Classifying Urban sounds using Deep Learning

Introduction

Sounds are all around us. Whether directly or indirectly, we are always in contact with audio data. Sounds outline the context of our daily activities, ranging from the conversations we have when interacting with people, the music we listen to, and all the other environmental sounds that we hear on a daily basis such as a car driving past, the patter of rain, or any other kind of background noise. The human brain is continuously processing and understanding this audio data, either consciously or subconsciously, giving us information about the environment around us.

The goal of this capstone project, is to apply Deep Learning techniques to the classification of environmental sounds, specifically focusing on the identification of particular urban sounds.

Problem Statement

The main objective of this project will be to use Deep Learning techniques to classify urban sounds

When given an audio sample in a computer readable format (such as a .wav file) of a few seconds duration, we want to be able to determine if it contains one of the target urban sounds with a corresponding likelihood score. Conversely, if none of the target sounds were detected, we will be presented with an unknown score.

Datasets and Inputs

For this project we will use a dataset called Urbansound8K [1]. The dataset contains 8732 sound excerpts (<=4s) of urban sounds from 10 classes, which are:

- Air Conditioner
- Car Horn
- Children Playing
- Dog bark
- Drilling
- Engine Idling
- Gun Shot
- Jackhammer
- Siren
- Street Music

Tools:

1. Python.
2. Jupyter Notebook.
3. PowerPoint.
4. Excel

Libraries:

1. NumPy.
2. Pandas.
3. Matplotlib.
4. Seaborn
5. sciket learn
6. Librosa