IIT Bombay - Android Dev Intern

Shri Guru Gobind Singhji Institute of Engineering and Technology

—

Aditya Shivram Mahajan

Final Semester Report

Email: adityaspmahajan@gmail.com

Reg No: 2017BCS001

Roll No: A10

31 May 2021

Certificate

This is to certify **Aditya Mahajan(2017BCS001)** has carried out the internship work in **Android Development** from the **Indian Institute of Technology Bombay**. The internship work embodies the results of original work, and studies are carried out by the student themselves.

Guide
Dr.J.M Waghmare
(Associate Professor)

Guide
Sachin Deepak Wattamwar
(Assistant Professor)

Head
Prof. S.S.Hatkar
(Head of CSE Department)

Acknowledgment

We would like to express our gratitude to all those who helped us to complete this work. We want to thank our guide Dr.J.M Waghmare for their continuous help and generous assistance. They helped in a broad range of issues from giving us direction, helping to find the solutions, outlining the requirements, and always having the time to see us.

We would like to thank our colleagues who helped us from time to time from preparing the report and giving good suggestions also extend our thanks to our teaching and non-teaching staff of the Department who have directly or indirectly supported the cause.

We will be failing in our duties if we do not express our thanks and gratitude from the bottom of our hearts to my friends and parents who continually motivated us for the satisfactory completion of the project well in time.

Mr. Aditya Mahajan

INDEX

Abstract

In the following report I have described about all the details of my internship at IIT Bombay as an Android developer Intern. Which include the details of the clients I worked with, their apps, etc. I have also mentioned the tech stack and the architecture along with the modules I worked on and a few technical details about those modules.

Introduction

IIT Bombay is consulted by lots of government and private companies, startups, etc with some ideas and asks for help in developing and improving various products. The products which have a great effect on humanity and helps people in improving their life or can revolutionalize the world are selected to proceed further with.

So IIT Bombay along with their faculties hire interns from different colleges all over India to find unique talents and from different domains in order to satisfy the requirements of resources to complete the particular project, and then these students help in building these products.

Mentors and Project Leads

IIT Bombay Mentor
Mr Ganesh Ramakrishnan
Professor

SGGS Mentor
Mrs. Jaishri Waghmare
Associate Professor

Project Manager
Vikram Bansal
CTO at Tekolutions.ai

Reporting Lead
Anuja Dumda
Project Assistant

Clients of IIT Bombay

IIT has lots of clients and some of the clients that I have worked with during my internship period are as follows:

Lokavidya	Ekal Prashikshan	Vayam
Startup	Educational NGO	Govt. Project

Ekal Prashikshan - (https://www.ekal.org/)

The Ekal Abhiyan is a non-profit organization involved in education and village development in rural areas and tribal villages of India and Nepal. It is the largest grassroots, non-government education initiative in India with a presence in villages providing free education to children. The model of operation of the Foundation is a single-teacher based school, with the provision of "Ek Shikshak, Ek Vidyalaya"

Lokavidya - (https://lokavidya.com/)

Lokavidya Technologies was formed in the year 2016 with a vision to provide ICT solutions for Developmental Problems. The company envisions to cater to individualistic needs of education, skilling, and livelihood based on their aspirations. Lokavidya emphasizes, understanding the needs of the people, designing custom-made content for either direct or peer-to-peer learning, and enabling them to network for employment opportunities in their locality and also collaborate for entrepreneurial activities.

Vayam

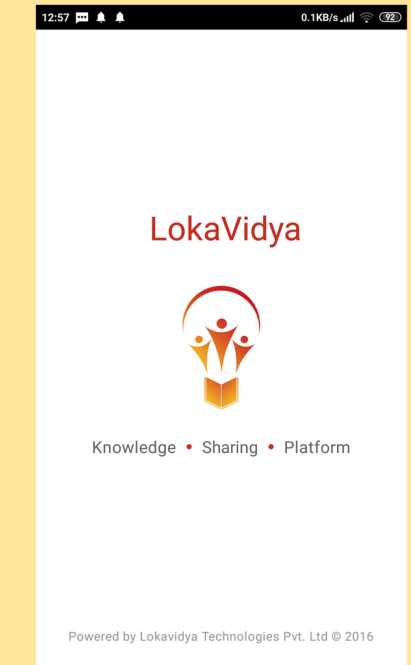
Vayam is a documentation app for the government project which stores the details of Wells, kunds, etc with their information. Where the Field assistants can go from place to place and record the water data available in that particular village. It has not yet been launched.

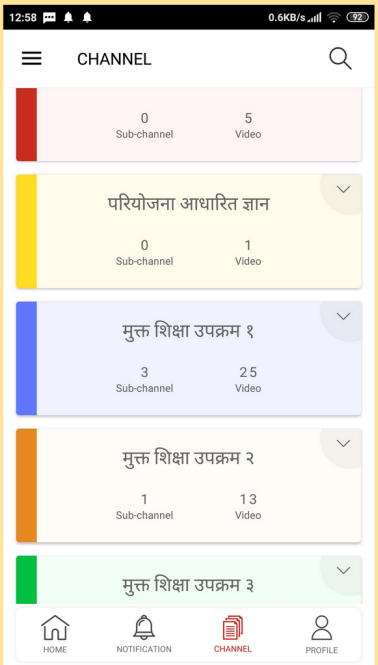
About the Apps

Now that we know a bit about the clients let us look at the apps that I was building and improving.

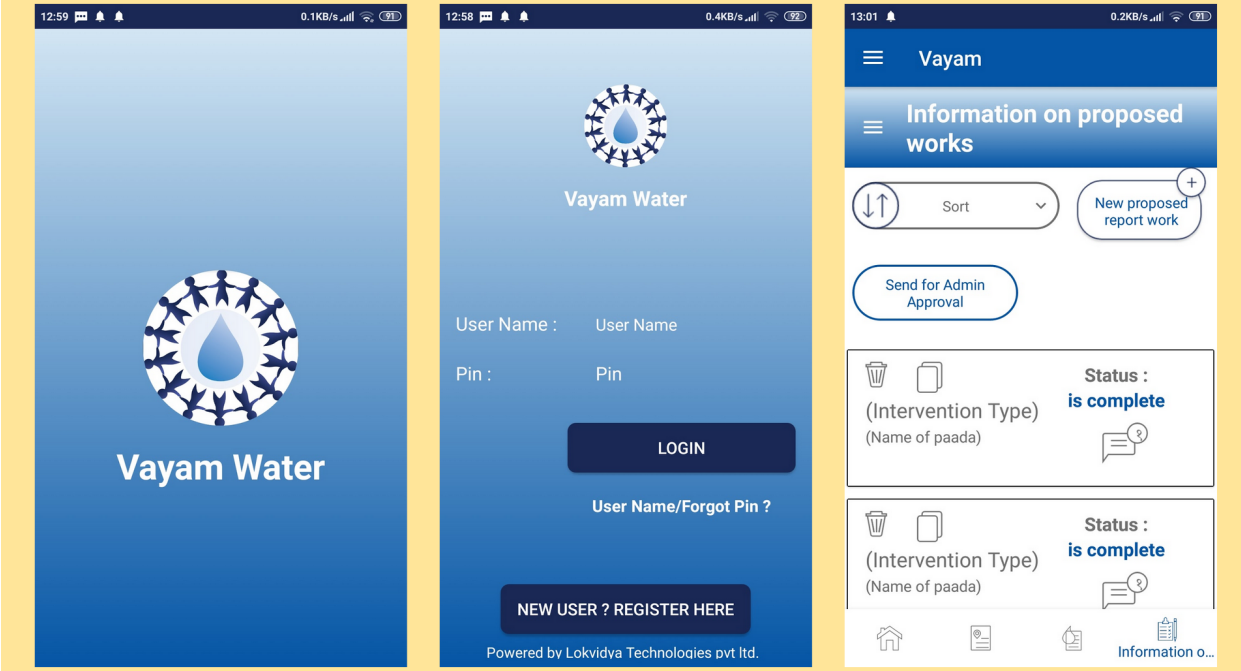
1) Lokavidya and Ekal are kind of online tutorial platforms with the aim of providing education to rural students. They had a very similar user Interface with slight changes in the features and working.

   Ekal Playstore Link: Ekal Prashikshan - Apps on Google Play
   Lokavidya Playstore Link: LokaVidya – Apps on Google Play
   Following are some of the Screenshots of the apps





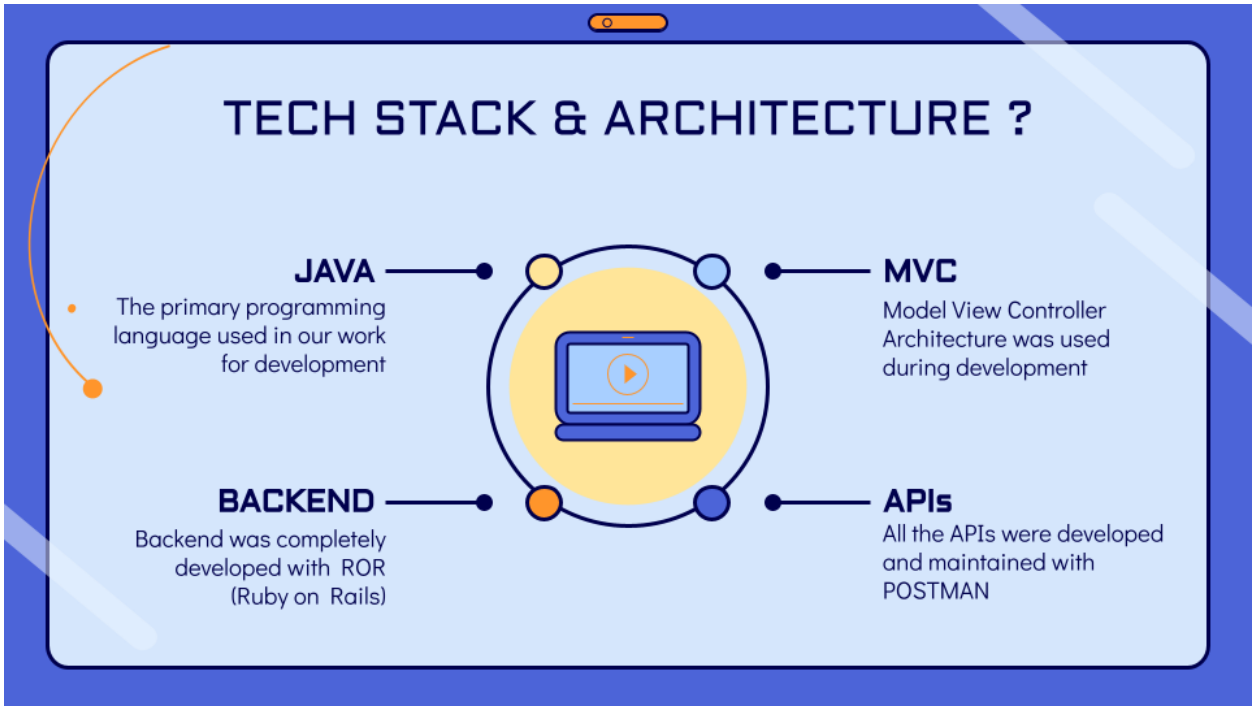
2) Vayam is a documentation app for the government project which stores the details of Wells, kunds, etc with their information. Following are some of the screenshots of the application.



Modules Added

The internship started with going through the codebase of the app, get to know the underlying MVC (Model - View - Controller) architecture used. Initially, we started with small bug fixes like API URL changes, some screen design fixes, etc. Java was the main programming language used and for backend ROR (Ruby On Rails). The APIs were developed and maintained in POSTMAN.

Then after about a month, we started developing new features into the app parallel to fixing some old issues and bugs. Some of the new features that were added are as follows.



I. PDF File Support

Library Used: **MuPDF** - Link

- MuPDF is a lightweight PDF, XPS, and E-book viewer.
- MuPDF consists of a software library, command-line tools, and viewers for various platforms.
- The viewer is small, fast, yet complete. It supportsmany document formats, such as PDF, XPS, OpenXPS, CBZ, EPUB, andFictionBook 2.

Secondary Use : **PDF Renderer** -Link

Used in Ekal app as there were very basic functionalitiesrequired and also is very lightweight. This class enables rendering a PDFdocument. This class is not thread safe.

We create a renderer and for every page you want to render, you open the page, render it, and close the page. After you are done with rendering, you close the renderer. After the renderer is closed it should not be used anymore.

II. Audio Support

Library Used: **AAudio** - Link

AAudio is a new Android C API introduced in the Android O release. It is designed for high-performance audio applications that require low latency. Apps communicate with AAudio by reading and writing data to streams.

The AAudio API is minimal by design, it doesn't perform these functions:

- Audio device enumeration
- Automated routing between audio endpoints
- File I/O
- Decoding of compressed audio
- Automatic presentation of all input/streams in a single callback.

III. API Optimization and Migration

Library Used: **Volley** - Link

Volley is an HTTP library that makes networking forAndroid apps easier and most importantly, faster.Volley offers the following benefits:

- Automatic scheduling of network requests.
- Multiple concurrent network connections.
- Transparent disk and memory response caching with standard HTTPcache coherence.
- Support for request prioritization.

But the problem with this was that it is not maintained currently and is archived and the last update was in 2017. So we shifted from Volley to Retrofit

Library Migrated to:**Retrofit -** Link

Retrofit is a type-safe HTTP client for Android andJava

Conclusion

1. This Internship helped me a lot in improving my technical as well as other industry skills required.
2. Some of the technical Skills Include: Java, MVC Architecture, API handling, APIs integration, Android studio features, etc.
3. So all the above things mentioned is the work done during my 6 months internship period.
4. I also learned how to handle team members and management skills.