San José State
UNIVERSITY

Redbriks

A Real Estate Mobile Application

Submitted by Project Group 2

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CMPE 277 – Smartphone Application Programming

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1 Project Description

1.1 Abstract

This project is based on real estate mobile application. The real estate mobile application is based on Android platform. There are not real estate mobile applications currently available into app store which has recommendation system, virtual and augmented reality integrated into it. Hence, our project goal is to make such application available to use for general public.

It becomes really troublesome to find a real home relevant to your needs. But fortunately, there are various or many real estate property images that are available online that becomes pretty easy to rule out homes even before visiting the home. Many of the realtors, right now are using flying drones that help capturing real-time images and videos of the house from a sky point of view.

With real estate mobile applications, end user can look into the and surf the available houses while doing any other activity. That helps to save money, time and effort. Our real estate mobile application helps you in narrowing down the choices. If you are on your way to hunt for houses, use this app and get relieved from other worries. You will find a perfect place to live that gives you peace and comfort.

1.2 Project Goals and Objectives

The goals behind developing this project is to acquire the domain knowledge of the entire system and modules surrounding to it. There are typically mainly 4 modules that involves virtual reality module, augmented reality module, core application logic and application backend. Project goal is to make lives of people easy with recommending best homes for their family.

There are various aspects of this app that are based on the real estate core objectives. One being the lack of user interaction that is very rare in current real estate applications. Developing objectives with this project is to gain the domain data that the entire system works upon. Mainly there are modules that divide the entire working system into various parts. Virtual reality application shows 360-degree view of the entire real estate property; this enables user to change the direction while viewing the video. Augmented reality is solely based on a combination of virtual objects interacting with a real world object. There are typically mainly 4 modules that involves virtual reality module, augmented reality module, core application logic and application backend. Project goal is to make lives of people easy with recommending best homes for their family.

1.3 Background, Problems and Motivation

The basic problem with real estate application is they don't have proper virtual and augmented view of the properties which lead to a great frustration to the end users. They affect many factors like money, effort and time. For example, a guy staying in India wishes to study in US but he is unaware of the real estate scenario over here like how to lease and what is good apartment to lease and all other stuffs.

In that case with current real estate mobile applications there is no facility that shows up the virtual and augmented view of the properties. Hence, people have to visit the real estate location and see for options. This increases their time to view and inspect the property. While with our app they can directly go to the property and take a virtual tour and also see the outside of building in a 3D view with real world objects. This duo problem motivated us to develop one single solution to all the problems. This is the most motivation behind putting time and efforts behind this project. After launching this app into app store there will truly huge amount of crowd that will use the application to get the knowledge of various features and functionalities that this app provides.


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1.4 Project Applications and Impact

There are similar applications that are available into the market like Trulia, Lovely, Homesnap, Zillow Mortgages, etc. These applications help the buyer with the financial advisers. Like the current mortgage rate and the yearly expenditure on the taxes with various other parameters being involved. It shows the calculator that displays the monthly debts, refinancing the property, down payment and interest rate. It also shows the price range with which there are possibilities and shows compatible properties with a thorough analysis of the nearby schools, neighborhood and homeowners associations involved.

There are graphic charts displaying the rise and fall of the property prices with the area and also the nearby area for which the recommendation algorithm will take place. It is very safe to trust those apps as there is a lot of stocks involved which leads to the profit and loss of that company. But the initial stages of the app like view of the property inside and out are completely lacking in this scenario. This increases their time to view and inspect the property. While with our app they can directly go to the property and take a virtual tour and also see the outside of building in a 3D view with real world objects. One being the lack of user interaction that is very rare in current real estate applications. Developing objectives with this project is to gain the domain data that the entire system works upon. Mainly there are modules that divide the entire working system into various parts.

2 Requirements

The functional and non-functional requirements for this application are listed below:

2.1 Functional requirements

While design any project requirements play very important part. Requirements should be very clear and well stated. All aspects of the project should be considered while preparing the requirements which can result into the very good project design. Following are the functional and nonfunctional requirements for this project

Manage Membership

- System shall allow the existing user sign in.
- System shall allow the new user sign up.
- System shall not allow the nonregistered user sign in.
- System shall save the new user's information into the database.
- System shall give the toast message of the successful registration.
- System shall validate the user credentials.
- System shall allow the view, update and delete the user profile.
- System shall allow the nonregistered user to use the system.

Manage Search

- System shall display the name of the current city.
- System shall display the list of the houses in the current city on the home screen.
- System shall allow the user to select the search preferences for the house.
- System shall display the result of the search as list of houses.
- System shall allow user to view the details of the specific house.

Mange House Details

- System shall display the details of the house on the details page.
- System shall display images, rent, area, number of bedrooms, address, features related to the house.
- System shall provide option to give the driving directions to the house.
- System shall provide the 360^0 video for the virtual tour of the house.
- System shall provide the augmented view of the house.
- System shall provide the call option.
- System shall provide the email option.

Manage Sharing

- System shall provide the sharing option.
- System shall allow the user to share the contents on the social media using the share option.
- System shall give the toast message of the successful sharing.

Manage Comments

- System shall allow user to view all previous comments.
- System shall display comment text, review and the email id of the user.
- System shall allow the user to add the new comment with the rating.
- System shall save the new comment in the database.
- System shall give the toast message of the successful comment save.

Manage Recommendation

- System shall display preferences options.
- System shall allow the user to choose the preferences.
- System shall accept the user search preferences.
- System shall prepare the list of the recommended houses depending upon the preferences.
- System shall display the list of recommended houses on the house detail screen.

2.2 Non-Functional Requirements

Performance

- System's performance can be measured by the rate of the requests served for specific time interval.
- Request management should be handled very efficiently.
- Each user should get the experience of the solo system.
- System shall provide the list of houses in very short time.

Usability

- System shall provide the user friendly UI for the users.
- Any user without training should be able to use the application.
- Application should be easy to use.
- Help should be provided if needed by the user.

Security

- System's security is very important aspect.
- System should be protected from any malware.
- System should be protected against unauthorized users.
- Regular backups should be scheduled for in case of data lost.

Capacity

- System shall be able to store the large amount of house data on the cloud.
- Large number of user's data shall be able to store on the cloud.
- System shall be able to display houses data including the images on the application.

Scalability

- System shall be able to handle the vast number of user requests by scaling.
- System shall be able to scale the data storage when the requests increase.

Availability

- System shall be available in the areas where the network is poor.
- System shall be available on all the possible android devices.

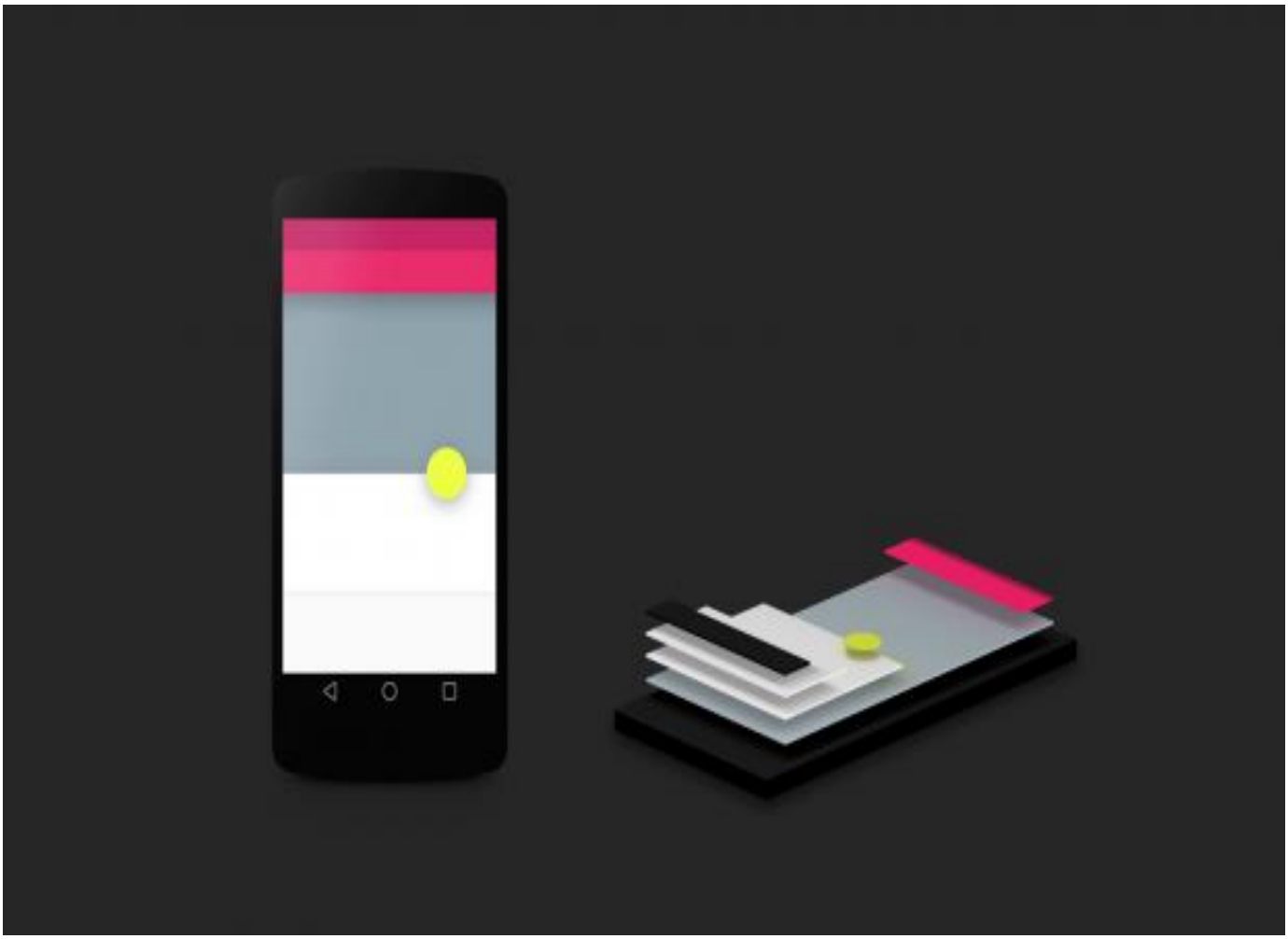
3 Web UI Design Principles

Today there are millions of android applications are available on the play store. First thing user notices about the application is the logo of the application. Logo should be attractive yet self-explaining. We created our own logo for the “Redbriks” application which is very much suitable for the house renting application.

While designing the mobile application designer should follow the standards for the user interface. Appearance of the design matters while choosing between many applications. Design should be user friendly and easy to follow yet attractive. Designer should keep in mind who the target audience is. If the audience is children, then the deigning should be more vibrant and easy to follow. To maintain the pace with millions of the applications designers need to treat the mobile application as the primary object of the goal.

Following are some principle to follow while designing the mobile application that every designer should follow:

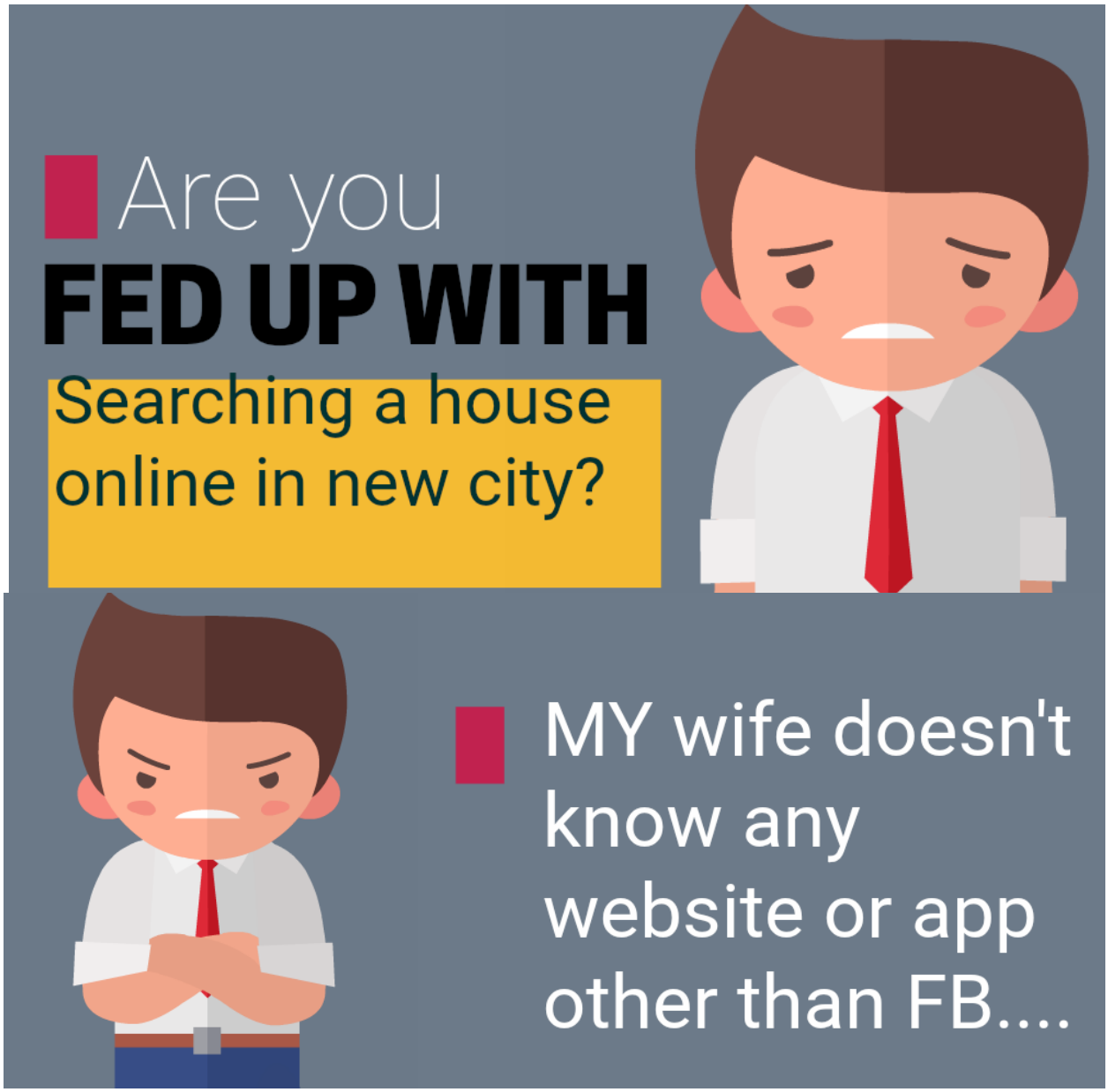
- Learning Experience: Mobile application should provide the intuitive experience to the user. This means user should be able to find the next step with easy. He does not have to remember the steps of the operation. All the options should be displayed as the user can easily find it. Also the meaning of the icons should be very clear so user will be able to know the operation performed with that icon.
- Design Layout: Layout of the application should be coherent with different sections of the application. It should have the consistent flow so it will provide the better user experience. While designing the layouts designer should follow the best examples for the same OS.
- Search within app: Search patterns for the inside of the applications are pretty much predefined. User should get the recent searches, which provides the faster output. Application should provide the auto complete option for the better user experience. Dynamic filtering is also the required option for the application.
- Layered Experience: Foe the best design user interface should be layered. In the context of the application layered means all the options should not be visible at the same time. Options related to one task should be gathered together and displayed at one time. Layered should be arranged in a manner that user will uncover them as needed.

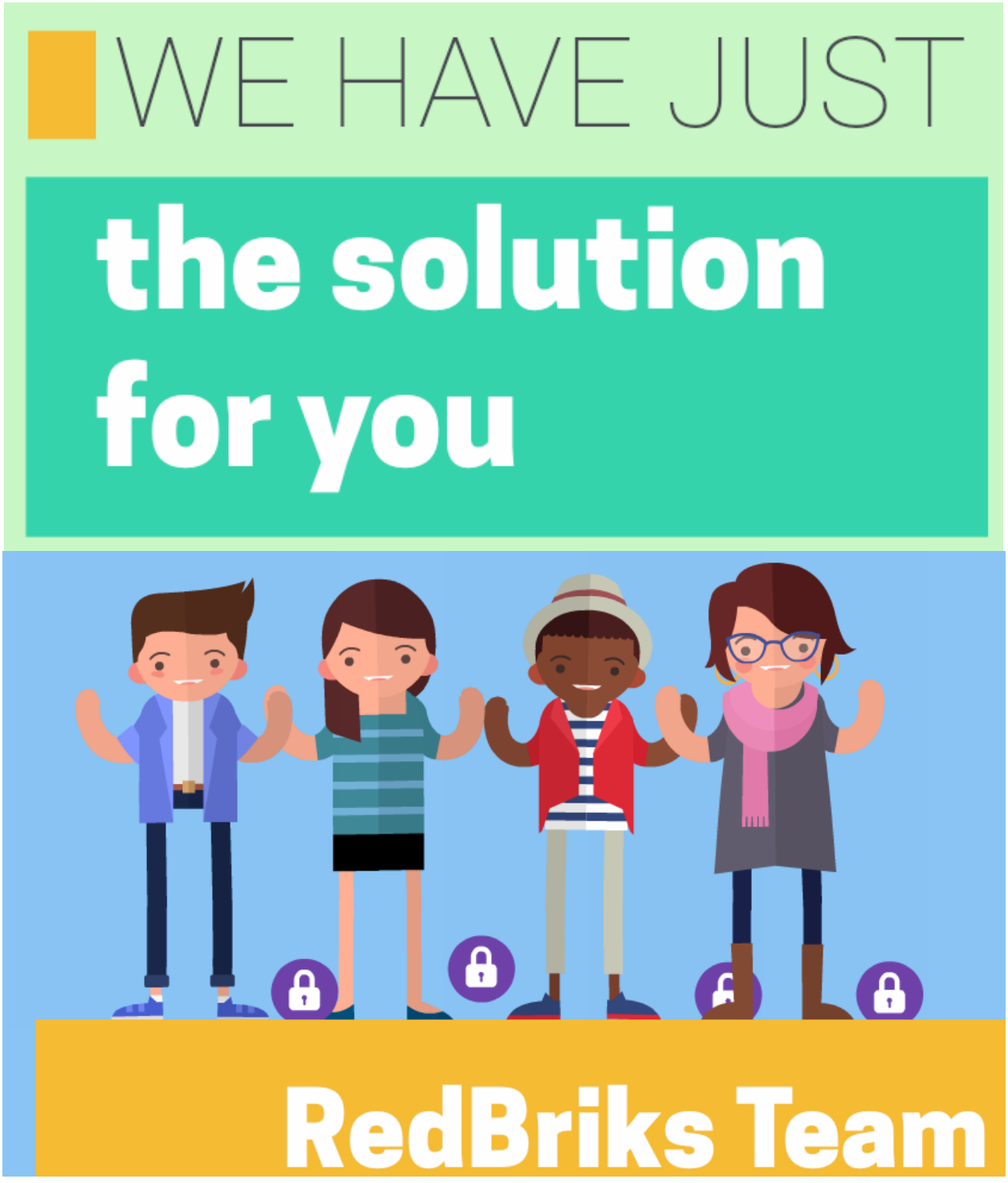


- Interactive Elements: User should get very good interactive experience from the design point of view. All the interactive elements should be clearly placed so user is sure to use them when needed. Interactive options in the menu is not a good design practice. User will not be able to find the hidden options.
- User Queries: Upon tapping any button user should get some kind of response that the process is started or being processed. Some kind of messaging should be used to notify the user on starting and completion of process. White in abstraction from underlying architecture and features available.

4 Storyboard and Wireframes

4.1 Storyboard



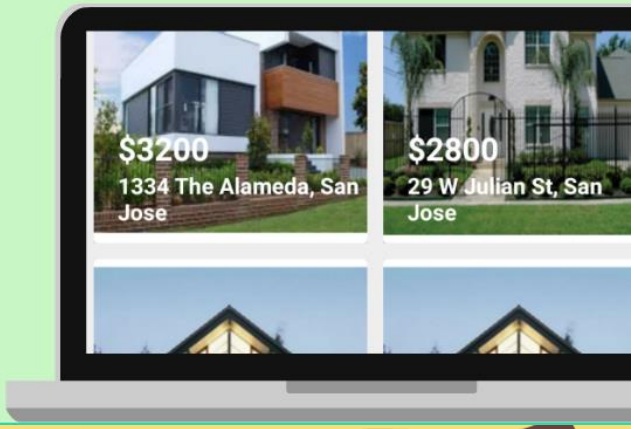

WE HAVE JUST
the solution
for you
RedBriks Team

It will save

Time

Efforts

Money



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TODAY

RedBriks Android App!

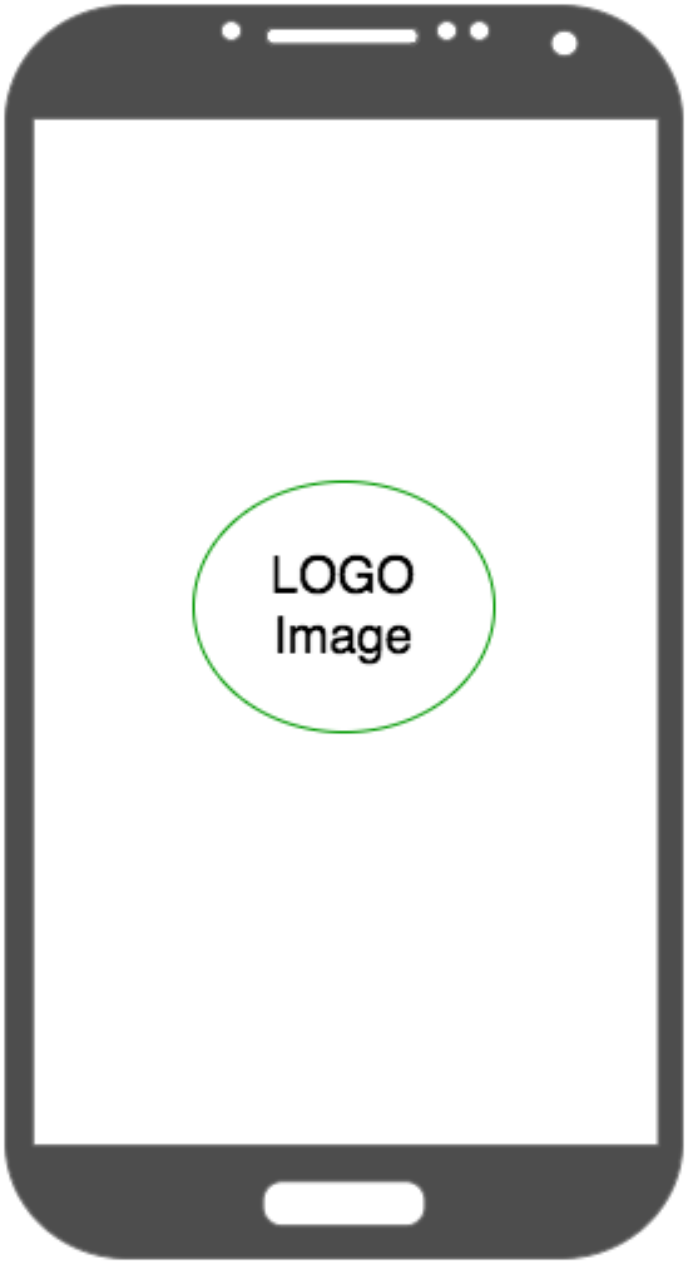
4.2 Wireframe

Wireframe is a model in 3D which uses components such vertical lines and boxes to represent the overall structure of our app. Draw.io is tool which has been used to create the wireframe. In this tool, we have to add Android components. It will give an option to add custom wireframe. It's a template with android phone.

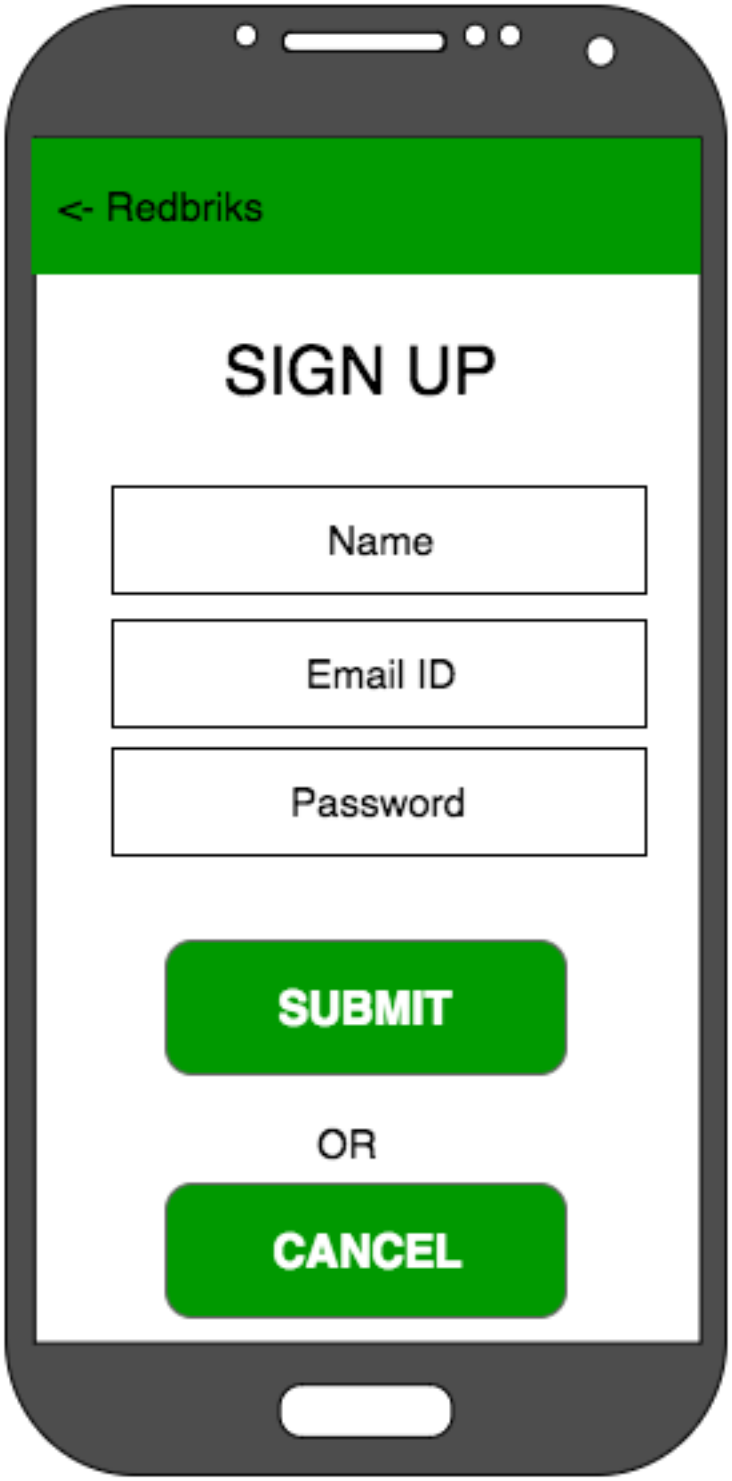
Wireframe is very important aspect of the design. In the wireframe, we define layout of the page. We define colors, layout of the page and all the components inside the frame. It starts with the header part where notifications and other status are displayed. Next part is the body part where all the component design is included.

It is nothing but the architectural design of the whole app. It's a blueprint which designers will create. It should be designed by following the design guidelines. It should cover all the aspect of design wisely.

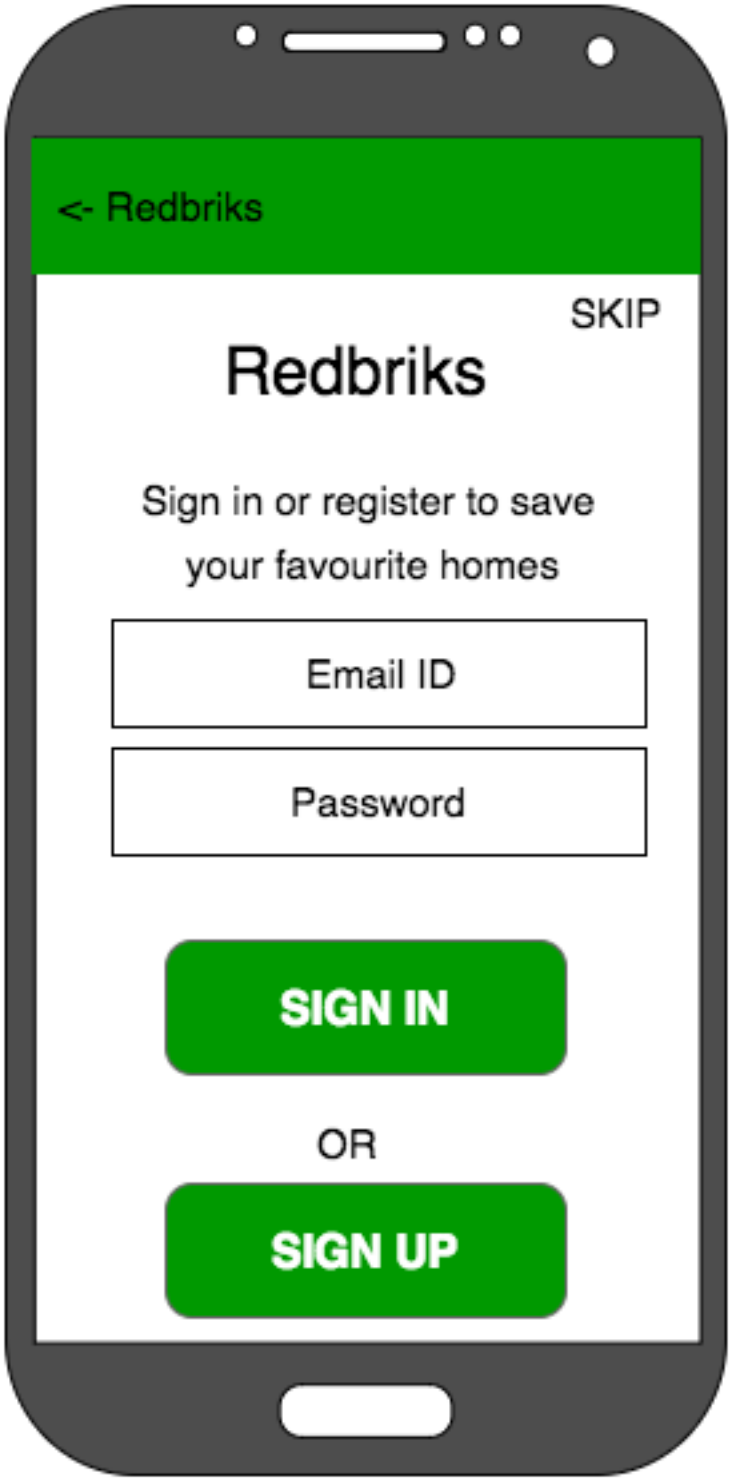
Splash Screen:



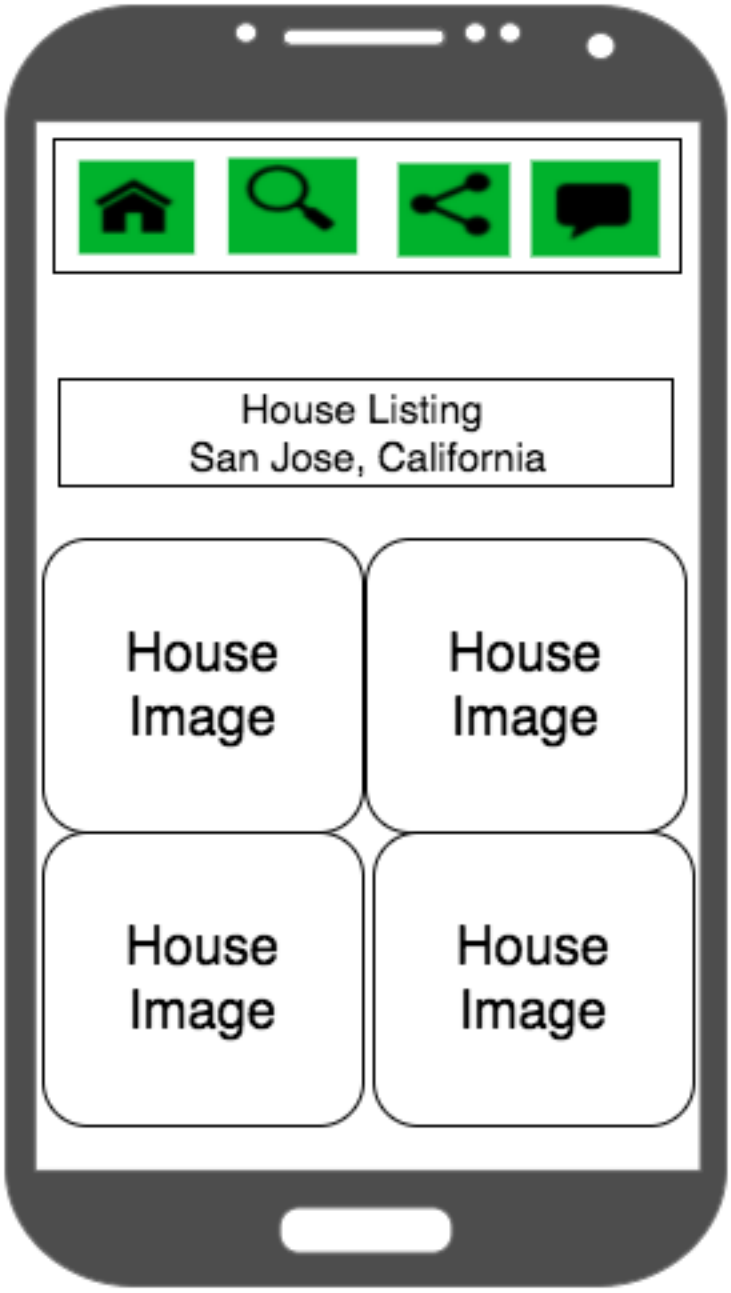
Sign UP Screen:



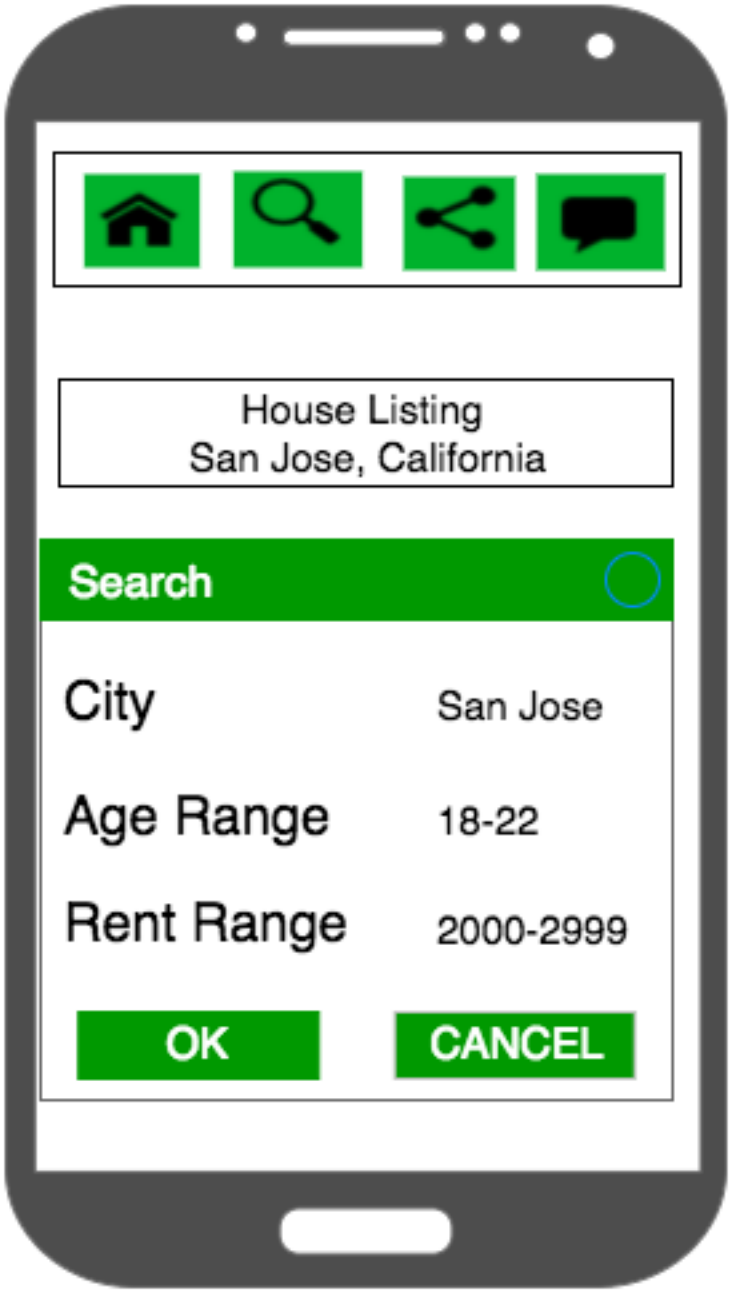
Sign In Screen:



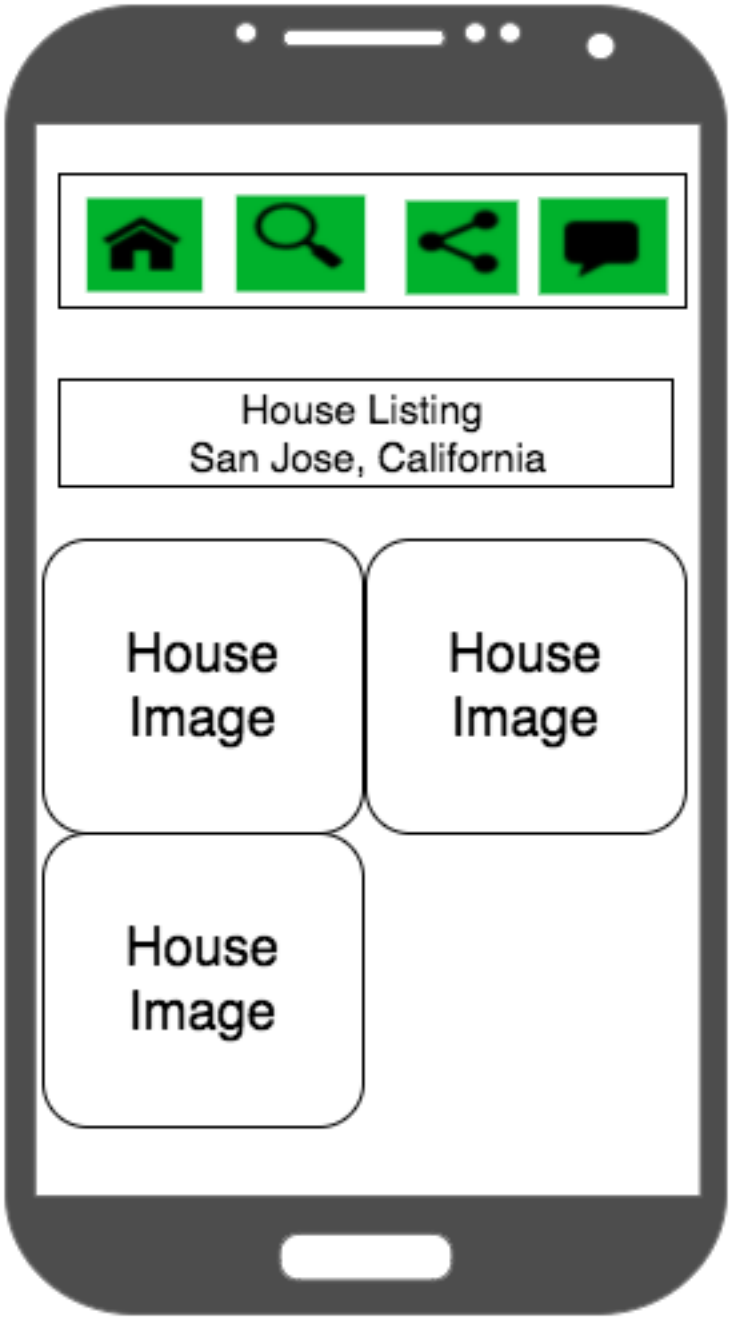
Home Screen:


House Listing
San Jose, California
House Image
House Image
House Image
House Image

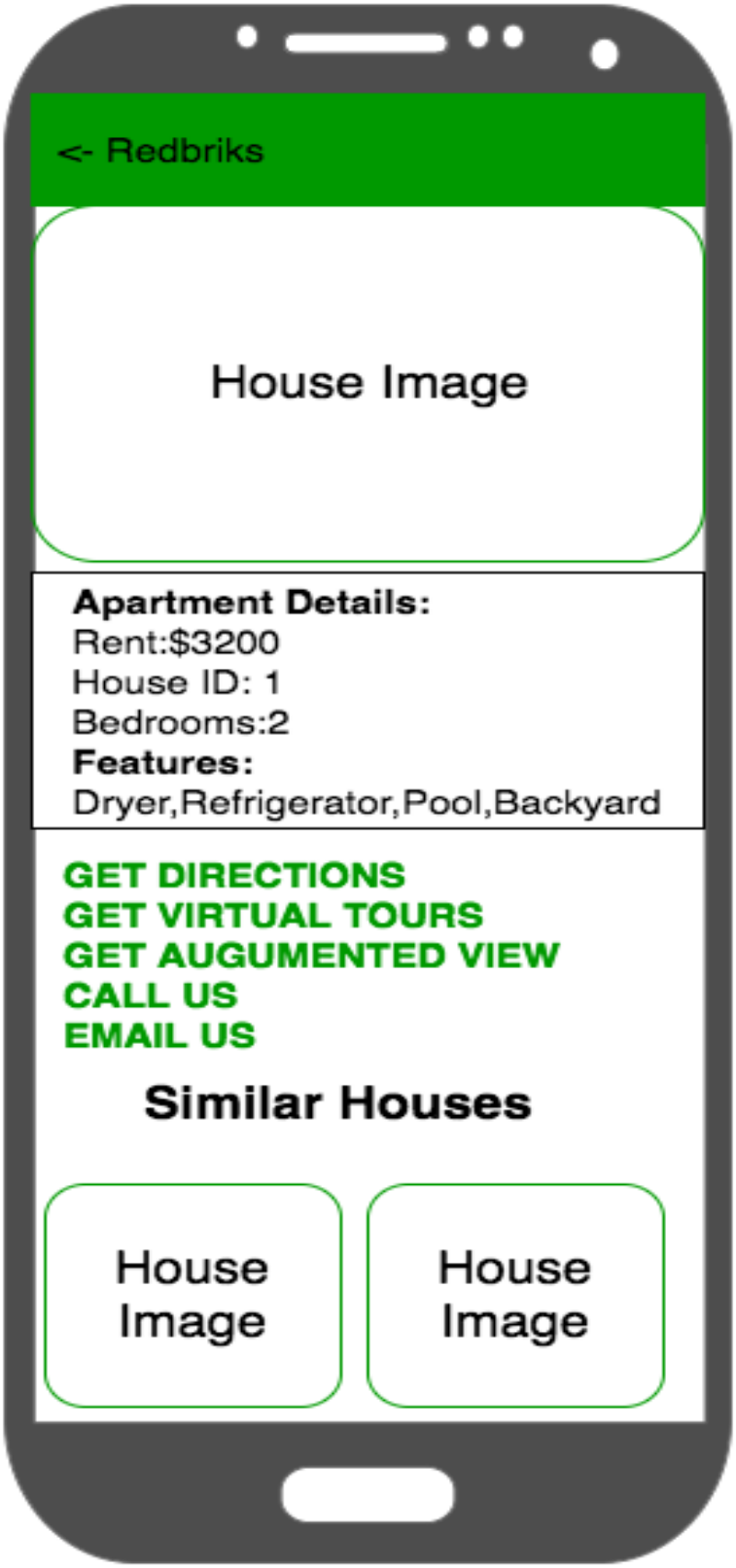
Search House Screen:



Search Result Screen:

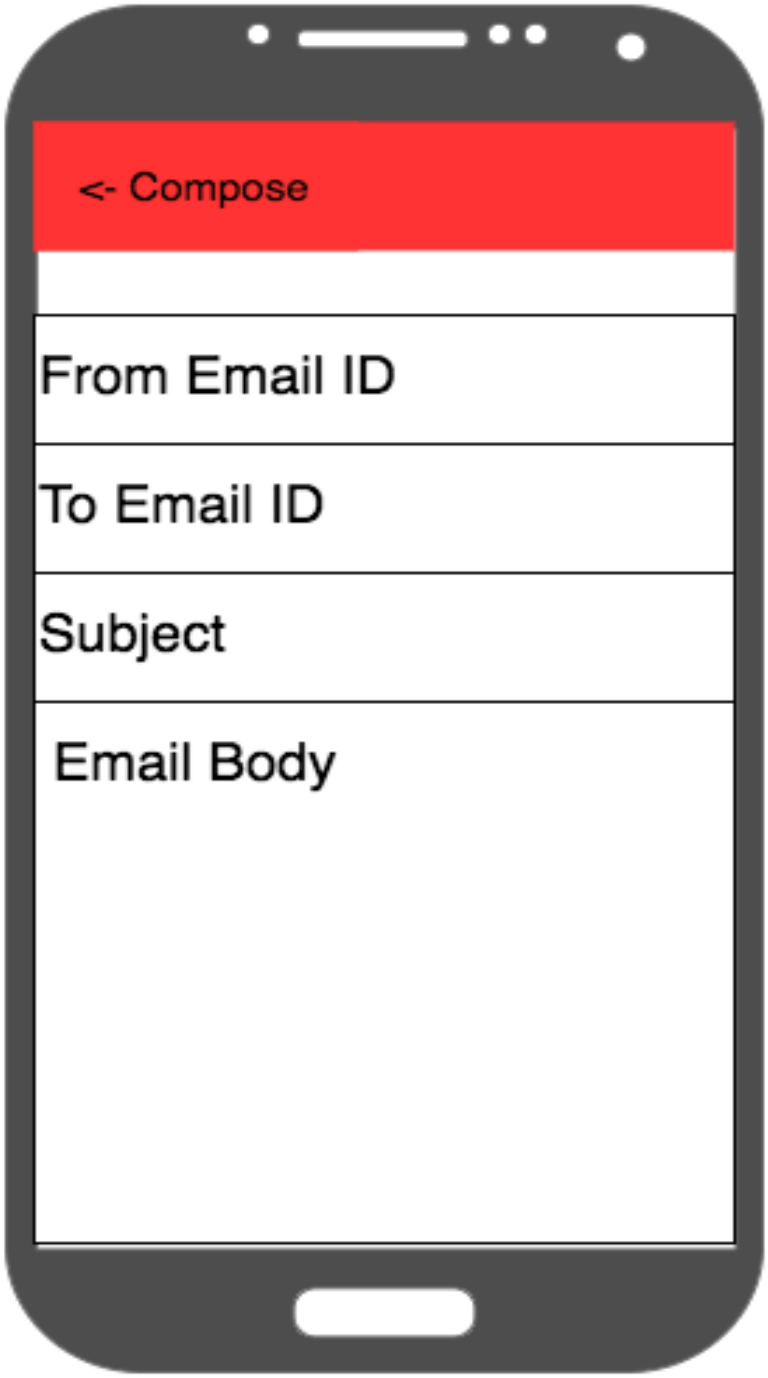


Search Result Details Screen:

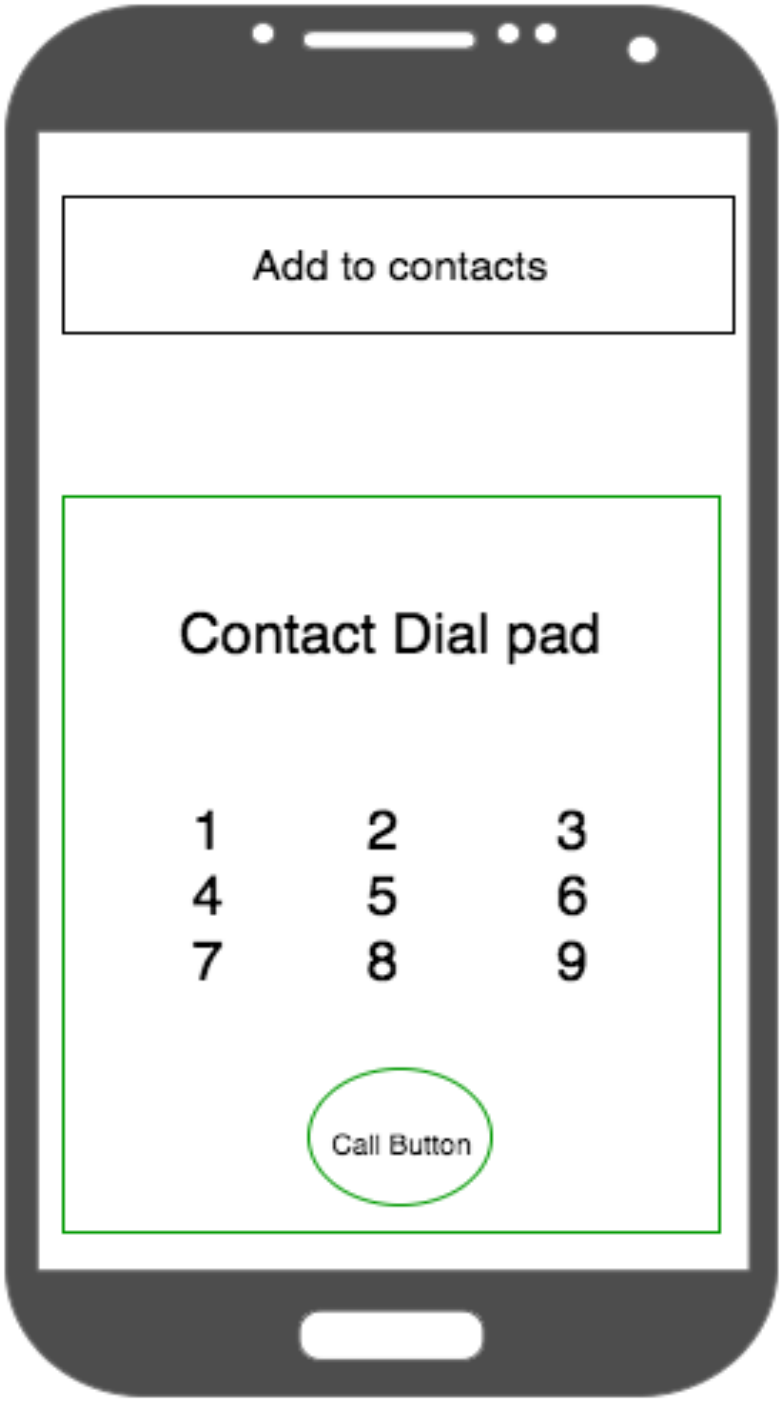


Share House Screen:

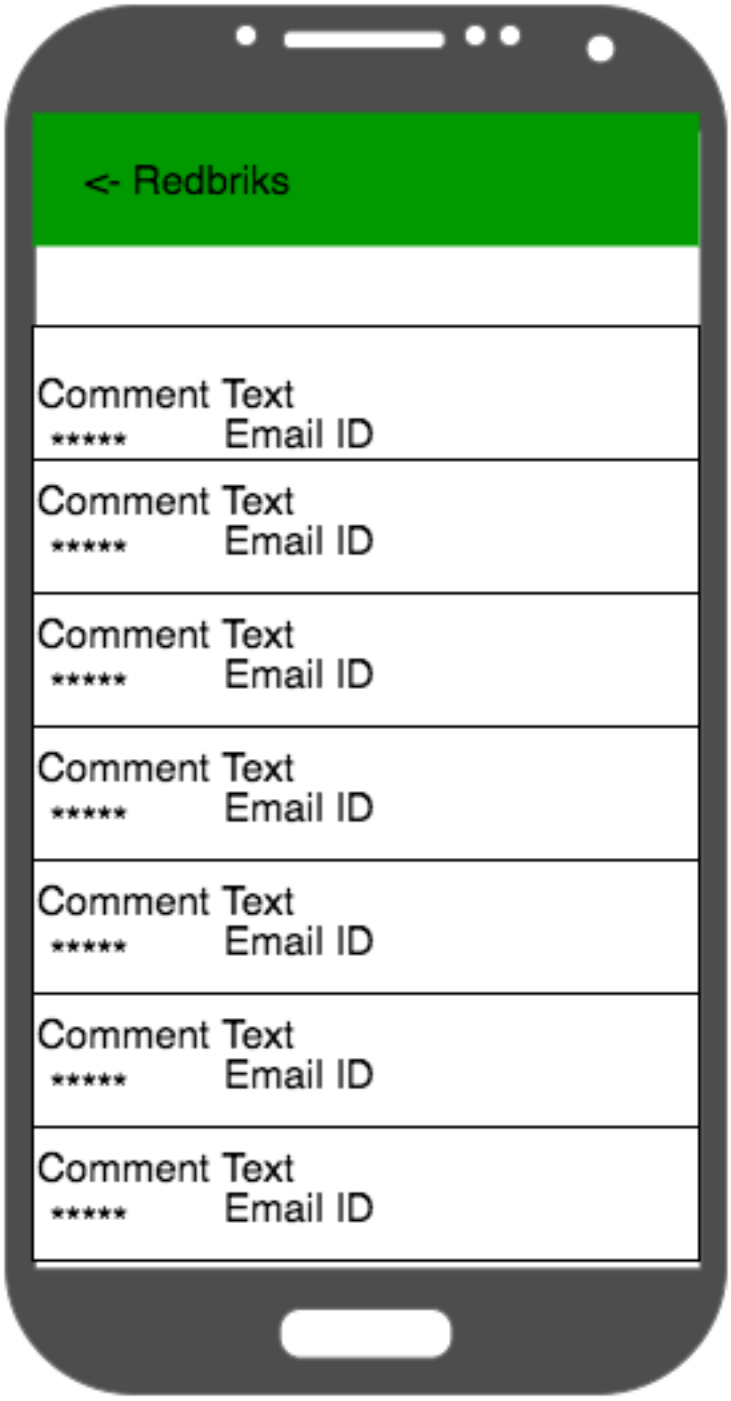
Share with Gmail Screen:



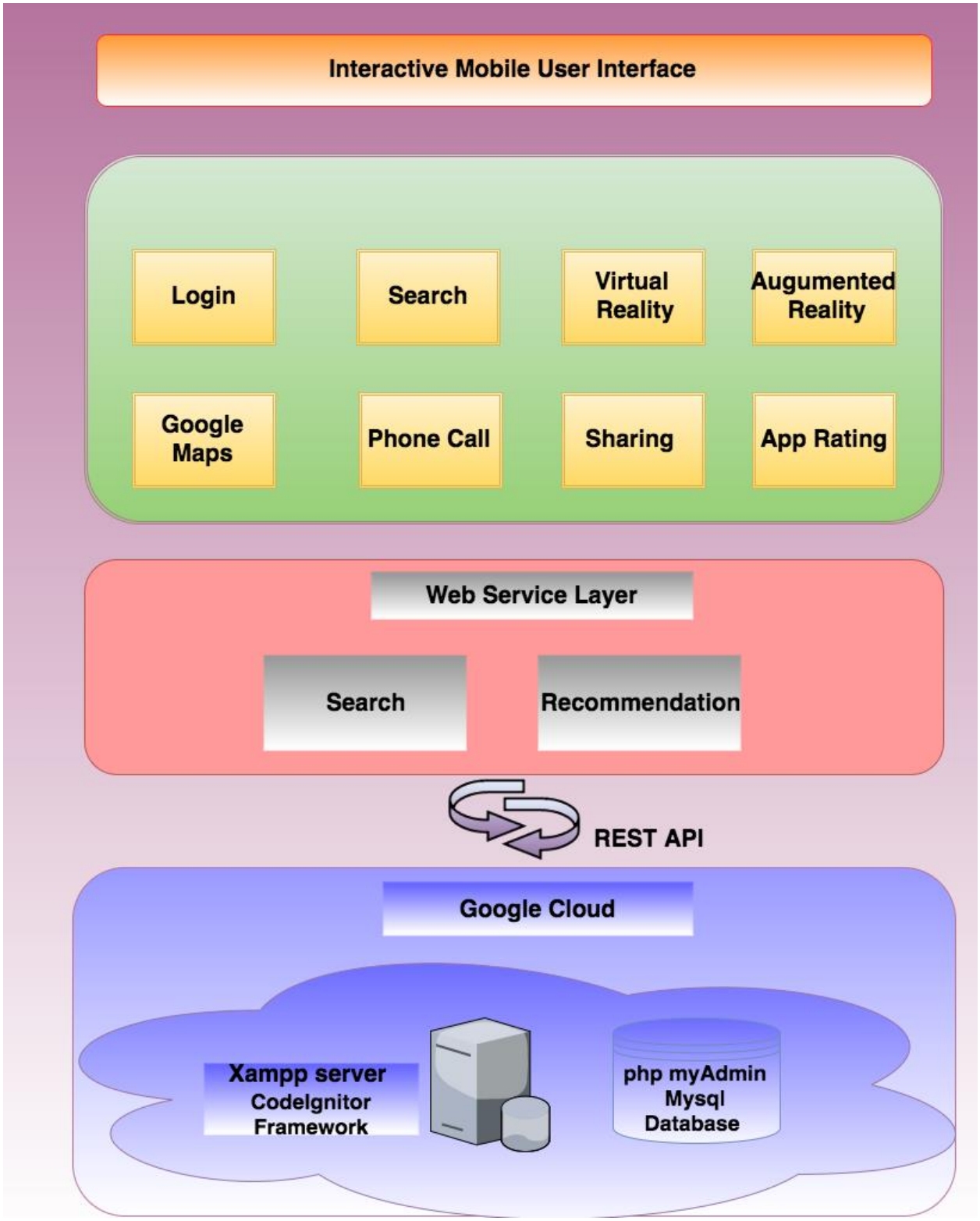
Contact Screen:



Comment Screen:



5 High Level Architecture Design



Interactive Mobile UI:

This is system is designed by using Android mobile technology. UI is designed keeping in mind all UI guidelines. This UI is very interactive and user friendly. This UI has been designed using material design. It provides guidelines to create standard uniform UI which gives smooth look and feel to the application. Android UI features such as Recycler View, Card Layout, Grid Layout and Spinner has been implemented to give rich lookout.

System Core Modules:

- **Login:**
  This module will allow user to Sign Up or Login using user name and password.

- **Search:**
  This is very important feature implemented to provide user interface to search houses according to his preferences. This will accept user inputs such as location, age range and price range. Depending on the input it will search the database and give the house listing results.

- **Virtual Reality:**
  User will be able take 360-degree tour of the house with the help of this module.

- **Augmented Reality:**
  User will be able take virtual tour of the house with the help of this module.

- **Google maps:**
  This will take the current location of the user and directly navigate the to the address displayed in search result. Motivation for this design has been taken from the Yelp app.

- **Phone Call:**

User will be able to place a call. Implicit intent is used which will identify the application installed on the mobile and ask for choices to make a call.

- **Sharing:**
  Sharing with the social media feature will allow to share the contents with social medias such as FB and Twitter.

- **App rating:**
  Finally, user will be able to rate the app and comment if he liked it.

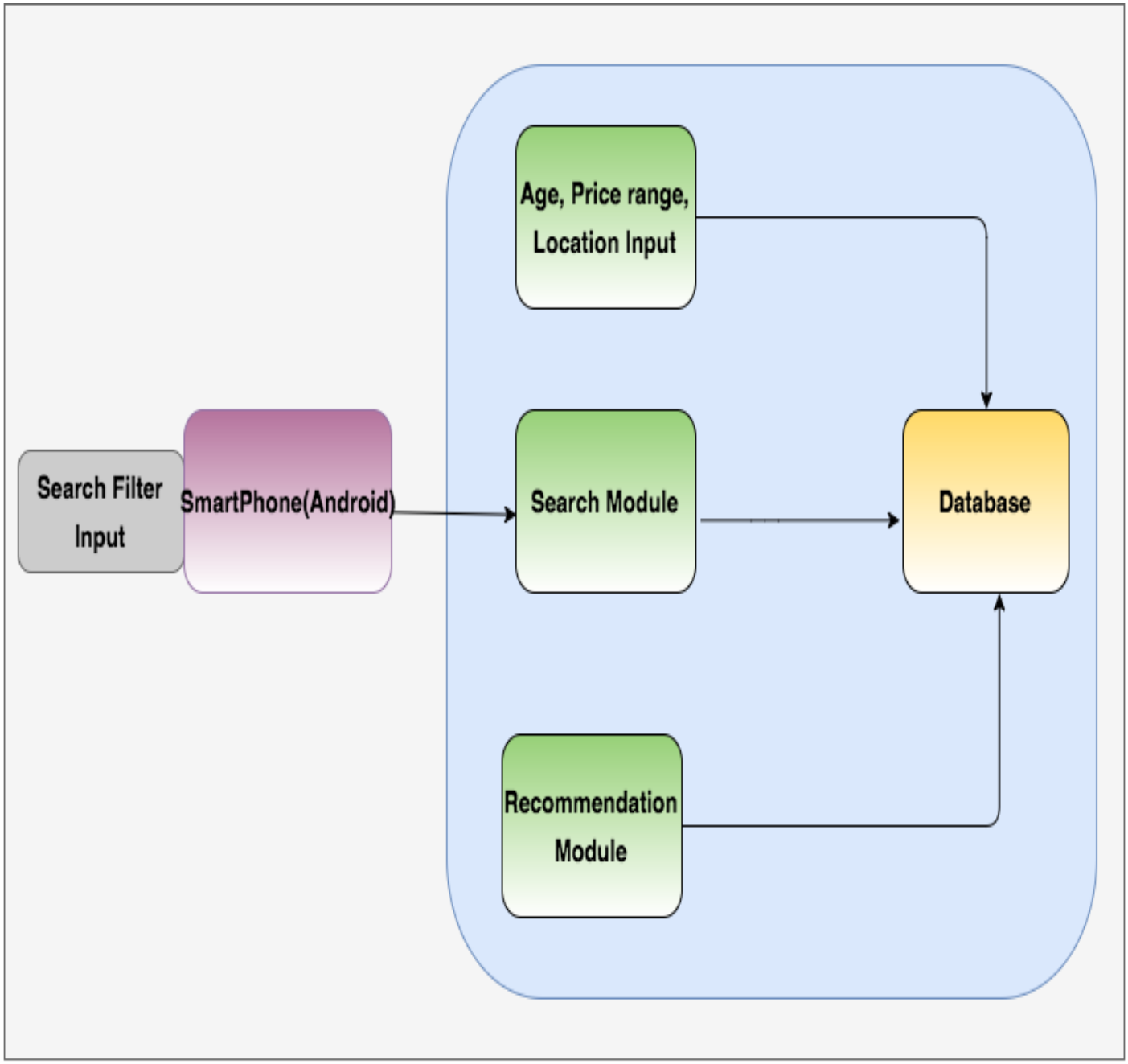
Web Service Layer:

Web service is implemented by using PHP Code Ignitor framework. Search features gives REST API endpoint to get the direct search results for house listing. Recommendation will give the result for REST API endpoint to get the recommendations.

Database and Server:

Database and server resides on google cloud. This system is implemented by using php Myadmin database and xmapp Server. House related data and the recommendation data is stored on the cloud database that is available to the end user seamlessly.

6 Component Level Design



Input Search Filter:

User will enter search inputs as Age Range, Price Range and Location Preferences. Android UI is very interactive and provides combo box to select user input.

Search Module and Recommendation System:

Search module will receive the input and give it to recommendation system and direct search result module. When user enters the input, direct search module will come into picture. It will search for direct results in the database. When user clicks on any of the house showed in direct search results, recommendation system will kick in to give recommendation about the similar houses. It will consider the ratings given by other people and it will cosign angle between preferences and existing data. For calculating final house list, top 4 houses showing maximum deviation will be considered.

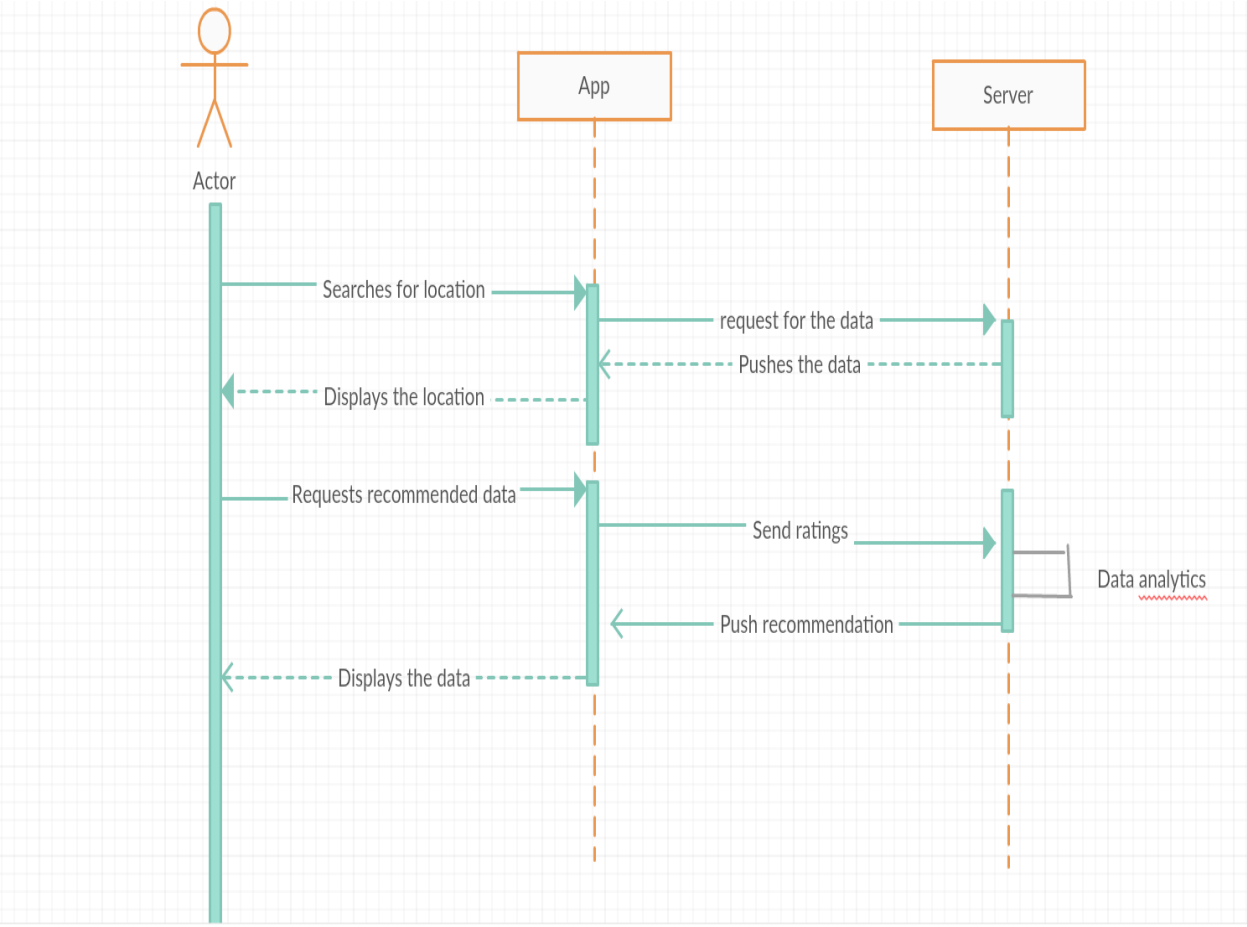
Database:

This system used myPHP admin database. It has two tables. One for storing house details and another for recommendation data. User inputs are compared against the existing data and results are generated.

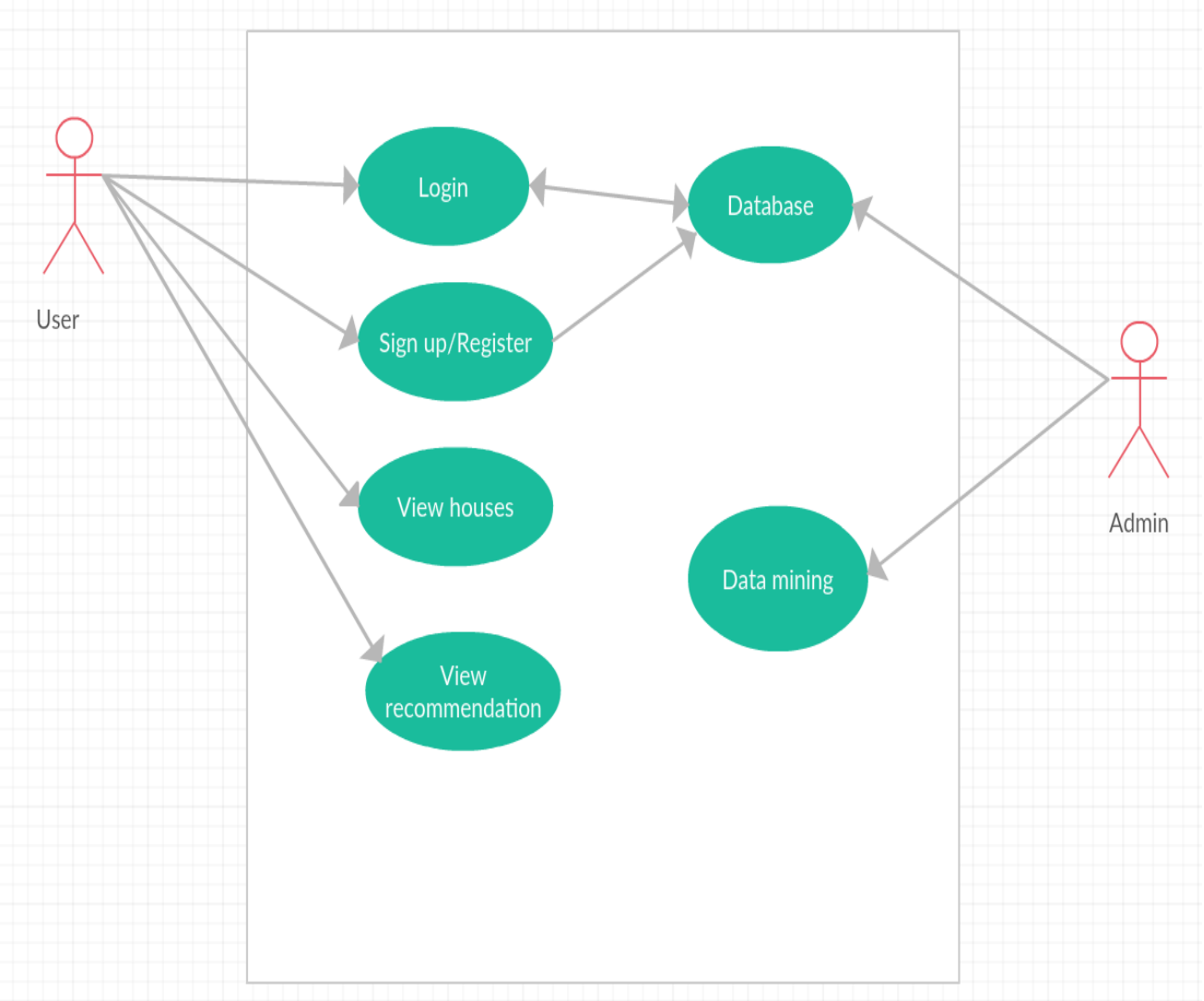
7 Sequence – Workflow

7.1 Sequence

Sequence diagram:



Activity:

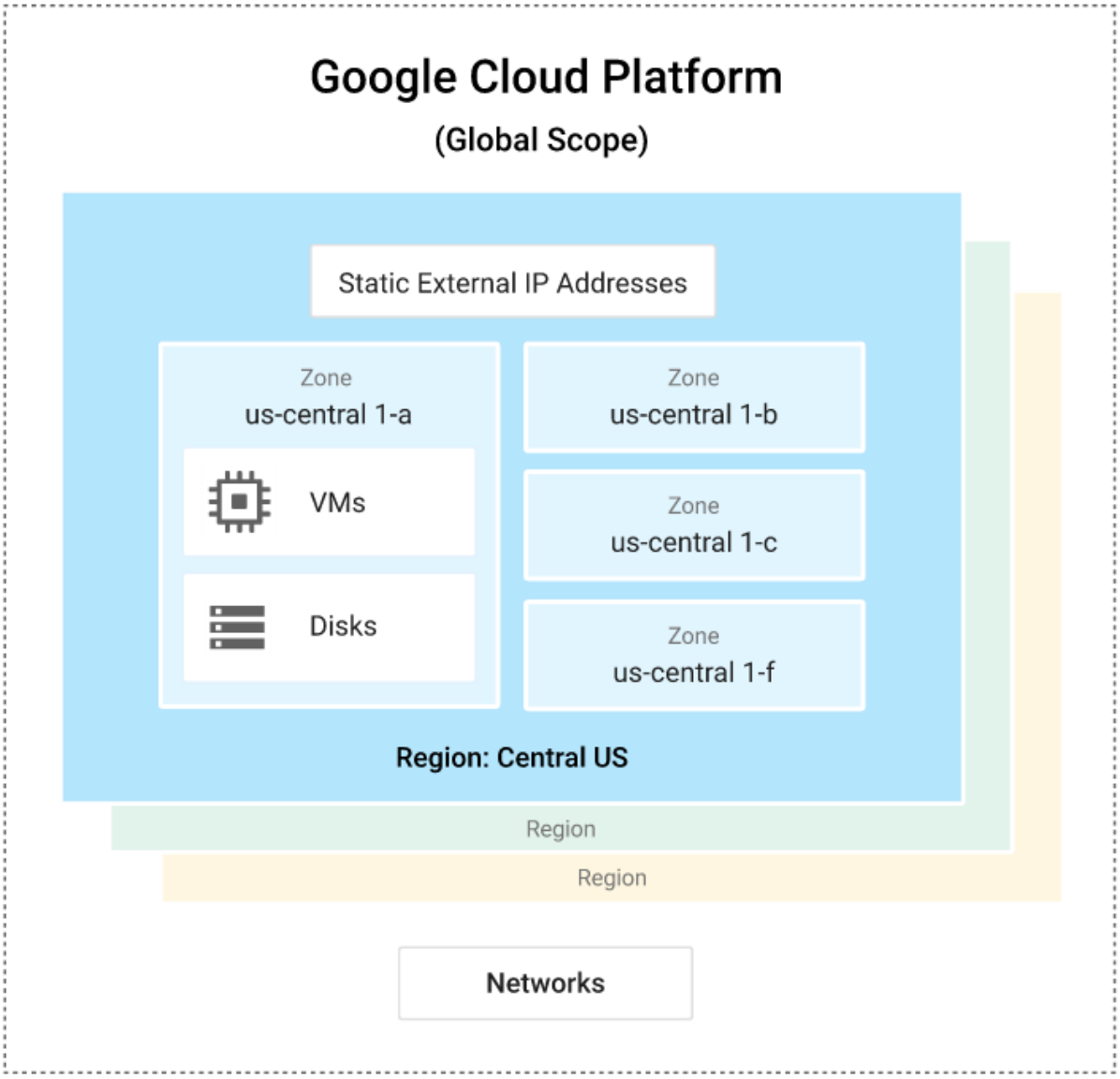

User
Login
Database
Sign up/Register
View houses
View recommendation
Data mining
Admin

8 Cloud Technologies Used and Descriptions

Google cloud:

With Google Cloud Platform, you can construct, test, and convey applications on Google's very adaptable and solid framework for your web, versatile, and backend arrangements. Cloud Platform offers a full range of cloud items and administrations for register, stockpiling, organizing, enormous information, machine learning, operations, and that's just the beginning. Cloud Platform comprises of an arrangement of physical resources, for example, PCs and hard circle drives, and virtual assets, for example, virtual machines (VMs), that are contained in Google's server farms the world over. Every server farm area is in a worldwide district. Locales incorporate Central US, Western Europe, and East Asia. Every area is an accumulation of zones, which are confined from each other inside the district. Every zone is distinguished by a name that joins a letter identifier with the name of the area. For instance, zone an in the East Asia locale is named asia-east1-a. This conveyance of assets gives a few advantages, incorporating excess if there should be an occurrence of disappointment and decreased dormancy by finding assets nearer to customers. This circulation likewise presents a few standards about how assets can be utilized together.

In distributed computing, what you may be accustomed to considering as programming and equipment items, get to be administrations. These administrations give access to the hidden assets. The rundown of accessible Cloud Platform administrations is long, and it continues developing. When you build up your site or application on Cloud Platform, you blend and match these administrations into mixes that give the foundation you need, and after that add your code to empower the situations you need to manufacture. A few assets can be gotten to by some other asset, crosswise over areas and zones. These worldwide assets incorporate preconfigured circle pictures, plate depictions, and systems. A few assets can be gotten to just by assets that are situated in similar area. These territorial assets incorporate static outside IP addresses. Different assets can be gotten to just by assets that are situated in similar zone. These zonal assets incorporate VM cases, their sorts, and plates.



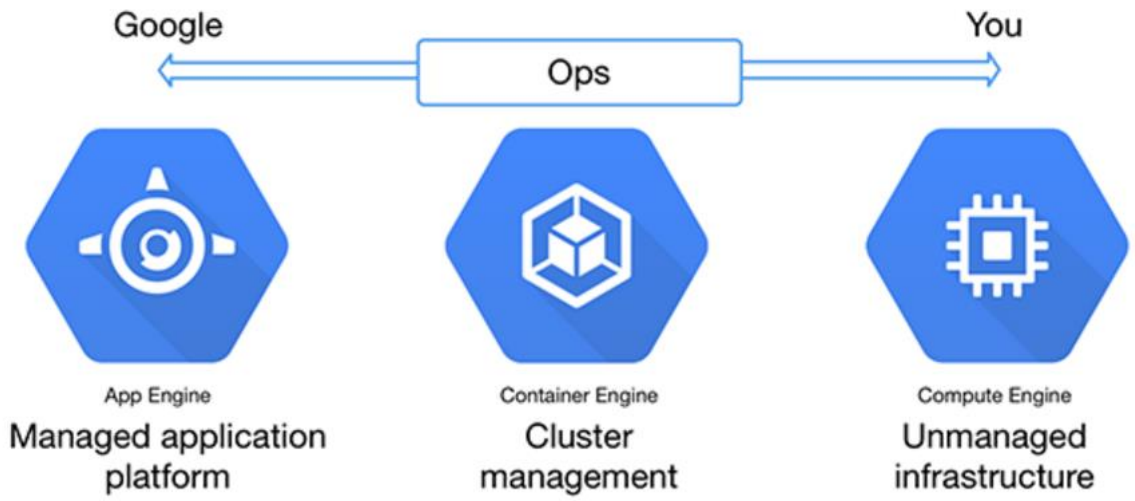
The extent of an operation fluctuates relying upon what sort of assets you're working with. For instance, making a system is a worldwide operation on the grounds that a system is a worldwide asset, while holding an IP address is a territorial operation in light of the fact that the address is a provincial asset.

As you begin your Cloud Platform applications, it's essential to see how these districts and zones interface. For instance, regardless of the possibility that you might, you be able to wouldn't have any desire to join a circle in one district to a PC in an alternate area in light of

the fact that the dormancy you'd present would make for exceptionally poor execution. Gratefully, Cloud Platform won't give you a chance to do that; circles must be joined to PCs in similar zone.

Contingent upon the level of self-administration required for the registering and facilitating administration you pick, you could conceivably need to consider how and where assets are assigned.

For more data about the land dissemination of Cloud Platform, see Geography and Regions.

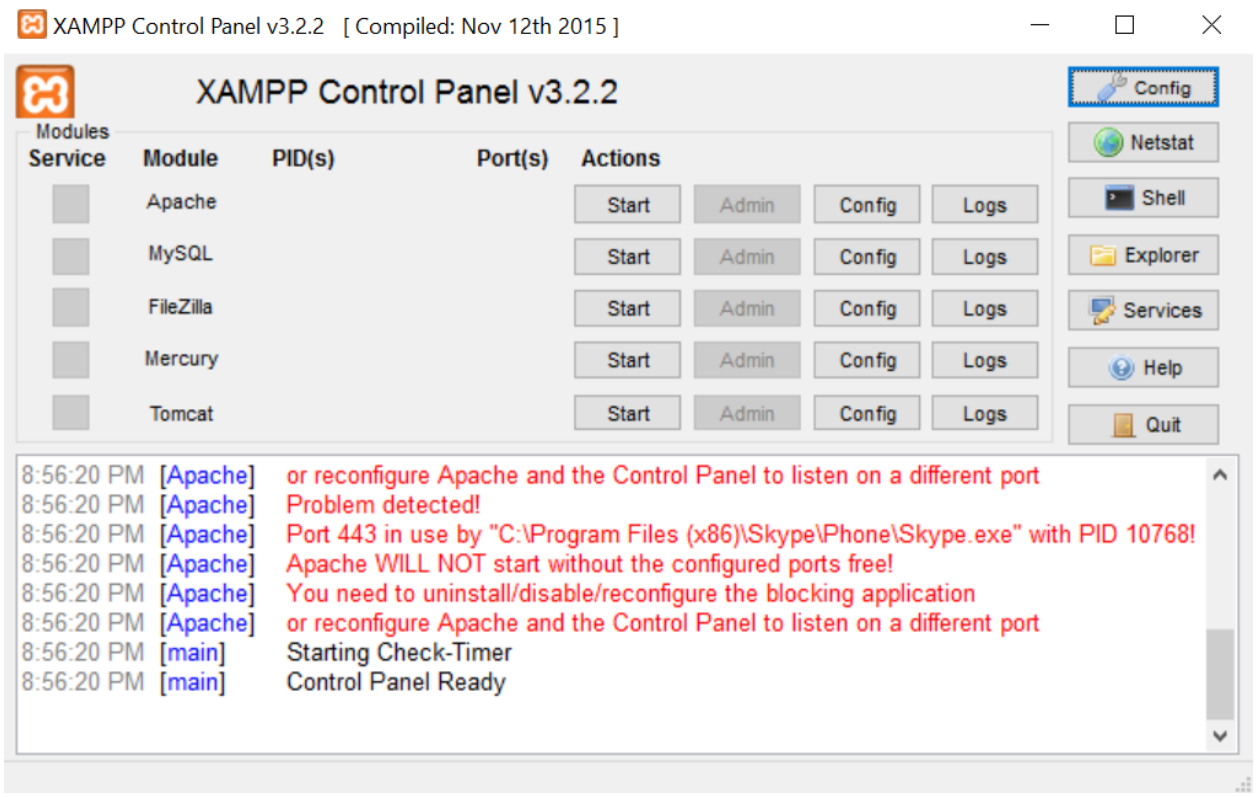


XAMPP server:

XAMPP is a totally free, simple to introduce Apache appropriation containing MariaDB, PHP, and Perl. The XAMPP open source bundle has been set up to be unimaginably simple to introduce and to utilize. Numerous individuals know from their own particular experience that it is difficult to introduce an Apache web server and it gets harder on the off chance that you need to include MariaDB, PHP and Perl. The objective of XAMPP is to manufacture a simple

to introduce circulation for engineers to get into the universe of Apache. To make it helpful for engineers, XAMPP is arranged with all elements turned on. On account of business utilize please investigate the item licenses, from the XAMPP perspective business utilize is likewise free. There are as of now conveyances for Windows, Linux, and OS X.

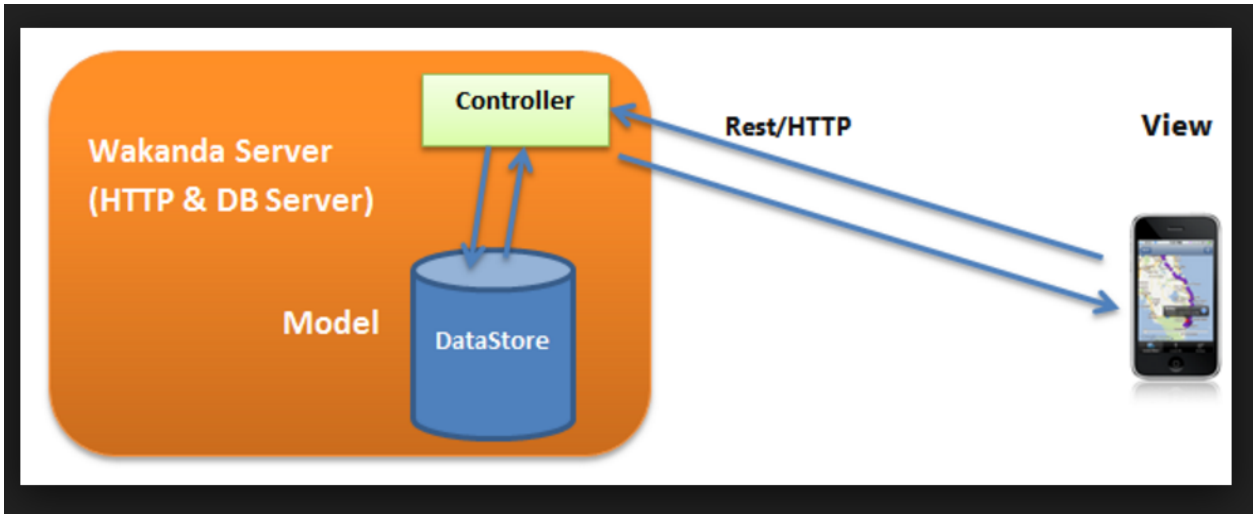
XAMPP gives a perfect neighborhood improvement environment, however is not implied for creative arrangements. We need to make facilitating PHP applications made with XAMPP as simple as could be allowed. We are beginning by giving inside and out instructional exercises on the best way to run XAMPP in the cloud utilizing Microsoft Azure, Google Cloud Platform, 1&1 and Amazon Web Services.


XAMPP Control Panel v3.2.2 [Compiled: Nov 12th 2015]
XAMPP Control Panel v3.2.2
Modules
Service
Module
PID(s)
Port(s)
Actions
Apache
MySQL
FileZilla
Mercury
Tomcat
Start
Admin
Config
Logs
Config
Netstat
Shell
Explorer
Services
Help
Quit
8:56:20 PM [Apache] or reconfigure Apache and the Control Panel to listen on a different port
8:56:20 PM [Apache] Problem detected!
8:56:20 PM [Apache] Port 443 in use by "C:\Program Files (x86)\Skype\Phone\Skype.exe" with PID 10768!
8:56:20 PM [Apache] Apache WILL NOT start without the configured ports free!
8:56:20 PM [Apache] You need to uninstall/disable/reconfigure the blocking application
8:56:20 PM [Apache] or reconfigure Apache and the Control Panel to listen on a different port
8:56:20 PM [main] Starting Check-Timer
8:56:20 PM [main] Control Panel Ready

9 RESTFul Interfaces

CodeIgniter is turning out to be outstanding for its energy as a PHP based web application structure, yet it's not frequently that we see cases of it being utilized for whatever else. Today we'll figure out how we can utilize CodeIgniter to make a RESTful API for your current web applications, and exhibit how to collaborate with your own API or other RESTful web-administrations, for example, Facebook and Twitter.

This URL looks very much like any other CodeIgniter URL with a controller and a method, but you will notice that the api/1 points you do the directory where the API is located you can interact with your API (i.e added, deleted, edited, queried) based on HTTP headers and URL query strings or HTTP arguments.



The default format for output is JSON which is what we see in this basic example. Normally in CodeIgniter, you just pass in parameter values, but a REST controller accepts any number of parameters in any order. For this to work, we need to pass in the name of the parameter followed by the value in pairs.

Our APIs

---

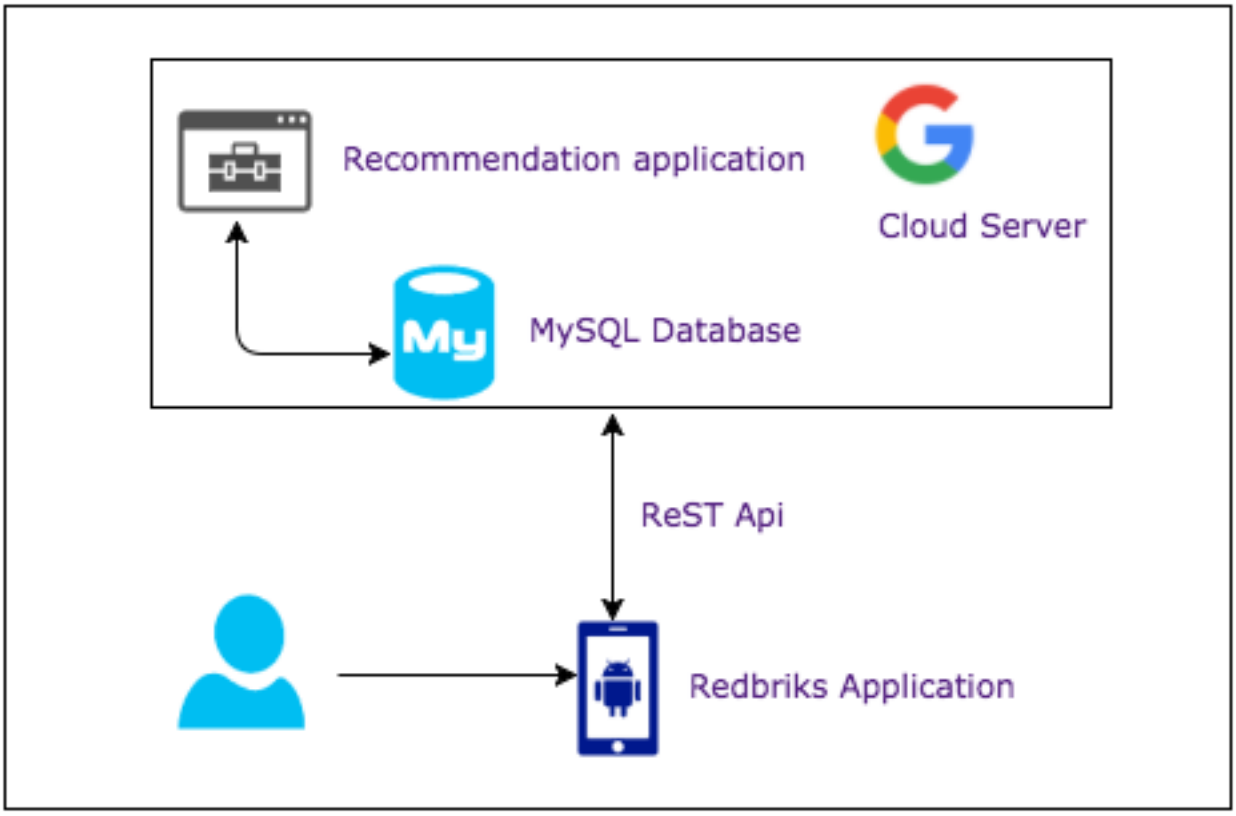
http://104.198.212.96/project277/index.php/welcome/getRecommendedHouses

http://104.198.212.96/project277/index.php/welcome/getHouseByLocation?city=Fremont

http://104.198.212.96/project277/index.php/welcome/getSearchedHouses?city=SanJose&rentRange="Low"

10 Design Implementation

Implementation of the system contain both server and client side. Our application contains both the sides. On the server side database and the recommendation application is hosted. All the computation for the recommendation takes place on the server. Also the server is hosted on the Google cloud where scalability, availability is handled.



10.1. Server Side Design

Database

We used the relational database to store the house related information. Database contains the user information, comments and house information. We used the PHP MySQL database for the implementation.

Backend

To develop the backend server, we have used the XAMPP server. Framework used is the codeigniter. We also used the PHP coding language to develop the recommendation system.

REST APIs

We used the REST end points to communicate with the server. Android application used these REST end points to communicate with the server.

No	Operation	REST end point
1	List of the houses by the city.	"http://104.198.212.96/project277/index.php/welcome/getHouseByLocation?city=cityname"
2	List of the houses by the city age and rent.	"http://104.198.212.96/project277/index.php/welcome/getSearchedHouses?city=cityname&rentRange=rentrange&age=agevalue"
3	List of the recommended houses.	"http://104.198.212.96/project277/index.php/welcome/getRecommendedHouses"

10.2. Client Side Design

User Interface

To provide the user interface we used the mobile application. Currently we have developed the Android application. We aim to develop the iOS and the web application.

Middle layer

For the communication between the server and user interface we used the http client. Http client consumes the REST endpoints and provides the result in the JSON format.

11 Testing (UI or Stress Test)

ID	Feature	Summery	Execution Steps	Expected Result	Actual Result
01	Installation	Test that the application should be installed on the Android mobile device successfully.	1. Open the Redbriks application in the Android Studio. 2. Run the application. 3. Application will be installed on the mobile device.	Redbriks should be successfully installed on the mobile device.	Pass
02	Launch the application	Test that the application should launch on the Android mobile device successfully.	1. Locate the application's icon on the device. 2. Press the icon.	Redbriks will be launched successfully within the 10 seconds.	Pass
03	Handle Call Interrupt	Test User should be able receive the call during application usage and when he returns back to application it should maintain the same state.	1. Launch the application. 2. Log in to the application. 3. Receive the call. 4. Navigate back to the application, get the application's previous state.	User should be able returns back to application it should maintain the same state.	Pass
04	View splash screen	Test that the splash screen is displayed while the application is being launched	1. Launch the application. 2. Observe the splash screen.	The splash screen is displayed while the application is being launched	Pass

05	Login	Test that the existing user can login into the system using his credentials.	1. Enter the email-id and password. 2. Click on the “SIGN IN” button. 3. Navigates to the main screen.	Existing user can login into the system using his credentials.	Pass
06	Incorrect Login	Test that the user cannot login into the system with wrong credentials.	1. Enter the email-id and password. 2. Click on the “SIGN IN” button. 3. Get the message that either email or password is wrong.	User cannot login into the system with wrong credentials.	Pass
07	Register	Test that the new user can sign up into the system.	1. Choose the option “SIGN UP”. 2. Enter the name, email-id and password. 3. Submit and get the confirmation. 4. Navigates to the main screen.	The new user can sign up into the system.	Pass
08	View city	Test that the system displays the current city.	1. Navigate to the main screen. 2. View the current city name.	The system displays the current city.	Pass
09	View comments	Test that the system displays the all the previous comments.	1. Navigate to the main screen. 2. Choose the comment icon. 3. View all the previous comments.	The system displays the all the previous comments.	Pass
10	Post comment	Test that the user can post the new comment.	1. Navigate to the comment screen. 2. Click on the “+” button. 3. Add the comment, rating and the user name. 4. Submit the comment.	The user can post the new comment	Pass
11	Search the houses	Test that the user can enter the search	1. Navigate to the main screen. 2. Click on the	The user can enter the search preferences and	Pass

		preferences and get the result as a list of houses.	"Search" icon. 3. Choose city, age range and rent range. 4. Submit the search preferences.	get the result.	
12	View house list	Test that the user can view the list of houses from the current city	1. Navigate to the main screen. 2. View the list of houses.	The user can view the list of houses from the current city	Pass
13	View details of the house	Test that the user can view the details of the particular house by clicking on the house image.	1. Click on the image of the house. 2. View the details of the house like area, images, rent, facilities etc.	The user can view the details of the particular house by clicking on the house image.	Pass
14	Send the mail	Test that the user can send the mail through app.	1. Navigate to the house details screen. 2. Click on the "EMAIL US" icon. 3. Compose the mail and send it.	The user can send the mail through app.	Pass
15	Call	Test that the user can call the "Redbriks" team through app.	1. Navigate to the house details screen. 2. Click on the "CALL US" icon.	The user can call the "Redbriks" team through app.	Pass
16	Navigate	Test that the user can navigate to the house location.	1. Navigate to the house details screen. 2. Click on the "GET DIRECTIONS" icon 3. Follow the directions to go to the house.	The user can navigate to the house location.	Pass
17	Virtual tour	Test that the user can view the virtual tour of the house.	1. Navigate to the house details screen. 2. Click on the "GET VIRTUAL TOUR" icon. 3. View the 360^0 video of the house.	The user can view the virtual tour of the house.	Pass
18	Augmented view	Test that the user can view the	1. Navigate to the house details screen.	The user can view the augmented	Pass

		augmented tour of the house.	2. Click on the “GET AUGMENTED VIEW” icon. 3. Point the device’s camera on the targeted picture. 4. View the house.	view of the house.	
19	Share	Test that the user can share about Redbriks on the social media through app.	1. Navigate to the home screen. 2. Click on the “Share” icon. 3. Choose the social media application to share your thoughts. 4. Share the thoughts.	The user can share about Redbriks on the social media through app.	Pass
20	View suggested houses	Test that the user can view the list of suggested houses.	1. Navigate to the house details screen. 2. View the list of suggested houses.	The user can view the list of suggested houses.	Pass
21	Uninstall	Test that the user can successfully uninstall the application from the mobile device.	1. Locate the Redbriks icon on the mobile device. 2. Uninstall the application.	The user can successfully uninstall the application from the mobile device.	Pass

12 Automation Testing - Selenium

Testing a mobile application means verifying its performance, stability, quality, reliability and various other widespread factors that help in practicing the application operations in real time. Testing strengthens the stability of the application to exist in real time. It gives an application the capability to work smoothly given any environment and criteria. There are various stages of testing like, stress testing, performance testing, UI testing, automation testing etc. Based on the needs and requirements these tests are designed and integrated with the whole testing framework of the application. There are similar applications that are available into the market like Trulia, Lovely, Homesnap, Zillow Mortgages, etc. These applications help the buyer with the financial advisers. Like the current mortgage rate and the yearly expenditure on the taxes with various other parameters being involved. It shows the calculator that displays the monthly debts, refinancing the property, down payment and interest rate. It also shows the price range with which there are possibilities and shows compatible properties with a thorough analysis of the nearby schools, neighborhood and homeowners associations involved. There are graphic charts displaying the rise and fall of the property prices with the area and also the nearby area for which the recommendation algorithm will take place.


Performance Testing
Reliable
High Performance
Intuitive
Mobile App Testing
Functional Testing
Usability Testing

Selendroid

Selendroid is a an testing automation framework that helps testing mobile applications seamlessly. Selendroid is a combination of selenium and android that is used to test the UI testing on various other platforms. It is also used to test hybrid mobile applications that are available on various other platforms. Tests are completely noted down using various forms of testing scripts and exposed APIs.

Selendroid framework have various advantages. It is completely parsed with JSON protocol and is easily integrated with REST API. Test cases can be written in any language like Java, Perl, PHP, Python or any other. Just we need to integrate relevant jar with that folder and start writing the test cases.

Testing an mobile application means verifying its performance, stability, quality, reliability and various other widespread factors that help in practicing the application operations in real time. Testing strengthens the stability of the application to exists in real time. It gives an application the capability to work smoothly given any environment and criteria. There are various stages of testing like, stress testing, performance testing, UI testing, automation testing etc. Based on the needs and requirements these tests are designed and integrated with the whole testing framework of the application.


Regression Testing
Performance Testing
Functional Testing
Integration and System Testing
Usability Testing
Compatibility Testing

SELENDROID ARCHITECTURE

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The basic problem with real estate application is they don't have proper virtual and augmented view of the properties which lead to a great frustration to the end users. They affect many factors like money, effort and time. For example a guy staying in India wishes to study in US but he is unaware of the real estate scenario over here like how to lease and what is good apartment to lease and all other stuffs. In that case with current real estate mobile applications there is no facility that shows up the virtual and augmented view of the properties. Hence, people have to visit the real estate location and see for options. This increases their time to view and inspect the property. While with our app they can directly go to the property and take a virtual tour and also see the outside of building in a 3D view with real world objects.

This duo problem motivated us to develop one single solution to all the problems. This is the most motivation behind putting time and efforts behind this project. After launching this app into app store there will truly huge amount of crowd that will use the application to get the knowledge of various features and functionalities that this app provides.

13 Design Patterns

Server side design pattern

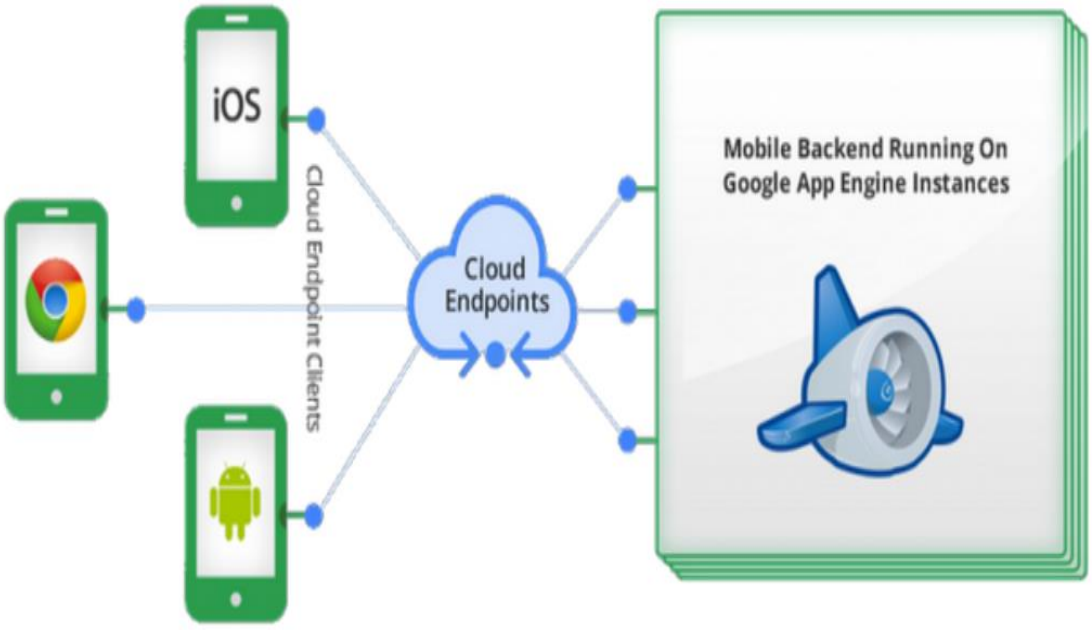
Context: Numerous center level models are firmly coupled accordingly lessening adaptability. This makes the application less hearty because of innovation conditions.

This application has an innovation freethinker center level. The center level for our situation is Google Cloud End focuses, which cooperate with the handler classes furthermore, information get to layer, to and foam, to show the information in the portable application.

Solution: The versatile application takes after a reasonable isolation of handler classes and the information get to layer. This isolation guarantees simplicity of support, advancement furthermore, troubleshooting. The center level goes about as a dealer between the presentation level what's more, the information layer utilizes REST API for correspondence.

Reusability: Reusability is critical to any center level design this application utilizes techniques that are reusable and has clear isolation from the other techniques for usability.

Platform agnostic: The center level is conveyed on the Google application motor Java end focuses module right now making it stage rationalist.


iOS
Cloud Endpoint Clients
Cloud Endpoints
Mobile Backend Running On
Google App Engine Instances

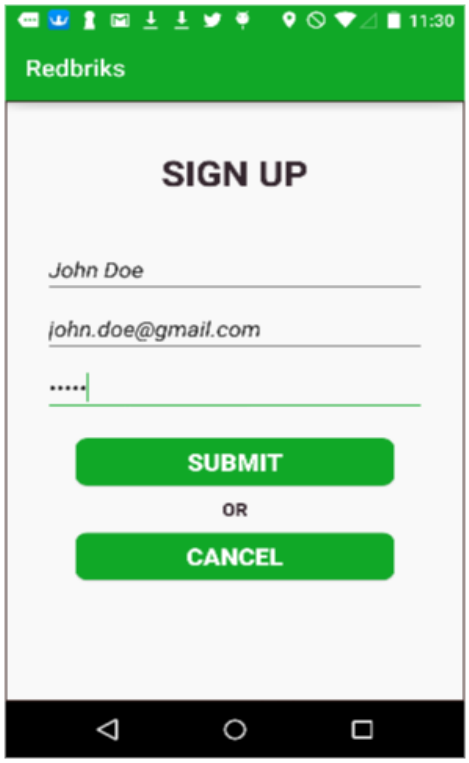
14 User Interface – Screens

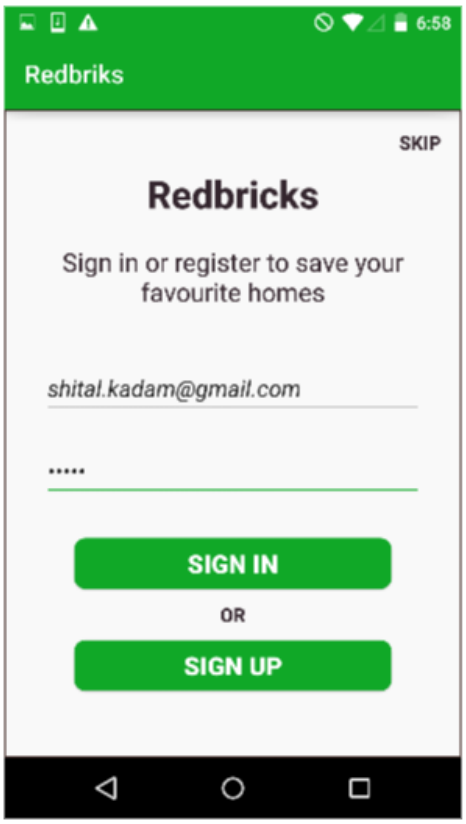
SPLASH SCREEN

- Redbriks logo.

SIGN UP SCREEN

- Sign up to save the houses you like.
- Enter name, email id and password.
- Click on the "SUBMIT" button to complete registration.
- Or click on "CANCEL" button to cancel the registration.



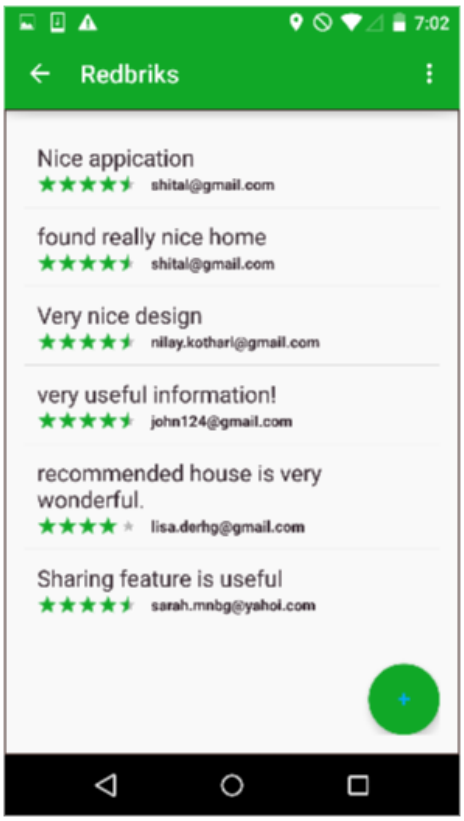


SIGN IN SCREEN

- Sign in to save the houses you like.
- Enter email id and password and click on the "SIGN IN" button.
- If you don't have the account yet click on the "SIGN UP" button to register now.
- If you don't wish to do either choose the "SKIP" option.

HOME SCREEN

- The home screen shows the current city and state name.
- Actionbar contains the four options home, search, share, and comment.
- List of the houses in the current city is displayed.
- House image with rent and address is available.
- User can view the detailed information on clicking on the house image.

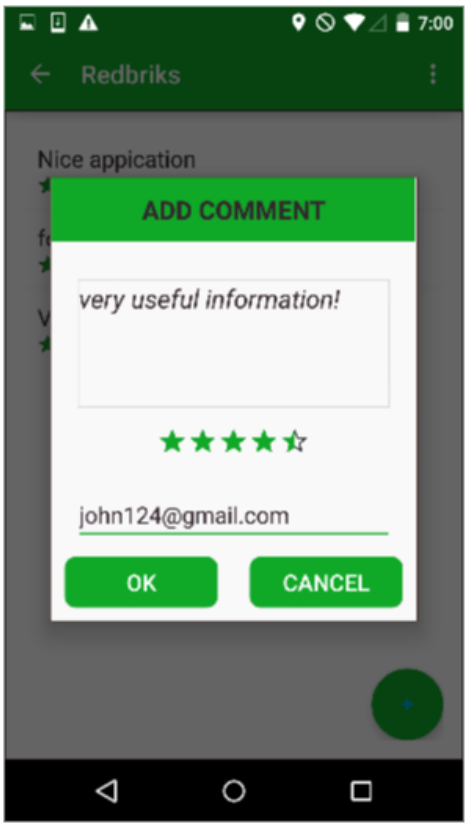


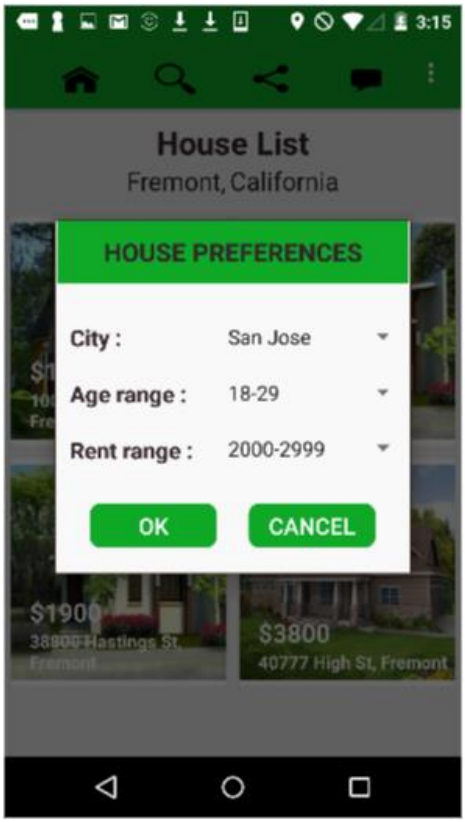
COMMENT SCREEN

- The user can view all the previous comments.
- Each comment contains a comment text, rating, and the user email id.
- User can also post a new comment by clicking on the "+" button

COMMENT ADD SCREEN

- The user can add the new comment about the Redbriks app.
- Enter the comment text, select the rating and enter the email id.
- Click on the "OK" button to post the comment.
- Or click on the "CANCEL" button to cancel the comment.



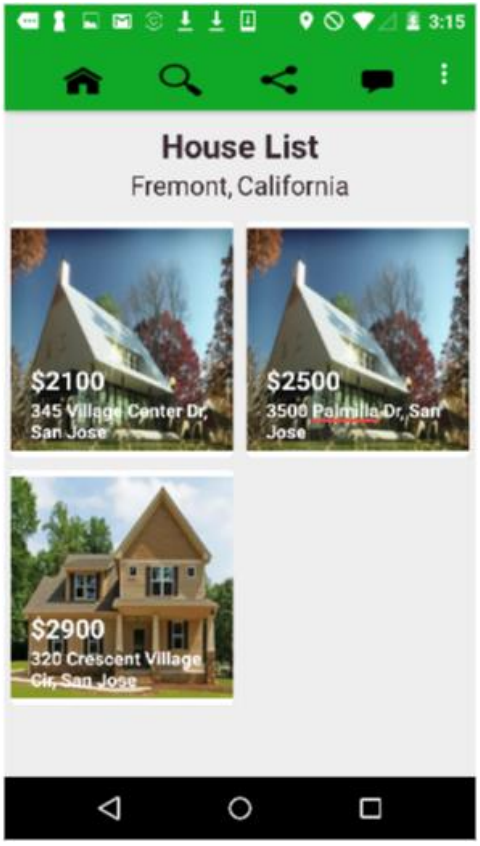


SEARCH SCREEN

- The user can choose the search preferences for the house.
- Search preferences are the city, age range and rent range.
- The matching list of houses will be displayed.

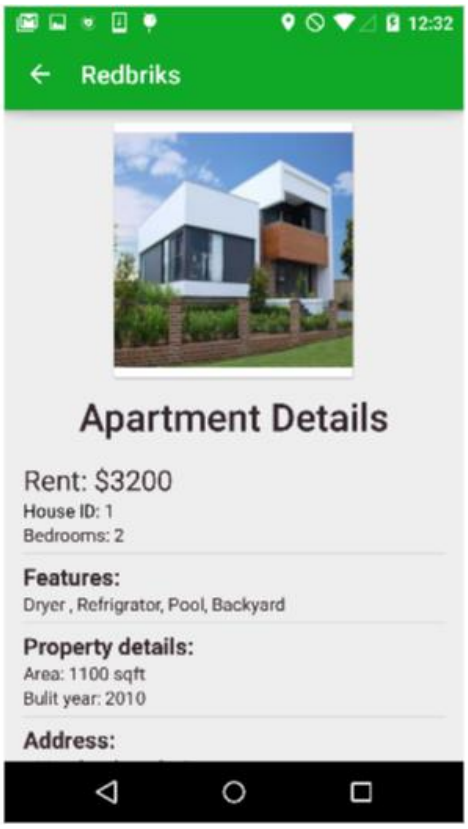
SEARCH RESULT SCREEN

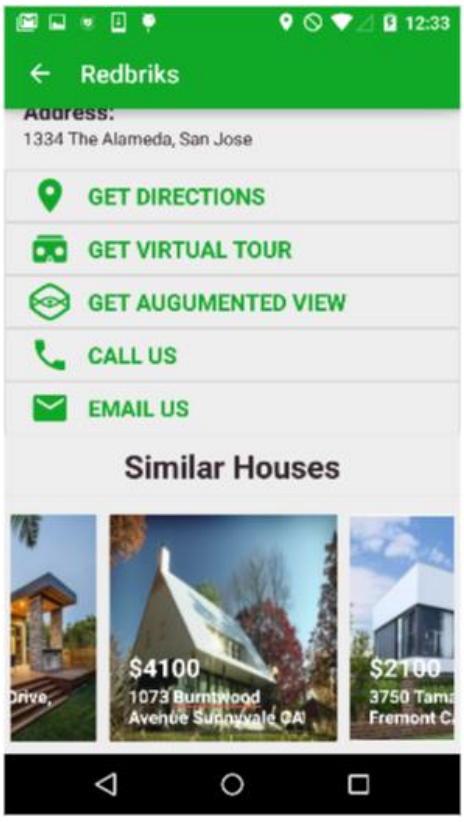
- After the search is completed result of the search is displayed as the list of houses.
- House list matches the search preferences given by the user.



HOUSE DETAILS SCREEN

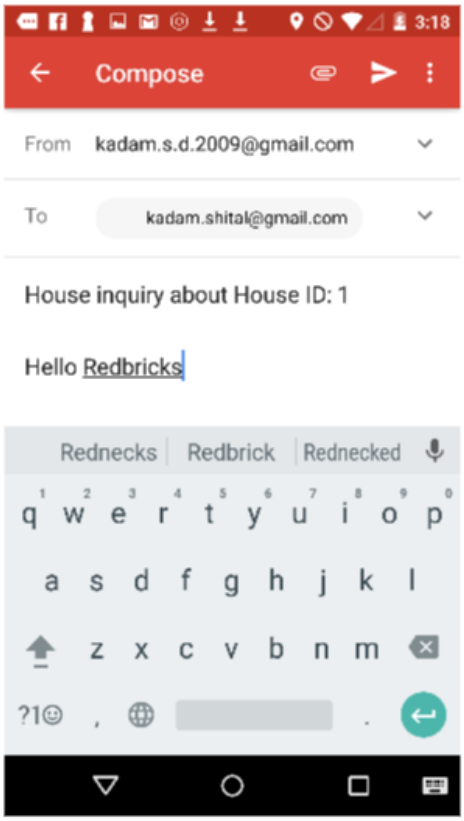
- The screen shows the details of the selected house.
- House image, rent, number of bedrooms, features, property details, house address are listed.
- The user can view the house description.





RECOMMENDATION SCREEN

- House details screen contains the recommended houses list.
- The user can also choose the different options like, directions, virtual tour, augmented view, call and email.

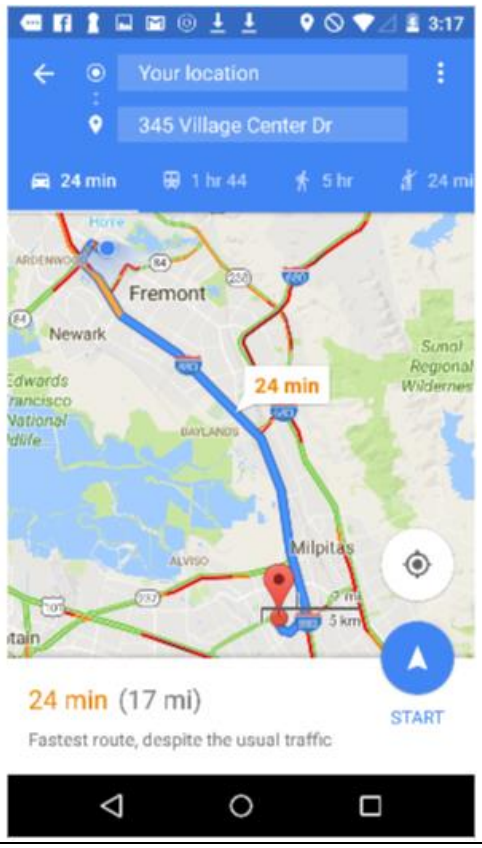


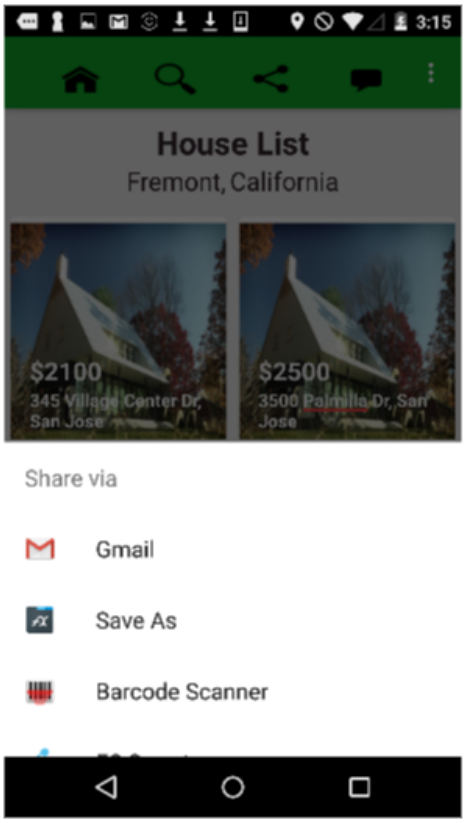
EMAIL SCREEN

- The user can send email to the "Redbriks" team by clicking on the "EMAIL US".
- Recipient email, email subject with house id and email body will be already filled.
- User can add the enquiry about the house and send it.

MAP SCREEN

- The user can get the direction to the specific house by clicking on the "GET DIRECTIONS".
- Google map will open and the directions will be displayed



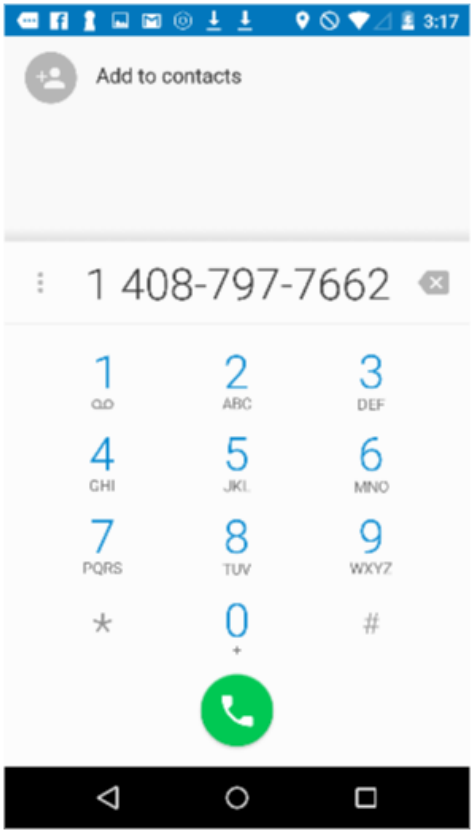


SHARE SCREEN

- The user can share his view about the Redbriks using the share feature.
- When user clicks on the share icon chooser will appear.
- User can choose desired option like facebook, google+ etc.

CALL SCREEN

- The user can call Redbriks team by clicking on the "CALL US" option.
- Call will be placed and user can talk to the team.



AUGMENTED SCREEN

- When user clicks on the "GET AUGMENTED VIEW" device's camera will start.
- Then user can point the camera on the registered image.
- User can see the view of the house.
- By rotating the image or camera user can see 360^0 view of the house.

15 Future Scope

There are similar applications that are available into the market like Trulia, Lovely, Homesnap, Zillow Mortgages, etc. These applications help the buyer with the financial advises. Like the current mortgage rate and the yearly expenditure on the taxes with various other parameters being involved. It shows the calculator that displays the monthly debts, refinancing the property, down payment and interest rate. It also shows the price range with which there are possibilities and shows compatible properties with a thorough analysis of the nearby schools, neighbourhood and homeowners associations involved. There are graphic charts displaying the rise and fall of the property prices with the area and also the nearby area for which the recommendation algorithm will take place. It is very safe to trust those apps as there is a lot of stocks involved which leads to the profit and loss of that company. But the initial stages of the app like view of the property inside and out are completely lacking in this scenario. This increases their time to view and inspect the property. While with our app they can directly go to the property and take a virtual tour and also see the outside of building in a 3D view with real world objects. One being the lack of user interaction that is very rare in current real estate applications. Developing objectives with this project is to gain the domain data that the entire system works upon. Mainly there are modules that divide the entire working system into various parts.

16 Profiling

No	Feature	Contribution
1	Understanding the project scope	Nilay, Sachet, Shital, Vidya
2	Recommendation module study	Nilay, Sachet, Shital, Vidya
3	Virtual reality study	Nilay, Sachet, Shital, Vidya
4	Augmented reality study	Nilay, Sachet, Shital, Vidya
5	Implementation of recommendation module	Sachet, Vidya
6	Implementation of Virtual reality	Nilay, Shital
7	Implementation of GPS sensor	Shital, Vidya
8	Social media integration	Shital, Sachet
9	Commenting Module	Nilay, Sachet
10	Database hosting	Sachet, Vidya
11	Cloud hosting	Sachet, Nilay
12	Backend integration	Nilay, Vidya
13	UI design	Shital, Vidya
14	Selenium testing	Sachet, Nilay
15	Presentation slides	Vidya, Shital
16	Login and registration module	Nilay, Nilay
17	Research Paper	Nilay, Sachet, Shital, Vidya

17 References

A. Sotsenko, M. Jansen, M. Milrad and J. Rana, "Using a Rich Context Model for Real-Time Big Data Analytics in Twitter," *2016 IEEE 4th International Conference on Future Internet of Things and Cloud Workshops (FiCloudW)*, Vienna, Austria, 2016, pp. 228-233.
doi: 10.1109/W-FiCloud.2016.55
keywords: {Big data;Context;Context modeling;Measurement;Real-time systems;Sparks;Twitter;big data;context analytics;k-means clustering;rich context model;twitter},
URL: http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=7592729&isnumber=7592673

B. Chen Zhou, Hao Jiang, Yanqiu Chen, Lihua Wu and Shuwen Yi, "User interest acquisition by adding home and work related contexts on mobile big data analysis," *2016 IEEE Conference on Computer Communications Workshops (INFOCOM WKSHPS)*, San Francisco, CA, 2016, pp. 201-206.
doi: 10.1109/INFCOMW.2016.7562072
keywords: {Internet;learning (artificial intelligence);mobile radio;principal component analysis;dimensionality reduction;greedy strategy;machine learning algorithms;mobile big data analysis;mobile internet;principle components analysis;user interest acquisition;user mobility;Big data;Context;Context modeling;Context-aware services;Data models;Internet;Mobile communication;interest acquisition;mobile big data;user behavior},
URL: http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=7562072&isnumber=7561992

C. http://www.creativeblog.com/mobile/10-principles-mobile-interface-design-4122910

D. https://developer.android.com/training/material/lists-cards.html
E. https://developer.android.com/design/material/index.html
F. https://www.codementor.io/design/tutorial/mobile-app-ui-design-principles
G. https://www.draw.io/
H. https://en.wikipedia.org/wiki/Website_wireframe
I. https://www.apachefriends.org/index.html

18 Presentation

18.1. Presentation link

https://prezi.com/5_zz0iaww0as/redbricks/

18.2. Code Link

https://github.com/shitalkadam/Redbriks

https://drive.google.com/drive/u/1/folders/0BwLnnJZBKfndcEhuUVZYUjN3YXM

18.3. Video Link

https://youtu.be/Fjxnv9CHor4