**Executive Summary**

**1. Business Problem:** Analyzing ifprovision of weather-based recommendation will increase Spotify’s user engagement significantly.

**2. Process Flow and Analysis:**

* ***2.1 Data Collection & Pre-processing:*** Spotify Europe Kaggle data set was used to get date – region level songs data, number of streaming and the weather conditions on that day. Genre data was scraped data to map the sub-genre in European Spotify dataset to parent-genre. Top 6 genres which contributed to 95% of streams, were used for further analysis. Scraped Spotify Community to understand the user’s pain points and ongoing issues.
* ***2.2 Data Modelling:*** Text analytics performed on the scraped user reviews suggested that 13% of pain points related to recommendation and further analysis of reviews concerning recommendation indicated weather as a key frequent word. Clustering was performed using LDA to classify ongoing issues and the results suggested weather-based albums, playlists, songs are frequently requested by users.
* ***2.3 Hypothesis Testing:*** Two tailed t-test was performed to test if - “Weather significantly impacts the genre of songs played by users”.
* Sample Hypothesis: On a snowy day, if average streaming of Pop songs is significantly different than average streaming of non-pop songs.
  + Null Hypothesis: “Difference in number of streams between Pop and Non-Pop songs” on a snowy day is the same as on a non-snowy day.
  + Alternate Hypothesis: “Difference in number of streams between Pop and Non-Pop songs” on a snowy day is significantly different than on a non-snowy day.
* Hypothesis testing was performed for different weather (sunny, rainy, cloudy, snowy & humid) and genre combinations (Pop, Dance EDM, Hip-Hop Rap, Latin, Rock & Folk Acoustic). Results from hypothesis testing conveyed that 17 out of the 30 combinations saw a significant difference i.e. different daily weather conditions had an impact on genre of songs being played by the user.
* ***2.4 Lift Analysis:*** For all the 17 weather-genre combinations which showed significance in test was studied for understanding the lift/dip in number of streams for each genre for difference in weather conditions. An average of 14% absolute change/lift was observed.

**3. Impact & Recommendations:**

* ***3.1 Impact:*** In Europe the 14% absolute change in number of streams, can potentially lead to an increase of ~1.67Bn minutes in user engagement.
* ***3.*2 *Recommendations:*** The recommendations are – a. Add a section recommending local weather-based playlist (Customer Engagement), b. Changing the color of user interface based on weather for power users (Customer Retention).

The above recommendations will lead to increased probability of a. Current premium userbase to extend the subscription, b. Non premium user base to subscribe for premium services.

**4. Limitations:** Our analysis doesn’t capture a possible causal factor - Competitor’s relatively poor streaming recommendation for different weather conditions might also lead to increased user engagement for Spotify. Secondly, our analysis lacks hourly streaming data. Availability of hourly streaming data will help better validate the significance of weather on genre of songs streamed. Finally, performing an A/B test between test group (receiving weather-based recommendation) and control group will help assert that weather impacts the genre of songs streamed.