Spotify Track Popularity Analysis

# Overview

This project analyzes how various audio features of songs influence their popularity, using data from Spotify. The dataset includes a wide range of tracks along with their popularity scores and audio characteristics such as tempo, energy, danceability, and more.  
  
The analysis explores relationships between these features and the track's popularity, aiming to draw insights that can help predict or explain why certain songs perform better than others.

# Project Structure

This repository contains:  
- `Spotify\_Track\_Popularity\_Analysis.ipynb`: The Jupyter notebook with the full data analysis, including:  
 - Data loading and preprocessing  
 - Exploratory Data Analysis (EDA)  
 - Feature analysis and modeling  
 - Visualizations and insights  
- `data/`: A folder containing the dataset used in the analysis (please upload the dataset to this folder).  
- `README.md`: This file, providing a guide on how to run the analysis.

# Dataset

The dataset used in this analysis is sourced from Kaggle and contains information about Spotify tracks, including:  
- Track name  
- Artist name  
- Popularity score  
- Audio features: tempo, energy, danceability, etc.  
  
Ensure that the data is placed in the `/data` directory when cloning this repository.

# How to Run the Analysis

### Requirements  
To reproduce this analysis, you need to have the following dependencies installed:  
- Python 3.x  
- Jupyter Notebook  
- The following Python packages:  
 - `pandas`  
 - `numpy`  
 - `matplotlib`  
 - `seaborn`  
 - `sklearn` (if machine learning models were used)  
  
You can install the required dependencies by running:  
```bash  
pip install -r requirements.txt  
```

## Running the Notebook

1. Clone this repository:  
 ```bash  
 git clone https://github.com/your-repo/spotify-track-popularity-analysis.git  
 ```  
2. Navigate to the project directory:  
 ```bash  
 cd spotify-track-popularity-analysis  
 ```  
3. Ensure that the dataset is present in the `data/` directory.  
4. Start Jupyter Notebook:  
 ```bash  
 jupyter notebook  
 ```  
5. Open the `Spotify\_Track\_Popularity\_Analysis.ipynb` notebook and run the cells to reproduce the analysis.

# Key Steps in the Analysis

1. \*\*Data Loading\*\*: The dataset is loaded and cleaned. Missing values are handled, and relevant columns are selected for analysis.  
2. \*\*Exploratory Data Analysis (EDA)\*\*: Various visualizations are generated to understand the distribution of features and their relationship with track popularity.  
3. \*\*Feature Analysis\*\*: Relationships between audio features (such as tempo, energy, etc.) and popularity are explored.  
4. \*\*Modeling\*\* (if applicable): A machine learning model is trained to predict the popularity of a track based on its features. The notebook includes model training, testing, and evaluation steps.

# Results

The main findings of the analysis are:  
- Certain audio features, such as energy and danceability, show a strong correlation with track popularity.  
- Visualizations of feature relationships help in understanding trends in popular music.

# Conclusion

This analysis provides insights into the factors influencing song popularity on Spotify, offering a foundation for predicting or recommending tracks based on their audio features.

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