Spotify Artist & Track Analytics Dashboard

Project Report

Executive Summary

This project presents a comprehensive Power BI dashboard analyzing a Spotify-style dataset containing 114,000+ tracks from 31,437 unique artists. The dashboard visualizes key metrics including track popularity, audio features (energy, danceability, tempo), and artist performance to provide actionable insights into music characteristics and trends.

Key Metrics:

- Total Tracks: 114,000
- Unique Artists: 31,437
- Average Popularity: 33.24
- Average Energy: 0.64
- Average Danceability: 0.57

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1. Introduction

1.1 Project Objective

The goal of this project is to create an interactive Power BI dashboard that enables stakeholders to:

- Understand artist frequency and track distribution
- Identify popular tracks and their characteristics
- Explore relationships between audio features and popularity
- Filter and analyze data by genre, artist, and musical key

1.2 Dataset Overview

The dataset (`dataset.csv`) contains Spotify track metadata with 114,000 records and the following key columns:

Column	Description	Data Type
track_id	Unique track identifier	Text
track_name	Name of the track	Text
artists	Artist(s) name(s)	Text
album_name	Album name	Text
popularity	Popularity score (0-100)	Numeric
energy	Energy level of track (0-1)	Decimal
danceability	Danceability score (0-1)	Decimal
tempo	Tempo in BPM	Numeric
key	Musical key (0-11)	Numeric
track_genre	Genre classification	Text
duration_ms	Track duration in milliseconds	Numeric
explicit	Whether track contains explicit content	Boolean
acousticness	Acoustic level (0-1)	Decimal
valence	Musical positivity (0-1)	Decimal
time_signature	Time signature of track	Numeric

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2. Dashboard Design & Architecture

2.1 Layout Structure

The dashboard is organized into a single comprehensive report page with the following sections:

Top Section – KPI Cards

- TotalTracks: Displays total number of tracks (114,000)
- AVG_Energy: Average energy metric (0.64)
- AVG_Popularity: Average popularity score (33.24)
- Avg_Danceability: Average danceability (0.57)

Left Sidebar – Interactive Slicers

- track_genre: Filter by musical genre
- artists: Filter by specific artist
- Additional key field slicer for musical key distribution

Center & Right – Data Visualizations

1. **Count of track_name by artists (Bar Chart)**
    - Shows top artists by number of tracks
    - Helps identify most prolific artists in dataset
2. **Sum of popularity by track_name (Bar Chart)**
    - Highlights most popular tracks
    - Identifies chart-performing songs
3. **Count of track_name by key (Donut Chart)**
    - Displays distribution of musical keys (0-11)
    - Shows key preferences in the dataset
4. **Sum of tempo by track_name (Line/Area Chart)**
    - Illustrates tempo variations across tracks
    - Helps identify fast vs. slow songs
5. **Sum of danceability by track_name (Bar Chart)**
    - Shows most danceable tracks
    - Useful for playlist creation

2.2 Color Scheme & Design

- **Theme:** Dark background with Spotify-inspired green accents (#1DB954)
- **Primary Chart Color:** Bright green (#00D84F) for visual consistency
- **Typography:** Clean, modern font for readability
- **Accessibility:** High contrast ratios for visibility

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3. Data Model & DAX Measures

3.1 Key Measures

The following DAX measures were created to calculate KPIs:

TotalTracks = COUNTROWS('Songs')
Counts total number of records in the dataset.

AVG_Energy = AVERAGE('Songs'[energy])
Calculates average energy across all tracks.

AVG_Popularity = AVERAGE('Songs'[popularity])
Computes average popularity score.

Avg_Danceability = AVERAGE('Songs'[danceability])
Measures average danceability of tracks.

3.2 Data Relationships

The dashboard uses a single table model (Songs) with:

- No foreign key relationships
- Slicers applied at report level
- Context-sensitive calculations based on user selections

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4. Key Insights

4.1 Artist Distribution

- **Most Represented Artists:** George Jones, The Beatles, Steve Wonder, Linkin Park, Elvis Presley appear most frequently
- **Artist Count:** 31,437 unique artists contribute to the 114,000 tracks
- **Insight:** Long-tail distribution with few artists having many tracks

4.2 Popularity Analysis

- **Average Popularity:** 33.24 (on 0-100 scale)
- **Top Tracks:** RUMI:TON, X ULTIMA VEZ, Halcyon show highest popularity scores
- **Finding:** Popularity varies significantly across tracks, with many songs having low discoverability

4.3 Audio Feature Profile

- **Energy:** Average 0.64 suggests moderately energetic music overall
- **Danceability:** Average 0.57 indicates moderate danceability across the dataset
- **Tempo Distribution:** Most tracks cluster between 80-180 BPM
- **Key Distribution:** Keys are relatively evenly distributed (0-11), with slight variations

4.4 Genre & Musical Key Insights

- **Key 0 (C Major):** Most represented key in the dataset
- **Key Distribution:** Fairly balanced across all musical keys
- **Genre Filtering:** Dashboard allows drill-down by genre to compare characteristics

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5. Technical Implementation

5.1 Tools & Technologies

- **Power BI Desktop:** Primary visualization and reporting tool
- **Power Query:** Data transformation and cleaning
- **DAX (Data Analysis Expressions):** Measure calculations
- **Dataset Format:** CSV (Comma-Separated Values)

5.2 Data Loading & Refresh

- Data source: `dataset.csv` (20MB, 114,000 rows)
- Refresh method: Manual or scheduled refresh in Power BI Service
- Update frequency: Can be configured based on data source availability

5.3 Interactivity Features

- **Slicer Synchronization:** track_genre and artists slicers filter all visuals
- **Drill-Down Capability:** Click on chart elements for detailed views
- **Dynamic Updates:** All charts update instantly based on slicer selections

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6. Use Cases & Applications

6.1 Music Industry Analysis

- **A&R Teams:** Identify trending artists and track characteristics
- **Playlist Curators:** Find high-popularity, high-danceability tracks
- **Music Producers:** Understand successful track attributes (energy, tempo, valence)

6.2 Portfolio & Learning

- **Data Visualization Skills:** Demonstrates proficiency with Power BI, DAX, and design
- **Data Analysis:** Shows ability to extract insights from large datasets
- **Project Management:** Complete end-to-end project from data to report

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7. Future Enhancements

7.1 Potential Extensions

1. **Additional Pages**
    - Genre deep-dive analysis with comparisons
    - Acoustic vs. non-acoustic track characteristics
    - Artist performance metrics and trends
2. **Advanced Measures**
    - Popularity bands (High/Medium/Low)
    - Tempo categories (Slow/Moderate/Fast)
    - Energy ratings (Calm/Energetic/Intense)
3. **Enhanced Interactivity**
    - Bookmarks for preset views
    - Buttons for navigation and filtering
    - Custom tooltips with additional metrics
4. **Data Enrichment**
    - Time-based analysis (if release dates added)
    - Artist genre specialization
    - Correlation analysis between audio features and popularity

7.2 Performance Optimization

- Implement aggregation tables for faster queries
- Use query folding in Power Query for efficient transformations
- Consider incremental refresh for large datasets

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8. Repository & Deployment

8.1 GitHub Repository

Repository Name: `spotify-artist-track-analytics`

Structure:

```
spotify-artist-track-analytics/
├── dataset.csv # Main dataset (114K tracks)
├── Spotify_Artist_Track_Analytics.pbix # Power BI report file
├── README.md # Project documentation
├── screenshots/
│ └── dashboard.png # Dashboard screenshot
└── docs/
└── PROJECT_REPORT.md # This report
```

8.2 How to Use

1. Clone the repository
2. Open `Spotify_Artist_Track_Analytics.pbix` in Power BI Desktop
3. Configure data source to point to `dataset.csv`
4. Refresh data and explore the dashboard
5. Customize colors, measures, and visuals as needed

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9. Conclusion

The **Spotify Artist & Track Analytics Dashboard** successfully demonstrates:

- ✓ Proficiency with Power BI and data visualization best practices
- ✓ Ability to work with large datasets (114,000+ records)
- ✓ DAX knowledge for creating meaningful measures
- ✓ Design thinking for creating user-friendly dashboards
- ✓ Complete project execution from data sourcing to deployment

This dashboard serves as both a functional analytics tool and a portfolio piece showcasing data analytics capabilities suitable for positions in business intelligence, data analysis, and analytics engineering.

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10. Author & Contact

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Project: Spotify Artist & Track Analytics – Power BI Dashboard

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11. References

- Microsoft Power BI Documentation: https://learn.microsoft.com/en-us/power-bi/
- Spotify Audio Features API: https://developer.spotify.com/documentation/web-api/reference/
- DAX Function Reference: https://dax.guide/

Report Generated: January 4, 2026
Dashboard Version: 1.0
Last Updated: January 4, 2026