Deliverable 1

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References:
- https://blog.clairvoyantsoft.com/music-genre-classification-using-cnn-ef9461553726
- https://www.analyticsvidhya.com/blog/2021/06/music-genres-classification-using-deep-learning-techniques/

1. Choice of Dataset https://www.kaggle.com/andradaolteanu/gtzan-dataset-music-genre-classification/
   - The data I chose represents a set of 1000 audio tracks each with a length of 30 seconds from various songs and spanning 10 different genres of music. In addition, the data contains visual spectrograms for each track in order to perform additional visual analysis on the data such as through Neural networks. Furthermore, 2 CSVs are provided that include various features which were extracted from the audio tracks, 1 CSV representing features extracted from the 30 second tracks and the other representing the extraction of those features after splitting each track 10x into 3 second clips.

2. Data Preprocessing:
   - The dataset seems to be a good choice for developing models for genre classification and has recordings from 2000-2001 under various conditions to have low bias.
   - I plan to visualize the audio tracks using charts like waveforms, spectrograms, and chroma features.
   - For feature extraction, I may use the LabelEncoder function from the sklearn library.
   - I would also split my data into training and testing sets which should be feasible since I have 100 tracks per genre.

3. Model:
   - Different possible models include: K-means Clustering, Multiclass Support Vector Machines, KNN, and CNNs.
   - According to the reference mentioned, CNNs would lead to the best results and would be my primary focus in this project. Libraries like TensorFlow would be very useful in implementing this machine learning model.

4. Evaluation Metric:
   - Because I will be working on classifying what genre (among 10) a track belongs to, I would choose the category of "Confusion matrix and accuracy/precision-recall/logistic loss" as an evaluation metric.

5. Application:
   - It would be a nice implementation of this model to build a simple website that accepts an audio track as input and then predicts what genre the track belongs to; however, I am not sure of its actual relevance especially with apps that can recognize the song itself (ex: Shazam)