Outline of Topics

- Introduction

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- Diagrams

- How CNN works?

- Output

- Future scope
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- Advantages

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- **Introduction**

Introduction

- Genre classifications can be of great utility to musical information retrieval systems
- Genre is a natural way of classifying music
- It is intrinsically built on the similarities between pieces of the same genre and differences between pieces of different genres
- Currently no widely accepted automatic genre identification system
- An automated genre recognition system would make it possible to classify and search large electronic music libraries

- **Problem Statement**

Problem Statement

- Music genre refers to categorisation of music on the basis of interaction between artists, market forces, and culture. It helps to organize music into collections by indicating similarities between compositions or musicians. Automatic genre classification is non-trivial as it is difficult to distinguish between different genres.
- Music Genre classification is very important in today's world due to rapid growth in music tracks, both online and offline. Many Machine Learning techniques are used for Music Genre Classification. Here Convolution Neural Network is used for training and classification. The proposed system classifies music into various genres by extracting the feature vector. Music genre labels are useful to organize songs, albums, and artists into broader groups that share similar musical characteristics

- **Review of Literature**

Review of Literature

(i) Convolutional Neural Network Achieves Human-level Accuracy in Music Genre Classification [Mingwen Dong Psychology, Rutgers University (New Brunswick)]

- Purpose:-It proposed a method that combines knowledge of human perception study in music genre classification and the neuro physiology of the auditory system.

(ii) Explaining deep convolution neural networks on music classification[KeunwooChoi, Gyorgy Fazekas, Mark Sandler]

- Purpose: Introduced auralisation of a CNN to understand its underlying mechanism, which is based on a deconvolution procedure to extend understanding of CNNs in music

(iii) Musical Genre Classification of Audio Signals [George Tzanetakis, Student Member, IEEE, and Perry Cook, Member, IEEE]

- Purpose:- In this paper, the automatic classification of audio signals into an hierarchy of musical genres is explored. More specifically, three feature sets for representing timbral texture, rhythmic content and pitch content are proposed.This paper classified the music using supervised machine learning approach.

(iv) Automatic Musical Pattern Feature Extraction Using Convolutional Neural Network[Tom LH. Li, Antoni B. Chan and Andy HW. Chun]

- Purpose: To show that musical data have very similar characteristics to image data so that the variation of musical patterns can be captured using CNN. also to show that the musical pattern features are informative for genre classification tasks

(v) Music Genre Classification using Machine Learning techniques.[Hareesh Bahuleyan,(2018)]

- Purpose: The work conducted gives an approach to classify music automatically by providing tags to the songs present in the user's library.

- **Dataset**
- **Software Requirements**
- **Diagrams**

Dataset

- Dataset used is GTZAN Dataset
- GTZAN is a famous dataset for Music Genre Classification problem
- 1000 audio files of 30 sec each
- 10 Different genres
- Dataset is obtained from marsyas.info website

- Hardware requirement: 64 bit Operating System, x64-based processor
- Software requirement: Python version 3.8 and above
- Source code editors: Any python code editor can be used
- Python libraries:
  * NumPy
  * Pandas
  * Seaborn
  * Matplotlib
  * Librosa
  * Tensorflow
  * Sklearn
  * Keras
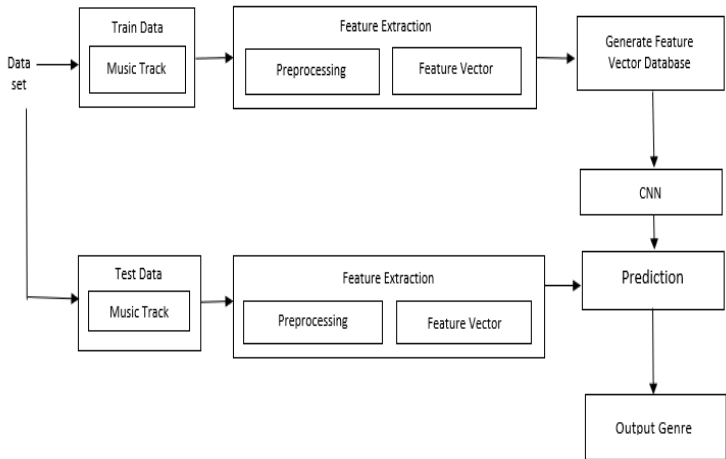
Figure 1: Block Diagram
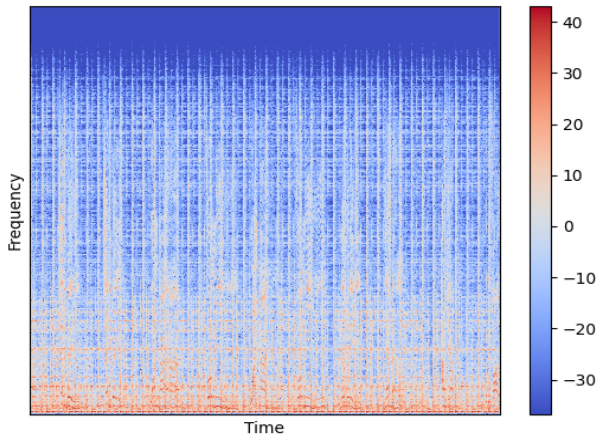
Figure 2: Mel-spectogram
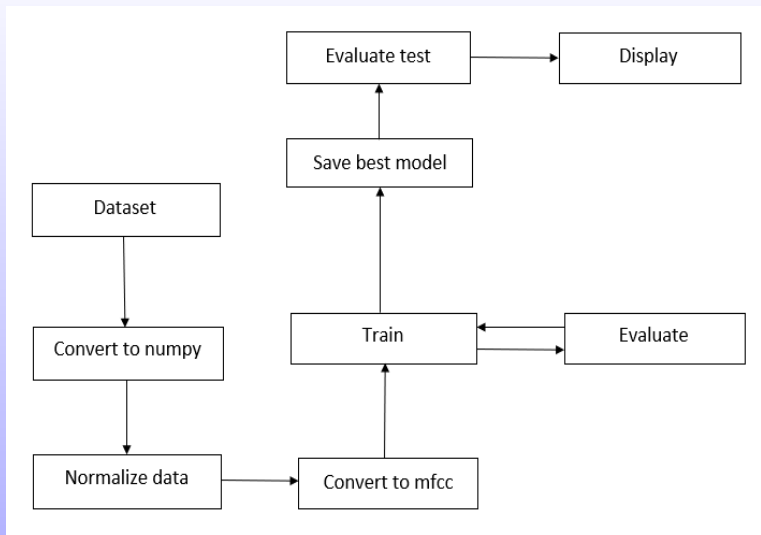
Figure 3: Train Test and Validation

- **How CNN works?**
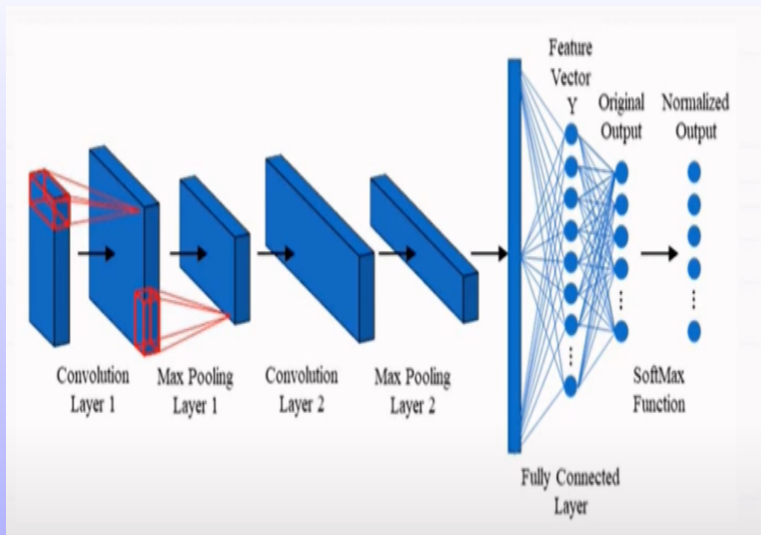
Figure 4: Working of CNN

Confusion Matrix
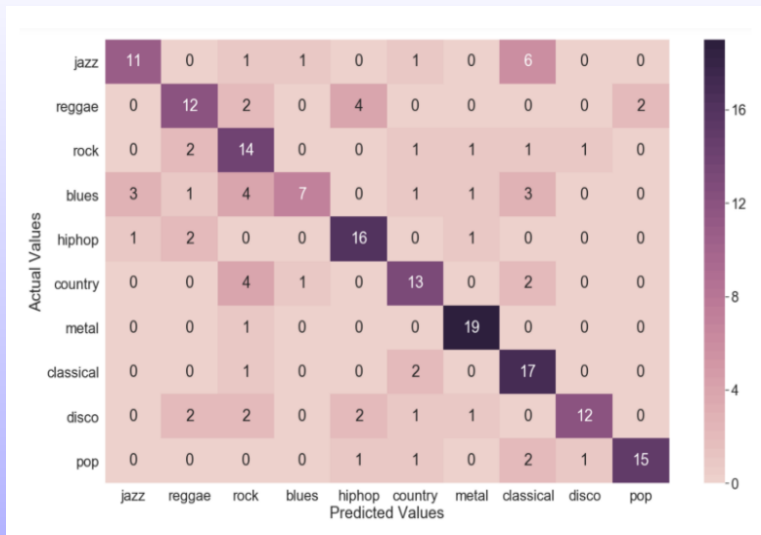
Figure 5: Confusion Matrix

- **Output**
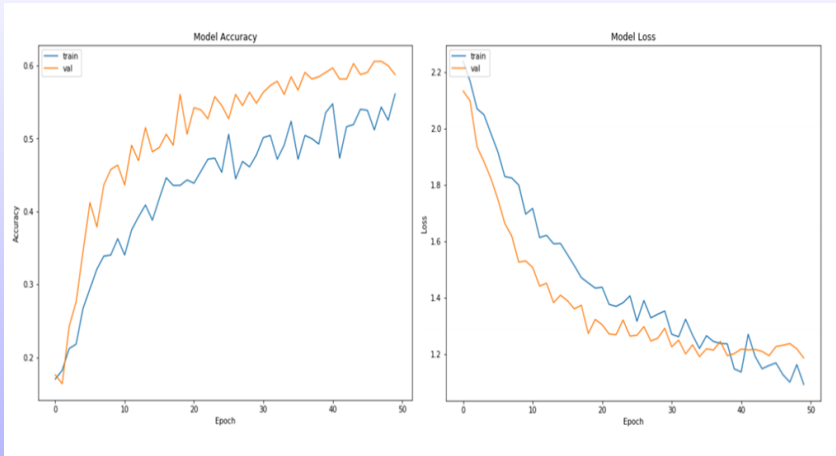
JSON file

Figure 6: Output

Figure 7: Output

Output

```
#make prediction on a sample
X = X_test[999]
y=y_test[999]

predict(model, X, y)
```

```
Expected index: 4, Predicted index: [4]
```

Figure 8: Output

- **Future scope**
- **Application**
- **Advantages**

- Use larger data
- Recording the Music
- Song Detection
- Android Application

- Convenient to use
- Effective
- Flexible
- Continuous Improvement

Music Genre Classification provides the following features/functions.
1. Conversion of music file- The input music file gets converted into statistical data using Librosa library.
2. Detection of genre- The main function of the project is to detect the genre of the song/music file inputted.

- **References**

References

[1] Hareesh Bahuleyan. Music genre classification using machine learning techniques.arXiv preprint arXiv:1804.01149, 2018.

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[3] Mingwen Dong. Convolutional neural network achieves human-level accuracy inmusic genre classification.arXiv preprint arXiv:1802.09697, 2018.

[4] Tom LH Li, Antoni B Chan, and Andy HW Chun. Automatic musical patternfeature extraction using convolutional neural network.Genre, 10:1x1, 2010.

[5] George Tzanetakis and Perry Cook. Musical genre classification of audio signals.IEEE Transactions on speech and audio processing, 10(5):293–302, 2002.

Thank you!