DA221M COURSE PROJECT

MUSIC GENRE CLASSIFICATION USING NEURAL NETWORKS

PRESENTED TO

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INTRODUCTION

- The increase in music production and exponential growth of online music streaming platforms like Spotify, YouTube Music, Apple Music, etc. have made music genre classification as an interesting topic.
- Accurate genre labelling is crucial for music discovery and personalised recommendations on streaming services.

Our GOAL?

- Our group project focuses on developing a deep neural network model for recognizing and classifying different music genres.
- The goal is to create an intelligent system that can accurately identify the genre of a given audio sample, with applications in music streaming, recommendation systems, and audio analysis.

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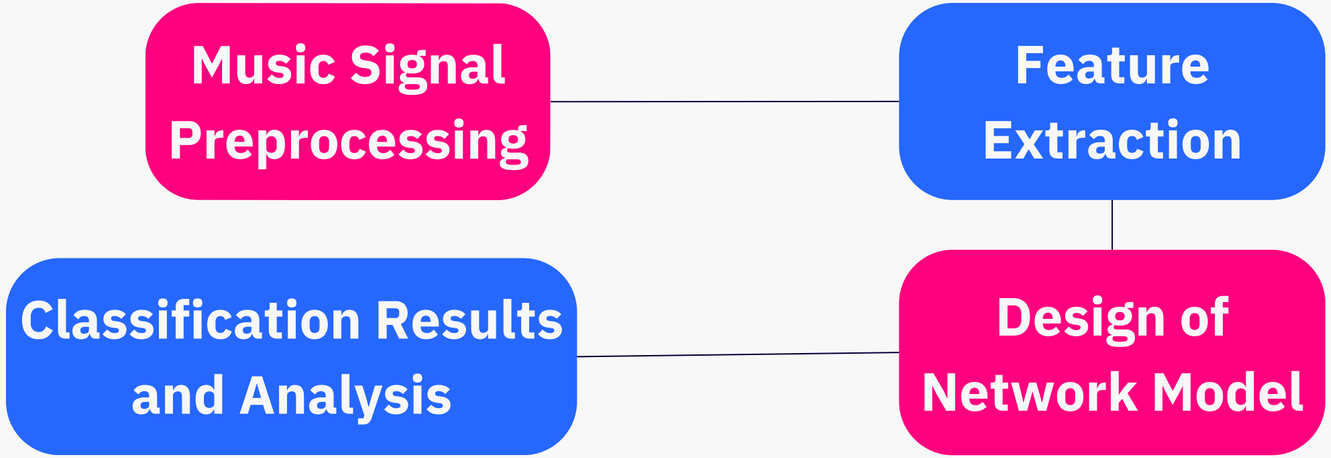
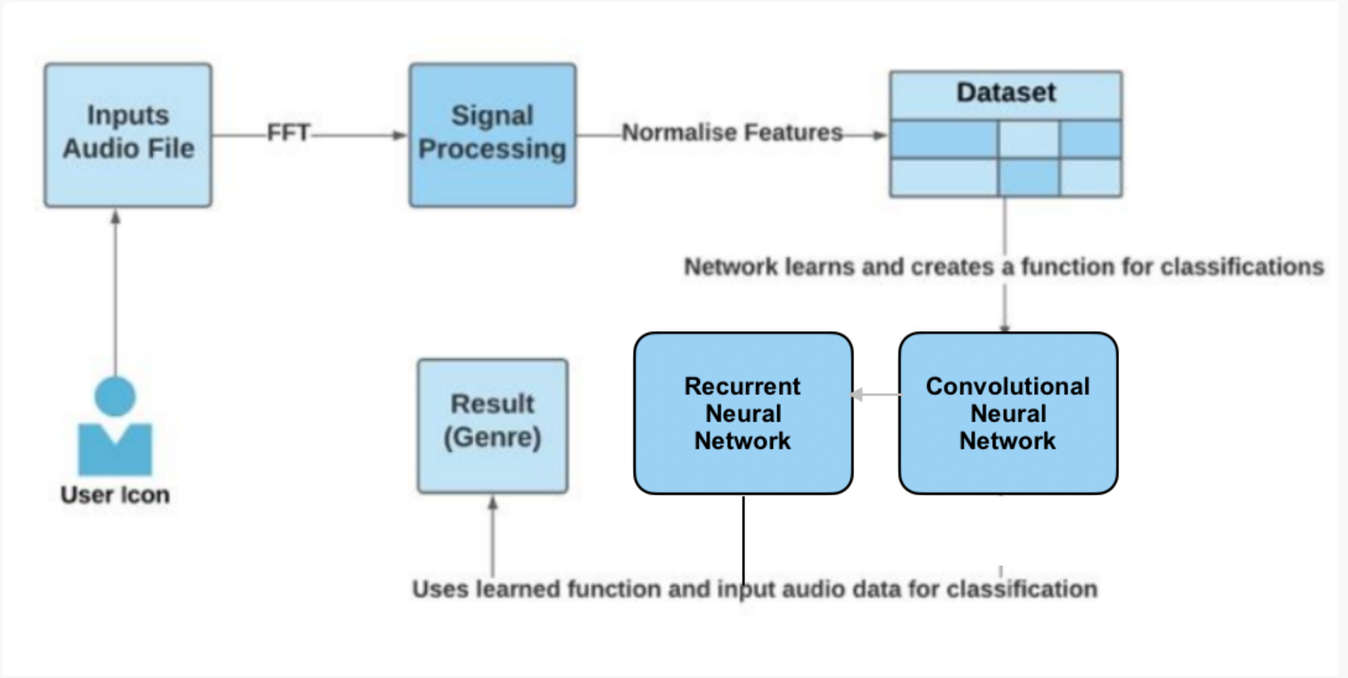
Overview and Methodology



The methodology involves several key steps for music genre classification using Deep Neural Networks (DNNs), specifically Convolutional Neural Networks (CNNs) and Convolutional Recurrent Neural Networks (CRNNs)



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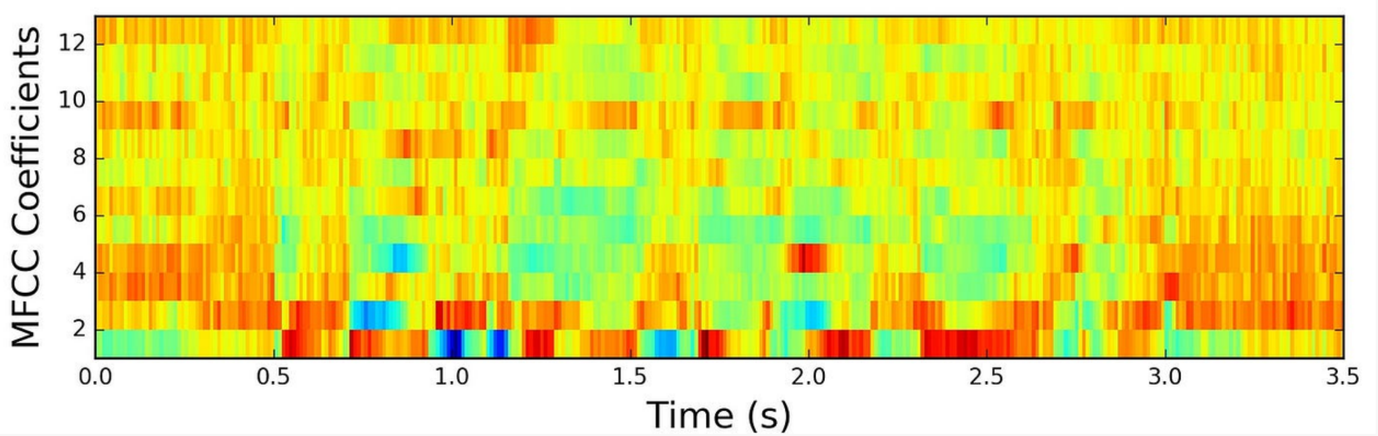
What Music Features have been used in this project?

Dataset used:

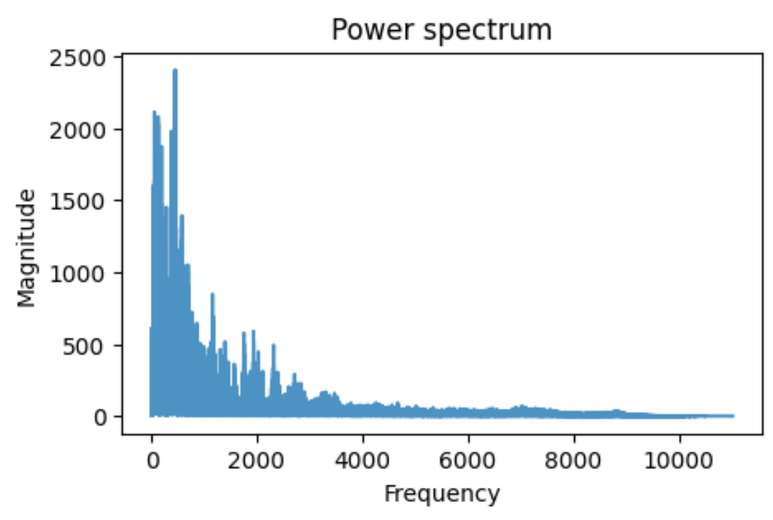
We used the GTZAN Genre Collection dataset, which is used for the classification of audio signals by musical genres. The dataset consists of 1,000 audio tracks, each 30 seconds long. It contains 10 genres, each represented by 100 tracks.

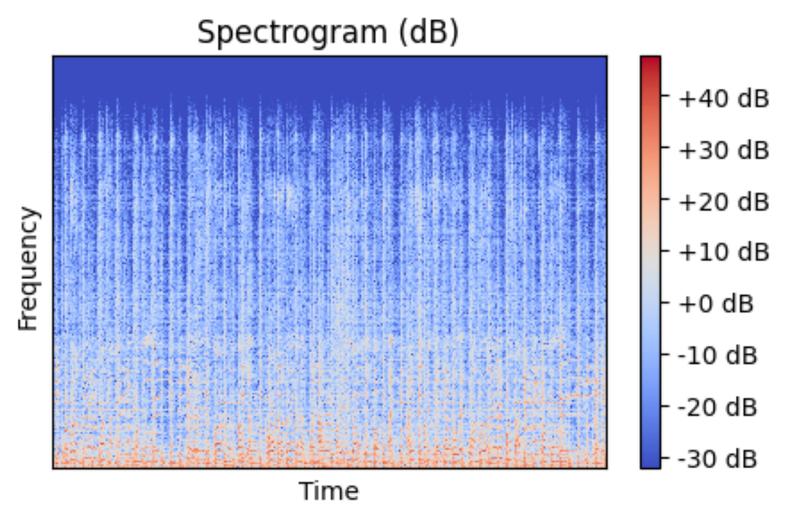
- In this course project, we have used MFCC (Mel-frequency cepstral coefficients) to train the neural networks.
- They are derived from the Mel-frequency cepstrum, which represents the short-term power spectrum of sound in a way that is perceptually relevant to humans.

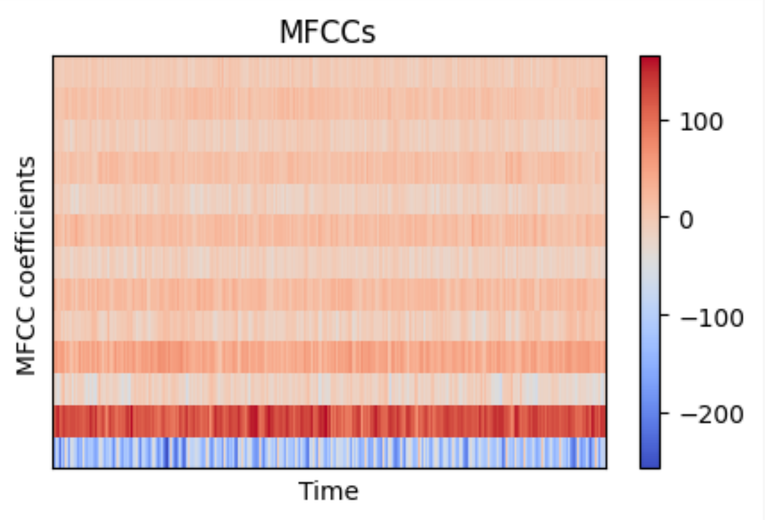


How have MFCCs been extracted?

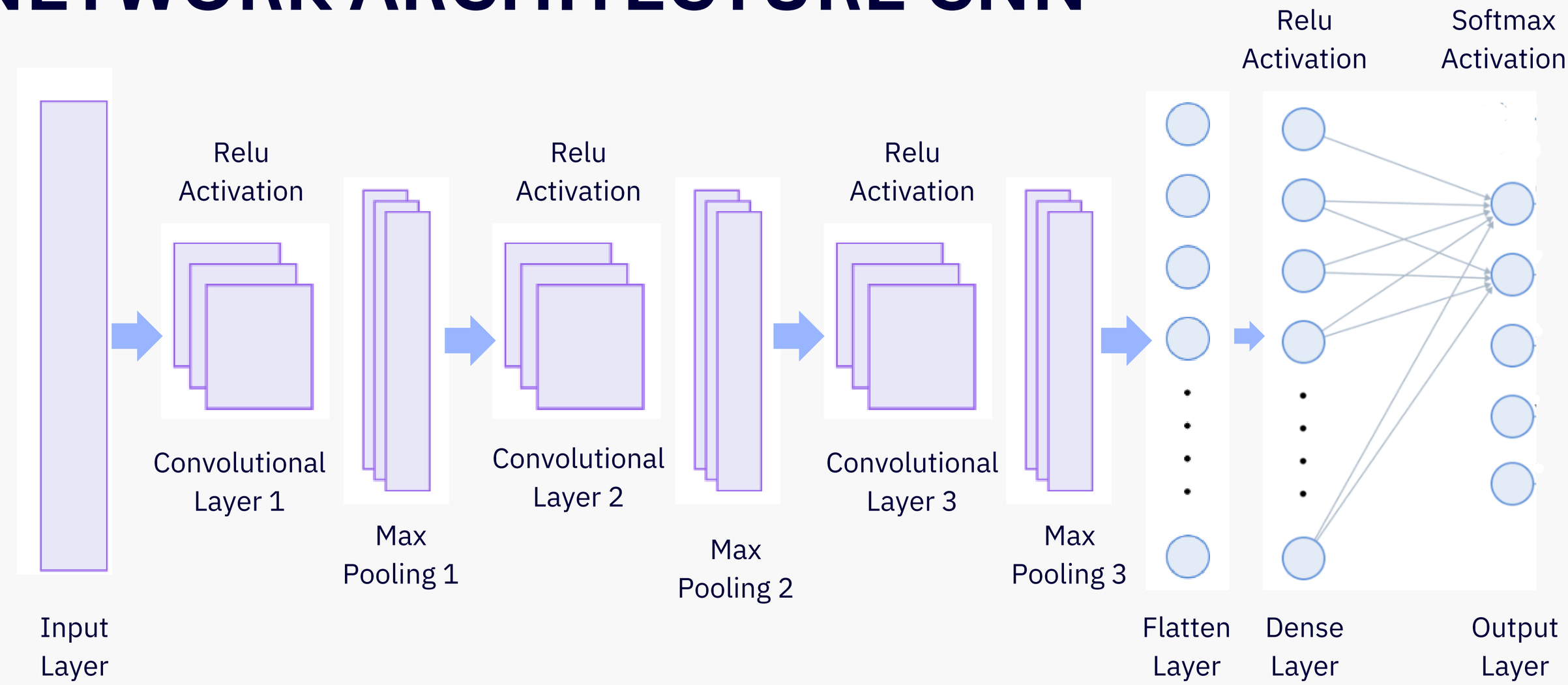
Power Spectrum Calculation → Short Time Fourier Transform (STFT) → Transformation to Logarithmic scale → Mel-Frequency Cepstral Coefficients (MFCCs) Extraction





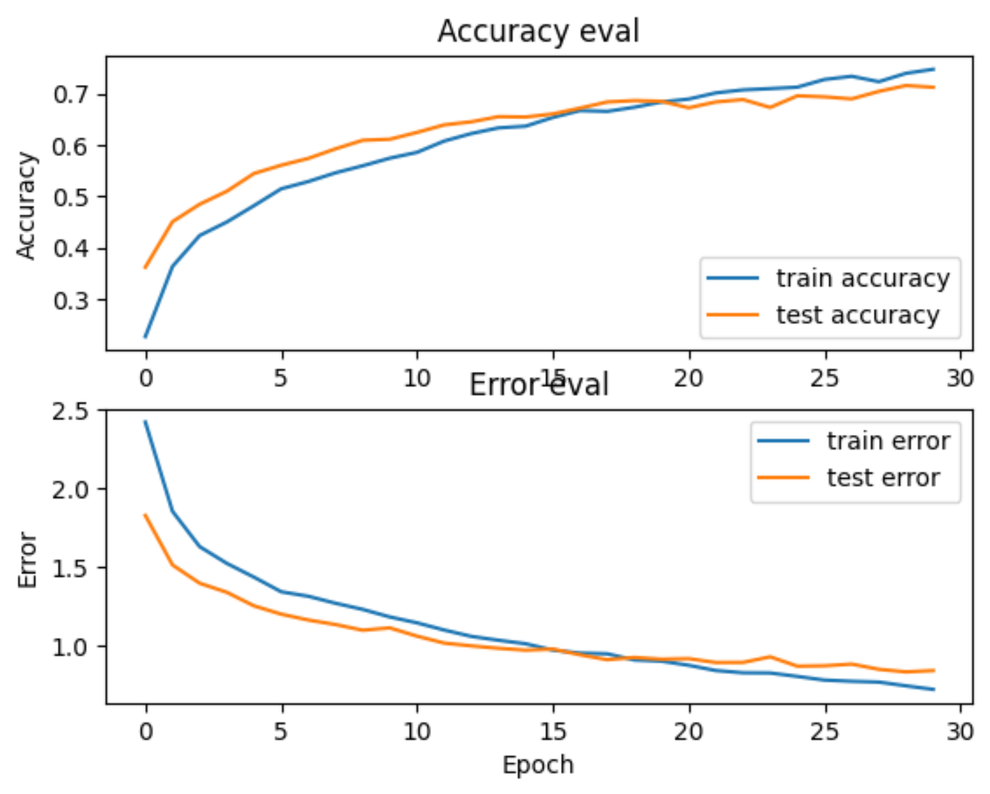


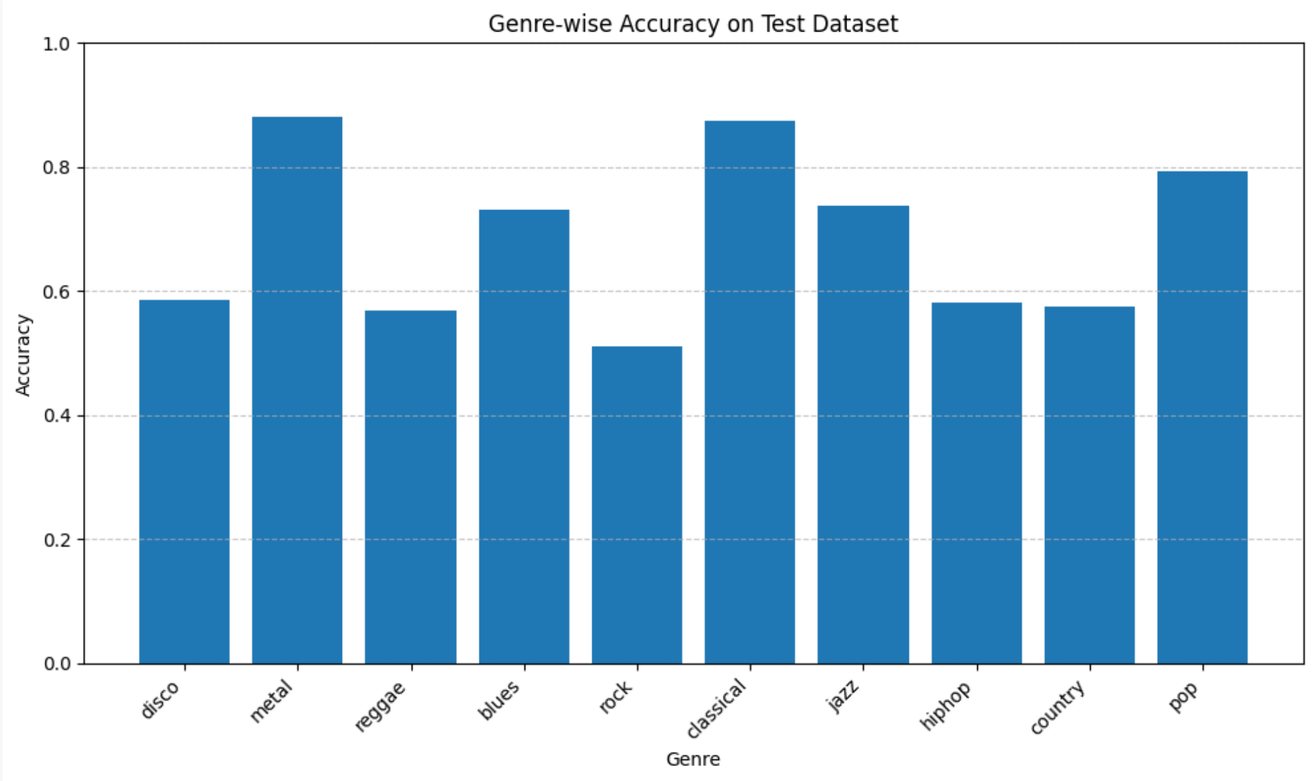
NETWORK ARCHITECTURE CNN



PERFORMANCE - CNN

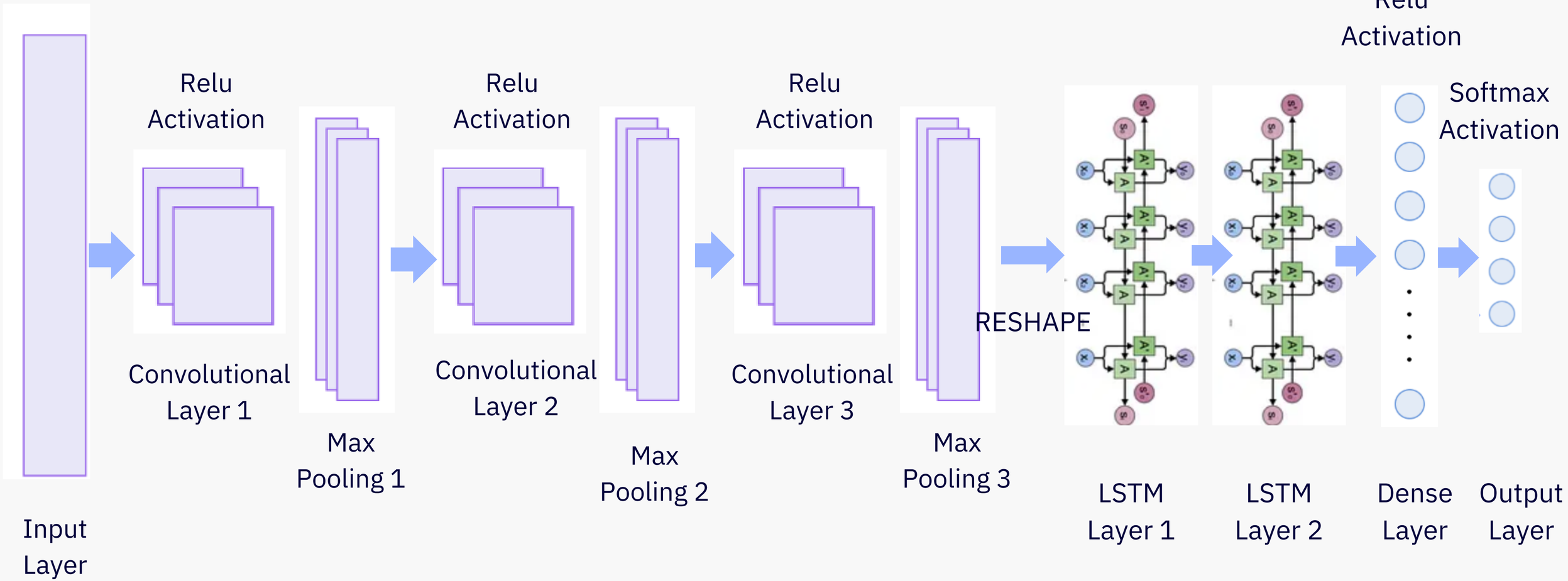
Using CNN, we have acheived an accuracy of **68.34%** on test dataset.





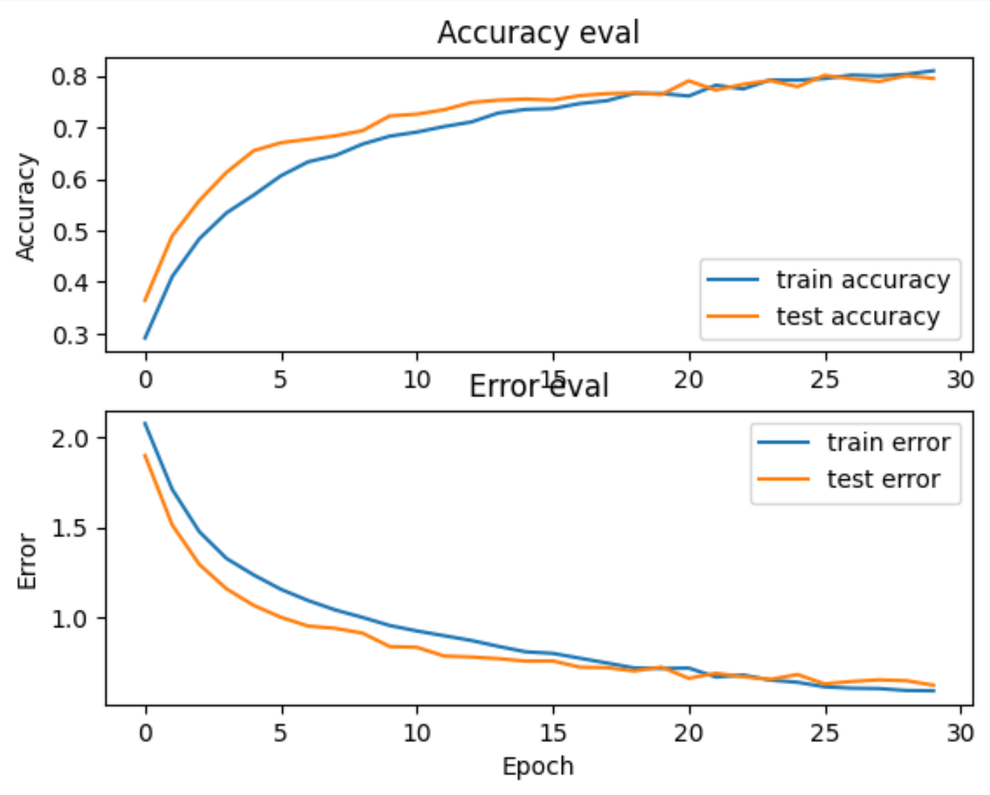
Genrewise accuracy can be seen in the above image.

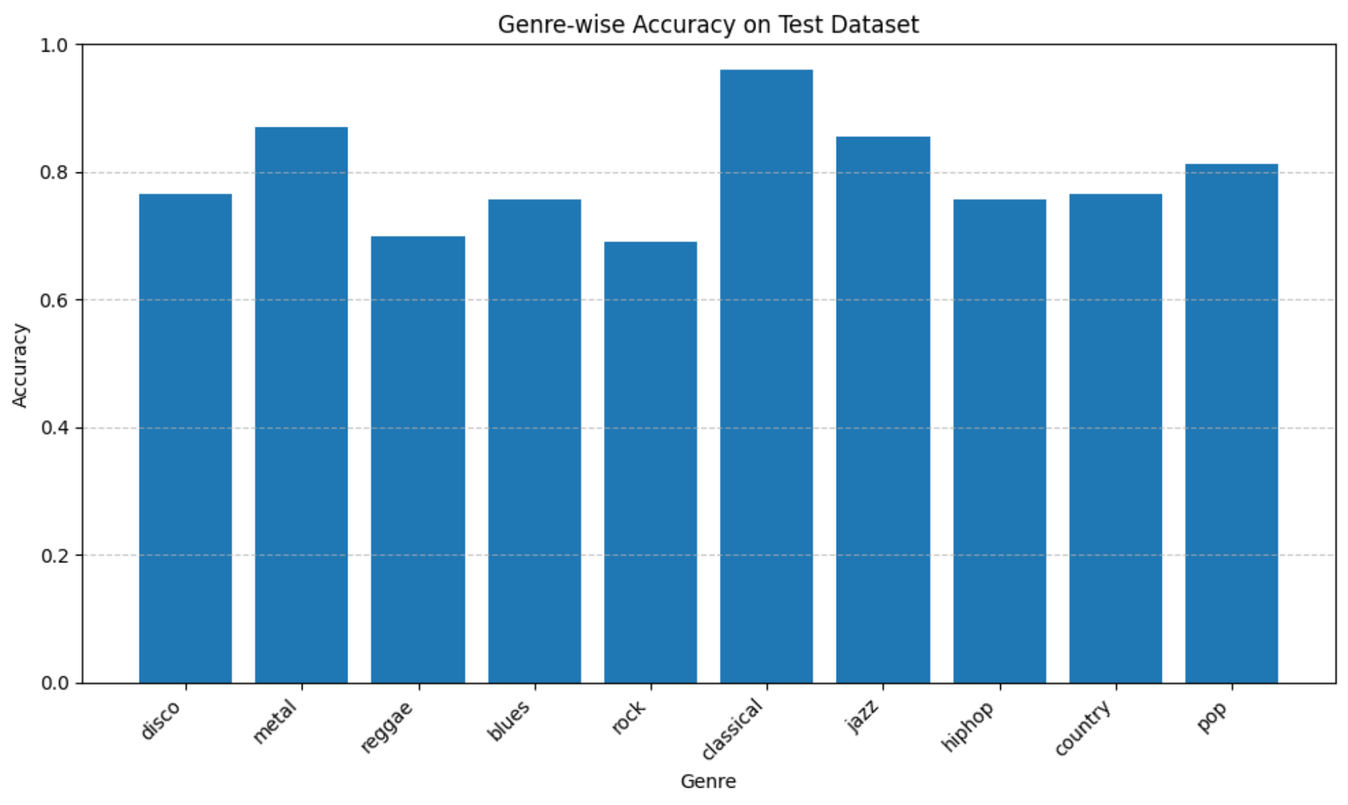
NETWORK ARCHITECTURE CRNN



PERFORMANCE - CRNN

Using CRNN, we have acheived an accuracy of **79.23%** on test dataset, beating the accuracy obtained using CNN model.





Genrewise accuracy can be seen in the above image.

References:

- https://ieeexplore.ieee.org/document/9675685
- https://www.hindawi.com/journals/misy/2022/2376888/#:~:text=Using%20deep%20learning%2C%20the%20data,music%20genre%20classification%20network%20model
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Thank You