Tempofy

Music features on exercise performance and heart rate

play

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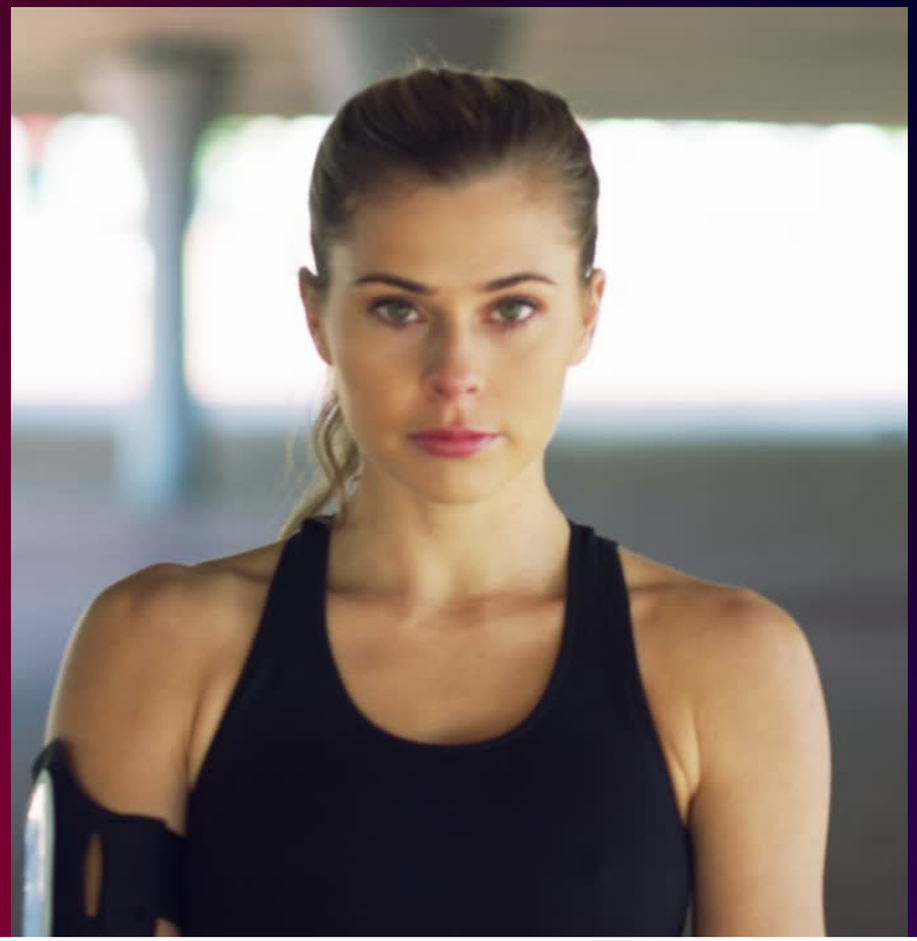
Agenda

1. Context and opportunity
2. Project's goal
3. User roadmap
4. Data lifecycle
5. First prototype demonstration
    a. Coding
    b. Visualization
6. Limitations and challenges

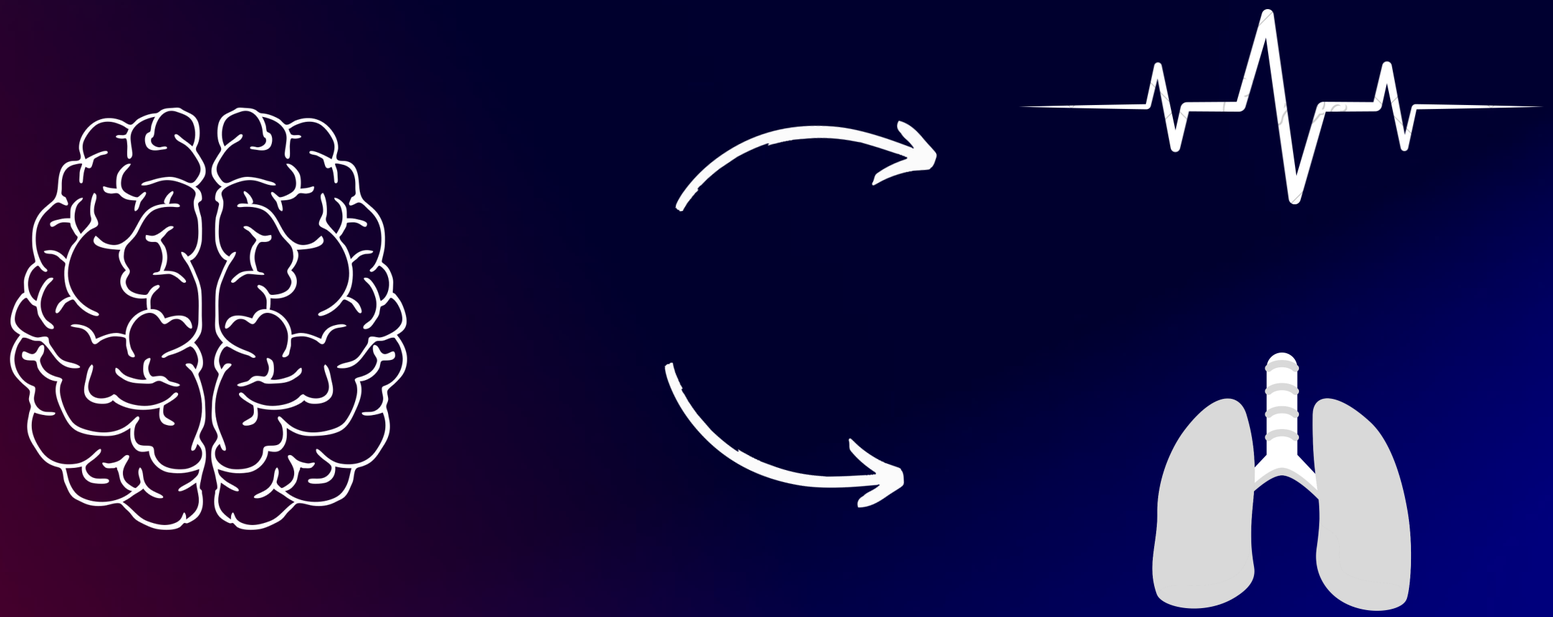
Tuning in: How music may affect your training performance



"There is no other stimulus on earth that simultaneously engages our brains as widely as music does"

Brian Harris, certified neurologic music therapist

Sound processing



Listening to music triggers the release of dopamine, a brain chemical that makes people feel engaged and motivated.

Tuning in: How music may affect your heart. Harvard Health. (2021a, March 30). https://www.health.harvard.edu/heart-health/tuning-in-how-music-may-affect-your-heart

Our goal

Improve training performance by providing users with a tool to increase engagement and motivation through music.

How

Analyzing track's features and giving recommendations using Spotify API

Playlist

Group of tracks

Track

An audio file

Track's features

Properties of a track that can be quantified and analyzed by providing information about the musical content and structure.

Tempo

The speed or pace of a given piece and derives directly from the average beat duration (BPM).

Danceability

How suitable a track is for dancing.
0.0 least danceable and 1.0 most danceable.

Energy

Represents a perceptual measure of intensity and activity.
Is a measure from 0.0 to 1.0

Valance

Describes the musical positiveness conveyed by a track.
Is measure from 0.0 to 1.0

User roadmap

1

Creating a training playlists

2

Granting authorization to access credentials

3

Selecting the playlist to be analized

4

Feedback and music analysis by Tempofy

5

Reorganizing tracks in the playlist

Data lifecycle

DATA ACQUISITION AND PROCESSING

Code

Gather the user's Spotify data via API.

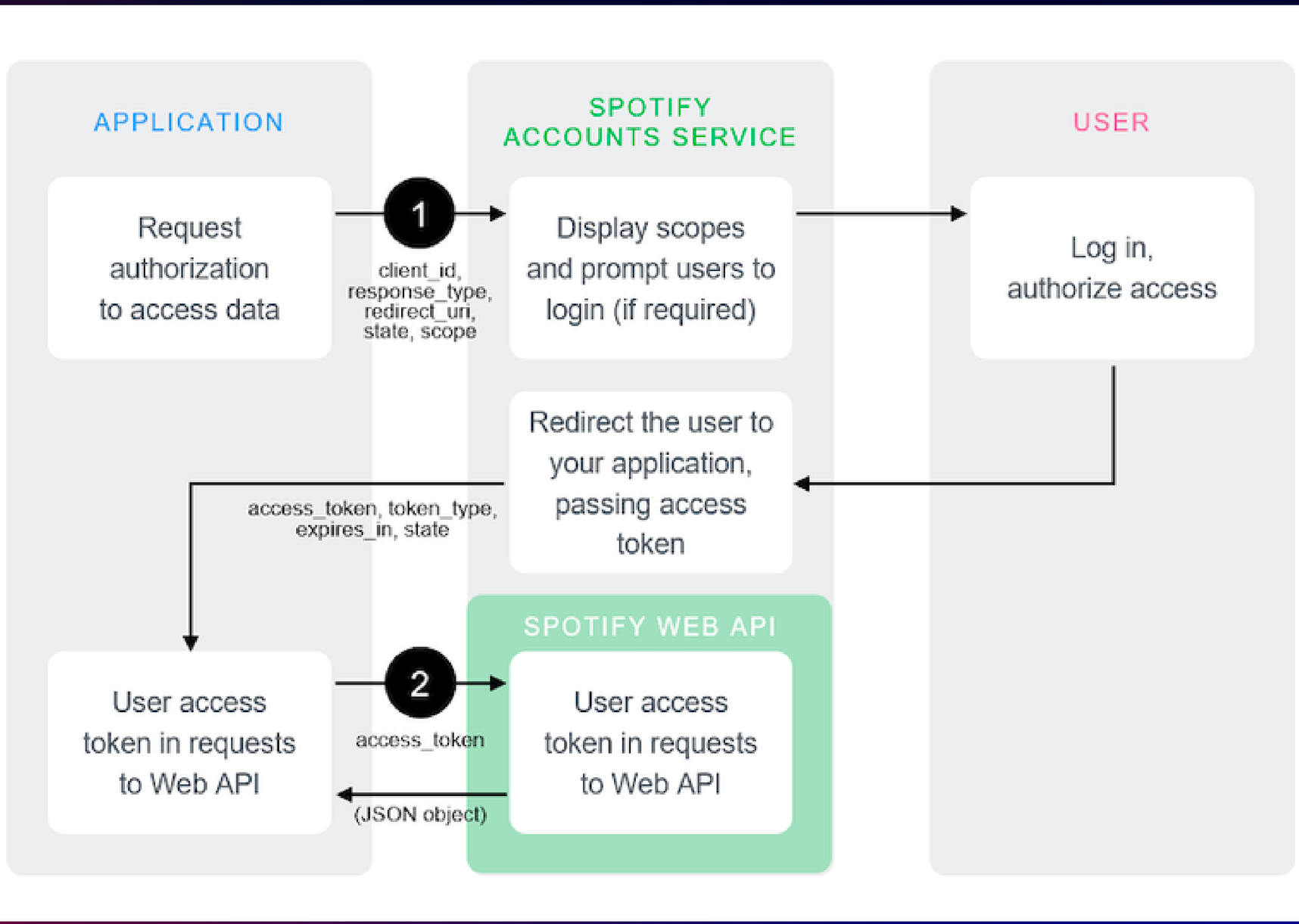
DATA STORAGE

Storing tracks in a csv file

DATA USAGE

Power BI

Interactive dashboard with personal analysis and recommendations


APPLICATION
SPOTIFY ACCOUNTS SERVICE
USER
Request authorization to access data
1
client_id, response_type, redirect_uri, state, scope
Display scopes and prompt users to login (if required)
Log in, authorize access
Redirect the user to your application, passing access token
access_token, token_type, expires_in, state
SPOTIFY WEB API
User access token in requests to Web API
2
access_token
User access token in requests to Web API
(JSON object)

My app

En adelante, aceptas que My app podrá:

Ver los datos de tu cuenta de Spotify

Tu nombre y tu nombre de usuario, tu foto del perfil, el número de seguidores que tienes en Spotify y tus playlists públicas

Ver tu actividad en Spotify

Tu contenido y tus artistas principales

Puedes cancelar este permiso de acceso en cualquier momento desde spotify.com/account.

Para obtener más información sobre cómo My app puede usar tu información personal, consulta la política de privacidad de My app.

Iniciaste sesión como Vicente Consoli Castro.
¿No eres tú?

ACEPTO

CANCELAR

Data accquisition and process

Retrieve metadata from Spotify content through Spotify web API.

1. Create a developer account and access the dashboard
2. Create an APP:
    a. Provides: Client ID and Client Secret needed to request an access token
    b. Redirect URI
    c. Stats and interactions
3. Request authorization
4. Request data from specific endpoints by doing API calls with different scopes.

Data accquisition and process

Web API

The creation of applications that can interact with Spotify's streaming service.

Restful API with different endpoints which return JSON metadata.

Access token:

String containing the credentials and permissions that can be used to access a given resource from Spotify and users.

Web api. Web API | Spotify for Developers. (n.d.). https://developer.spotify.com/documentation/web-api

Data accquisition and process

A URI (Uniform Resource Identifier)

String of characters that identifies a specific resource and allows access to resources.

Enables the Spotify authentication service to automatically invoke your app every time the user logs in.

Web api. Web API | Spotify for Developers. (n.d.). https://developer.spotify.com/documentation/web-api

Data accquisition and process

Authorization:
Granting a user or application access permissions to Spotify data and features.

OAuth 2.0 authorization framework: Spotify uses a standardized protocol for user authentication and authorization when accessing its API. It allows users to control access to their Spotify data while enabling third-party applications to integrate and interact with the Spotify platform.

Web api. Web API | Spotify for Developers. (n.d.). https://developer.spotify.com/documentation/web-api

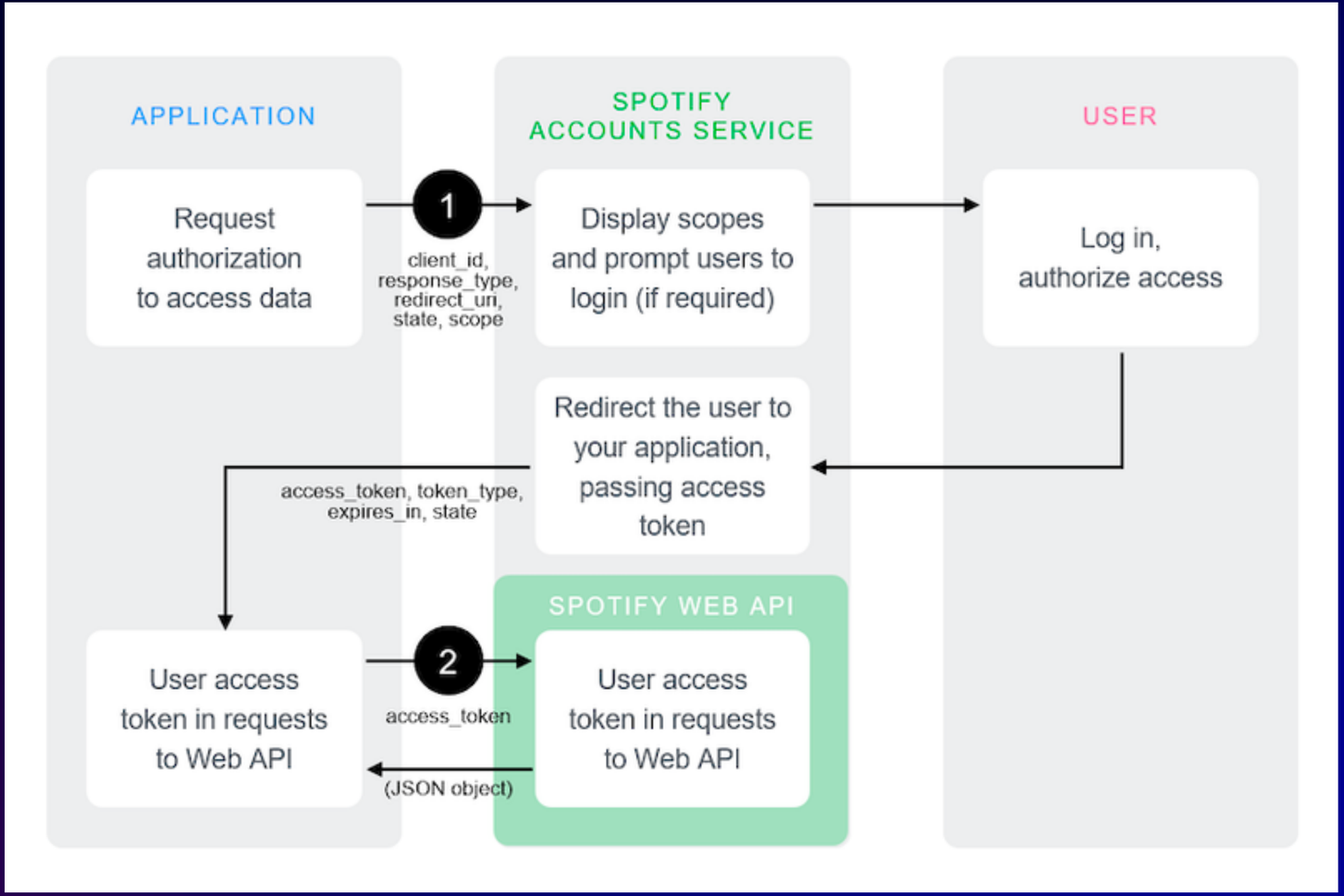
Data accquisition and process

Implicit Grant Flow

It is carried out on the client side and it does not involve secret keys.

No need for server-side code to use it.

Access tokens issued are short-lived with no refresh token to extend them when they expire.



Web api. Web API | Spotify for Developers. (n.d.). https://developer.spotify.com/documentation/web-api

Data accquisition and process

Scopes
Set of words that determine what can we do in specific endpoints.

Endpoints:
Specific URLs or routes can be accessed to perform certain operations or retrieve specific data from the API.

Get Playlists, Get Several Tracks, and Get Tracks' Audio Features.

Web api. Web API | Spotify for Developers. (n.d.). https://developer.spotify.com/documentation/web-api

Data usage

Give feedback to Tempofy users based on tracks features to improve performance.

1. Access user's data from CSV file
2. Generate a dynamic report through Power BI.
    a. Heart Rate Range Table based on Karvonen Formula
    b. Spotify tracks features

Data usage

Heart Rate Range Table

Depending on heart intensity to achieve we select the song that has a similar bpm as heart rate.

Based on **Karvonen Formula.** A mathematical formula that helps you determine your target heart rate (HR) training zone

Table of heart rate at training intensities from 50-90%

age	50%	60%	65%	70%	75%	80%	90%
10	140	154	161	168	175	182	196
11	140	153	160	167	174	181	195
12	139	153	160	167	174	180	194

Heart rate range table. Topend Sports. (n.d.). https://www.topendsports.com/fitness/heartrate-range.htm

Data usage

Features:

Danceability

Energy

Valance

Tempo bands:

- slow (95-100 bpm)
- medium (115-120 bpm)
- fast (135-140 bpm)
- very fast (155-160 bpm)

Heart rate range table. Topend Sports. (n.d.). https://www.topendsports.com/fitness/heartrate-range.htm

Limitations and challenges

1. We can only pull up to 50 songs from the playlist while a playlist can have more.

2. When we download the tracks data, we do it only once and write over it if we run the code again. One next challenge would be to implement a database to store all tracks and more to make recommendations. At the moment it is only an app to check how a playlist is,

3. We are using two types of credentials, the developer to call the token and the Spotify user id to access the playlist, but this can be automated.

4. We can build a front-end to generate a user interface so the user interacts better with the application.

5. Our product is exclusive to Spotify.

6. It mainly works for training with large groups, but it can be more personalized in the future.

References

Heart rate range table. Topend Sports. (n.d.). https://www.topendsports.com/fitness/heartrate-range.htm

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