Building a common platform for food donors, volunteers and needy to eliminate hunger

SayNoToHunger (Android application)

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ABSTRACT:

The research paper describes one of several solutions to eliminate the food wastage at restaurants, farmers and individual households. It proposes a way to feed the hunger driven people with the leftover edible food without it being discarded. The idea also enables the volunteers to not only donate the food but also spare sometime to deliver the food from the donors to the receivers. An android application was built enabling all these features along with a real-time database to store and retrieve the data.

CCS CONCEPTS:

Database management systems, Real-time processing, Mobile application

KEYWORDS:

Android, Database, Authentication, Agile, Adobe XD, Android Studio, Firebase

1   INTRODUCTION:

It adds more meaning to a person's life if he does something for the society. As a human being, it is responsibility of every individual to do their own part to the needy people around them. Solving some of the day-to-day problems in the society or at least providing some kind of support to lessen the effects of the problem should be the motive of everyone. This paper is mainly based on the above theme which tries to solve one of the major problems: 'Hunger'.

According to United Nations estimates there are about 690 million people hungry all over the world and this number is raising. This is disturbing as many people are deprived of essential food which is necessary to complete their daily activities. On one hand there is so much food wasted every day and on the other hand, there are people short of food. In an urge to find a solution for the above problem and taking this as a motivation, this paper builds a mobile application which serves as a common platform for the donors, volunteers and needy to communicate and serve each other. Donors include restaurants, farmers and individual households. Volunteers can either donate the food or spend their leisure time in getting the food moved from the donors to the needy. This project mainly focusses on the UN Sustainable Development Goals: 2. Zero Hunger, 3. Good Health and well-being and 12. Responsible consumption and Production.

Few similar applications were built previously. Food for All [1] is an iOS application which helps the restaurants to sell the leftover food at a discounted price. Restaurants will post the food details on the app before couple of hours of closing. Anyone with the application can check the details and also pay in the application. It also has a map which can locate the restaurants. Food Cowboy [2] is another website application which acts as a mediator between the people with excess food and charities. Their main goal is to distribute the food to NGO's. Once they receive information about the donors, the team verifies it

and sends a message to the charities with the donor details who can directly collect from them. The team also provides the service to ship the food between donors and charities if needed. No Food Waste [3] is a website acting in most parts of India. This group mainly concentrates on the food being wasted at weddings or parties. Users can update the hunger spots (where food is needed) and donors with some leftover food can directly contact the users and deliver the food. And many more applications were built with similar idea.

To differ from what is already existing, the current project's idea is to include farmers and other individuals along with the restaurants to post their available food on the application either with some price or for free. The main reason behind this is that, not only at restaurants but also there is lot of food being wasted at households too and also farmers may have the excess yield. Small amount of food is also taken into consideration because it can also serve one or two people. Inclusion of the above two parties make sure that maximum food is recovered and a greater number of people getting the food. The feature of volunteers is also added in the application who can post the requirement of food for the people around them as the needy group may not have the access to mobile and also, they can spare some leisure time in getting the food transferred from donors to the needy group.

2 METHODS:

2.1 Choosing customer base

It is important for any project to start with choosing the customer base. Success of a project is determined by the proper selection of set of people who will be willing to use the product. The main customer base targeted in this application are the volunteers and donors. Volunteers who are willing to post for food and volunteer for delivery and also donors who are willing to donate the leftover food. Application also demands that both parties have access to mobile phones.

2.2 Understanding the customers

A survey was carried out to understand more about the donors and volunteers. Four restaurant owners were asked about their willingness in donating the leftover food for which three among them showed interest and one denied because of their cultural belief. Twelve common people in different age groups were asked about volunteering, either post a food requirement or donate or drive the food. Eight among them showed willingness to do all the three things. Two among them were elderly but knowledgeable enough to use a mobile application and they agreed on donating and posting a requirement but not drive. Last person interviewed, showed no interest in the application.

This survey helped a lot in understanding the mindsets of different groups and determine the Digital habitat. As most of the feedback was positive which indicated the green status, the project was taken into further stages.

2.3 Selecting a platform for the application

With the ever-growing technology, there are many types of applications namely websites, android apps, iOS apps, etc. The application for this project is selected to be an Android app. In the present day, mobile phone has become part of the body for majority of the people. Also, mobile app if designed properly, will be easy to use. User does not need to go to the browser and type the website address which has to be remembered. As with all these benefits, mobile apps can appeal to most age groups.

2.4   Getting the software stack ready

Ease of development of any application relies on the software stack used. Prototype was developed in Adobe XD. Application development was done in Android Studio. Programming language used is Kotlin. The database used is Firebase database.

2.4.1 Adobe XD:

Adobe XD [4] provides a smooth and easy interface to develop any prototype, whether it may be a website or a mobile app. Various options are available like buttons, image uploads, background selection etc. This enabled to design the prototype in a decent way.

2.4.2 Android Studio:

Android Studio [5] is one of the prominent software to develop an android application. It is a freeware and comes with most of the important packages inbuilt which are required for the android app development. It enables MVVM (Model-View-ViewModel) architecture by its folder structure. This architecture helps loose coupling and supports Separation of Concerns in following way:

- Model: It is the data part of the application. Contains the data related files like the model of the tables defined, actual data and database. The code is written in simple Koltin files.
- View: It consists the UI files of the application. These are written in XML format. Android studio supports direct inclusion of the page features (buttons, text, images, etc) with a simple drag and drop and it adds the XML code automatically.
- ViewModel: These include the business logic files. The ViewModel coordinates between the Views and the Model. Once the ViewModel received the request, it fetches the data from the model and the corresponding view and sends the result to the user as shown in the fig 1.
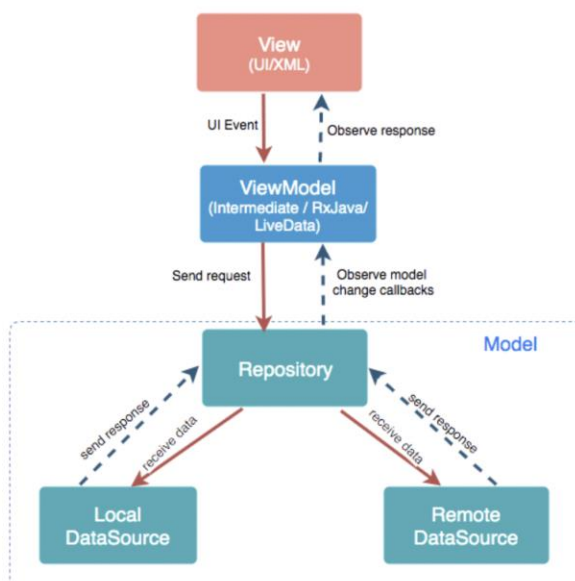

Figure 1: MVVM architecture, Image by Amit Shekar
[Public Domain] (https://blog.mindorks.com/mvvm-architecture
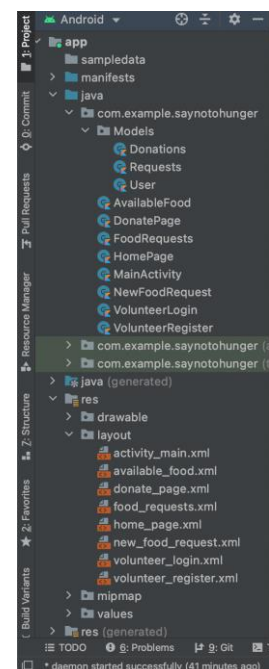-android-tutorial-for-beginners-step-by-step-guide)

Figure 2: MVVM file structure

2.4.3 Kotlin Language:

Kotlin has a more concise code compared to Java. Due to this reason that it is preferred in application development. Android studio provides app development in Java and as well as Kotlin. As the code is more compressed in Kotlin, it has been chosen for this application. It was one of the biggest challenges as I was new to this.

2.4.4 Firebase Database:

Firebase database is fast and reliable database majorly used for mobile app development. It has a web interface which is easy-to-use. Rather than shooting the SQL commands, the web interface has the options to directly select from them. It provides various authentication features and also has a real-time database where the data is stored.
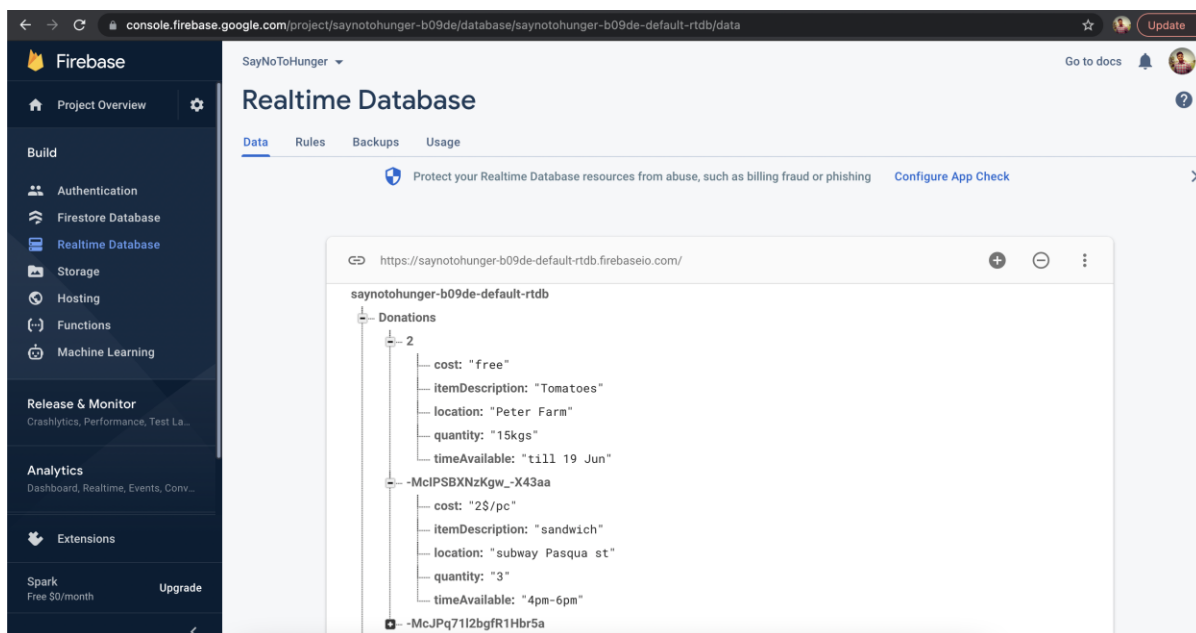

Figure 3: Firebase Database showing real-time data

2.5 Working

Once the application is started, it opens to a page with the name of the app 'SayNoToHunger' and background image. User can tap anywhere on the screen and it takes to homepage. Homepage contains few lines describing the work done till then and some motivational quotes. It also has two options 'Donate' and 'Volunteer'. Once Donate is selected, it takes the user to a form where he/she can fill out the details of leftover food and post it. After posting, it will be stored in the database and then listed on the 'Available Food' page. If the user selects the Volunteer option on the homepage, the registration form opens up for the new users and also has an option to open the login page for the previous users. Once logged in with e-mail and password, they can see the list of food request posts. Also, can post a new request to the same page. Volunteers have access to check the 'Available food' page so they can coordinate between the food donated and food required.

Application was built asking a very minimal details in all the pages. This was making sure that the elderly age group can access the app in an efficient manner.

Figure 4,5,6,7: Start page, Homepage, Food requests page, Available food page

3   RESULTS:

Edwards Deming PDSA (Plan, Do, Study, Act) was followed for this project. Planned in the phase of prototyping. Did some work in the development. Studied again to correct few errors and then finalized the application.

Entire project was built on Agile approach with few MVP's (Minimum Viable Product). The scrum dates for each MVP were 7-9 days. This approach made the development phase easy as the set of workflows can be planned for the following week.

The project followed Bazaar approach as the code entire code and development process is share on the Github and Youtube.

Github link: https://github.com/bipin-suram/SayNoToHunger

Youtube commercial: https://www.youtube.com/watch?v=3ZVSiO7hEew&t=4s

The outcome of this development is a working android application with all the features mentioned above. The application was tested on Samsung Galaxy S10. The response time was satisfactory and able to access all the pages in an efficient manner. The data is being updated in the database once it entered in the application and retrieved properly to the other pages required. Overall, the application is fully functional with satisfactory results.

4   CONCLUSIONS:

To conclude, UN SDG goal 3. Zero Hunger was selected a mobile application was built. This application serves as a platform for the donors, volunteer and the needy. Donors include any individual with some food can post on the app. Volunteers can either post the food needed or spare some time to deliver the food to the needy. This can reduce the food wastage and increase the number of people getting essential food.

5   FUTURE WORK:

Very few applications can be termed as complete as there will always remain something that can be improved. Few functionalities that can be added/improved in the current application are:

- The current application does not include the admin side of things due to the time constraint which can be developed in the future work.
- Volunteers can be given some kind of recognition (rating) for the work they do.
- IOS app and website can be built for the same.

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