SPOTIFY WEATHER PLAYLIST ANALYZER REPORT

JANUARY 2025

PURPOSE OF THE PROJECT

The project investigates the correlation between Spotify listening habits and weather conditions. Its aim is to identify patterns in music preferences based on weather categories, such as rainy, sunny, and cloudy days. By analyzing personal listening data and matching it with weather data, the project provides insights into how external factors influence music choices.

GOAL OF THE PROJECT

The goal is to create a personalized playlist system that organizes songs based on historical weather conditions during listening sessions. Even though the statistical analysis shows no significant correlation between weather and music preferences, the system still generates playlists tailored to past weather patterns, offering a unique and personalized listening experience.

HYPOTHESIS

The primary hypothesis of the project was:

- **H0 (Null Hypothesis):** There is no relationship between weather conditions and music preferences.

- **H1 (Alternative Hypothesis):** There is a relationship between weather conditions and music preferences.

Using chi-square tests, the project ultimately failed to reject H0, indicating no significant correlation between weather and music preferences.

DATA COLLECTION AND PROCESSING

1. **Spotify Listening Data**

   o Extracted personal Spotify data in JSON format.

o   Cleaned and transformed data into a structured format using Pandas, focusing on song names, timestamps, and listening durations.

2. **Weather Data**

o   Collected historical weather data for Istanbul, covering the same dates as the Spotify listening data.

o   Merged weather data with Spotify data based on the listening date.

METHODOLOGY

1. **Data Integration**

o   Spotify listening data was merged with weather data using the listening date as the key.

o   Weather conditions (e.g., "Rainy," "Clear," "Cloudy") were added to each song entry.

2. **Playlist Creation**

o   Songs were grouped by weather categories.

o   For each weather category, playlists were generated by ranking the most frequently played songs.

3. **Hypothesis Testing**

o   A contingency table was created to represent the frequency distribution of songs across weather categories.

o   A chi-square test was performed to evaluate the relationship between weather conditions and song preferences.

FINDINGS

1. **Statistical Outcome**

o   The chi-square test resulted in failing to reject the null hypothesis (H0), indicating no significant correlation between weather and music preferences.

2. **Generated Playlists**

- o   Despite the lack of correlation, playlists were successfully created for each weather category based on historical listening data. These playlists offer a personalized music experience for users.

LIMITATIONS AND FUTURE WORK

Limitations:

1. **Data Source Constraints**

   - o   The project relied on personal Spotify listening data, which may not be representative of broader user behavior.

2. **Simplified Weather Categories**

   - o   Only broad weather categories (e.g., rainy, sunny, cloudy) were considered, potentially oversimplifying the relationship between weather and music preferences.

3. **No Real-Time Adaptation**

   - o   The playlists were based on historical data rather than real-time weather conditions.

CONCLUSION

The Spotify Weather Playlist Analyzer offers a novel way to explore personal music preferences by leveraging weather data. Although the statistical analysis did not reveal a direct correlation, the system provides valuable insights and unique playlists based on historical listening patterns. This project demonstrates the potential for personalized, data-driven music experiences, paving the way for future enhancements in music recommendation systems.