

## Exercise 2: Music Retrieval and Genre-based Evaluation

The goal of this second exercise is to build and experiment with a content-based music retrieval system and evaluate this system using genre ground truth and qualitative assessment.

We will use the [GTZAN Genre Collection](#) for this task.

Your requirements are to

- 1. Build a feature extraction pipeline to extract audio descriptors (20%)**
- 2. Genre classification**
  - a. Run small genre classification experiments to investigate the applicability of different features (15%)
  - b. Visualize these results using confusion matrices and evaluate the classification performance by means of evaluation metrics (15%)
  - c. Discuss your results. (10%)
- 3. Content-based query-by-example retrieval system using different features**
  - a. Evaluate the obtained rankings based on the given genre labels and appropriate evaluation criteria (15%)
  - b. Make a basic search engine that retrieves tracks from the collection based on arbitrary sound file input and that provides audio playback to listen to the results (15%)
  - c. Discuss your results. (10%)

The exercise will be carried out in Python, more specifically using [Jupyter Notebook](#). We suggest to install [Anaconda](#) for convenience.

Furthermore, we will make use of the numpy, sklearn, and librosa python libraries which you can install after installing python using the following command:

```
pip install -r requirements.txt
```

To get started with Python, Jupyter and the libraries, we recommend the following resources:

- [Python and Numpy Basic Introduction](#)
- [Running the Jupyter Notebook](#)
- [Notebook Basics](#)
- [Librosa Documentation](#)
- [Librosa and IPython Notebook](#)

To complete this exercise, implement the missing parts of the accompanying Jupyter Notebook and submit it with the resulting outputs via TUWEL by 7.6.2017.