



Design and Development of an Android App for the Undergraduate College Library: A Case Study

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Received: 6 June 2024

Revised: 22 July 2024

Accepted: 1 August 2024

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ABSTRACT

The creation of an Android application for a library is described in this paper. Nowadays, Everybody has a smartphone, which is an invaluable tool for resource access. Providing users with easy access to information is the primary goal of our Android app. The article describes using Android App Inventor 2 to create a library Android app. Additionally, a brief explanation of the requirements and procedures for making a library app is provided. Through this program, users can access resources such as the OPAC, question papers, syllabus, E-Notes, N-LIST, and websites for libraries and colleges. It saves customers time and energy while increasing the number of visitors to the library.

Keywords: Android App, DVS Library, Electronic Resources, Information Technology, Library Android App, Library App, Smartphones

1. Introduction

Remote access to libraries' collections and services is now a necessity, and smartphones are the perfect tool for this. The primary goal of our project is to develop an Android app for a library that seamlessly connects various online resources such as the library website, Web-OPAC, college website, faculty-created educational content, New Arrivals, N-List, NDL-National Digital Library, Institution Repository, and online courses. This paper details the creation of the DVS_LIBRARY App, an Android-based app developed in a college library using Android App Inventor 2. One of the app's standout features is its ability to provide users with direct access to specific resources or services without the need to launch a web browser. The app is created using the MIT App Inventor Android application, a free tool that allows for easy app creation and sign-in using a Gmail account. Once the Android app is developed, it can be quickly downloaded by customers by scanning a QR code on their smartphones.

1.1. About DVS Library and Information Center

One of the greatest resource hubs in the Shimoga Region is the DVS Library. The library moved to its building in 2016 after opening its doors in 1966. To accomplish the goals of our institution, we have a lovely library that started with 472 books and has since grown to 44726 books with 21988 unique titles and 30 worldwide, national, and regional magazines in the fields of science, the arts, and commerce. The library created an Android app and an educational website to make it easier for people to access information. There are five distinct tiers of knowledgeable and committed employees at the library who assist patrons in obtaining particular services.

2. Statement of the Problem

This article uses the MIT app inventor at DVS Shivamogga to illustrate how to create and develop Android applications. It also describes the capabilities of the MIT App Inventor and the many menus and settings that could be included in the library's Android application. Similar institutions can effectively apply this experience.

3. Objectives of the Study

- To create an Android app for a college library gateway that provides online access to library resources.
- To describe DVS Library's experience creating and developing apps using MIT App Inventor.
- To enable users to access study materials, e-notes, etc.
- To explain the design and development of an app's user interface using App Inventor Designer.

4. Requirements Hardware

- A computer with Internet connectivity.
- An Internet-connected Android device (phone or tablet).

Software

- A Web browser (Chrome or Mozilla Firefox/Microsoft Edge)
- A Google account.

Libraries should have a dedicated website updated with e-resources, notes, quizzes, and other materials to connect the data to the Android app. (If libraries lack funding, they can use free hosting services like 000WebHost.com, wix.com, and weebly.com.) You must have a Google Drive account to download the Android app and upload e-resources.

- A Dspace server was instituted to share the faculty-published articles and audio and video lecture content.
- Host the Library Web OPAC(through static IP) to facilitate access through the Android app.

5. Flow Chart

6. Description of Library App Development

7.1 About MIT App Inventor

MIT App Inventor is an online application development tool designed for Android smartphones. Originally created by Google, it is currently managed by the Massachusetts Institute of Technology (MIT). The software is open-source and free. It allows those without programming experience to create Android application software or Apps. With its Graphical User Interface

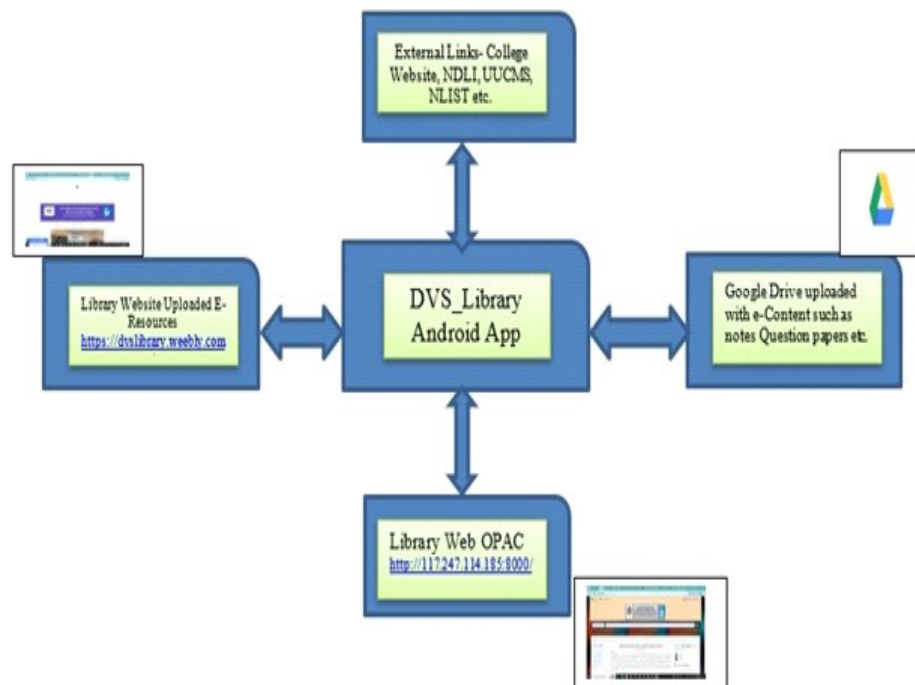


Figure 1. Flow chart of DVS Library Android App



Figure 2. MIT App Inventor web Page

(GUI), similar to StarLogo and Scratch programming languages, users can create Android smartphone applications by dragging and dropping visual elements. According to Kurniawan et al. (2024), this digital application “increases students’ creativity; for example, when they discuss synchronously, they can do it in writing mode or orally.”

7.2 Android

Nearly 90% of smartphones run the open-source Android software. It is also one of the most

widely used mobile platforms, designed for touch displays and based on a modified version of the Linux kernel. Google provides economic sponsorship for Android, developed by the Open Handset Alliance, an alliance of developers. As Kaddipujar et al. (2022) correctly pointed out, "Users can quickly design and arrange interface components and connect logic blocks to create mobile applications with this drag-and-drop visual programming tool for designing and building fully functional apps for Android." Thus, no programming language is required to create an Android app with Android App Inventor 2; all that is required is an understanding of the concept and the ability to drag & drop the required items.

8. Methodology

Niranjana, K. (2020), the author, explained Android App development for libraries. First, a Google search for "Android App Inventor 2" leads to the home page of Android App Inventor 2. Click the Create App option. Then, it will redirect to the Gmail account authentication page.

8.1. Login with a Gmail Account

Login will open the Gmail authentication screen. Then, click on 'Continue' to complete the authentication procedure.

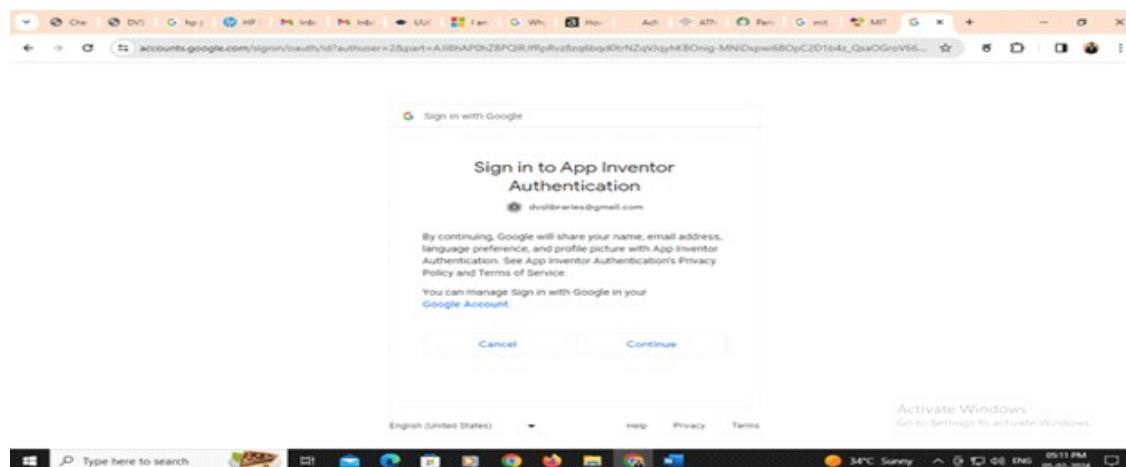


Figure 3. Logging in with a Gmail Account

8.2 Privacy Policy

After logging into the Gmail account, MIT App Inventor allows you to access the user app account. To use App Inventor, one must accept the terms of service and agree to the MIT App Inventor Privacy Policy.



Figure 4. MIT App terms of services

8.3. Welcome to APP Inventor

After accepting the terms of service, a welcome to app inventor display will appear; select the continue button.

8.4. Create New Project Name

After selecting a blank project, the user will be prompted to name the new project. Enter the developer project/app name, then 'click' the ok button.

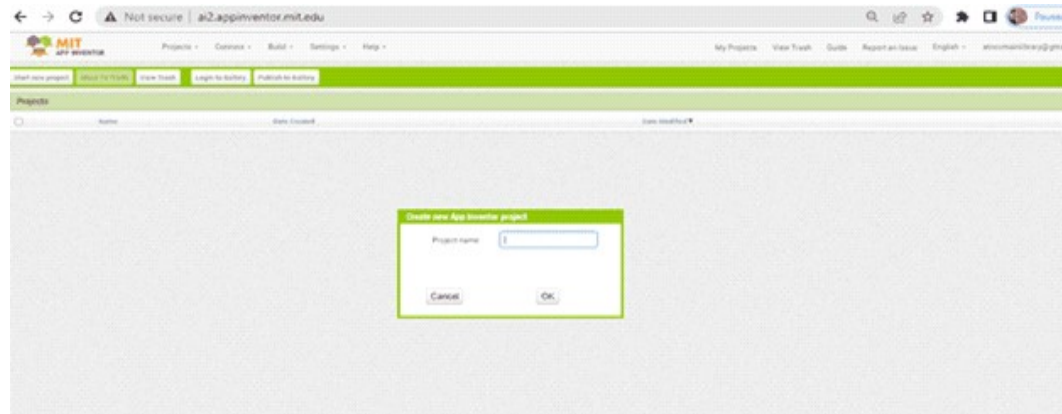


Figure 5. Enter your project name/app name

8.5. Add Multiple Screen

Add multiple screens its link to the main home page.



Figure 6. Add screen

8.6. Home Page of the App

The app's main page is very important for attracting users. On the Home screen, using the properties panel, one can make changes to things like the background, Screen name, background Color, Icon, font size, shape, text, and text colour.

9. Designer Interface

The Designer interface has several key sections, as shown:

9.1. Palette Panel

The Palette is located on the left side of the design. It lists all of the components that can be added to the project, organized into drawers based on their nature. Clicking on a drawer expands it, and one can examine the components inside.

9.2. Viewer Panel

To select a component, click on it, drag it, and drop it onto the phone screen image in the second panel, the Viewer.

9.3. Components Panel

As one can drag components to the Viewer to add them to your app, they also appear in a list in the Components panel.

9.4. Properties Panel

One can select a component by clicking on it in the Viewer or the Components panel. Once a component is selected, a developer can change its settings in the Properties panel.

10. Add a Button to the Screen

To choose a button component in the user interface, click, drag, and drop it onto the phone screen displayed in the Viewer panel. In the Components panel, click Button1 to select it. The Properties window displays all of the properties of that Button; alter them as needed, such as the menu's name, icon, font size, shape, text, and colour.



Figure 7. Add to button

10.1. Add Label

Click, drag, and drop a label component you've selected from the user interface onto the phone screen, which will show up in the Viewer panel. The label component is also utilized to establish a gap between the buttons. To choose it, click the label in the Components window. The Properties box shows all of that label's details; change the text color, shape, font size, menu name, and icon as needed.

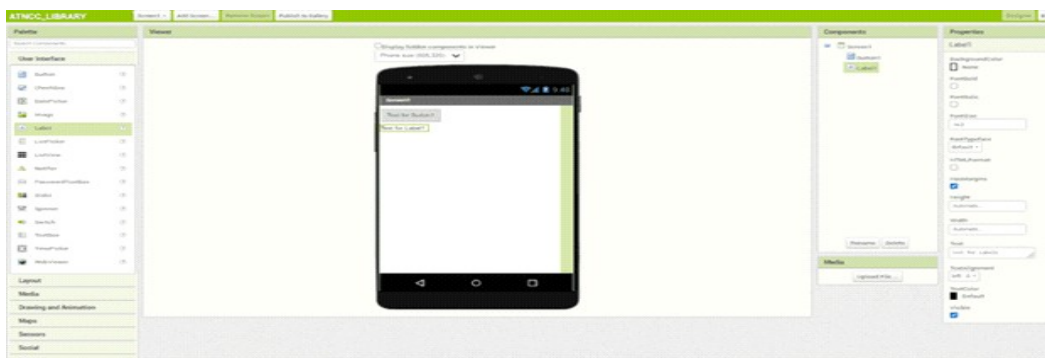


Figure 8. Add label

10.2. Add Image

From the UI, select the Image option. After clicking on it, drag and drop it into the Viewer window's representation of the phone screen. The developer can easily insert the picture and size by viewing the image's properties in the Properties tab.

10.3. Connectivity

One can link to the button, select the connectivity option in the user interface, then click on it, drag it, and drop it into the non-visible viewer components. In the Properties panel, type `android.intent.action.VIEW` in the action box, then paste/type the button connection link into the Data URI box.



Figure 9. Insert image



Figure 10. Connectivity

10.4. Blocks Editor

This section describes the programming used in the Library app. To open the Blocks Editor after adding components to the Designer, click the Blocks button in the top-right corner. Unlike the Designer, where components may be dragged, this requires choosing several code blocks that fit together like jigsaw pieces. The instructions contained in these blocks direct the program on what to perform. The primary distinction between the Blocks Editor and the Designer is that the latter determines the application's behaviour, while the former controls its look and feel. For an app to be successful, both are required.

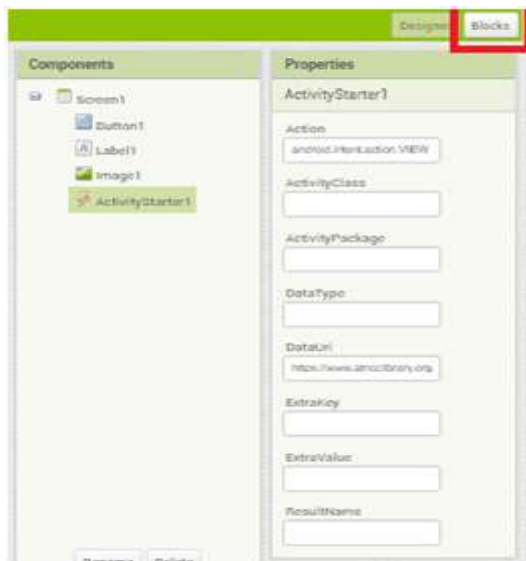


Figure 11. Blocks



Figure 12. Blocks

10.4.1. Blocks Palette

On the left of the Blocks Editor is the Blocks palette. This is where one can discover all the blocks, organised into two sections— Built-in blocks and Component blocks.

10.4.2 Built-in Blocks

The built-in blocks are organised into categories. Clicking on a category causes its blocks to show. For example, clicking 'Control' displays all control-related blocks.

10.4.3. Component Blocks

In the Blocks palette, choose the Button1 object. This opens the “drawer” of blocks that govern the button’s behaviour. It displays all of the blocks you can use to control the behaviour of that button or what should happen when a user clicks or touches it.

10.4.4. Action to the Button

To include built-in and Component blocks in your programme, click and drag them into the Viewer panel. When the user clicks the button, it acts as a control component for the built-in blocks.

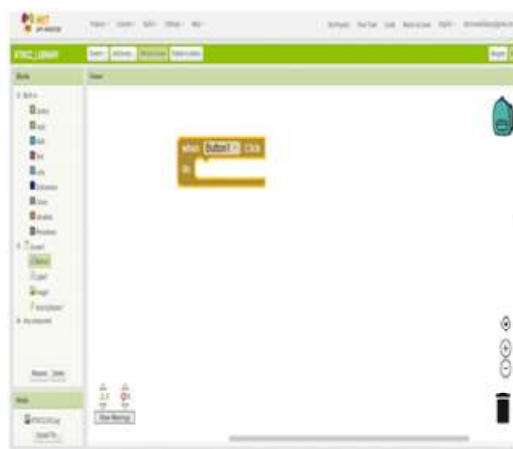


Figure 13.Action to the button



Figure 14. Link to the button

10.4.5. Link to the Button

MIT App Inventor is a programming language that uses blocks resembling puzzle pieces with words on them. The blocks join together to form instructions that are then translated into computer language so that a mobile device can follow them.

10.4.6. Code the Blocks

When the user clicks on Button1, the text for Label1 changes to Hello World! Hello, World! One can place as many blocks as one wishes inside the When Button1.Click the event block. When the user hits the button, all the blocks inside will begin to run.



Figure 15. Code the blocks

10.5. Open the Project

After designing the app with the necessary buttons, labels, screens, fonts, photos, and colours, click on the project menu to import your project or create a new project. The project is automatically saved, and one can replicate the same app under a different name.

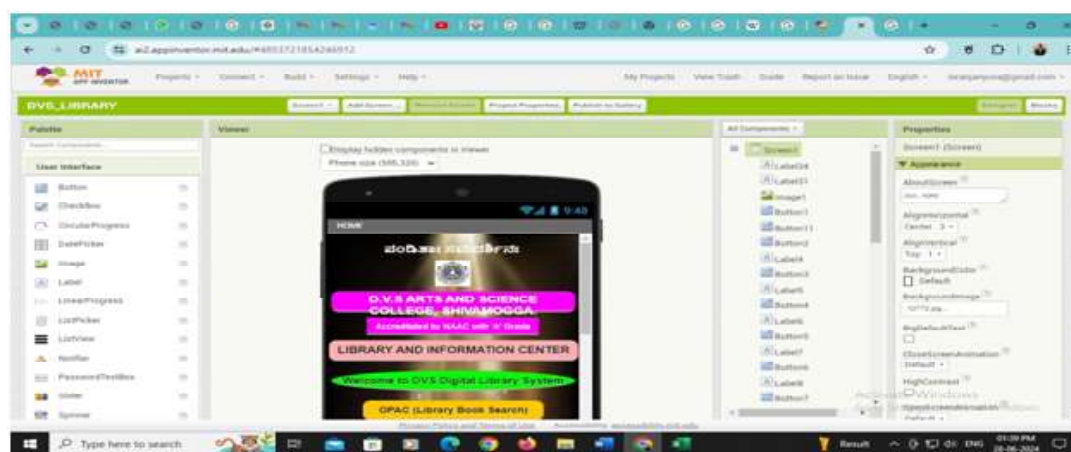


Figure 16. Open your project

10.6. Build the App

On the computer, in App Inventor, click the Build drop-down arrow from the menu at the top of the screen, then click Android App (apk.).

10.7. Scan QR Code

After clicking the Android App (apk.) button and downloading the Android app, scan the QR code and download it.

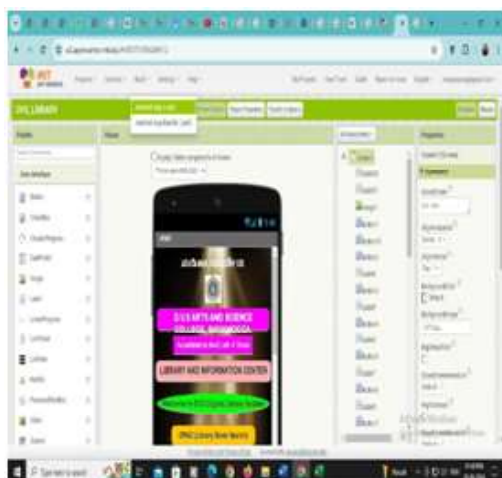


Figure 17. Build your App



Figure 18. Scan the QR code

10.8.DVS Library App

The DVS Library Android App, which enables customers to access any library service 24/7 from any location using their mobile phones, is the most recent addition to our library service. Because of this, patrons can now access any publication kept in the library for a range of scholarly uses. According to Mishra et al. (2017), "Mobile apps can potentially benefit today's students by offering more channels for interaction, ubiquitous access to library e-resources, OPAC, Library digest, news, and multimedia learning materials, among other things." Accordingly, DVS Library decided to use the Android app to distribute OPAC Link, e-content, digital library content, new arrivals, e-notes, question paper links, and instructional materials (see Figure 1).



Figure 19. App icon in the smartphone



Figure 20. Home page of the App



Figure 21. Content covered in the App

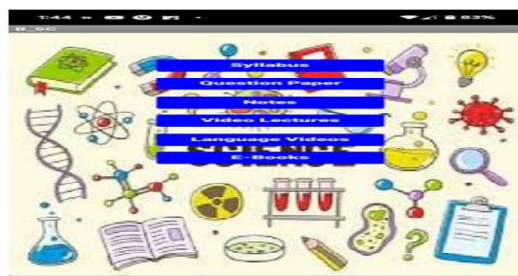


Figure 22. Dspace linked offline content link in the App

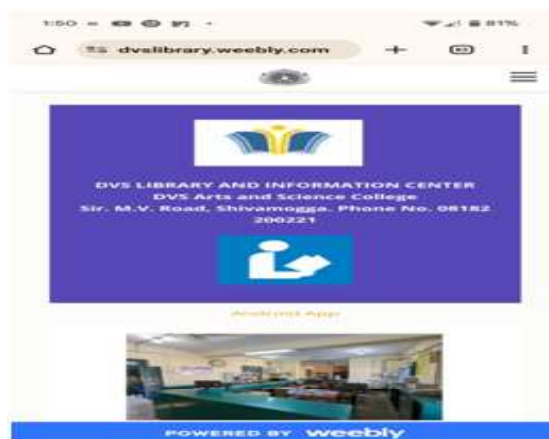


Figure 23. Library website view through App



Figure 24. Library OPAC link through App

11. Conclusion

Singh and Tewari (2021) These days, Android devices are all the rage. Android applications are becoming more and more varied every day. The development of it has grown to be a crucial component of the curriculum for programming today. Currently, Android apps act as a kind of virtual link between users and libraries. Anyone can learn to program and make fully functional Android apps with MIT App Inventor, a block-based programming tool that even beginners can use. With 67.8 million apps already produced, MIT App Inventor serves a global community of around 3 million users from 195 countries. Many consumers can now access programming and app creation through the open-source App Inventor platform. After adopting the Android app at the DVS library, the number of visitors increased, resulting in increased visitor awareness of library services.

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