## Project 1: Music Genre Generation System

**Objective:**

Modern people rely on music streaming services to discover new music. To improve the efficiency of music creation and recommendation systems, automated classification technology is not only a fundamental aspect of data categorization but also a core technique in music AI applications.

The goal of this project is to develop a machine learning system that can automatically generate music in specific genres, analyzing audio features to determine whether the generated music belongs to genres such as classical, rock, pop, and other similar styles.

**Datasets:**

**Music Genre Dataset: GTZAN Genre Collection**

- 1,000 music clips (each 30 seconds long)
- 10 music genres: blues, classical, country, disco, hiphop, jazz, metal, pop, reggae, rock
- Download link: https://www.kaggle.com/datasets/carlthome/gtzan-genre-collection

**Evaluation Criteria:**

1. **Classification Accuracy**
   Measures the proportion of generated music clips that are correctly identified as belonging to their intended genres by an automatic genre classifier. High accuracy indicates that the generated music closely matches the desired style.
2. **Confusion Matrix Analysis**
   Provides a detailed breakdown of classification results, showing how often generated samples of one genre are misclassified as another. This helps to identify specific genres that the system finds challenging to generate or distinguish.
3. **Loss Curve**
   Visualizes the change in training and validation loss over time during the model's learning process. Analyzing the loss curve helps to assess the convergence, stability, and potential overfitting or underfitting of the model.

4. **Completeness of the GUI Interface**

   Evaluates the functionality and user-friendliness of the graphical user interface (GUI). A complete GUI should allow users to select target genres, generate music samples, listen to outputs, and possibly visualize results (e.g., genre predictions, audio features).