R Notebook

Harrison DiStefano

Final Project EDA

```
# Libraries
#install.packages("RMariaDB")
library(RMariaDB)
```

```
## Warning: package 'RMariaDB' was built under R version 4.0.5
```

```
library(DBI)
library(ggplot2)
```

```
# Connect to database
db_host <- Sys.getenv("DB_READ_ENDPOINT")
db_user <- Sys.getenv("DB_READ_USER")
db_pw   <- Sys.getenv("DB_READ_PASSWORD")
db_port <- Sys.getenv("DB_READ_PORT")
db_name <- Sys.getenv("DB_READ_DB")
db_drv  <- RMariaDB::MariaDB()

con <- dbConnect(db_drv, user=db_user, password=db_pw, dbname=db_name, host=db_host, port=db_port)

dbListTables(con)
```

```
## [1] "music"    "postal"   "postal_r"
```

```
# Take a look at the first few rows
query1 <- "
SELECT *
FROM music
LIMIT 10

;
"

result1 <- dbGetQuery(con, query1)
result1
```

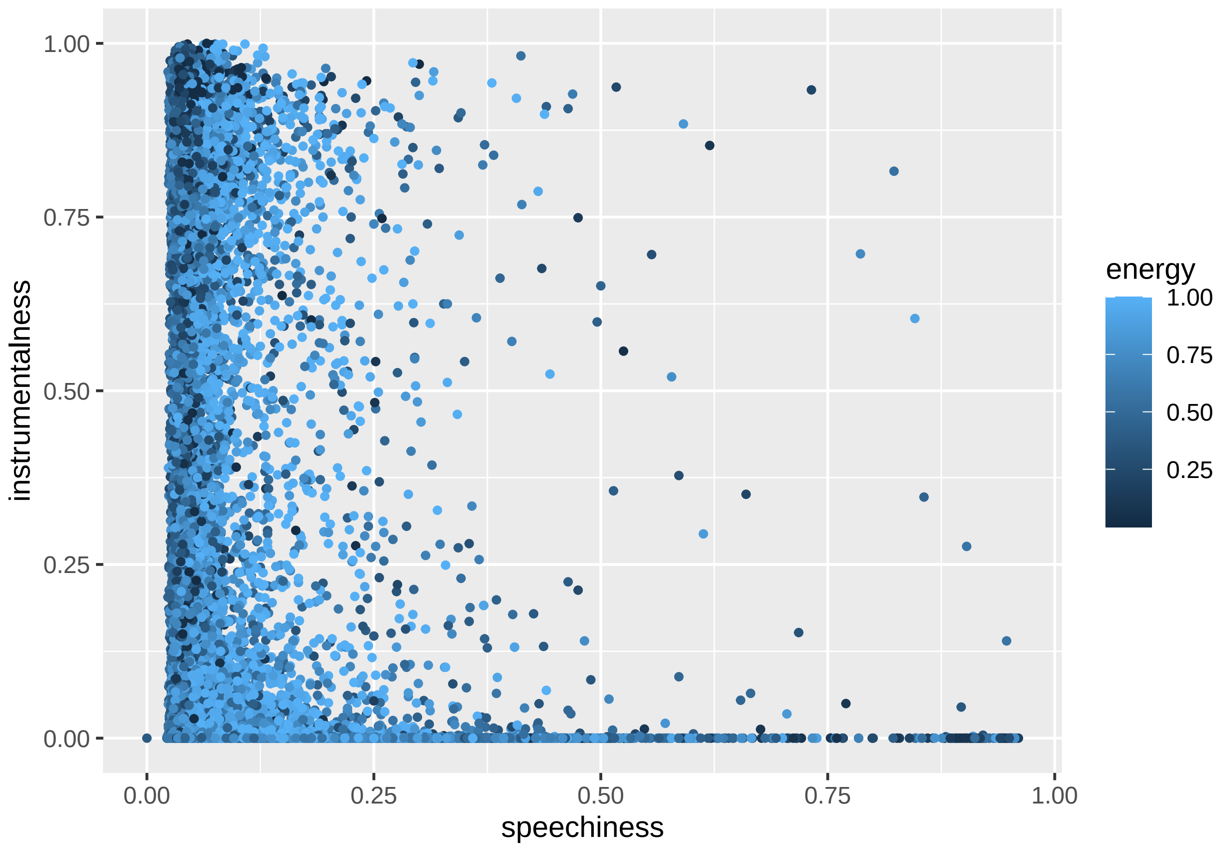
```
##    id                               track           artist
## 1   1                The Continental Walk      The Rollers
## 2   2                          Two Lovers       Mary Wells
## 3   3                           If I Knew    Nat King Cole
## 4   4 "Lara's Theme from ""Dr. Zhivago"""   Roger Williams
## 5   5                Say Wonderful Things       Patti Page
## 6   6             Till The End Of The Day        The Kinks
## 7   7               Hot Smoke & Sasafrass The Bubble Puppy
## 8   8                       I'm A Drifter  Bobby Goldsboro
## 9   9                            Bust Out      The Busters
## 10 10                       School Is Out  Gary U.S. Bonds
##                                      uri danceability energy song_key loudness
## 1  spotify:track:00Bu7AiNb06604KMuYTQAi        0.603  0.732        0   -5.647
## 2  spotify:track:00CmjeeHvAVKvx3tcIiZTy        0.678  0.405        2  -16.965
## 3  spotify:track:00Vwp9jQUs52JOnbbLaz5e        0.371  0.386        1   -9.238
## 4  spotify:track:00YhuN9oOmXUyLQiHjXPxt        0.361  0.280        7  -13.422
## 5  spotify:track:010BIyGminG03GMg8afVAq        0.490  0.440        3   -9.387
## 6  spotify:track:014NOunS25K1LbcM6DlQ5I        0.542  0.929        0   -7.066
## 7  spotify:track:01AxKIwrI7bCLOZOnmw41I        0.558  0.738        0  -14.270
## 8  spotify:track:01cZbN980X7YkWdzSRlBGD        0.426  0.404        0  -17.804
## 9  spotify:track:01f0S7TvfaZvHbg1fEbIug        0.445  0.787        6  -10.145
## 10 spotify:track:01GarP7Iim3fsxASclkEFW        0.464  0.778       10  -11.338
##    song_mode speechiness acousticness instrumentalness liveness valence   tempo
## 1          1      0.0372      0.80700         0.00e+00   0.0993   0.802 105.425
## 2          1      0.0304      0.42600         0.00e+00   0.1090   0.960 105.902
## 3          1      0.0308      0.70800         4.67e-04   0.0787   0.169  80.207
## 4          1      0.0294      0.82100         4.35e-01   0.1440   0.213  82.298
## 5          1      0.0321      0.87400         0.00e+00   0.3370   0.426 109.329
## 6          1      0.0784      0.52600         5.97e-03   0.1250   0.793 140.800
## 7          1      0.0668      0.75000         4.79e-03   0.0876   0.841  82.556
## 8          1      0.0339      0.10600         1.43e-04   0.0351   0.654 198.205
## 9          1      0.0772      0.00812         8.17e-01   0.1740   0.857 121.472
## 10         1      0.1850      0.86800         3.68e-05   0.4340   0.812 149.199
##    duration_ms time_signature chorus_hit sections hit decade
## 1       144000              3   31.93079        6   1  60s\r
## 2       167000              4   29.18796        8   1  60s\r
## 3       168000              4   57.12898        7   1  60s\r
## 4       160000              3   38.22192        8   1  60s\r
## 5       140000              3   21.83825        7   1  60s\r
## 6       138000              4   88.39831        5   1  60s\r
## 7       156000              4   27.82633        9   1  60s\r
## 8       208000              4   32.27175       10   1  60s\r
## 9       152000              4   29.06464        8   1  60s\r
## 10      150000              4   26.98884        8   1  60s\r
```

```r
query2 <- "
SELECT speechiness, instrumentalness, energy
FROM music

;
"

result2 <- dbGetQuery(con, query2)
```

```r
ggplot(data = result2, mapping = aes(x = speechiness, y = instrumentalness, col = energy)) +
  geom_point(size = 1)
```



Most of the tracks displaying a high degree of speechiness have 0 instrumentalness, probably indicating they are audio books, podcasts, spoken word, etc.

There are a few outliers that have both high speechiness and instrumentalness (> 0.5 for both) which is interesting because from the variable descriptions these seem mutually exclusive.

More energetic tracks clustered more around the extremes of instrumental and spechiness?

Let's take a closer look at the outliers:

```
query3 <- "
SELECT artist, track, speechiness, instrumentalness
FROM music
WHERE speechiness > 0.5 AND instrumentalness > 0.5
ORDER BY speechiness DESC

;
"

result3 <- dbGetQuery(con, query3)
result3
```

```
##                         artist                                      track
## 1                  Traditional                                     Clowns
## 2               Natural Sounds                          Divine Protection
## 3             Morton Subotnick                            "Touch, Pt. 1"
## 4                        Iasos                               Lagoon Night
## 5              Daniel Johnston               I Am A Baby (In My Universe)
## 6           Karl-Heinz Schäfer                        L'agresseur agressé
## 7               Black Asteroid                                    Turbine
## 8                   Joe Mcphee                            Improvisation 7
## 9        Karlheinz Stockhausen                           Klavierstück III
## 10 American Symphony Orchestra Hermit's Bell Overture Written by Maillart
##    speechiness instrumentalness
## 1        0.846            0.604
## 2        0.823            0.816
## 3        0.786            0.697
## 4        0.732            0.933
## 5        0.620            0.853
## 6        0.591            0.884
## 7        0.578            0.520
## 8        0.556            0.696
## 9        0.525            0.557
## 10       0.517            0.937
```

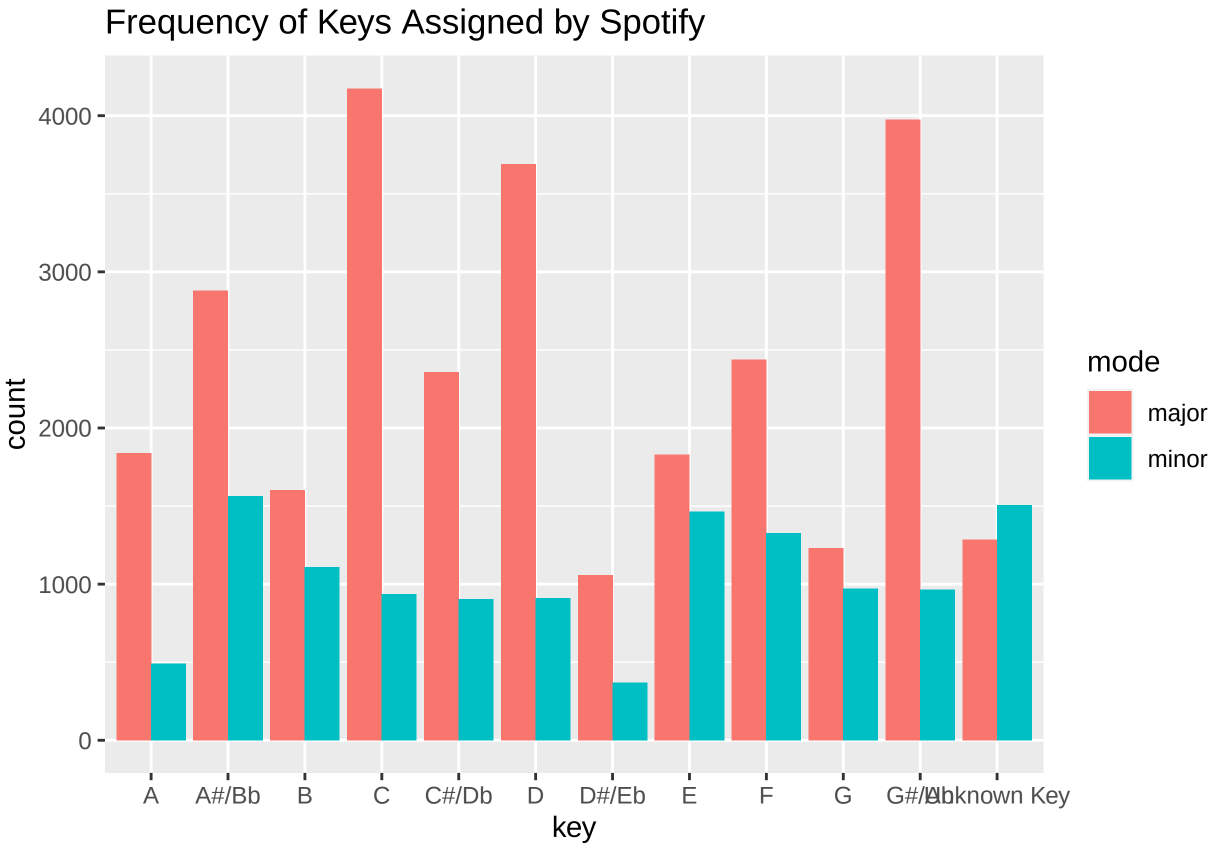
Listening to these tracks, most have very little actual vocalization but are generally noisy. It's possible Spotify's algorithm is mistaking some of the cacophonous sounds as voices.

```
query4 <- "
SELECT CASE WHEN song_key = 0 THEN 'C'
            WHEN song_key = 1 THEN 'C#/Db'
            WHEN song_key = 2 THEN 'D'
            WHEN song_key = 3 THEN 'D#/Eb'
            WHEN song_key = 4 THEN 'E'
            WHEN song_key = 5 THEN 'F'
            WHEN song_key = 5 THEN 'F#/Gb'
            WHEN song_key = 6 THEN 'G'
            WHEN song_key = 7 THEN 'G#/Ab'
            WHEN song_key = 8 THEN 'A'
            WHEN song_key = 9 THEN 'A#/Bb'
            WHEN song_key = 10 THEN 'B'
            ELSE 'Unknown Key'
       END,
       CASE WHEN song_mode = 0 THEN 'minor'
            WHEN song_mode = 1 THEN 'major'
            ELSE 'Unknown Mode'
       END
FROM music

;
"

result4 <- dbGetQuery(con, query4)
names(result4) <- c("key", "mode")

ggplot(data = result4, aes(x = key, group = mode, fill = mode, stat = "count")) +
  geom_bar(position = "dodge") +
  labs(title = "Frequency of Keys Assigned by Spotify")
```



Spotify assigned most songs to a major key which makes sense because most songs are written in major keys.

C, D, and G#/Ab (probably Ab, G# is awkward) major are the most commonly found keys. Generally keys with less accidentals (#/b) keys are more popular–the two most popular keys C major and D major have 0 and 2 respectively.

Around 2800 tracks are of unknown key, or about 7% of the database.

```r
# Disconnect from database to clean up connection
dbDisconnect(con)
```