Music For You

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Introduction:

The purpose of the website is to categorize popular music and show where a musical artist will be. The website will sort the music into several different categories, or “pillars”. The pillars of the project are artist, album, popular songs, genre, and release date. The website focuses on allowing the user to connect with the music they love.

Once a user selects an artist, song, genre, or decade, the website will then provide a deep dive into the selected option. This will give the user a better insight into the music they love, while also providing them with the information they need to find more music they will like.

For example, the user can search for the band. The website will then provide the user with relevant information about the artists that they may be interested in listening to. Once a user has found artists that they like, they will be able to find more similar artists.

The priority of the website is to display many rows of information that relate to the most popular songs on Spotify. This information will allow users of the website to learn interesting trivia about their favorite music. This website also serves as a trial of using the database software postgresql.

The tools used on the project are GitLab, Google Cloud Platform, Bootstrap, Javascript, Python, Flask, SQLAlchemy and PostgreSQL.

Using Flask and SQLAlchemy we are able to use Python to display dynamic web pages that contain information about music. This information was gathered from the Spotify API. The Spotify API provided easy to access JSON files that we were able to convert into a SQL database.

Design:

APIs:

- https://api.spotify.com

The spotify API is an API that uses REST principles. To use the API we needed to request a valid OAUTH token, which was granted automatically. This API provides several endpoints that provide various information about music. The API then returns all of the requested information in the form of a JSON file.

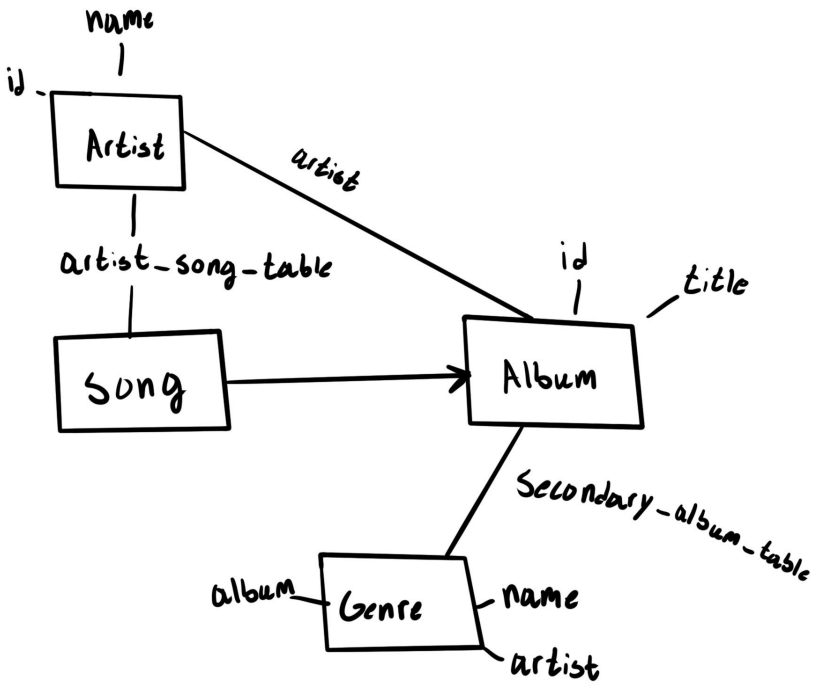
To use this data we set up a python script that would request the data for the top 100 songs. To do this the script calls the playlist endpoint "https://api.spotify.com/v1/playlist/" and references the appropriate playlist ID for Spotify's top 100, in this case the ID is "6UeSakyzhiEt4NB3UAd6NQ", making the API call "https://api.spotify.com/v1/playlist/6UeSakyzhiEt4NB3UAd6NQ". From this data we are primarily interested in retrieving the artists of said songs, so we extract the artist section of the JSON given by the API call and its internal Spotify ID into a dictionary that uses the ArtistID as a key and the Artist's name as the Value. This should give more than 100 artists as many songs feature other artists.

After retrieving the artist name and ID of the top 100 songs on Spotify, we do another API call that retrieves the artist's top tracks and the album that the track is in. To do this we iterate through the dictionary of ArtistIDs and do an API request in the format of "https://api.spotify.com/v1/artists/'artistKey'/top-tracks/" where 'artistkey' is replaced by the ID of the Artist from the dictionary of artists that we are iterating through. All of this information is appended together into a list of dictionaries that each have three keys; "track" that has the song name as its value, "album" that has the album name as its value, and "artist" that has the artist name as its value. This list of dictionaries is then dumped into a JSON file. We do this so that the information is more easily referenced, and it makes it easier to put into an SQL database. By doing this we also help to future proof the website, so that a change in the API will not break the website later.

Database Models:

The SQL database pulls its information from the raw data JSON file that is made from the API data. To do this it runs the JSON through a python script that parses through the JSON data to return the artist, album, and song. This then assigns an id to each entry, ignoring repeating entries.

Our Database has 5 tables; song_to_artist, song_to_album, artist, song, album.



This illustrates songs the relation between songs to artist, songs to album, and artist to album. Along with its relation to genre. Each artist can make multiple albums, and multiple songs. While an album can also have multiple songs and multiple artists. A song can have multiple artists. An album can have multiple genres.

An artist has two primary attributes ID and name. An album is similar to an artist as it has two primary attributes, ID and title. A song also has two attributes, ID and title.

Songs is dependent on album. Artist has two primary attributes, id and name. Album has two primary attributes, id and title. Song has the attribute name. The tables are all linked together in the database.

Because of the way these tables are linked to each other, we are able to reference the information in one table to another. This allows us to display a table on the website that contains the song name, album name, artist name, and genre name. Since song to album is a many to one relationship we are able to reference an album and receive all of its songs. A similar relationship also extends to artist to songs and artist to album. However, a song can have multiple artists and can be in multiple albums, such as a greatest hits album, so the database allows the website to have the same entry be referenced in multiple ways.

Tools:

Front-End:

When a user first enters the site, they will be greeted by the homepage- the splash page. At the top of the display there is a Navbar that presents the user with the option to either go to an about page where they can learn about the project or they can go to any of the model pages. In the middle of the splash page is a carousel that contains pictures of various musical artists. Once the user scrolls down they are presented with tabs implemented using Bootstrap that contain the varying ways to search for music. These pages are linked using Flask so that they can be dynamic. The Tabs available are Artists, Generes, and Songs.

- “All” displays all the artists available and lets the users freely browse for their artists.
- “Generes” displays the type of music the artist performs.
- “Songs” displays the top songs of Artists.

The homepage uses Flask to connect to other pages such as songs, artists, etc. It uses render_template to connect to the HTML of the other pages. To create the page aesthetics we employ Bootstrap, so that all of the elements are consistent and look modern.

Format of Pages

To browse by artist, click on the Artists tab. On the web page- artistPage.html, there is a search by artist name, genre, top songs, album and released date.

The artist page has a search bar for users to search for the artists. The page is divided into two parts: the navigation bar and main body. The navigation bar consists of links that consist of the about page, artist, songs, and genres, along with a link to the homepage and a search bar. The second part is the main information box. In this, it displays all information about the searched artist. The artist page displays the discography of the artist. It also has the picture and description of the artist. The page contains a table that contains information on the artist. The website also shows related music and artists of the searched artist. It also shows related music of the artists or artists of similar genres. The information box contains a table. The table is used to display the information in an informative and pleasing way in the middle of the page. The file artistsTable.html contains the information about the table. In artistTable.html, for example, “artist name” is a set of entities, where each entity is a name and an entry. You can see on the artistsTable.html what the artist's name and model looks like. The page is also clickable, if clicking on an artist, song, or genre, the webpage will lead to a page containing the information about the subject.

Similarly, to browse songs, the user would click on the songs tab in the navbar. Similar to the artist page, the song page consists of two parts, the navigation bar and the main body. The navigation bar is used for searching different songs and displaying them. The search bar will show the result of the search. The second part is the main information box. It consists of a table that contains information about the top artists on spotify. For example, “songs” is a set of entities, where each entity is a song. You can see on the songsTable.html what the song model looks like. It would include artist name, genre, top songs related to the artists, origin, and also released dates. Along with the searched songs, it would also show related information. While browsing songs, it will also include song names and albums with similar songs and genres.

There is also a page called “All.” This page consists of all songs and artists that allows for users to have flexibility when they browse. The set up of this page is similar to other pages, with a search bar and the main information table. It contains song name, album, artist genre and release date. All the tables from the web page are sortable in alphabetic order from any of the columns. The last page of the website is an about page. The about page contains information of all of the members who are working on the project and their basic information (such as majors, interests). Alongside information on the group members, the about page also contains information about the project itself, including issues and commits from the GitLab repository. On this page you can also find the results of Unit Tests run on the project. The page linked to the main page and displayed on the navigation bar.

Back-End:

The group collaborates using a shared GitLab repository. This provides versioning control as well as keeping all team members on the same page during development. The development environment that the website runs off contains Flask, flask_sqlalchemy, requests, psycopg2-binary, Click, Jinja2, pep8, SQLAlchemy, gunicorn, and coverage.

Flask is used to serve python code into an html document. The use of Flask has allowed us to create dynamic web pages whose data can be changed depending on the information provided. Alongside Flask the website employs SQLAlchemy so that we can interface with the SQL database using python. Together the website is able to use python to serve information that is stored in an SQL database to the website itself.

To properly document the project we used pydoc to output a file that shows how each portion of the main python file works. To ensure that the website is working properly we also employ several unit tests throughout the project. These unit tests allow us to see that the website is behaving as expected, even in edge cases.

Hosting:

The website is hosted on Google Cloud Platform (GCP). To set up the GCP:

1. Create a GCP project,
2. Create an app.yaml file,
3. Install the gcloud sdk
4. Push the app to the app engine.

The project will ultimately be found on a url from NameCheap.