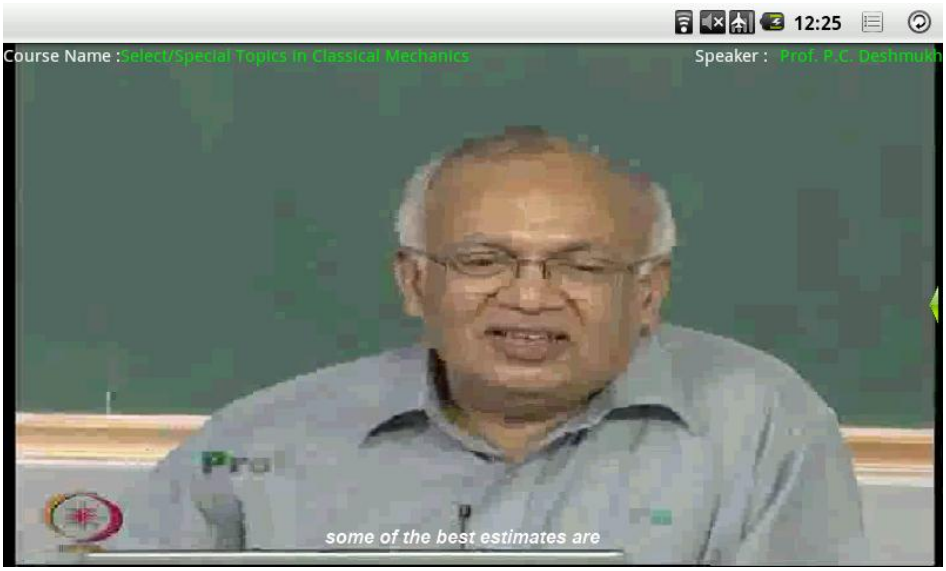

12:25
Course Name :Select/Special Topics in Classical Mechanics
Speaker : Prof. P.C. Deshmukh
some of the best estimates are

Figure (4.25)

Summary and Conclusion

5.1 Summary

First we implemented the tree structure using ExpandableListView into a Sliding Drawer. The required XML was parsed using XML Pull Parser. This implementation was tested in Aakash tablet. The video files stored in the android device will be displayed through a ListView in android. VideoView was used to display the video.

Seekto function was added with each topic to play the video from a particular position. Both these features were integrated and again tested in the tablet. Menu for Bookmarks and Browse srt file was created using the Menu and MenuItems class in Android. For saving the new bookmarks Sqlite Database was used. For playing subtitles along with the video the corresponding file can be searched through a list of srt files.

5.2Further Enhancements

5.2.1 supporting for different video formats .

5.2.2 Playing the audio of the lecture in different languages.

References

6.1 Web References

[1] Android Developer Website, http://developer.android.com

[2] SQLite Tutorial Website, http://www.androidhive.info/2011/11/android-sqlite-database-tutorial/

[3] Custom List View Website, http://www.codeproject.com/Articles/183608/Android-Lists-ListActivity-and-ListView-II-Custom

[4] Android Tutorial Website, http://www.mkyong.com/tutorials/android-tutorial/

6.2 Book References

[1] Shawn Van Every, Pro Android Media, Apress 2009;167-172

[2] Deitel, Java How To Program, 4Th Edition, Prentice Hall

[3] Programming Android O'Reilly

[4] Android Cookbook by Ian. F. Darwin

6.3 Paper References

[1] Porting Mobile web application engine to the Android platform: Yonghong Wu, Jianchao Luo, Lei Luo, School of Computer Science and Engineering, University of Electronic Science and Technology of China, Chengdu 610054

Appendix

Acronym or Abbreviation	Description
ADT	Android Development Tools
API	Application Programming Interface
APK file	Android Application Pac**k**age file
AVD	Android virtual Device
GUI	Graphical user Interface
IDE	Integrated Development Environment
ProxyMITY	**Proxy M**ultimedia **I**ntegration **T**ool for **Y**ou
SDD	Software Design Document
SDK	Software Development Kit
SRS	Software Requirement Specification
XML	e**X**tensible **M**arkup **L**anguage