From the Billboard Hot 100 to the Grammy Awards

Team Five

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Joined Data Analytics Course to gain understanding of basic coding & data analytics concepts

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Joined Data Analytics Course for a new challenge

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2020 University of Texas B.S.A. Mathematics Graduate

Joined Data Analytics Course to learn basic coding and jump start career.

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Joined Data Analytics Course for a career change.

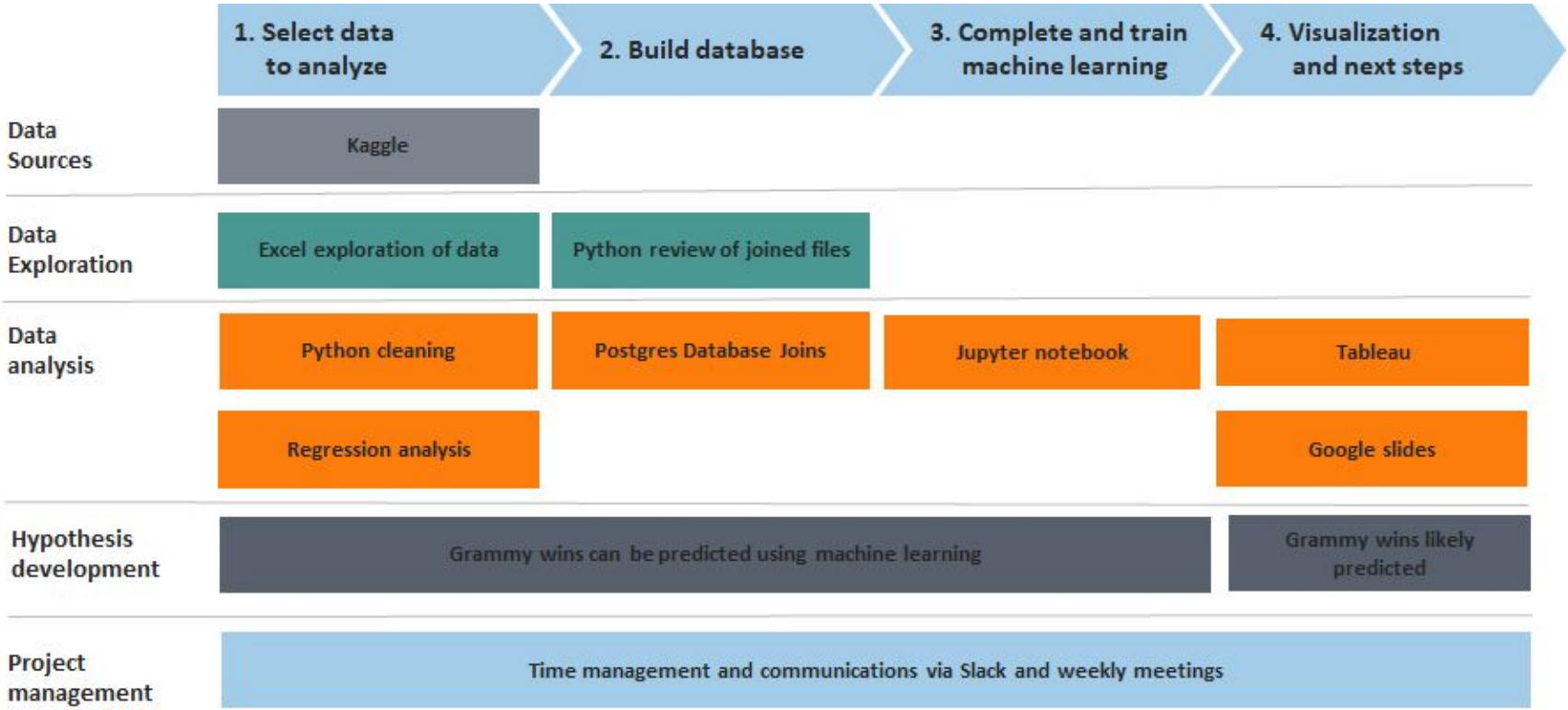
Question

Does inclusion on the Billboard Hot 100 Chart impact the likelihood that a song will win a Grammy Award?

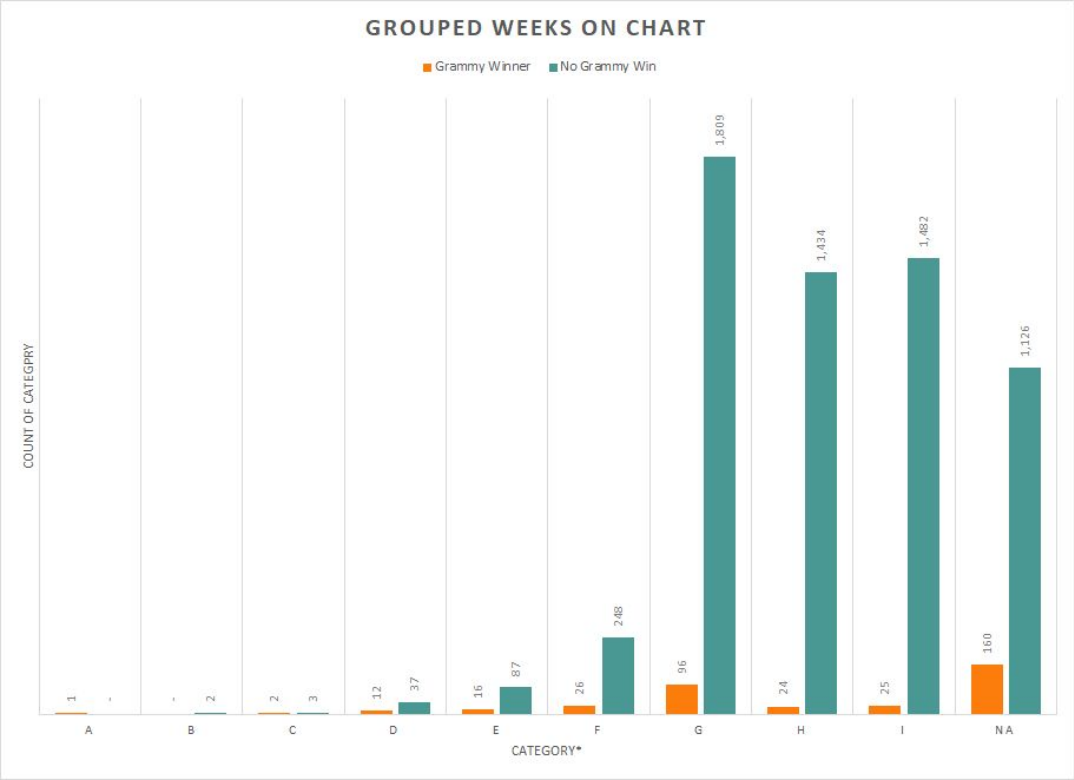
Anderson Paak & Bruno Mars -
“Sonic Song” currently #1 on Billboard Hot 100

Taylor Swift -
11- time Grammy Award Winner

Project Outline

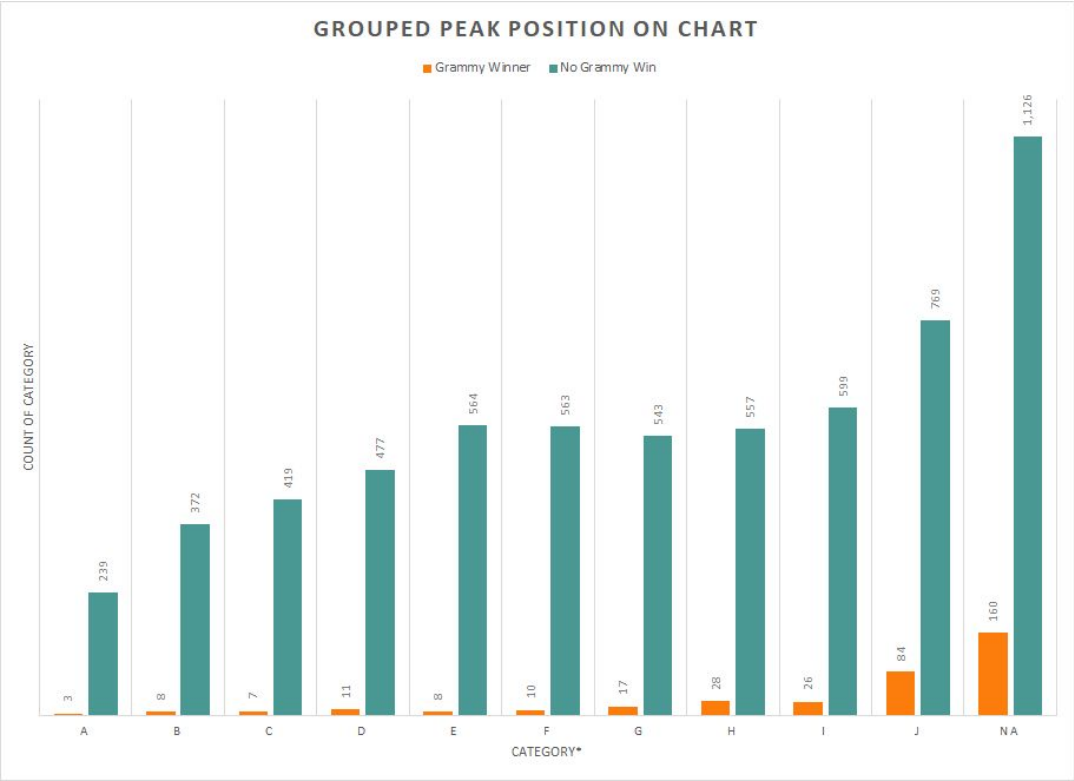


Data Exploration



- Tools Used: Excel
- Total weeks on Billboard Chart
- Grouped categories based on statistical results
    - A - Greater than or equal to 80
    - B - Greater than or equal to 70
    - C - Greater than or equal to 60
    - D - Greater than or equal to 50
    - E - Greater than or equal to 40
    - F - Greater than or equal to 30
    - G - Greater than or equal to 20
    - H - Greater than or equal to 10
    - I - Less than 10
    - NA - Not ranked
- Initial results showed little correlation between weeks on chart and a Grammy win (r = 0.008)

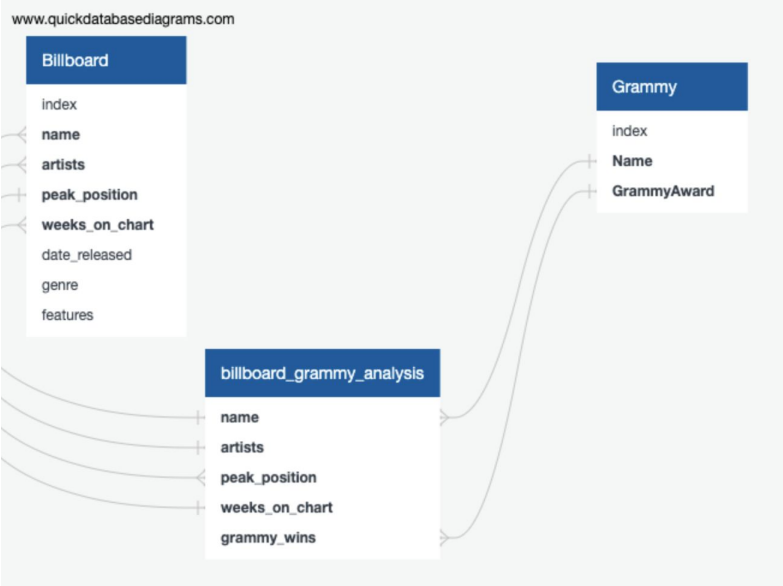
Data Exploration



- Peak Position on Billboard Chart
- Grouped categories based on simple buckets
  - A - Greater than or equal to 90
  - B - Greater than or equal to 80
  - C - Greater than or equal to 70
  - D - Greater than or equal to 60
  - E - Greater than or equal to 50
  - F - Greater than or equal to 40
  - G - Greater than or equal to 30
  - H - Greater than or equal to 20
  - I - Greater than or equal to 10
  - J - Less than 10
  - NA - Not ranked
- Initial results showed some correlation between peak position on chart and a Grammy win (r = 0.14)

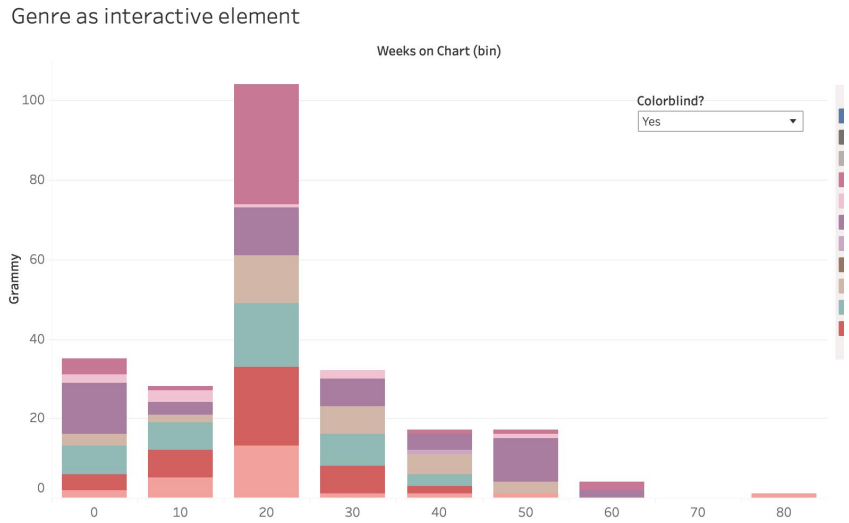
Database Design

- Created ERD
- Finalized Postgres as the database.
- Used Python to clean Billboard and Grammy CSVs
- Loaded CSVs into Postgres database tables
- Joined Billboard and Grammy tables to get one complete dataset.



Used an iterative design approach

Tableau Dashboard



- Tool Used: Tableau
- Dashboard
- The interactive chart shows the correlation between weeks on chart and Grammy win for a specific Genre. We can either look at a specific Genre or the consolidated view.
- Also, to help user who are color blind, we have added the color-blind view of the chart.
- Interactive features include genre filters

Machine Learning - Grammy Prediction

	Prediction	Actual
0	1	1
1	2	2
2	1	1
3	2	2
4	1	1
5	1	1
6	1	1
7	1	1
8	2	2
9	1	1
10	2	2

Machine Learning Model Choice

- Logistic Regression
  - Predicts binary outcomes
  - Used to help assess whether or not an artist that is on the Billboard Top 100 Chart will win a Grammy
- Benefits:
  - Simple to implement and make predictions for linear outcomes
  - Simple to understand, train, and update with new data to be used in the future
- Limitations:
  - Does not work with non-linear outcomes
  - Requires a large dataset
  - Prone to overfitting

Machine Learning - Grammy Prediction

Machine Learning Model In Action

- Feature Selection:
  - Dropped Variables: "weekly_rank", "writing_credits", "lyrics"
  - These variables are not informative for our MLM analysis.
  - Increased Accuracy Score
- Training and Testing:
  - X predicts y
  - X: input created by dropping “artists” and “name” columns
  - y: output taken from “GrammyAward” column
  - Use the train_test_split module to split X and y into training and testing sets
    - X_train, X_test, y_train, y_test
  - The model’s prediction, y_pred, were compared with the actual values, y_test.
- Accuracy Score:
  - Assesses how well our Machine Learning Model Performs
  - **94.12%**

Results and Other Considerations

- **Original hypothesis:** Grammy winners can be accurately predicted based on Billboard Chart information
- **Null hypothesis:** Grammy wins do not follow Billboard chart positions
- Final result of machine learning model showed a 94.12% accuracy score
    - Conclusion from model that Grammy winners are likely predicted using current model.
- Dataset limitations - time on chart and peak position unavailable
- Committee based decision bias to data analytics based
- Multiple genre listed for individual song
- Additional information for later machine learning models
    - Genre impact
    - Release date in relation to Grammy awards
    - Location of release (US, UK)

Next Steps and Additions

- Automatic web scraping to add in weekly Billboard chart
- Use additional data sets and modern compilations of song ranking
- Expand Grammy and Billboard datasets to include all available
- Grammy Award category changes and additions
    - 1959 - 14 categories
    - 2021 - 84 categories

Questions?