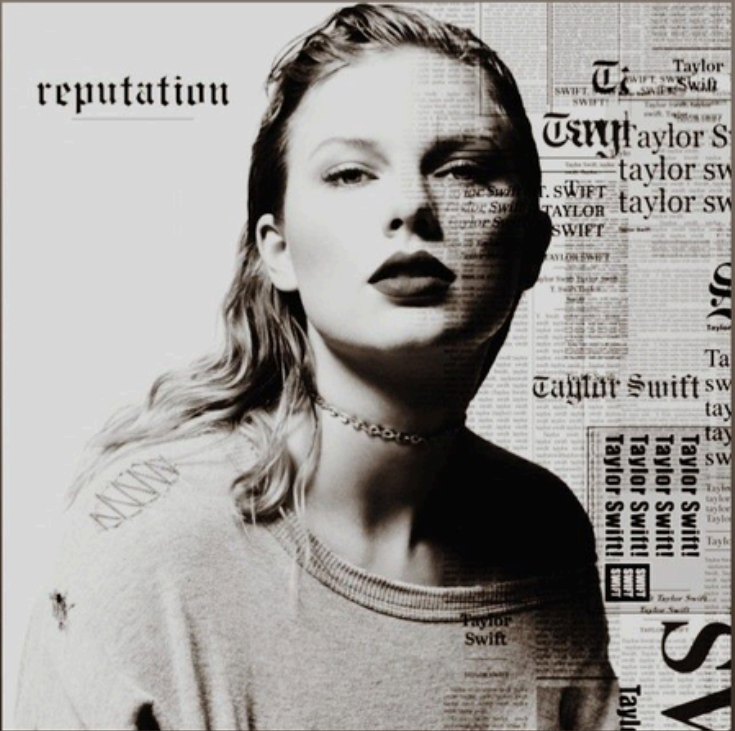




RECOMMENDATION  
ENGINE

SOCIAL NETWORK  
ANALYSIS



Don't Blame Me  
Taylor Swift

1:23 3:56

Heart icon, Previous button, Play/Pause button, Next button, Volume icon

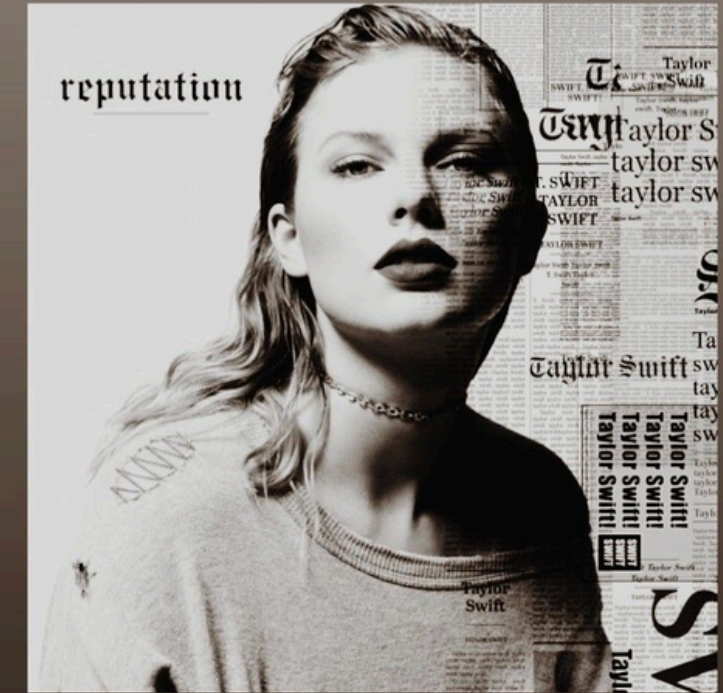
Full screen icon, Share icon

Progress bar

Previous button, Play/Pause button, Next button



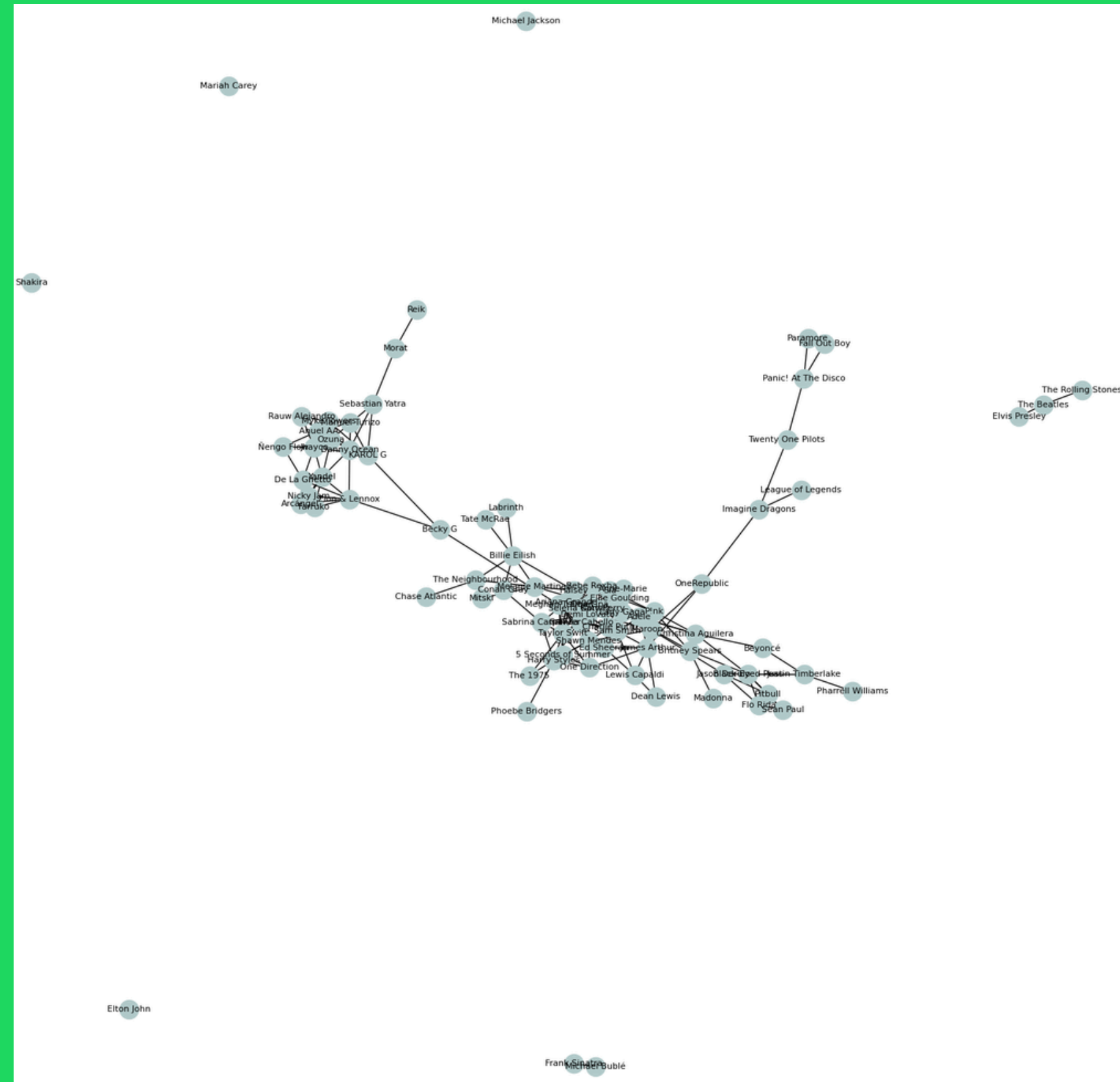
# PROBLEM STATEMENT



**Problem Statement:** To build a personalized recommendation engine for music streaming services focused on artists, using the data available in the Spotify API. The recommendation engine should take into account the user's listening history, favorite artists, and the popularity of the artists to provide the user with a list of artists that are highly relevant to their musical tastes and preferences. The recommendations should be updated in real-time to reflect the changing preferences of the user and be able to adapt to the user's evolving musical tastes



# NETWORK GRAPH





**SPOTIFY**

# **NODE STATISTICS**

- **POPULARITY THRESHOLD = 80**
- **NUMBER OF NODES = 84**
- **CONNECTED COMPONENTS = 7**
- **EDGE DENSITY = 0.0599**
- **HIGHEST DEGREE CENTRALITY = CAMILLA CABELLO (0.1566265060240964)**
- **LOWEST DEGREE CENTRALITY = MICHAEL JACKSON (0.0)**
- **CLOSENESS CENTRALITY = MEGHAN TRAINOR ( 0.3187241720505209 ), MJ (0)**
- **Meghan Trainor, Betweenness Centrality: 0.3355750718324212**





# TOP 10 CLOSENESS AND BETWEENNESS CENTRALITY

```
Node: Meghan Trainor, closeness Centrality: 0.3187241720505209
Node: Selena Gomez, closeness Centrality: 0.29192877705512316
Node: Shawn Mendes, closeness Centrality: 0.29192877705512316
Node: Sia, closeness Centrality: 0.2881043825958857
Node: Taylor Swift, closeness Centrality: 0.2868517548454688
Node: Sam Smith, closeness Centrality: 0.2868517548454688
Node: Ariana Grande, closeness Centrality: 0.2807485260189695
Node: Adele, closeness Centrality: 0.27720967905234384
Node: Ed Sheeran, closeness Centrality: 0.2760498059182336
Node: Maroon 5, closeness Centrality: 0.2760498059182336
```

```
Node: Meghan Trainor, Betweenness Centrality: 0.3355750718324212
Node: Becky G, Betweenness Centrality: 0.2968242307207926
Node: KAROL G, Betweenness Centrality: 0.16613772161818016
Node: Maroon 5, Betweenness Centrality: 0.1450164359024677
Node: OneRepublic, Betweenness Centrality: 0.12197570770888434
Node: Zion & Lennox, Betweenness Centrality: 0.10889201404922831
Node: Imagine Dragons, Betweenness Centrality: 0.10255656773435205
Node: Halsey, Betweenness Centrality: 0.09657092431603859
Node: Lady Gaga, Betweenness Centrality: 0.0933829283602935
Node: James Arthur, Betweenness Centrality: 0.0776829281196103
```



SPOTIFY

# INTERPRETATION

- The edge density of the graph is 0.0599, indicating that the number of edges in the graph is relatively low compared to the maximum number of possible edges. The graph is sparse, with many nodes having only a few connections.
- The node with the highest degree centrality is Camilla Cabello, with a value of 0.1566265060240964. Degree centrality measures the number of connections a node has to other nodes in the graph, so this indicates that Camilla Cabello has the largest number of connections in the network.
- The node with the lowest degree centrality is Michael Jackson, with a value of 0.0. This indicates that Michael Jackson has no connections to other nodes in the network.
- The node with the highest closeness centrality is Meghan Trainor, with a value of 0.3187241720505209. Closeness centrality measures the average distance from a node to all other nodes in the network, so this indicates that Meghan Trainor is the closest node to all other nodes in the network.
- The node with the lowest closeness centrality is also Michael Jackson, with a value of 0. This indicates that Michael Jackson is not reachable from any other nodes in the network, as he has no connections.
- Meghan Trainor also has the highest betweenness centrality, with a value of 0.3355750718324212. Betweenness centrality measures the extent to which a node lies on the shortest path between other nodes in the network, so this indicates that Meghan Trainor is a key node in the network, lying on many of the shortest paths between other nodes.



**SPOTIFY**

# CONCLUSION

- The low edge density of the network suggests that there may be relatively few connections between nodes, which could limit the accuracy of recommendations based on direct connections. However, the presence of 7 connected components in the network also suggests that there are distinct groups of nodes that are more tightly connected, and these groups could provide a basis for more accurate recommendations.
- The highest degree centrality node (Camilla Cabello) and the highest betweenness centrality node (Meghan Trainor) could be used as starting points for recommendations, as these nodes are well-connected and have a large number of connections to other nodes. Additionally, the low closeness centrality of Michael Jackson indicates that he may not be a good starting point for recommendations, as he is not well-connected to other nodes in the network.
- In conclusion, the network properties described provide some information about the potential for using this network as a basis for a recommendation engine



**SPOTIFY**

# **BUSINESS IMPLICATIONS**

Building a personalized recommendation engine for artists in a music streaming service can have significant business implications:

- **Improved User Experience:** By providing personalized recommendations based on the user's listening history and preferences, the recommendation engine can improve the overall user experience and increase user engagement with the music streaming service.
- **Increased User Retention:** By providing a personalized and relevant experience, the recommendation engine can help retain users and reduce churn. This can have a significant impact on the overall revenue of the music streaming service.
- **Increased Music Discovery:** By recommending new and diverse artists to users, the recommendation engine can promote music discovery and encourage users to expand their musical horizons. This can lead to increased usage of the music streaming service and higher engagement with the platform.
- **Increased Revenue:** By providing a more personalized and engaging experience, the recommendation engine can help attract new users and retain existing ones. This can result in increased revenue from subscriptions and advertising.
- **Competitive Advantage:** A strong and effective recommendation engine can provide a competitive advantage for the music streaming service in the highly competitive market of music streaming services.