Mobile Computing

Project Report

Decibel

Ankur Sharma (2016255)
Dewangee Agrawal (2016034)
Suraj Prathik Kumar (2016101)

1) Final Project Idea

The basic idea for the project -

- The regions covered by us are -
    - Girls Hostel
    - Boys Hostel
    - Old Academic Block
    - New Academic Block
    - Seminar Block
    - Library Building
    - Students' Center
    - Open Areas
- The noise strength and vacancy of all the locations within the given regions can be looked for via the app.
- Looking for silent places around campus from anywhere.
    - This is done via accessing the microphone of devices which have the app installed.
    - We run a background service to gather data for the noise via the microphone of the location of the device. Privacy of the users is also maintained by dropping some packets.
    - We update this data at regular intervals (5-15 secs).
    - The places with the least noise strength ordered by most vacancy are displayed.
- Finding places around campus with the most vacancy.
    - This is done via information about the wifi routers.
    - We collect the data regarding the capacity of the different locations manually.
    - We use the wifi mac addresses to find the number of devices connected to the routers at a given time.
    - We subtract this data from the capacity of a location to find the vacancy.

    - The location with the most vacancy ordered by least noise strength are displayed.
- We use firebase to store and fetch the data for the app and keep updating it regularly.

We've implemented all the initial use cases of the project. The comment from the project presentation to reduce the updation time while keeping track of battery loss has also been incorporated. We weren't given any other comments during the mid project review.

2) Functionalities implemented:

Technical Details -

- The basic UI of the app is created using activities and fragments.
- We've created animations to improve the UI of the app.
- The data for the wifi mac addresses and their respective locations is collected.
- The data regarding the occupancy of the different study areas throughout the campus has also been collected manually by us.
- The data is stored to the FireBase database.
- The database is connected to the UI and the data displayed in the app.
- We use a toggle to display the various locations for the user to choose from.
- We use RecyclerView to display the different rooms in each of these locations.
- We map the location of the device by the mac address of the wifi router it is connected to. We use this method to check the location of the device instead of GPS since the battery usage is reduced in this case.
- We run a service to check the noise strength in any location.
- The real time vacancy information of any room is calculated by subtracting the occupancy by the number of devices connected to the router of that location.

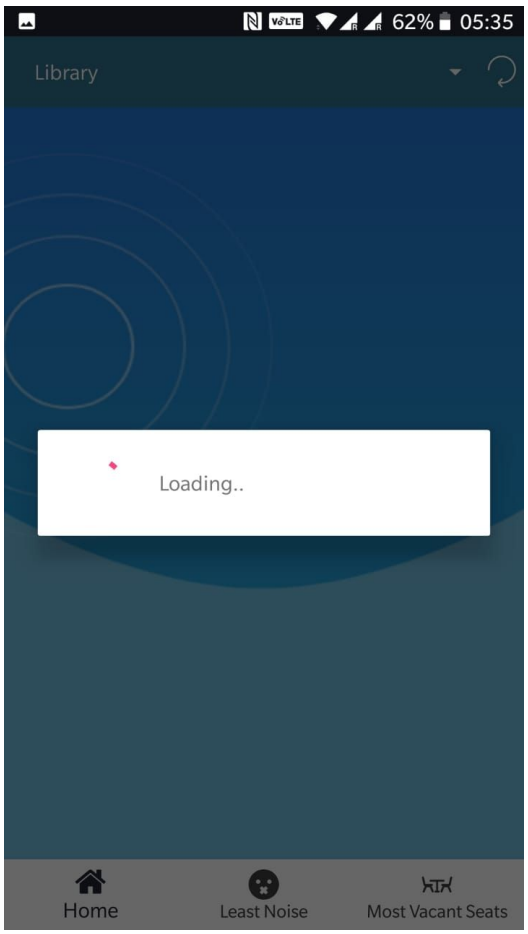
Tools -

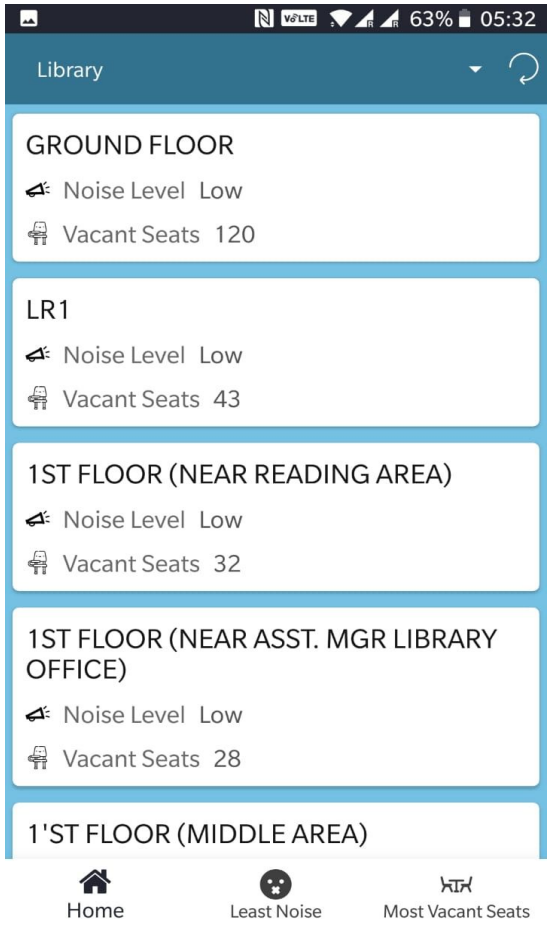
- **FireBase** is used to store the data of the locations along with their wifi mac addresses, the noise strength and the vacancy.
- We use the **MVP** (model-view-presenter) architecture for building the UI of the app.
    - An interface is created for each of the frames - noise, vacancy and region which defines the functions to collect data from the Firebase database and pass the data to the views.
    - The presenters pass the data from the FireBase database to the views by implementing the functions from the interfaces.

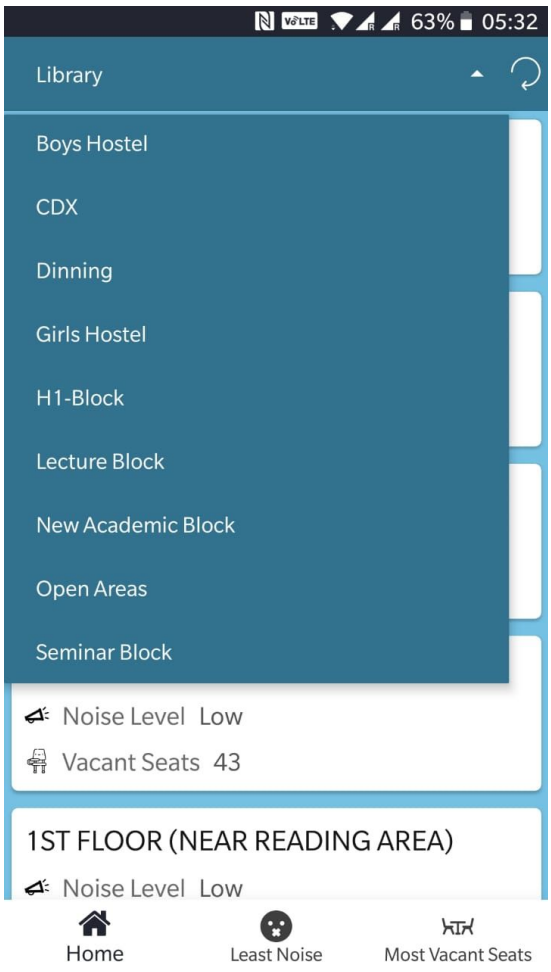
    - The views call the adapter to bind the data to the view holder and display it via the Recyclerview.
- **Butterknife** is used to bind the views to their IDs.
- **MediaRecoder** is used to calculate the noise strength via the Mic.
- We use **Github** to make regular commits to our code.

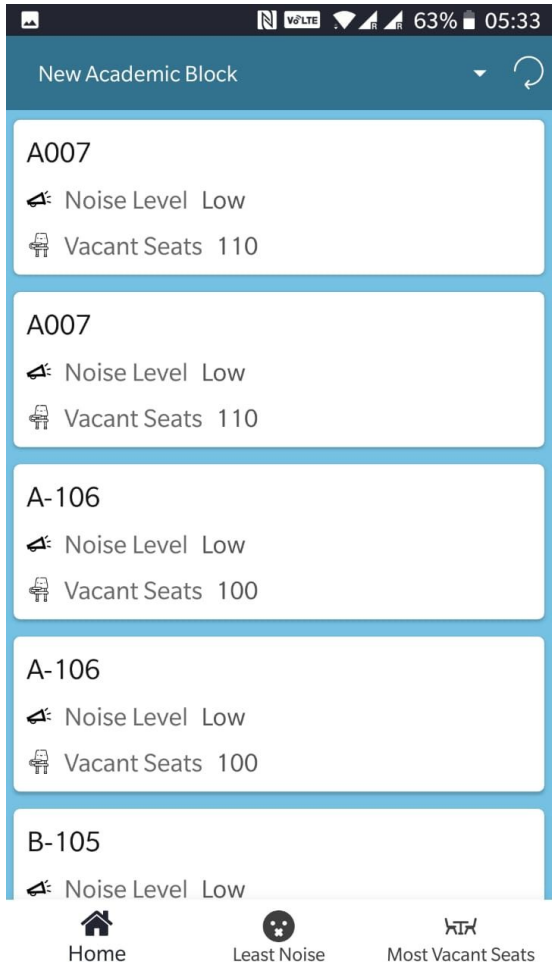
Wireframes and Screenshots -

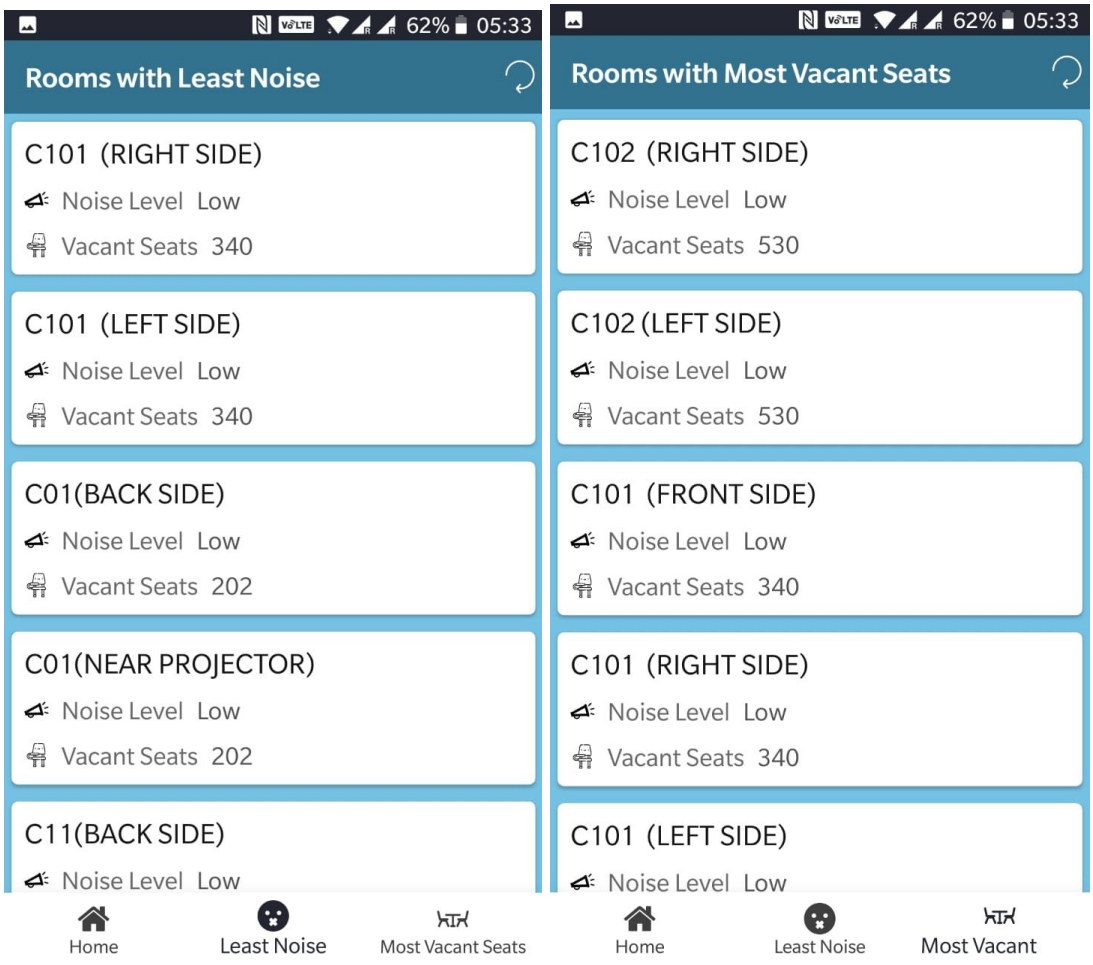
App


62% 05:35
Library
Loading..
Home
Least Noise
Most Vacant Seats


63% 05:32
Library
GROUND FLOOR
Noise Level Low
Vacant Seats 120
LR1
Noise Level Low
Vacant Seats 43
1ST FLOOR (NEAR READING AREA)
Noise Level Low
Vacant Seats 32
1ST FLOOR (NEAR ASST. MGR LIBRARY OFFICE)
Noise Level Low
Vacant Seats 28
1'ST FLOOR (MIDDLE AREA)
Home
Least Noise
Most Vacant Seats


63% 05:32
Library
Boys Hostel
CDX
Dinning
Girls Hostel
H1-Block
Lecture Block
New Academic Block
Open Areas
Seminar Block
Noise Level Low
Vacant Seats 43
1ST FLOOR (NEAR READING AREA)
Noise Level Low
Home
Least Noise
Most Vacant Seats


63% 05:33
New Academic Block
A007
Noise Level Low
Vacant Seats 110
A007
Noise Level Low
Vacant Seats 110
A-106
Noise Level Low
Vacant Seats 100
A-106
Noise Level Low
Vacant Seats 100
B-105
Noise Level Low
Home
Least Noise
Most Vacant Seats



3) Final outcome

- The app provides the users information about the quiet places in campus where they can go to study in peace.
- It also allows them to know the vacancy of the respective locations from anywhere within campus.
- The privacy of the users is maintained as we drop the sound packets collected via the microphone.
- It can be used by guards too to maintain the noise level in the different buildings and maintain the decorum.

4) Individual Contribution

- Ankur - Noise strength and vacancy information updation, Firebase integration
- Dewangee - Data collection, MVP model, UI, Firebase integration
- Suraj - Data collection, MVP model, UI, Firebase integration