CS464 Machine Learning Term Project Proposal
Urban Sound Classification

Team Members

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Description of the Data

The dataset is called "*UrbanSound*" and it has 8732 labelled sound instances that are shorter than 5 seconds. These instances consist of urban sounds from 10 classes, which are; "Air Conditioner", "Car Horn", "Children Playing", "Dog Bark", "Drilling", "Engine Idling", "Gun Shot", "Jackhammer", "Siren" and "Street Music". The attributes of data are as follows, "ID" (unique ID of the sound instance), "Class" (the type of sound). The size of the dataset is approximately 6 GBs.

Purpose of the Project and Potential Questions to Answer

This project aims to develop a machine learning algorithm to identify the sources of urban sound excerpts. With this algorithm, it would be possible to use the classified data in several fields such as surveillance, urban soundscape monitoring, noise source identification and active noise cancellation.
Possible questions we are trying to answer with this data are:

- What are the limitations and challenges in the field of sound processing and classification?
- Which type of urban sound signal belongs to which category?
- What are the other possible uses of urban sound classification?
- Which machine learning algorithms and libraries are suitable for sound classification?
- How to weight sound signals with respect to frequencies?
- What are the required features and attributes of sounds in order for them to be used in machine learning?

What to Achieve by the Next Milestone

We are planning to do proper research about sound classification and identifying the possible problem-solving areas to figure out which areas our project would be beneficial to. We will learn to use *Python3* and its machine learning libraries such as *Keras* and *TensorFlow* effectively since we are planning to develop this project using *Python3* and these libraries. We will learn how to manipulate our data with appropriate matrix and vector operations by using *Numpy* and *Pandas* libraries. We will also use Scipy to analyze the frequencies.

We will determine which algorithms to use, and possibly implement these algorithms. These algorithms will be used for accurate categorising of the sound excerpts. The dataset will be organized according to the needs of our project which will be recognized during the development. After shuffling the dataset, 8:2 ratio will be used for training, validation and test data.