FAMILY ACTIVITY SHARING APPLICATION

Aditya Nath Kalla *

Masters of Computing and Innovation
University of Adelaide

June 2020

"Technology is best when it brings people together"

— Matt Mullenweg

Executive Summary

Social interactions have been the norm of the day. Interactions in this digital era are not just limited to texts and calls, they go beyond that and are much more complex yet seem very simple. This report introduces a platform that caters to the needs such as data sharing, flexible grocery checklist, event management, and more."**Our Wall**" is a native mobile application that runs both on Android as well as IOS. It is designed on the basic principles of social networking using native development technology. The app creates a space for hassle-free data sharing within the family which is without intrusions. Shared events, lists, and galleries are some of the premia features, the application focuses on.

The vision behind Our Wall is to create a social media that offers a private and secure space for families to stay connected no matter where they are located. From easy and convenient google authentication and signing-in to user-friendly UI and UX

*Authors Contact: ID A1760704,University of Adelaide, Adelaide 5000, South Australia, E-mail: a1760704@student.adelaide.edu.au

design, the app offers a convenient, captivating, and interactive experience for its users. This is the report document for shared family activity application[2] which we [1] have developed for our final semester project.

1 Introduction

I remember the first time I logged into yahoo chat rooms. My immediate impression about the technology was, "God this is amazing!" fast forward a decade, now we are in a digital era where the social network has taken over the world. The current context of collaborations is clustered with social apps, which have become new carriers of emotion, love, and information. The family lays the rudiments for collaboration. Some research showed that two-thirds of all social media users stated that their major reason to use social networking platforms is to stay in touch with family and friends.[11]. There has always been a need to properly manage schedules and holidays with the family by balancing work and personal life for which people mostly rely on personal note-taking, calendars, lists like shopping lists as these small things play a key role in any family[6] There has always been a problem with these already available tools, majority of them are not connected and hence it's good for personal use but not for sharing and for the tools that have sharing features also comes with other details and limitations that a simple family maintenance app does not need. It is true that there is evidence that social media platforms play some important parts of people's lives, in many possible ways and it is also true that there have been many concerns of data privacy and security in these platforms. People have been anxious rather more concerned about all the personal data that is collected and shared by these platform moderators.[13] This gives us the opportunity to exploit the problem and provide a simplified solution form the field of expertise.

"Call it a clan, call it a network, call it a tribe, call it a family: Whatever you call it, whoever you are, you need one."

— *Jane Howard*

The application[2] we have developed as a part of our academic project is our proposal to solve the aforementioned issues with a networking platform, yet can stay connected with the people they love and care and the ones that matter the most. This app[2] lets the users create and share grocery lists, plan and manage their

[1] Aditya Nath, Tianyuan Li , Sonia Rani
[2] Our Wall

day-to-day activities, schedule events, occasions, click and share images, etc. The data that is stored in the app can be accessible by all the members of the family who are registered with the app and is completely private to the family or group. The development has been done on a native mobile platform[3]. Which means, our app[2] is available for both android and IOS users with a single programmatic code base. This will be convenient for users as well as moderators who maintain and update apps regularly. However, for the purpose of this project and report, we have limited the testing of app[2] to android devices only. In the following section, I have described the main goals that we planned to achieve in this project. In section 3 I have described in detail the systematic approach that we have followed, tools used, the process followed to achieve the planned objectives. In section 4 I have discussed what has been achieved, user test results, and lessons learned from the development process. Finally, in section 5 I conclude with a summary of the project outcomes and future work that can be done to extend the work further and future prospects of the project.

Figure 1: Image showing logo of our application *"Our Wall"*

2 Project Goals

In this section, I have briefly discussed, the main goals that we have set for this project. These goals helped to visualise and focus on the final outcome of the project.

The application[2] we have developed is focused to set goals and niche. The audience or consumers for whom we provided our solution is users with family as the main variable. Our main goal was to provide a platform that can connect the family in a better way than that which is available now. The following are the main functionalities we tried to implement in this project.

[3]Dart and Flutter

- Private social space where users can share data without risk of exposing themselves to the online world.
- Collection of shared lists eg. grocery list, to-do list
- Shared calendar where every family member can add activities, schedules and that can be seen by all other members of the same family
- Shared image gallery, in which everyone can add images, and others can view them.
- Privately hosted database

We have made the application onboarding process very simple and user friendly such that users can use their existing google[4] account information (assuming they already have a valid account) to log into the application and start using its features. We have developed our application after thorough research with due consideration of several aspects and the end result is both visually beautiful and functionally robust.

3 Approach

In this section, I have talked about the approach we have followed to achieve our objectives and finish our project.

We started planning our project with the goals discussed in the above sections as our major objectives for this project. We know that we are going to develop for families but the concern here is where are we going to develop the tech. After considering many possible factors such as ease of convenience, user friendly, addictive, and less fuss we decided to develop a mobile application. The best *Project Management* approach I thought would be appropriate for our project is ***Agile Methodology***

Agile software development[see fig: 2] process comprises of various approaches to software development stages under which the requirements and provide solutions to evolve through the collaborative effort of self-organizing and cross-functional teams.

Agile is a process in which a team manages the project by breaking it into several small stages. It also involves collaboration with stakeholders, making continuous

[4]Account info that can be used to login to Gmail

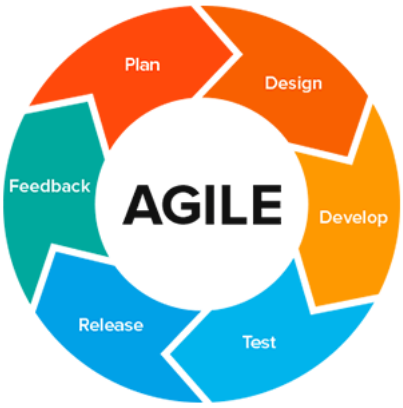


Figure 2: Image showing Agile software development cycle

improvement and iteration at every stage. The process begins with the client's description of how the end product will be put to use and what problem will it solve. This gives a good clarity on customer's expectations to the project development team. Once the work starts, development teams cycle through a process of planning, executing, and evaluating the final deliverable to fit the customer's needs. Here, continuous collaboration is the key, both among team members and also with the project stakeholders, to make appropriate decisions[19].

The following is the list of the technologies we have used:

- **Prototyping Tools**
  - Balsamiq
  - Adobe XD
- **Software Front End:**
  - Dart
  - Flutter
  - XML
- **Software Backend and Database:**
  - Google Firebase

- Cloud Firestore
- Firebase Storage
- Dart

I have tried to explain about these tools in detail in the following section

3.1 Project Development Tools

In this section I have briefly discussed about different utilities and tools that I have used to execute the project.

Tool and platform selection was our primary discussion task as a team and we have considered the possibility of different device platforms that can be used within same social family[12] or user groups, therefore, we had decided to implement this project in a tech that is accessible from all platforms[16]. The possible solutions were progressive web application[14] or applications built on native[10] platform[15]. We selected *Flutter* which is a latest native[10] mobile and web framework as a suitable option for building the project.

3.1.1 Prototyping Tools

The design tools used for creating UI[5] and UX[6] are *Balsamiq* and *Adobe XD*[7]

Figure 3: Adobe XD official logo

Figure 4: Balsamiq official logo

- *Balsamiq* [see fig: 4] is the online based industry standard low-fidelity wireframing tool used to develop quick mockups[5].
- *Adobe XD* [see fig: 3] is a vector-based user experience design tool for web and mobile apps which is developed and published by Adobe Inc[3].

[5]User Interface
[6]User Experience
[7]Adobe Experience Design

3.1.2 Software Tools

The core software has been developed using software called *Dart* and framework called *Flutter*

Figure 5: Official Flutter Logo

Figure 6: Official Dart Logo

Flutter [see fig: 5] is an open-source mobile app UI framework developed by Google[8].It is released in May 2017. It will allow developers[9] to create a native[10] mobile application with single code-base. This means one programming language and one code-base can be used to create and maintain app across different platforms [17](eg: iOS and Android). Flutter has two important components:

- **SDK(Software Development Kit)** : A collection of tools that will help to develop applications including tools to compile code into native[10] machine code (code for iOS and Android).
- **Framework (UI Component Library)**: This is a collection of UI elements which are reusable *(like buttons, text inputs, sliders, and so on)* and can also be personalize for individual needs.

Flutter uses the programming language called *Dart*

Dart [see fig: 6] is a programming language created by Google in October 2011.Dart is mainly focused on front-end development.It is a typed object programming language. Dart's syntax is similar to that of JavaScript

3.1.3 Development Environment

The Integrated Development Environment we have used to develop our project is *Android Studios*[11]

[8]Google.Inc
[9]Software Programmers
[10]Compiles natively to device environment
[11]Developed by Google and JetBrains

Figure 7: Image showing the official logo of Android Studios

Android Studios [see fig: 6] is Google's official integrated development environment (IDE) for Android operating system. It is built upon JetBrains' IntelliJ IDEA software and designed specially for Android application development. It is available for Windows, mac OS and Linux based operating systems[4].

3.1.4 Application Backend

For this project we have selected *Firebase*[12] as our database platform. Firebase [see

Figure 8: Firebase official logo

Figure 9: Firestore official logo

fig: 8] is an application development platform for mobile and web which is developed by Firebase.Inc in 2011. Firebase has many products under its domain[9]. The products we have used are *Cloud Firestores(please see fig: 9), Firebase Storage.*

- *Cloud Firestore* [see fig: 9] is fully managed, serverless, cloud-native NoSQL document database that simplifies the process of storing, syncing, and querying data for mobile, web, and IoT apps at global scale.[8]
- *Firebase Storage* is a stand-alone solution to upload user generated content (like images and videos) from a device. It is designed specifically for scale, security, and network resiliency.[1]

3.1.5 Project Management Tools

For managing our work properly we have used tools like *Google Drive, GitHub, Trello.*

[12]Database solution from Google

- *GitHub* [see fig: 10] is a software and web version control hosting platform. GitHub offers the distributed version control and also source code management (SCM) functionality of Git, in addition, it also has its own features. It provides access control and collaboration features such as feature requests, bug tracking, task management, and wikis etc[7].

Figure 10: GitHub official logo

Figure 11: Trello official logo

  GitHub is based on Git[10] which is a free and open-source distributed version control system. It is designed to handle small to very large projects without any issues.

After we have finalised on software and supporting tools, we divided our project into modules and sub modules as follows:

- Basic App Setup
- Database setup and connecting with the app
- Authentication and sign in either direct or social account
- Main app features
  - Lists
  - Calendar and Events
  - Gallery
- Sharing data between users
- Search feature
- Assets, transitions, animations and navigation
- Final UI and UX changes

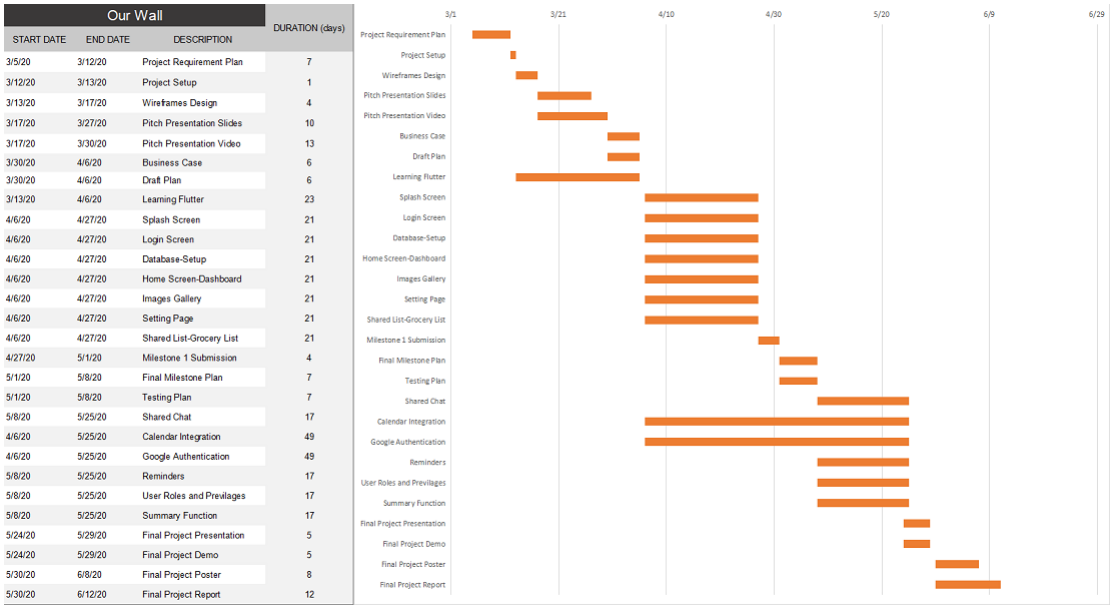
We have made a detailed Gantt chart [see fig:12] to set our tasks in order within stipulated time.[18]

3.2 Project Development Process

This section describes the project development process and also my personal contribution and approach that I have followed to make the best use tools described in the section above to meet all milestone requirements, to finish and submit the project on time. Following are the steps I followed:

- At first I have designed the flow chart ([see fig: 17] for detailed app flow and [see fig: 15] for simplified version)and to visualize how the project would from start to finish. At this point, the flow chart was vague which got better and better during the entire development process.
- With the basic idea in mind I have prepared a prototype with *Balsamiq* and *Adobe XD*. This helped me to plan my coding process in order.
- At first I designed the Welcome screen [13] which is displayed at app launch and on "click action" navigates to Home screen[13] of the application.
- After the basic structure of the app, I have intialised the database in Firebase[12]. I have imported all the required packages to link the app to the database.
- With database connected, I have implemented Google Authentication Using *OAuth 2.0*[14]. At this point, we have the app with controlled authentication.
- I have designed the database such that it stores the information of all users that are registered with the app.
- After testing the robustness of the program, I designed The following components of the App:
  - Curved bottom navigation bar
  - Card layout
  - Date and time display format
  - Animated home page display pic
- After finishing adding content to Home page[13] I designed the Gallery page.
- In Gallery page[13] I used a Floating action button (FAB) to grab the image either from the device camera or from the device image gallery.

[13]See Appendix A
[14]Google APIs use the OAuth 2.0 protocol for authentication and authorization



Our Wall			
START DATE	END DATE	DESCRIPTION	DURATION (days)
3/5/20	3/12/20	Project Requirement Plan	7
3/12/20	3/13/20	Project Setup	1
3/13/20	3/17/20	Wireframes Design	4
3/17/20	3/27/20	Pitch Presentation Slides	10
3/17/20	3/30/20	Pitch Presentation Video	13
3/30/20	4/6/20	Business Case	6
3/30/20	4/6/20	Draft Plan	6
3/13/20	4/6/20	Learning Flutter	23
4/6/20	4/27/20	Splash Screen	21
4/6/20	4/27/20	Login Screen	21
4/6/20	4/27/20	Database-Setup	21
4/6/20	4/27/20	Home Screen-Dashboard	21
4/6/20	4/27/20	Images Gallery	21
4/6/20	4/27/20	Setting Page	21
4/6/20	4/27/20	Shared List-Grocery List	21
4/27/20	5/1/20	Milestone 1 Submission	4
5/1/20	5/8/20	Final Milestone Plan	7
5/1/20	5/8/20	Testing Plan	7
5/8/20	5/25/20	Shared Chat	17
4/6/20	5/25/20	Calendar Integration	49
4/6/20	5/25/20	Google Authentication	49
5/8/20	5/25/20	Reminders	17
5/8/20	5/25/20	User Roles and Previlages	17
5/8/20	5/25/20	Summary Function	17
5/24/20	5/29/20	Final Project Presentation	5
5/24/20	5/29/20	Final Project Demo	5
5/30/20	6/8/20	Final Project Poster	8
5/30/20	6/12/20	Final Project Report	12

Figure 12: Image of project Gantt chart

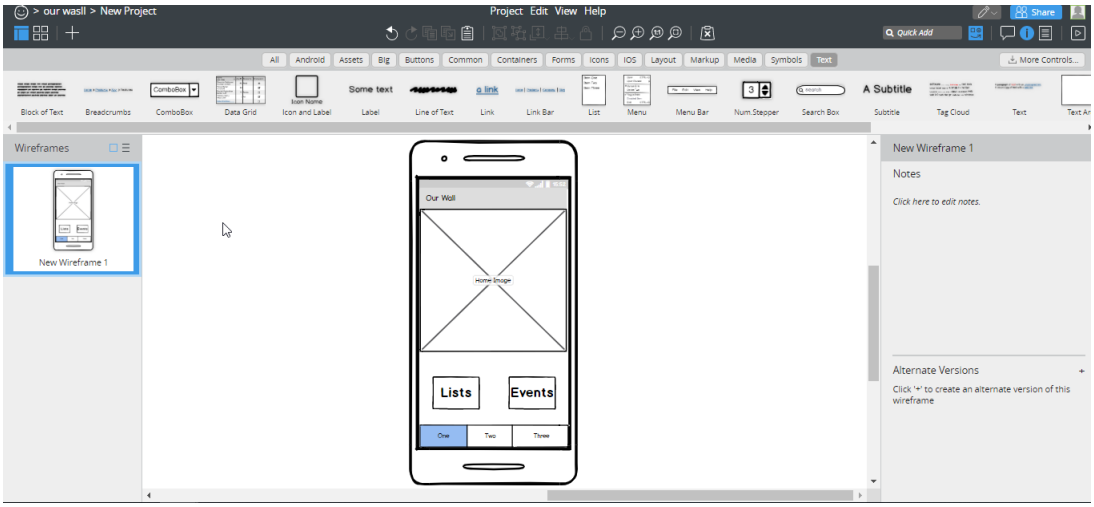


Figure 13: Image showing creating mockup in Balsamiq

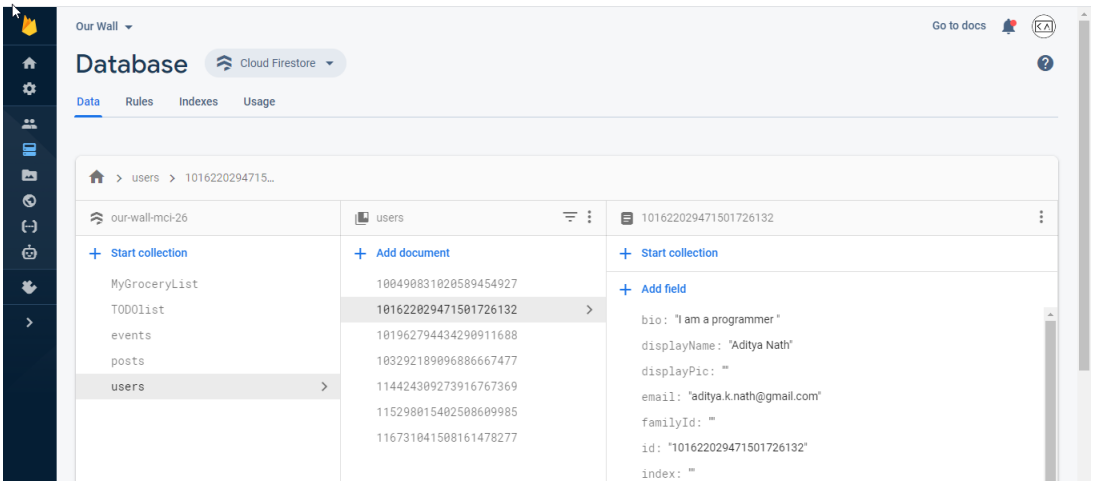


Figure 14: Image showing Firebase Database Console

- Selected or captured image once posted will be added to database storage and immediately displayed on the galley screen of the app. The change here is real-time.
- I have also developed a search feature where users will be able to search for all other users on the platform using their names. These results will be shown on search Page**Add reference Here** of the app.
- Lastly the Settings page contains information such as *Profile Settings, Application info, Developer Info Logout button.* The function of each is explained below.
  - *Profile Settings* is a page within the app that allows the logged in user to change their profile information such as display name and bio information.
  - *Application info* page contains a list of all the packages that are used for the application. I thought This will help other developers to better understand the app background logic.
  - *Developer info* page contains the name of me and my team[1] members that assisted me in this project. I have also added the name of our project supervisor[15]. Just to make this page interactive and interesting I have added cool features such that any user can send a direct email to either

[15]Assistant Professor Claudia Szabo

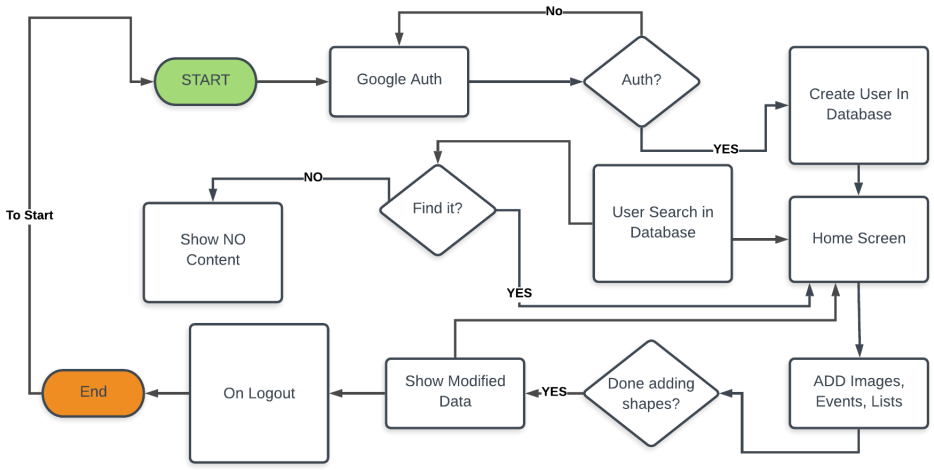


Figure 15: Image showing simplified layout of application process flow

member of our team or supervisor and also will be able to directly navigate to the supervisor's profile page[2] on university website[16].

– *Logout* button as name suggest logs the user out of the app to Welcome[13] screen

- A member from my team[1] has worked on developing shared Lists page for Groceries and To-do Lists. This is CRUD[17] action on database. I have added the swipe animation for the delete list and snack bar message to enhance user experience.

- Another member from my team[1] had worked on calendar and events feature for the app. With this feature, the user can see the calendar when within the app and can able to select a date and add an event with title and description on that selected date. This added date will also be added to the database and all the users will be able to see that event on that date.

- I have contributed here in this section by modifying UI and UX for calendar and event display screen.

- Finally, I have modified the entire app design, UI components, fixed major and minor bugs, and tested thoroughly with different user accounts and data inputs

[16] www.adelaide.edu.au
[17] Create, Read, Update, Delete

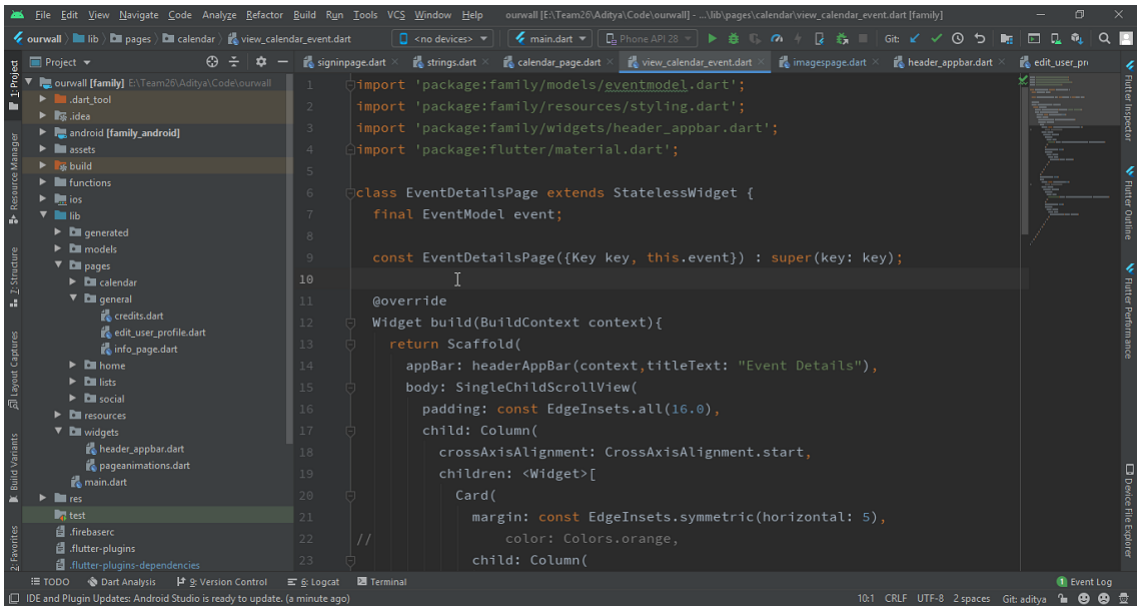


Figure 16: Image Android Studio work in progress

manually.

- The end result is very satisfying as all the proposed features were implemented and I have also left scope for adding new features if needed to extend the app further.

4 Results

This section talks briefly about the final result of the project, what has been implemented, individual achievements, etc. The final outcome of the project is a fully functional and robust mobile application for devices that run on the Android operating system. This application is the family shared activities app. A user can log in to our application using their Google account credentials. once logged in he can create to-do lists, write grocery lists, create calendar events, plan schedules, capture and upload images, and collaborate and share these content with other users using the app. Users will feel much more connected, together with other users as the feeling of sharing is natural to real-life cases.
For simplicity, I have divided the results into individual sections.

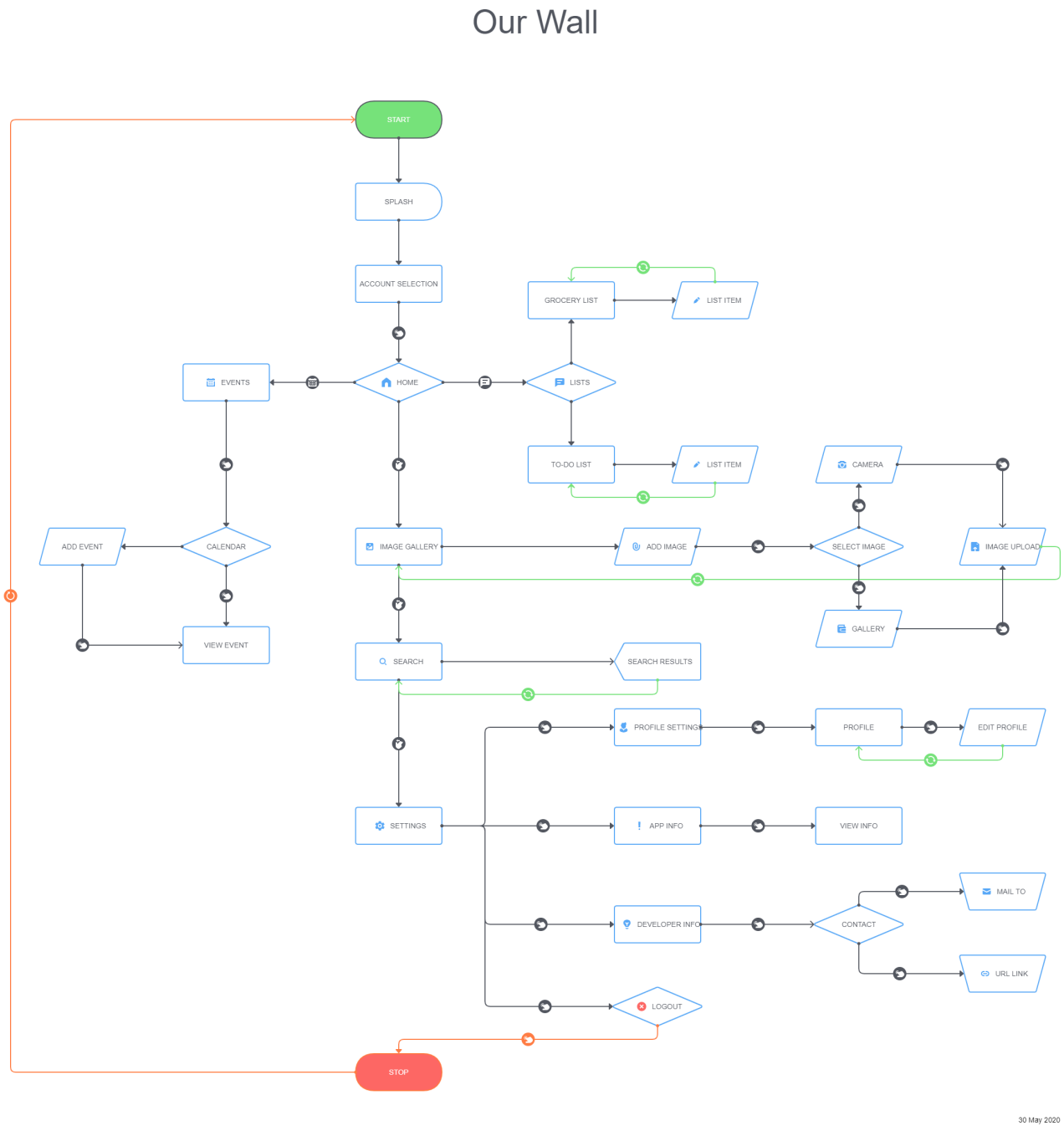


Figure 17: Detailed process flow of the application

4.1 Detailed Testing Result

This The application has been tested thoroughly and following are the list of test results:

- Displayed welcome screen at start
- Was able to log in on sign-in button press using google account
- Was able to navigate smoothly to all the screens of the application
- Lists feature is working smoothly i.e., display list, create content, add content to the database, delete content from the app, delete from database, show updated list, etc.
- Calendar and events feature are working as intended i.e., display calendar, create events, add events to a database, display events, etc.
- Gallery feature is working as planned i.e., display images in a staggered grid, add images from the dialog, access device camera, access device image gallery, post image screen, get current geo-location, upload to the database, display uploaded image on gallery screen.
- Settings and profile screens are working smoothly
- Was able to send emails to developers and open URL from app in the Developer info screen
- Successfully logged out when logout button is pressed and was navigated to welcome screen

5 Conclusion

The journey of the project "Family Activity Sharing Application" has been a great learning and working experience. The project has provided many challenges along the way and I had learned about many other concepts regarding app development while solving those obstacles. The final outcome of our project was both creatively laid out and very well executed. I am really thankful that I was part of this project.

5.1 Individual Achievement

This project was very challenging for me at the start. The reason being this is not just a web technology but a mobile application. Having said that this was also very interesting, practical, and very close to real-life projects. The journey of the project from planning and execution was a great lesson learned and a great real-world experience. The following are a list of my achievements for this project.

- I had to learn a new and very advanced mobile development architecture for this project.
- I feel that the potential of this tech is really huge and this can also be a career path
- I have learned to use wireframe, mockup, UI, UX tools, and create prototypes rapidly which now I can put into practice for my later projects as well.
- I now have a better understanding of App development process prototyping, user scenarios, user flows, test cases, character development, code debugging, database management, database rules. etc
- I have learned how to work individually and to work as a team to achieve common goals.
- This project has boosted my confidence and leadership which helped me manage an entire project and a small team.
- I believe I can work more to extend this app and launch it as a social media which is targeted at families.
- For report writing I have learned and used typesetting tool called "LaTex".

5.2 Future Direction

The application[2] we have developed has a great deal of scalability and commercial viability when extended to meet market standards. The following are future prospectus of our project

- *Lists* can be extended by adding timestamps, owner and modified by tags, restricting the editability of non-admin users, adding notification reminders, saving lists into categories, saving an entire list as favorite content to users, linking lists to Calendar, etc.

- *Calendar* can be extended by adding a time trigger to an event and displaying today's events and upcoming appointments on the home screen, adding a priority tag to an event, and categorizing them for more advanced scheduling. blocking calendar so that the same slot cannot be used either individually or as a family etc.
- *Gallery* can be further extended by adding image filters like Instagram to make it more addictive. Linking images to calendar and lists, sharing images to other platforms, deleting images, etc
- App can be modified by including social networking features and change the app to Social network application.

References

[1] *5 tips for Firebase Storage*. July 2016. URL: https://firebase.googleblog.com/2016/07/5-tips-for-firebase-storage.html.

[2] *A/Prof Claudia Szabo*. URL: https://www.adelaide.edu.au/directory/claudia.szabo.

[3] *Adobe XD*. URL: https://www.adobe.com/au/products/xd.html.

[4] *Android Developers*. URL: https://developer.android.com/.

[5] *Balsamiq Wireframes - Industry Standard Low-Fidelity Wireframing Software: Balsamiq*. URL: https://balsamiq.com/wireframes/.

[6] Raewyn Bassett, Brenda Beagan, and Gwen E Chapman. *Grocery lists: connecting family, household and grocery store*. Feb. 2008. URL: https://www.emerald.com/insight/content/doi/10.1108/00070700810849916/full/html.

[7] *Build software better, together*. URL: https://github.com/.

[8] *Cloud Firestore — Google Cloud*. URL: https://cloud.google.com/firestore.

[9] *Firebase*. URL: https://firebase.google.com/.

[10] *git home page*. URL: https://git-scm.com/.

[11] Russell Heimlich. *Using Social Media to Keep in Touch*. Dec. 2011. URL: https://www.pewresearch.org/fact-tank/2011/12/22/using-social-media-to-keep-in-touch/.

[12] CYRIL KOWALISKI. *My smartphone conundrum*. Oct. 2012. URL: https://techreport.com/blog/23716/my-smartphone-conundrum/.

[13] Lee Rainie. *How Americans feel about social media and privacy*. Mar. 2018. URL: https://www.pewresearch.org/fact-tank/2018/03/27/americans-complicated-feelings-about-social-media-in-an-era-of-privacy-concerns/.

[14] Sam Richard and Pete LePage. *What are Progressive Web Apps?* Jan. 2020. URL: https://web.dev/what-are-pwas/.

[15] Margaret Rouse. *What is native app? - Definition from WhatIs.com*. Mar. 2018. URL: https://searchsoftwarequality.techtarget.com/definition/native-application-native-app#:~:text=A%20native%20application%20is%20a,device-specific%20hardware%20and%20software..

[16] Pietro Saccomani. *Native, Web or Hybrid Apps? What's The Difference?* June 2019. URL: https://www.mobiloud.com/blog/native-web-or-hybrid-apps/.

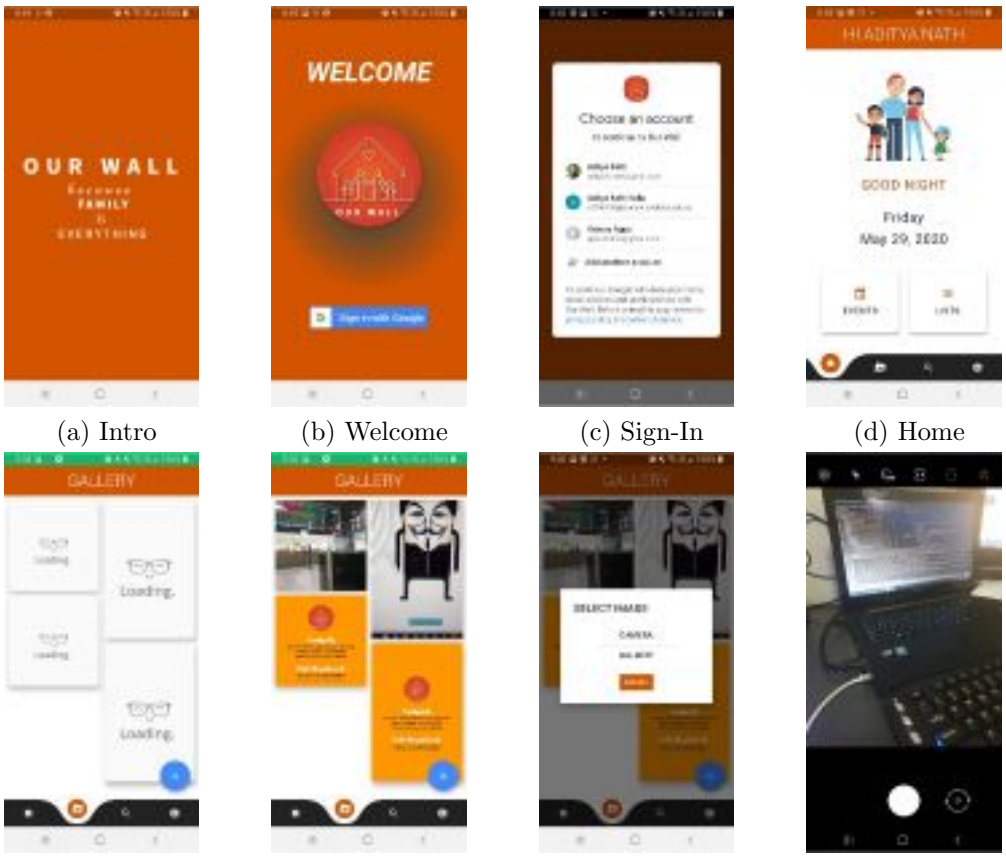
[17] Gaël Thomas. *What is Flutter and Why You Should Learn It in 2020*. Jan. 2020. URL: https://www.freecodecamp.org/news/what-is-flutter-and-why-you-should-learn-it-in-2020/.

[18] *What is a Gantt Chart?* URL: https://www.gantt.com/.

[19] *What is Agile Methodology in Project Management?* URL: https://www.wrike.com/project-management-guide/faq/what-is-agile-methodology-in-project-management/.

Appendices

A Application Screens



(a) Intro (b) Welcome (c) Sign-In (d) Home

(e) Image Loading (f) Gallery (g) Image Selection (h) Access Camera

Figure 18: Application Screens

(a) Upload Image

(b) Lists

(c) To-DO List

(d) Grocery List

(e) Add Item

(f) Delete Item

(g) Calendar

(h) Add Events

(i) Search

(j) Profile

(k) Settings

(l) Developer Info

(m) Launch Url

Figure 19: Application Screens