CS6312

Mobile Devices and Systems Sound Tracker Mobile Application

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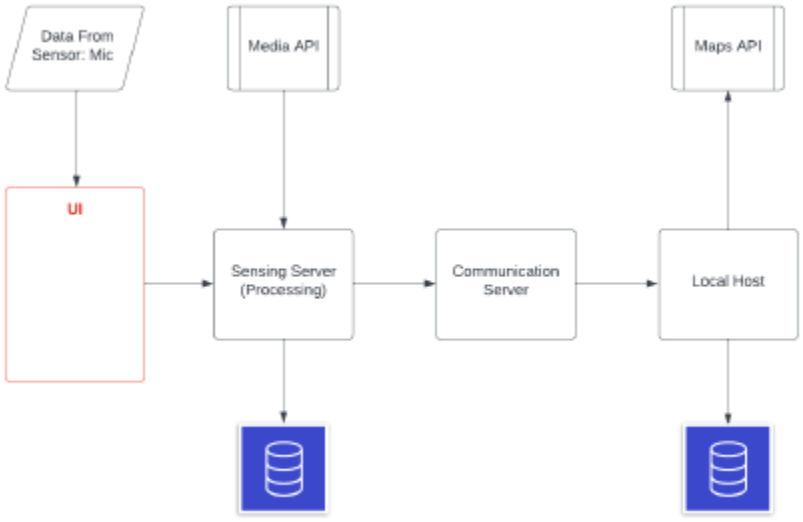
1. Objective –

To discuss and design architecture of sound tracking application.

2. Architecture -

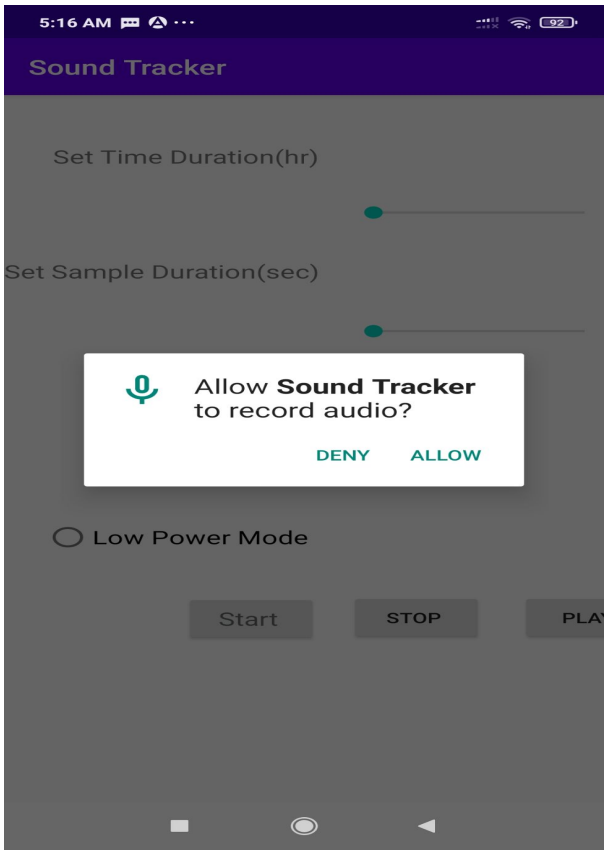


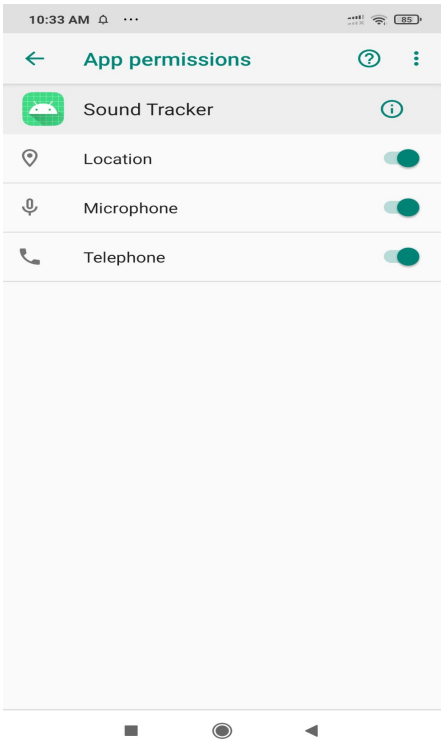
The developed architecture of sound tracker application consists of a user interface which enables the user to give input on parameters (frequency and duration) required to record audio and send data to the cloud database. Firebase is used to host database for our application. The server component used is by VScode, it is being used to receive data from firebase storage and give location coordinates, date, time and client id to be represented on web application. Used flask to create web application, using google maps API.

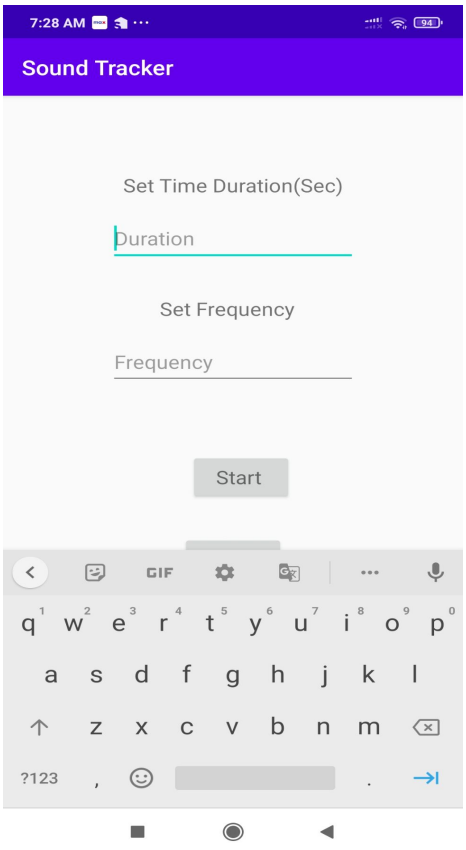
3. Development

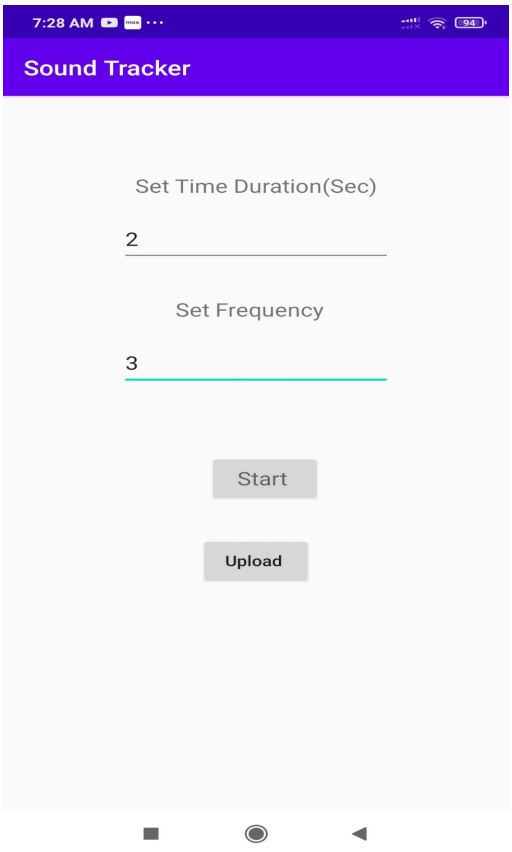
3.1 User Interface

Created a simple user interface which takes location and microphone permissions to record audio and track device location coordinates. Users are asked to set time duration in seconds to specify length of audio recording and to set frequency of audio recording. When the user presses the Start button the audio recording(s) start and with the upload function, the recorded audios are uploaded to firebase storage with location, date time and client ID.




10:33 AM
App permissions
Sound Tracker
Location
Microphone
Telephone


7:28 AM
Sound Tracker
Set Time Duration(Sec)
Duration
Set Frequency
Frequency
Start

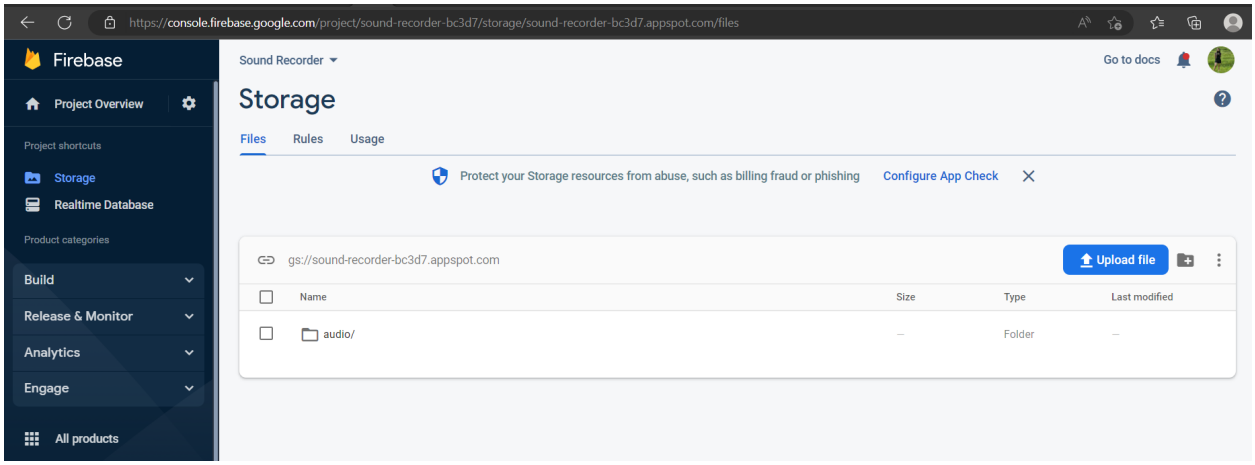

7:28 AM
Sound Tracker
Set Time Duration(Sec)
2
Set Frequency
3
Start
Upload

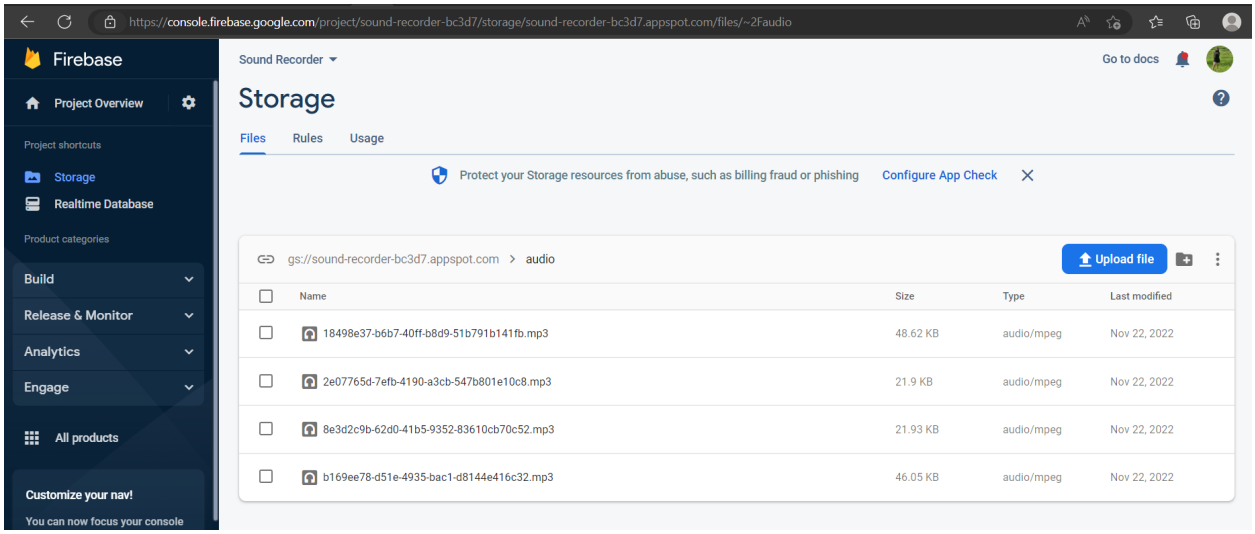
3.2 Application Development in Android

Android Studio is the official integrated development environment (IDE) for Google's Android operating system, built on JetBrains' IntelliJ IDEA software and designed specifically for Android development. It is available for download on Windows, macOS and Linux based operating systems.It is a replacement for the Eclipse Android Development Tools (E-ADT) as the primary IDE for native Android application development.

3.3 Data Storage

Firebase is a set of hosting services for any type of application (Android, iOS, Javascript, Node.js, Java, Unity, PHP, C++ ...). It offers NoSQL and real-time hosting of databases, content, social authentication (Google, Facebook, Twitter and Github), and notifications, or services, such as a real-time communication server.

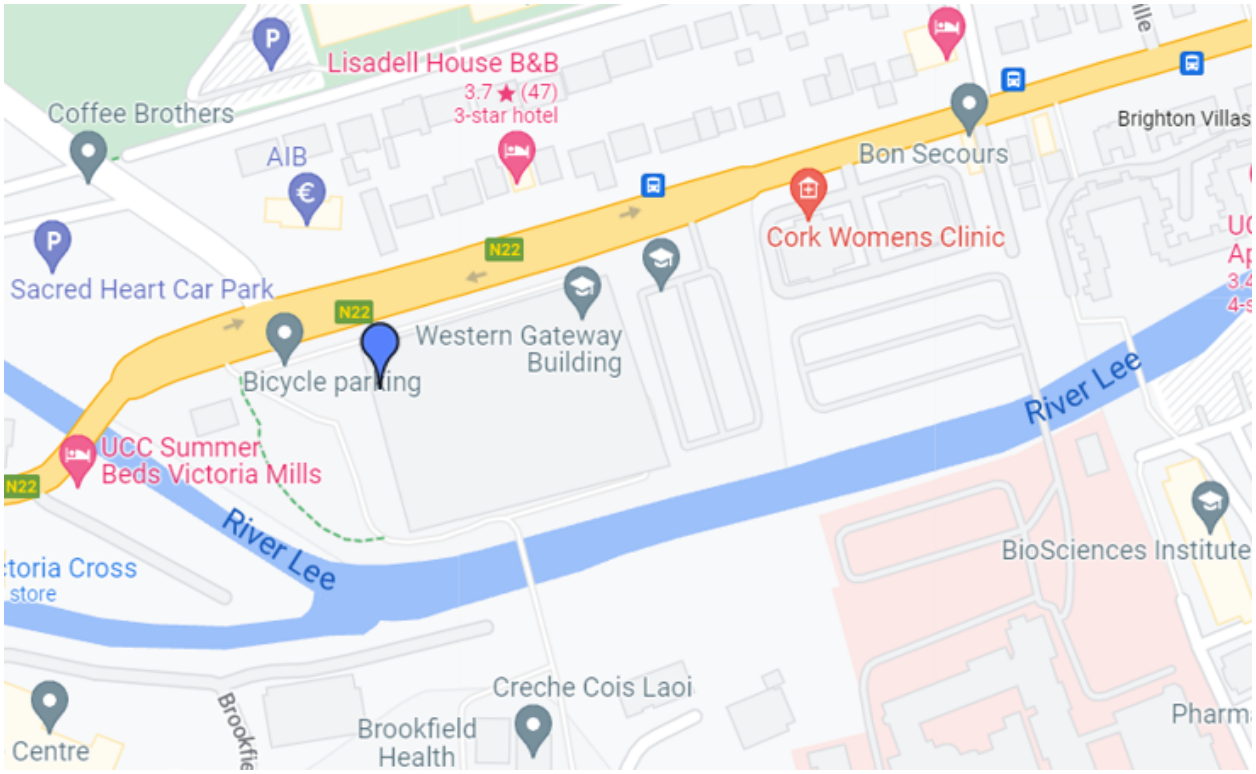




3.4 Web Application

Flask is a lightweight WSGI web application framework. It is designed to make getting started quick and easy, with the ability to scale up to complex applications. It began as a simple wrapper around Werkzeug and Jinja and has become one of the most popular Python web application frameworks.

```
SoundTrackerBackend > main.py > ...
1   from flask import Flask, render_template
2
3   app = Flask("app")
4   API_KEY="[redacted]SyAsq4sV3KXA6rmWuqKTx4vUGQnTF7[redacted]"
5
6   @app.route("/")
7   def main():
8       return render_template("index.html", key=API_KEY)
9
10  if __name__ == "__main__":
11      app.run(host="0.0.0.0", port="5000", debug=True)
```



4. Future Scope

The audio files can be used to determine noise at locations where they were recorded and further analysis can be carried out to detect noisy areas times in day, the place tends to be noisy.

Also the energy consumed can be determined for the audio packets to transfer from mobile client to the cloud storage.

Energy efficient methods can be created to transfer data packets with multiple files when the battery is in low power mode.

5. Conclusion

Created an application to record audio from mobile devices and save data to firebase storage. The data is retrieved by a communication server to represent on maps. Further developments can be made to process data to make calculations.

6. **Citations-**

(https://en.wikipedia.org/wiki/Android_Studio 2022, 6)

(https://en.wikipedia.org/wiki/Firebase 2022, 6)

(https://palletsprojects.com/p/flask/ 2022, 7)