**URL = 'https://www.lifehack.org/794639/famous-speeches'**

**Approach:**

The given URL contains embedded YouTube videos featuring speeches by famous personalities. The data was scraped from the website to obtain the **data-id** for each YouTube video and then created a list of YouTube URLs using data-ids for each embedded YouTube Video. Using the PyTube library, the videos were downloaded in audio format only. The audio files were then divided into chunks of 15 seconds each, resulting in multiple sub-videos for each original video.

The chunks of audio were then segregated into their respective classes. The entire dataset was divided into a train and test set, with 20 samples per class in the test folder. Audio features were extracted from each sample in the train set using the librosa library. Based on the extracted audio features, a new train dataframe was created.

A custom-defined Artificial Neural Network (ANN) was used for classification, with hyperparameter tuning performed using grid search. The best model, obtained from grid search, achieved an accuracy of 99.47% on the test folder. The model and logs for each grid search were saved for further reference.

The **main.py** file orchestrates a series of steps that transform raw data into a powerful predictive model:

* The process begins with data scraping, where relevant information is extracted from the given URL. Next, the data is downloaded and segmented into smaller, manageable chunks.
* To prepare the data for modeling, it is divided into train and test folders to facilitate evaluation.
* Audio features are then extracted from the data using the librosa library, creating a rich set of audio-based features for analysis. These features are organized into a well-structured dataframe, providing a clear and organized representation of the data.
* The next step involves hyperparameter tuning, where the model's performance is optimized by searching through a predefined parameter space. The best parameters are identified, and a new model is created using these optimal settings. The model is then evaluated using the test data to assess its accuracy and performance.
* As the search for the best model progresses, a comprehensive log is maintained, capturing the details of the search space and the corresponding results. This log serves as a valuable reference for future analyses and comparisons. Finally, the optimized model is saved, allowing for easy retrieval and utilization in subsequent tasks.