Noise Pollution Detection and Mapping

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1. Introduction

- Environmental noise has a significant effect to our health. It can cause t he hearing losses and sleep disorder
- The health impacts of noise pollution have become a growing concern among both the general public and policy makers. However, the prese nt state of the noise detect market is inefficient in terms of price and o ne-off
- This project is done in order to provide a practical and efficient way to collect and provide data to our customers

2. Study Goal

The goal of this study is to indicate the level of the noise on the map, it is required to develop a system for measuring the sound level with GPS data and visualize those data on the map.

1. Design a system that collects and exports the merged data which contains location and sound level
2. Measure the sound level with the system on the roadside around the university or on the commuter route that students mainly use
3. Export the measured data and import to a mapping program

3. Proposed System

This System structure collects and processes environmental noise data and GPS data, and based on the data collected. The system visualize the output via data visualization module.

For this system, the target customers are ones who needs the noise pollution data, including policy makers and city architects.

Our system holds two type of data input module with different characteristics. It can be classified into two models, one considering portability and popularity, and one model for repeated measurement.

For the data measurement methods of the system, noise indicator L_{den} will be used, with the measurement range limited to road traffic noise and railway noise.

Through this system, customers will have time and cost-efficient access to the visualized noise pollution data.

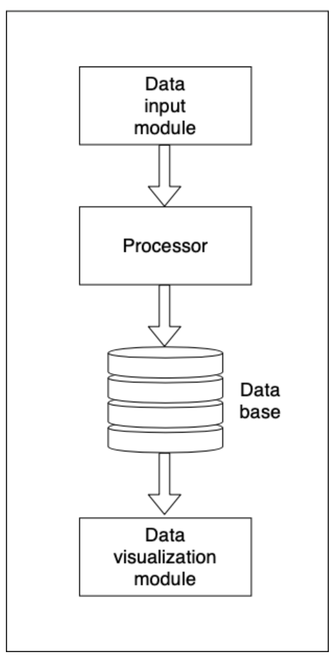

Figure 1. System diagram 1

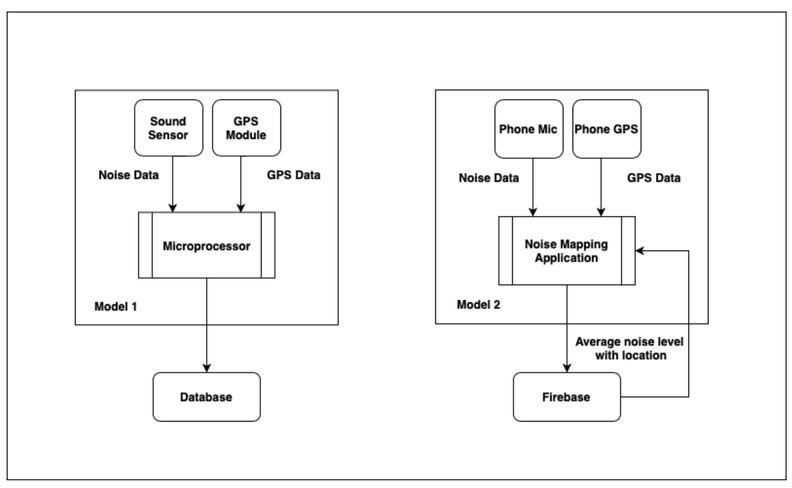

Figure 2. System diagram 2

4. Implementation

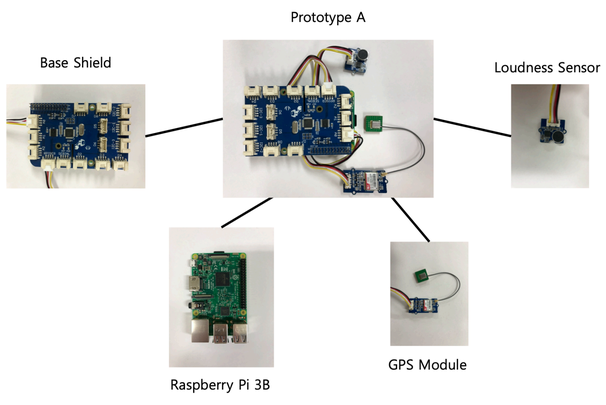

Figure 3. Prototype A (Micro processor)

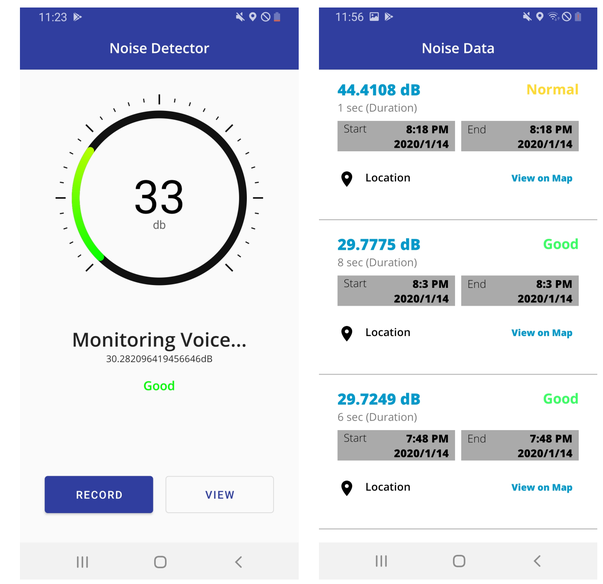

Figure 4. Prototype B (Android application)

5. Experiments

- Conditions
  Measurement range : Road traffic noise from the front gate of Ritsumeikan University to intersection
  Measurement indicator : L_{den} (Day-evening night) level
- Procedure
  - Collect data by prototype A
  - Create a .csv file
  - Import .csv file to the mapping program
- Results

Figure 5. Data visualized map

6. Discussion and Conclusion

Most of the pollution detecting systems on current market holds the problem of one-off and cost inefficiencies. However this developed system allow the users not only to detect sound pollution, but also save the location value. Moreover, visualize the data via heat map. Therefore, the developed system provides time-efficiency and persistence to users.

This study had difficultly collecting more data due to insufficient of finance and resources. Furthermore, the method of data storage has not been established. Therefore, for future study this project will build the database for a more efficient system.