Audio Classification

Approch:

1.Data preprocessing:

- Load the audio files from the UrbanSound8K dataset.
- EDA
- Extract relevant features from the audio files, such as Mel-frequency cepstral coefficients (MFCCs), spectral centroid, and spectral bandwidth.
- Normalize the features to ensure consistent scales across different features

2.Preparing the Dataset with Meta Data:

- Load the meta data which is in the csv file.
- By using functional coding to ready the dataset for our requirement.
- After prepare the Dataset we have to split our dataset into train and test.

3.Model Architecture:

- Design a convolutional neural network (CNN) architecture suitable for audio classification.
- Add layers like convolutional layers, pooling layers, and dense layer.
- Consider using techniques like dropout and batch normalization to prevent overfitting.
- Choose an appropriate activation function for the output layer based on the number of classes (e.g., softmax for multi-class classification).

4.Model Training:

- Train the model using the training data while monitoring the validation performance to prevent overfitting.
- Utilize techniques like early stopping and model checkpointing to save the best performing model.

5.Model Evalution:

- Evaluate the trained model on the testing dataset.
- Calculate metrics such as accuracy, precision, recall, and F1-score to assess the model's performance.

Performance:

Accuracy:0.64

Validation Accuracy:0.75

Challenges Faced:

- Designing an appropriate neural network architecture with the right balance between complexity and generalization is crucial for achieving good performance.
- Searching for dataset is a most challenging thing in this project.