

Recommendation_spotify

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Recommendation spotify

For this I am using my 2022 wrapped top songs as a base. Spotify API also provides artists that are similar to an artist. I picked a few of my favourite artists and got artists similar to them. I can calculate distances of these songs from this library and the top songs of 2022.

```
path <- "C:/Users/gadge/OneDrive/Desktop/InfoStats_R/" filename <- "Spotify_data.csv" df <- read_csv(paste(path,filename,sep=" ")) getting data
```

```
colnames(top_songs)
```

```
## [1] "track.id"           "track.name"
## [3] "track.artists"      "track.duration_ms"
## [5] "track.explicit"     "track.popularity"
## [7] "track.album.release_date" "danceability"
## [9] "energy"             "key"
## [11] "loudness"           "mode"
## [13] "speechiness"        "acousticness"
## [15] "instrumentalness"   "liveness"
## [17] "valence"            "tempo"
```

```
top_songs$album_release_year <- format(as.Date(top_songs$track.album.release_date,
                                                format="%Y-%m-%d"), "%Y")
top_songs <- top_songs %>% select(-track.artists,-track.explicit,-track.popularity,
                                -track.album.release_date)
```

```
head(top_songs)
```

```
## # A tibble: 6 x 15
##   track.id track~1 track~2 dance~3 energy key loudn~4 mode spec~5 acous~6
##   <chr>      <chr>      <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl>
## 1 5bozDHJ9RM~ Meri J~ 200386 0.326 0.253 5 -10.1 1 0.05 0.993
## 2 4zA2PuzWdz~ Nukta ~ 195093 0.546 0.369 8 -7.16 0 0.0288 0.984
## 3 6D5YqPRZo1~ Mujhe ~ 235173 0.513 0.359 8 -11.3 1 0.0371 0.971
## 4 2YBt1Fy6ZL~ Ae Dil~ 290114 0.466 0.602 2 -6.17 1 0.0546 0.914
## 5 4EMqJdOw0s~ Yeh Na~ 244680 0.292 0.339 10 -12.1 1 0.0343 0.96
## 6 6IrL40TcJ4~ Awaz D~ 199999 0.532 0.165 4 -8.90 1 0.0352 0.969
## # ... with 5 more variables: instrumentalness <dbl>, liveness <dbl>,
## # valence <dbl>, tempo <dbl>, album_release_year <chr>, and abbreviated
## # variable names 1: track.name, 2: track.duration_ms, 3: danceability,
## # 4: loudness, 5: speechiness, 6: acousticness
```

```
dim(top_songs)
```

```
## [1] 100 15
```

```
dim(library)
```

```
## [1] 48186 36
```

```
head(library)
```

```
## # A tibble: 6 x 36
##   artist_~1 artis~2 album~3 album~4 album~5 album~6 album~7 dance~8 energy key
##   <chr> <chr> <chr> <chr> <chr> <dbl> <chr> <dbl> <dbl> <dbl>
## 1 Hemant K~ 02Um2H~ 4DvNMp~ album 2022-0~ 2022 day 0.299 0.288 4
## 2 Hemant K~ 02Um2H~ 4DvNMp~ album 2022-0~ 2022 day 0.27 0.184 8
## 3 Hemant K~ 02Um2H~ 4DvNMp~ album 2022-0~ 2022 day 0.562 0.281 4
## 4 Hemant K~ 02Um2H~ 4DvNMp~ album 2022-0~ 2022 day 0.612 0.236 5
## 5 Hemant K~ 02Um2H~ 4DvNMp~ album 2022-0~ 2022 day 0.312 0.143 6
## 6 Hemant K~ 02Um2H~ 4DvNMp~ album 2022-0~ 2022 day 0.375 0.149 11
## # ... with 26 more variables: loudness <dbl>, mode <dbl>, speechiness <dbl>,
## # acousticness <dbl>, instrumentalness <dbl>, liveness <dbl>, valence <dbl>,
## # tempo <dbl>, track_id <chr>, analysis_url <chr>, time_signature <dbl>,
## # disc_number <dbl>, duration_ms <dbl>, explicit <lgl>, track_href <chr>,
## # is_local <lgl>, track_name <chr>, track_preview_url <chr>,
## # track_number <dbl>, type <chr>, track_uri <chr>,
## # external_urls.spotify <chr>, album_name <chr>, key_name <chr>, ...
```

```
library <- library %>% select(track_id,artist_id,album_id,
                             track_name,artist_name, album_release_year,
                             duration_ms, danceability, energy, loudness,
                             key, mode, speechiness, acousticness,
                             instrumentalness, liveness, valence,
                             tempo)
```

```
head(library)
```

```
## # A tibble: 6 x 18
##   track~1 artis~2 album~3 track~4 artis~5 album~6 durat~7 dance~8 energy loudn~9
##   <chr> <chr> <chr> <chr> <chr> <dbl> <dbl> <dbl> <dbl> <dbl>
## 1 3hluMH~ 02Um2H~ 4DvNMp~ Madhur~ Hemant~ 2022 213112 0.299 0.288 -9.14
## 2 7vj4wD~ 02Um2H~ 4DvNMp~ Ogo Ch~ Hemant~ 2022 193735 0.27 0.184 -13.8
## 3 2aPxAc~ 02Um2H~ 4DvNMp~ Palkir~ Hemant~ 2022 198552 0.562 0.281 -13.9
## 4 00r7kV~ 02Um2H~ 4DvNMp~ Palkir~ Hemant~ 2022 190597 0.612 0.236 -13.5
## 5 6kbeGf~ 02Um2H~ 4DvNMp~ Swapan~ Hemant~ 2022 190112 0.312 0.143 -14.8
## 6 3fyRG8~ 02Um2H~ 4DvNMp~ Mane H~ Hemant~ 2022 188352 0.375 0.149 -15.0
## # ... with 8 more variables: key <dbl>, mode <dbl>, speechiness <dbl>,
## # acousticness <dbl>, instrumentalness <dbl>, liveness <dbl>, valence <dbl>,
## # tempo <dbl>, and abbreviated variable names 1: track_id, 2: artist_id,
## # 3: album_id, 4: track_name, 5: artist_name, 6: album_release_year,
## # 7: duration_ms, 8: danceability, 9: loudness
```

```
top_songs <- top_songs %>% rename("track_id" = "track.id",
                                "track_name" = "track.name",
                                "duration_ms" = "track.duration_ms")
head(top_songs)
```

```
## # A tibble: 6 x 15
##   track_id track~1 durat~2 dance~3 energy key loudn~4 mode spec~5 acous~6
##   <chr>      <chr>      <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl>
## 1 5bozDHJ9RM~ Meri J~ 200386 0.326 0.253 5 -10.1 1 0.05 0.993
## 2 4zA2PuzWdz~ Nukta ~ 195093 0.546 0.369 8 -7.16 0 0.0288 0.984
## 3 6D5YqPRZo1~ Mujhe ~ 235173 0.513 0.359 8 -11.3 1 0.0371 0.971
## 4 2YBt1Fy6ZL~ Ae Dil~ 290114 0.466 0.602 2 -6.17 1 0.0546 0.914
## 5 4EMqJdOw0s~ Yeh Na~ 244680 0.292 0.339 10 -12.1 1 0.0343 0.96
## 6 6IrL40TcJ4~ Awaz D~ 199999 0.532 0.165 4 -8.90 1 0.0352 0.969
## # ... with 5 more variables: instrumentalness <dbl>, liveness <dbl>,
## #   valence <dbl>, tempo <dbl>, album_release_year <chr>, and abbreviated
## #   variable names 1: track_name, 2: duration_ms, 3: danceability, 4: loudness,
## #   5: speechiness, 6: acousticness
```

```
song_features_num <- c("danceability","energy","loudness","acousticness","instrumentalness",
                      "liveness","valence","tempo","album_release_year")
song_features_cat <- c("key","mode")
```

```
identifiers <- c("track_id","track_name")
```

```
top_songs <- top_songs %>% dplyr::select(any_of(c(identifiers,song_features_num,
                                                  song_features_cat)))
```

```
library <- library %>% dplyr::select(any_of(c(identifiers,song_features_num,
                                              song_features_cat)))
head(library)
```

```
## # A tibble: 6 x 13
##   track_id track~1 dance~2 energy loudn~3 acous~4 instr~5 liven~6 valence tempo
##   <chr>      <chr>      <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl>
## 1 3hluMHch~ Madhur~ 0.299 0.288 -9.14 0.99 0.296 0.422 0.496 76.5
## 2 7vj4wDw2~ Ogo Ch~ 0.27 0.184 -13.8 0.987 0.731 0.111 0.374 72.6
## 3 2aPxAc6~ Palkir~ 0.562 0.281 -13.9 0.995 0.808 0.109 0.812 78.7
## 4 00r7kVlS~ Palkir~ 0.612 0.236 -13.5 0.993 0.673 0.112 0.503 71.1
## 5 6kbeGfKf~ Swapan~ 0.312 0.143 -14.8 0.986 0.427 0.135 0.371 71.5
## 6 3fyRG8jV~ Mane H~ 0.375 0.149 -15.0 0.984 0.243 0.128 0.469 71.0
## # ... with 3 more variables: album_release_year <dbl>, key <dbl>, mode <dbl>,
## #   and abbreviated variable names 1: track_name, 2: danceability, 3: loudness,
## #   4: acousticness, 5: instrumentalness, 6: liveness
```

```
library <- library %>% filter(!(track_id %in% top_songs$track_id))
dim(library)
```

```
## [1] 48167 13
```

```
top_songs$top_song <- "Yes"
library$top_song <- "No"

df <- rbind(top_songs,library)
```

```
df <- data.frame(df)
head(df)
```

```
##           track_id           track_name danceability energy
## 1 5bozDHJ9RMQaAaYPe0ub7u Meri Jaan Mujhe Jaan Na Kaho      0.326 0.253
## 2 4zA2PuzWdzY4sbymDZ8wum Nukta Cheen Hai Gham-E-Dil      0.546 0.369
## 3 6D5YqPRZo10fpD2cy5hUz1 Mujhe Tum Nazar Se Gira To Rahe Ho 0.513 0.359
## 4 2YBt1Fy6ZLBCjxYjI8v2YW Ae Dil Mujhe Bata De      0.466 0.602
## 5 4EMqJd0w0s2a4dvImeWjve Yeh Nain Dare Dare      0.292 0.339
## 6 6IrL40TcJ49guEFPxiKMWu Awaz De Kahan Hai      0.532 0.165
##  loudness acousticness instrumentalness liveness valence  tempo
## 1 -10.116      0.993      6.88e-01    0.134  0.339 182.938
## 2  -7.160      0.984      1.21e-02    0.108  0.403 101.524
## 3 -11.288      0.971      9.85e-05    0.218  0.741 120.251
## 4  -6.174      0.914      7.49e-01    0.196  0.818  86.622
## 5 -12.051      0.960      7.88e-01    0.110  0.426  86.401
## 6  -8.904      0.969      3.61e-05    0.868  0.450  76.091
##  album_release_year key mode top_song
## 1          1971     5     1     Yes
## 2          1954     8     0     Yes
## 3          2008     8     1     Yes
## 4          1956     2     1     Yes
## 5          1964    10     1     Yes
## 6          1946     4     1     Yes
```

```
df$album_release_year <- as.double(df$album_release_year)
head(df)
```

```
##           track_id           track_name danceability energy
## 1 5bozDHJ9RMQaAaYPe0ub7u Meri Jaan Mujhe Jaan Na Kaho      0.326 0.253
## 2 4zA2PuzWdzY4sbymDZ8wum Nukta Cheen Hai Gham-E-Dil      0.546 0.369
## 3 6D5YqPRZo10fpD2cy5hUz1 Mujhe Tum Nazar Se Gira To Rahe Ho 0.513 0.359
## 4 2YBt1Fy6ZLBCjxYjI8v2YW Ae Dil Mujhe Bata De      0.466 0.602
## 5 4EMqJd0w0s2a4dvImeWjve Yeh Nain Dare Dare      0.292 0.339
## 6 6IrL40TcJ49guEFPxiKMWu Awaz De Kahan Hai      0.532 0.165
##  loudness acousticness instrumentalness liveness valence  tempo
## 1 -10.116      0.993      6.88e-01    0.134  0.339 182.938
## 2  -7.160      0.984      1.21e-02    0.108  0.403 101.524
## 3 -11.288      0.971      9.85e-05    0.218  0.741 120.251
## 4  -6.174      0.914      7.49e-01    0.196  0.818  86.622
## 5 -12.051      0.960      7.88e-01    0.110  0.426  86.401
## 6  -8.904      0.969      3.61e-05    0.868  0.450  76.091
##  album_release_year key mode top_song
## 1          1971     5     1     Yes
## 2          1954     8     0     Yes
## 3          2008     8     1     Yes
## 4          1956     2     1     Yes
```

```
## 5          1964  10    1    Yes
## 6          1946   4    1    Yes
```

```
sum(is.na(df))
```

```
## [1] 50
```

```
df <- na.omit(df)
```

```
dim(df)
```

```
## [1] 48217    14
```

```
for (col in song_features_num){
  #print(col)
  #df[,col] <- as.numeric(df[,col])
  df[,col] <- (df[,col] - min(df[,col]))/(max(df[,col])-min(df[,col]))
}
head(df)
```

```
##          track_id          track_name danceability
## 1 5bozDHJ9RMQaAaYPe0ub7u    Meri Jaan Mujhe Jaan Na Kaho    0.3385254
## 2 4zA2PuzWdzY4sbymDZ8wum      Nukta Cheen Hai Gham-E-Dil    0.5669782
## 3 6D5YqPRZo10fpD2cy5hUz1  Mujhe Tum Nazar Se Gira To Rahe Ho    0.5327103
## 4 2YBt1Fy6ZLBCjxYjI8v2YW      Ae Dil Mujhe Bata De    0.4839045
## 5 4EMqJdOw0s2a4dvImeWjve      Yeh Nain Dare Dare    0.3032191
## 6 6IrL40TcJ49guEFPxiKMWu      Awaz De Kahan Hai    0.5524403
##      energy  loudness  acousticness  instrumentalness  liveness  valence    tempo
## 1 0.2535070 0.8133040    0.9969880    6.921529e-01 0.1353535    0.339 0.8254468
## 2 0.3697395 0.8614983    0.9879518    1.217304e-02 0.1090909    0.403 0.4580932
## 3 0.3597194 0.7941958    0.9748996    9.909457e-05 0.2202020    0.741 0.5425926
## 4 0.6032064 0.8775740    0.9176707    7.535211e-01 0.1979798    0.818 0.3908529
## 5 0.3396794 0.7817559    0.9638554    7.927565e-01 0.1111111    0.426 0.3898557
## 6 0.1653307 0.8330643    0.9728916    3.631791e-05 0.8767677    0.450 0.3433353
##  album_release_year key mode top_song
## 1          0.5641026   5    1    Yes
## 2          0.4188034   8    0    Yes
## 3          0.8803419   8    1    Yes
## 4          0.4358974   2    1    Yes
## 5          0.5042735  10    1    Yes
## 6          0.3504274   4    1    Yes
```

```
df$key <- as.factor(df$key)
df$mode <- as.factor(df$mode)
```

```
modes <- df %>%
  dplyr::group_by(mode) %>%
  dplyr::summarize(mode_prob = (n())/(dim(df)[1]))
keys <- df %>%
  dplyr::group_by(key) %>%
  dplyr::summarize(key_prob = (n())/(dim(df)[1]))
modes
```

```
## # A tibble: 2 x 2
##   mode mode_prob
##   <fct>      <dbl>
## 1 0          0.331
## 2 1          0.669
```

```
df <- left_join(df,modes,by="mode")
df <- left_join(df,keys,by="key")
head(df)
```

```
##           track_id           track_name danceability
## 1 5bozDHJ9RMQaAaYPe0ub7u Meri Jaan Mujhe Jaan Na Kaho 0.3385254
## 2 4zA2PuzWdzY4sbymDZ8wum Nukta Cheen Hai Gham-E-Dil 0.5669782
## 3 6D5YqPRZo10fpD2cy5hUz1 Mujhe Tum Nazar Se Gira To Rahe Ho 0.5327103
## 4 2YBt1Fy6ZLBCjxYjI8v2YW Ae Dil Mujhe Bata De 0.4839045
## 5 4EMqJd0w0s2a4dvImeWjve Yeh Nain Dare Dare 0.3032191
## 6 6IrL40TcJ49guEFPxiKMWu Awaz De Kahan Hai 0.5524403
##   energy loudness acousticness instrumentalness liveness valence tempo
## 1 0.2535070 0.8133040 0.9969880 6.921529e-01 0.1353535 0.339 0.8254468
## 2 0.3697395 0.8614983 0.9879518 1.217304e-02 0.1090909 0.403 0.4580932
## 3 0.3597194 0.7941958 0.9748996 9.909457e-05 0.2202020 0.741 0.5425926
## 4 0.6032064 0.8775740 0.9176707 7.535211e-01 0.1979798 0.818 0.3908529
## 5 0.3396794 0.7817559 0.9638554 7.927565e-01 0.1111111 0.426 0.3898557
## 6 0.1653307 0.8330643 0.9728916 3.631791e-05 0.8767677 0.450 0.3433353
##   album_release_year key mode top_song mode_prob key_prob
## 1 0.5641026 5 1 Yes 0.6694112 0.09565091
## 2 0.4188034 8 0 Yes 0.3305888 0.09509094
## 3 0.8803419 8 1 Yes 0.6694112 0.09509094
## 4 0.4358974 2 1 Yes 0.6694112 0.08156874
## 5 0.5042735 10 1 Yes 0.6694112 0.06933239
## 6 0.3504274 4 1 Yes 0.6694112 0.06103656
```

```
song_features_cat <- c("key_prob", "mode_prob")
a <- df[df$top_song == "Yes",c(song_features_num,song_features_cat)]
b <- df[df$top_song == "No",c(song_features_num,song_features_cat)]
class(a)
```

```
## [1] "data.frame"
```

```
head(a)
```

```
##   danceability   energy loudness acousticness instrumentalness liveness
## 1 0.3385254 0.2535070 0.8133040 0.9969880 6.921529e-01 0.1353535
## 2 0.5669782 0.3697395 0.8614983 0.9879518 1.217304e-02 0.1090909
## 3 0.5327103 0.3597194 0.7941958 0.9748996 9.909457e-05 0.2202020
## 4 0.4839045 0.6032064 0.8775740 0.9176707 7.535211e-01 0.1979798
## 5 0.3032191 0.3396794 0.7817559 0.9638554 7.927565e-01 0.1111111
## 6 0.5524403 0.1653307 0.8330643 0.9728916 3.631791e-05 0.8767677
##   valence tempo album_release_year key_prob mode_prob
## 1 0.339 0.8254468 0.5641026 0.09565091 0.6694112
## 2 0.403 0.4580932 0.4188034 0.09509094 0.3305888
## 3 0.741 0.5425926 0.8803419 0.09509094 0.6694112
```

```
## 4    0.818 0.3908529          0.4358974 0.08156874 0.6694112
## 5    0.426 0.3898557          0.5042735 0.06933239 0.6694112
## 6    0.450 0.3433353          0.3504274 0.06103656 0.6694112
```

```
distance_prob <- function(v1,v2){
  sqrt(sum((v1[1:8]-v2[1:8])^2) +
        sum((v1[9:11] == v2[9:11])*v1[9:11]*v2[9:11])+
        sum((v1[9:11] != v2[9:11])*(1-v1[9:11]*v2[9:11])))
}
```

```
library(proxy)
mat <- proxy::dist(a,b,method = distance_prob)
```

```
dim(mat)
```

```
## [1]    98 48119
```

```
mat[1:3,2:5]
```

```
##          100          101          102          103
## 1 1.571216 1.550077 1.125687 1.488079
## 2 1.169918 1.786964 1.689686 1.633851
## 3 1.317955 1.511909 1.470336 1.424042
```

```
which.min(mat[1,2:5])
```

```
## 102
##    3
```

```
which.min(mat[1,2:5])-1
```

```
## 102
##    2
```

```
similar <- c()
for (i in (1:dim(mat)[1])){
  similar <- c(similar, which.min(mat[i,]))
}
```

```
similar
```

```
## 2514 26086 9164 24551 24290 11204 36711 1557 13306 9434 13167 24452 41940
## 2416 25988 9066 24453 24192 11106 36613 1459 13208 9336 13069 24354 41842
## 7782 26420 40992 41862 1863 5535 9167 5824 14722 41284 44596 1150 18855
## 7684 26322 40894 41764 1765 5437 9069 5726 14624 41186 44498 1052 18757
## 1207 18865 44711 47338 806 963 15150 11881 24458 1939 41967 5843 41296
## 1109 18767 44613 47240 708 865 15052 11783 24360 1841 41869 5745 41198
## 5926 23039 1619 24473 12840 5748 13223 40483 2440 41007 24399 25990 12749
## 5828 22941 1521 24375 12742 5650 13125 40385 2342 40909 24301 25892 12651
## 930 41283 46388 2083 2537 1269 9159 18410 1845 24452 1209 18802 11868
```

```
##      832 41185 46290 1985 2439 1171 9061 18312 1747 24354 1111 18704 11770
##     1217 24345 43209 40994 24415 1076 40987 2441 1634 22720 37920 7600 1513
##     1119 24247 43111 40896 24317 978 40889 2343 1536 22622 37822 7502 1415
##    19004 33770 23597 15429 22495 19354 14999 36698 32838 47000 24928 24528 41039
##    18906 33672 23499 15331 22397 19256 14901 36600 32740 46902 24830 24430 40941
##    24297 24387 24796 39566 11334 24529 7361
##    24199 24289 24698 39468 11236 24431 7263
```

```
top_song_matched <- df %>% filter(top_song == "Yes")
top_song_matched$similar_index <- similar
top_song_matched
```

```
##          track_id
## 1 5bozDHJ9RMQaAaYPeOub7u
## 2 4zA2PuzWdzY4sbymDZ8wum
## 3 6D5YqPRZo10fpD2cy5hUz1
## 4 2YBt1Fy6ZLBCjxYjI8v2YW
## 5 4EMqJd0w0s2a4dvImeWjve
## 6 6IrL40TcJ49guEFPxiKMwu
## 7 1vL4djCWLQVeN4rtzHHKuE
## 8 21DBxQXztOrwrrcNMRBdIk
## 9 0hFEqnYmbPJab6KjdKETkx
## 10 3erhEnXNihaUFWdKdxr794
## 11 35UPuNgkXKSaszorSa6Wda
## 12 4HxvIdH92INqp7Fj1S1lFW
## 13 7lvDsmTRXFE3dK40jvRiWB
## 14 68p0Z1wg4ql10t20jPzuxv
## 15 3f6lUIjrM4b5j0jKmwcpK5
## 16 4lcQHckNMeUkM8jx67j28G
## 17 4nEKA1qrppgDexxV25EvKs
## 18 0dYNiMzm5bNu7ap0EQT2qD
## 19 1Lc3ICwfCJq9f5aKFTbZKY
## 20 6f18804U3MHPStb9IJ7bqm
## 21 6n2kw901wjT1csXSeGsjwX
## 22 6MZCYPT3hZPzwJGLnXn1RF
## 23 6xAiuvSFpKgPbSkj7hupoP
## 24 3KSa00QU22QK38RukxKFXQ
## 25 6F7vjZLKx9CD6rve0p684V
## 26 0mAswKg3RCbmXAV4KYTUxM
## 27 6bwAmDZ1aYJGxYkAVI5FCK
## 28 7LKodE6tcBfMxpHXM3C4kQ
## 29 7rqueVeYViqGpH6EGFljBO
## 30 6FuRLbqyMlk0lugKxoH2qB
## 31 5vzex8q0tGNavmDwYcks6Z
## 32 0YSDElkycJ6Z8raNGULWiZ
## 33 3JlCtKzdOP25geInwMI9RF
## 34 46s2suC6mNTNlyXg3ecNCj
## 35 2GwwPl9SUKbHQ9tsN1GvPk
## 36 1SMNDZ0CR4W27fCU8Remqq
## 37 2oi55VmillH7At5wHVNfBE
## 38 0PZ01Ih1qTQawy5Wc9B7zy
## 39 1yXvnTDYUQvYewL0zMh1AR
## 40 27RqV0prpxzu72YyUNyLek
## 41 0zh7SH1nHYKaBxJHAn208k
```


42 7x9EeYMXayMPp6T1hnHnbf
43 1xmYCoRIZSzwUjuuVb30SL
44 5M3j7hoGi02D1FnK3Mmoi0
45 0Ywmvs5fEx0fc2Sy7KcZkN
46 3NVfZA00ZiThdRkPtJSWJx
47 1SGpAwL941VTN84pZxNmcI
48 39hCQjPyTtsHzsp0cx1fuJ
49 6XFGKG0jlwXWm12DHV1CWc
50 6IaQ7630KTJ9dXHZpL7dmz
51 7db01k9ryxPFJG0fvYBffu
52 7zHbrlvHQvhSXsmh36w3CS
53 70vSg23ZpLR0oj7xxzDBk2
54 6KYYr8UyH513XcaahGZdQx
55 335kskxwq8xBigEXYBQ61e
56 27zCiWApKo18JhyKK5Tw1p
57 221V4MxzMsy5N7nDj7wODt
58 7ApJYjqrR2D0mebt1wU0yX
59 1KaNTSpU12ZFyTPc07gTht
60 2VR1z4g6haFyMoghNj46KB
61 5UGYhJiv2CiqEFPdbIbQM1
62 1yYe7uNAcv5WXipa671H3G
63 64vuogBLq56H4ksdQCMTJg
64 6S2GWSxMpcEnP3wDc0FdsY
65 2X2fJui9VJWiaUHYeNZgKF
66 15P9r2s061goMnaMqPQ9bm
67 7ukboFFuDuxKWRdxahmth7
68 08P81JZE9PvvTiUH1IRbiv
69 1asbwyngXJV3JjtX6kY6CL
70 1WyVFz2yJiow797fnxiuVu
71 1oghlB7Tm7Xo3M2BviDnic
72 3chvS4B3KaT7wCyoVL088I
73 52QByX4Z0AQnSbC3QpBD8W
74 001LvKFwYbfKYPQF2Fiv77
75 04RedUeDN5QjRSJveIz6vp
76 4LRPiXqCikL1N15c3yImp7
77 6bmqjIMGj8BdmzGwfPKJGt
78 30aTtEKz0nDL3Mnhq2Bdib
79 78xcub4FzranFU5SmRPg8j
80 2DxsGXCFkJvTz7Dv81gOhd
81 0div6Bf8qZlryVh0XorLSM
82 2SEEc2aD9ymNGDRMJRq6Zm
83 0AJhcuRl3i1FfPNr88ZScv
84 46NYX9zIm171qtFYjakTI
85 5ah0k2jUcKea9Z60jBPNcB
86 6Ry6ewFsGGu0JUzmaZ5jeZ
87 5t0dDiEtorzHo7myp2Tt3q
88 3gBwuyMuSVK9ubjEhoNooA
89 3ezYLk9ned8ITGIPMvfpew
90 4wkxHafIXeX3zqcBEpaeN0
91 17ahSrFGTLNAEAquP1P88n
92 53keqrDTkt1GE9hJgUoql4
93 29cK0jhPhd3XrMBp0jkHnY
94 1y4VuKcGzBPMvq2pHMNQSk
95 4bM5Pg9Dl0t0aMSSaU1P6F

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## 96 4eb4Cfp6cTf10nKdBm6ukz
## 97 6rfyTglxmdDyADw3IFYETG
## 98 6YEigVLKeRSOusYWwA8VNr
##
##                                     track_name
## 1                               Meri Jaan Mujhe Jaan Na Kaho
## 2                               Nukta Cheen Hai Gham-E-Dil
## 3                               Mujhe Tum Nazar Se Gira To Rahe Ho
## 4                               Ae Dil Mujhe Bata De
## 5                               Yeh Nain Dare Dare
## 6                               Awaz De Kahan Hai
## 7                               Woh Aye Hain
## 8                               Thandi Hawa Kali Ghata
## 9                               Seekho Na
## 10                              Chha Rahi Kari Ghata ( Sawan : Des )
## 11                              Zindagi Ab
## 12                              Kal Talak Hum Theek Tha
## 13                              Pasoori
## 14                              Nigahen Milane Ko Jee Chahta Hai
## 15                              Ab Ke Saawan
## 16                              Mohabbat
## 17                              Chaudhvin Ka Chand Ho
## 18                              Ajnabi
## 19                              Mera Sundar Sapna Beet Gaya
## 20                              Mohabbat Karne Wale (Live)
## 21                              Chandni Raatein
## 22                              Bade Achhe Lagte Hain
## 23                              Hum Aap Ki Ankhon Mein
## 24                              Yeh Na Thi Hamari Qismat
## 25                              O Sajna Barkha Bahar Aayi
## 26                              Aisay Kaisay
## 27                              Jane Kya Tune Kahi
## 28                              Prem Mein Tohre
## 29                              Yaad Kiya Dil Ne
## 30                              Chalein Kahin
## 31                              Mera Dil Jo Mera Hota
## 32                              Din Dhal Jaye Haya
## 33                              Zindagi Kaisi Hai Paheli
## 34                              O Aasmanwale
## 35                              Mujhko Tum Jo Mile
## 36                              Ehsan Tera Hoga Mujh Par
## 37                              Mehram
## 38                              Dasht-E-Tanhai Mein
## 39                              Ja Ja Ja Bewafa
## 40                              Hum Aur Tum Aur Ye Sama
## 41                              Dil Jalaane Ki Baat - From "The Reluctant Fundamentalist"
## 42                              Yeh Na Thi Hamaari Kismat
## 43                              Do Chamakti Ankhon Mein
## 44                              Phir Kahin Koi Phool Khila
## 45                              Kis Kadar
## 46                              Koi Chupke Se Aake
## 47 Zindagi Denewale Sun, Teri Duniya Se Dil Bhar Gaya, From ''Dil - E - Nadan''
## 48                              Mujhse Pehli Si Mohabbat
## 49                              Aaj Jane Ki Zid Na Karo
## 50                              Chupke Se Mile Pyase Pyase

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51 Ek Din Aap (From "Yes Boss")
52 Mehfil Barkhaast Hui
53 Dhire Dhire Machal
54 Rut Phire Par Din Hamare
55 Ae Dil Kisi Ki Yaad Mein
56 Aap Ke Haseen Rukh Pe
57 Dil Cheez Kya Hai
58 Tumi Je Amar
59 Jane Woh Kaise Log The
60 Jhoom
61 Mera Saaya Saath Hoga
62 Mera Naam Chin Chin Chu
63 Tang Aa Chuke Hai Verse
64 Yo Soch
65 Boojh Mera Kya Naam Re
66 Nishiraat Banka Chand Akashe
67 Beqarar Karke Hamen Yun Na Jaiye
68 Ankahee
69 Sarphiri
70 Waqt Ne Kiya Kya Haseen Sitam
71 Jahan Mein Aesa Kaun Hai
72 Kinaray
73 Rasm -E- Ulfat Sikha Gaya Koi
74 Yeh Lo Main Haari Piya
75 Saiyan Be-Imaan
76 As It Was
77 Hum Dekhen Ge
78 Udhar Tum Hasin Ho
79 Chaa Rahi Kali Ghata
80 Tumhen Ho Na Ho
81 Bewajah
82 Tadbeer Se Bigdi Huyi Taqdeer
83 You're in Love with a Psycho
84 Kesariya Audio Teaser (From "Brahmastra")
85 Thare Rahiyo O Banke Yaar
86 Babuji Dheere Chalna
87 Faasle
88 Humsafar
89 Jadu Hai Nasha Hai - 2002
90 Yeh Hai Bombay Meri Jaan - Aye Dil Hai Mushkil Jeena Yahan
91 Goodbye Kiss
92 Aa Chal Ke Tujhe
93 Ei Sundar Swarnali Sandhaye
94 Tu Jaanay Na
95 Bairie Chain
96 Chan Kithan
97 Ankhon Hi Ankhon Mein
98 Yeh Raat Yeh Chandni - Hemant Kumar

##	danceability	energy	loudness	acousticness	instrumentalness	liveness
## 1	0.3385254	0.253507014	0.8133040	0.99698795	6.921529e-01	0.13535354
## 2	0.5669782	0.369739479	0.8614983	0.98795181	1.217304e-02	0.10909091
## 3	0.5327103	0.359719439	0.7941958	0.97489960	9.909457e-05	0.22020202
## 4	0.4839045	0.603206413	0.8775740	0.91767068	7.535211e-01	0.19797980
## 5	0.3032191	0.339679359	0.7817559	0.96385542	7.927565e-01	0.11111111

## 6	0.5524403	0.165330661	0.8330643	0.97289157	3.631791e-05	0.87676768
## 7	0.4932503	0.381763527	0.7949947	0.97590361	5.020121e-04	0.17171717
## 8	0.5877466	0.615230461	0.8690796	0.84638554	0.000000e+00	0.16868687
## 9	0.6957425	0.465931864	0.6954431	0.09658635	5.130785e-03	0.06656566
## 10	0.2897196	0.579158317	0.7524741	0.78212851	6.931590e-01	0.20101010
## 11	0.4787124	0.401803607	0.7833863	0.87248996	1.368209e-05	0.30101010
## 12	0.6261682	0.589178357	0.8115269	0.90763052	0.000000e+00	0.82525253
## 13	0.7414330	0.597194389	0.8770523	0.06596386	0.000000e+00	0.06313131
## 14	0.3946002	0.727454910	0.8638950	0.97289157	1.559356e-01	0.38686869
## 15	0.5160955	0.629258517	0.7430994	0.02871486	4.818913e-04	0.09353535
## 16	0.3831776	0.231462926	0.7137523	0.85542169	9.657948e-02	0.10909091
## 17	0.5441329	0.280561122	0.8628352	0.90261044	0.000000e+00	0.14545455
## 18	0.4122534	0.188376754	0.7966903	0.95080321	1.237425e-05	0.12222222
## 19	0.3686397	0.248496994	0.8312383	0.99497992	8.843058e-02	0.13535354
## 20	0.4569055	0.492985972	0.7846254	0.96686747	8.068410e-01	0.32828283
## 21	0.5700935	0.401803607	0.8598190	0.96184739	9.014085e-06	0.24747475
## 22	0.3925234	0.146292585	0.7269585	0.90060241	1.629779e-05	0.12323232
## 23	0.7185877	0.236472946	0.8522540	0.98493976	4.698189e-04	0.68484848
## 24	0.2087227	0.278557114	0.7866308	0.93172691	4.788732e-06	0.43939394
## 25	0.4631360	0.269539078	0.7508274	0.99598394	3.541247e-01	0.16161616
## 26	0.5991693	0.428857715	0.8304231	0.46887550	2.625755e-05	0.27474747
## 27	0.4901350	0.259519038	0.8005054	0.92269076	0.000000e+00	0.10101010
## 28	0.5804777	0.514028056	0.8754219	0.82831325	0.000000e+00	0.07979798
## 29	0.4143302	0.268537074	0.8261352	0.84839357	8.249497e-03	0.35454545
## 30	0.5607477	0.455911824	0.8575854	0.61044177	0.000000e+00	0.34949495
## 31	0.6344756	0.170340681	0.7684682	0.99598394	2.253521e-02	0.11818182
## 32	0.5212876	0.201402806	0.7271705	0.98393574	8.722334e-01	0.12727273
## 33	0.3717549	0.622244489	0.8724872	0.86345382	5.150905e-06	0.34646465
## 34	0.5212876	0.308617234	0.7862069	0.96184739	1.086519e-05	0.28585859
## 35	0.3406023	0.374749499	0.8091954	0.90963855	2.444668e-06	0.12020202
## 36	0.6272066	0.367735471	0.8223363	0.67369478	5.150905e-06	0.10707071
## 37	0.3800623	0.120240481	0.7259314	0.89859438	1.921529e-03	0.11414141
## 38	0.2949117	0.266533066	0.7528165	0.93473896	0.000000e+00	0.34444444
## 39	0.3821391	0.469939880	0.8473791	0.92871486	2.444668e-03	0.16969697
## 40	0.3333333	0.249498998	0.7700986	0.94779116	9.185111e-01	0.09252525
## 41	0.4309450	0.008667335	0.6684112	0.97991968	3.551308e-05	0.15454545
## 42	0.5181724	0.440881764	0.8649548	0.99497992	1.126761e-03	0.32020202
## 43	0.5565940	0.528056112	0.8158800	0.93574297	0.000000e+00	0.75656566
## 44	0.2980270	0.188376754	0.7066438	0.99196787	8.923541e-01	0.10808081
## 45	0.4776739	0.280561122	0.7513328	0.93975904	1.881288e-03	0.52222222
## 46	0.4153686	0.146292585	0.7524904	0.99899598	7.917505e-01	0.16060606
## 47	0.3364486	0.233466934	0.7468656	0.99698795	8.953722e-01	0.10707071
## 48	0.3738318	0.628256513	0.8335045	0.65160643	1.559356e-03	0.40303030
## 49	0.3084112	0.284569138	0.8658352	0.53714859	0.000000e+00	0.31313131
## 50	0.6739356	0.328657315	0.8519768	0.96285141	1.468813e-03	0.14848485
## 51	0.4797508	0.375751503	0.7632836	0.64457831	0.000000e+00	0.19090909
## 52	0.2731049	0.363727455	0.8564767	0.79618474	0.000000e+00	0.24646465
## 53	0.4184839	0.494989980	0.8302437	0.95983936	2.867203e-03	0.15555556
## 54	0.4932503	0.174348697	0.8182604	0.99698795	1.106640e-05	0.21919192
## 55	0.2866044	0.689378758	0.9042635	0.09427711	0.000000e+00	0.15353535
## 56	0.3177570	0.384769539	0.8656232	0.78614458	0.000000e+00	0.14040404
## 57	0.4766355	0.653306613	0.9092199	0.89056225	1.519115e-05	0.14646465
## 58	0.4890966	0.178356713	0.7588489	0.99497992	4.869215e-01	0.49090909
## 59	0.5316719	0.273547094	0.8425532	0.95983936	0.000000e+00	0.08373737

## 60	0.7622015	0.530060120	0.8119671	0.39357430	0.000000e+00	0.11111111		
## 61	0.5690550	0.422845691	0.8114453	0.98594378	1.026157e-01	0.23131313		
## 62	0.5597092	0.905811623	0.9070840	0.90361446	3.420523e-02	0.59595960		
## 63	0.6510903	0.070841683	0.7615717	0.96987952	0.000000e+00	0.11919192		
## 64	0.4506750	0.512024048	0.8490748	0.59437751	0.000000e+00	0.20505051		
## 65	0.5119418	0.557114228	0.8760088	0.82530120	3.360161e-04	0.23535354		
## 66	0.3935618	0.227454910	0.8097660	0.96184739	0.000000e+00	0.09393939		
## 67	0.6780893	0.446893788	0.7854732	0.97489960	2.525151e-01	0.62727273		
## 68	0.4984424	0.379759519	0.7999674	0.74698795	1.257545e-04	0.07979798		
## 69	0.3187954	0.553106212	0.8555800	0.85441767	9.607646e-04	0.09373737		
## 70	0.2461059	0.346693387	0.7958914	0.88955823	1.398390e-03	0.42828283		
## 71	0.4247144	0.257515030	0.7492459	0.98895582	1.167002e-01	0.09656566		
## 72	0.4496366	0.464929860	0.8031140	0.63755020	4.084507e-05	0.12222222		
## 73	0.3852544	0.281563126	0.7628760	0.82530120	0.000000e+00	0.06858586		
## 74	0.5763240	0.534068136	0.8541779	0.80522088	2.122736e-01	0.27272727		
## 75	0.3582555	0.525050100	0.7955653	0.97791165	2.404427e-01	0.73939394		
## 76	0.5399792	0.732464930	0.8912040	0.34337349	1.016097e-03	0.31414141		
## 77	0.4049844	0.682364729	0.8232331	0.93975904	3.943662e-04	0.66969697		
## 78	0.4257529	0.424849699	0.8865574	0.72289157	0.000000e+00	0.17777778		
## 79	0.5919003	0.464929860	0.8338469	0.55622490	0.000000e+00	0.08696970		
## 80	0.3250260	0.470941884	0.7965762	0.85040161	5.895372e-06	0.06696970		
## 81	0.5295950	0.623246493	0.8447705	0.21184739	2.726358e-05	0.09252525		
## 82	0.7767394	0.352705411	0.7852124	0.95883534	0.000000e+00	0.18585859		
## 83	0.7487020	0.806613226	0.8959159	0.01937751	1.076459e-04	0.34545455		
## 84	0.5815161	0.635270541	0.8347110	0.43674699	4.376258e-03	0.09929293		
## 85	0.3748702	0.606212425	0.7804190	0.84738956	1.680080e-05	0.30606061		
## 86	0.5649013	0.260521042	0.8010434	0.78112450	7.213280e-06	0.11818182		
## 87	0.5524403	0.468937876	0.8390315	0.17670683	0.000000e+00	0.15050505		
## 88	0.4932503	0.359719439	0.8024293	0.72188755	1.458753e-05	0.07898990		
## 89	0.6895119	0.649298597	0.8304231	0.24899598	2.334004e-05	0.07080808		
## 90	0.6656282	0.384769539	0.8304068	0.81626506	2.716298e-04	0.07676768		
## 91	0.6386293	0.837675351	0.9024537	0.07911647	0.000000e+00	0.62626263		
## 92	0.4444444	0.493987976	0.8576017	0.36847390	3.289738e-03	0.09373737		
## 93	0.6188993	0.147294589	0.7159371	0.99899598	7.877264e-01	0.08838384		
## 94	0.7352025	0.533066132	0.8207549	0.35441767	0.000000e+00	0.09303030		
## 95	0.6583593	0.236472946	0.7126111	0.56325301	3.309859e-04	0.09969697		
## 96	0.3156802	0.340681363	0.8147224	0.96485944	2.323944e-01	0.22020202		
## 97	0.7113188	0.395791583	0.8165159	0.67068273	0.000000e+00	0.09343434		
## 98	0.4579439	0.303607214	0.7978642	0.95381526	0.000000e+00	0.08969697		
##	valence	tempo	album_release_year	key	mode	top_song	mode_prob	key_prob
## 1	0.3390	0.8254468	0.5641026	5	1	Yes	0.6694112	0.09565091
## 2	0.4030	0.4580932	0.4188034	8	0	Yes	0.3305888	0.09509094
## 3	0.7410	0.5425926	0.8803419	8	1	Yes	0.6694112	0.09509094
## 4	0.8180	0.3908529	0.4358974	2	1	Yes	0.6694112	0.08156874
## 5	0.4260	0.3898557	0.5042735	10	1	Yes	0.6694112	0.06933239
## 6	0.4500	0.3433353	0.3504274	4	1	Yes	0.6694112	0.06103656
## 7	0.4480	0.6530144	0.8717949	3	1	Yes	0.6694112	0.06124396
## 8	0.9620	0.6977751	0.4273504	7	0	Yes	0.3305888	0.09857519
## 9	0.5340	0.4511535	0.8034188	7	1	Yes	0.6694112	0.09857519
## 10	0.3980	0.4587656	0.6666667	6	1	Yes	0.6694112	0.11002344
## 11	0.7500	0.6585192	0.8717949	8	1	Yes	0.6694112	0.09509094
## 12	0.8630	0.4750319	0.4529915	0	1	Yes	0.6694112	0.07841633
## 13	0.6690	0.4150788	1.0000000	11	0	Yes	0.3305888	0.06528818
## 14	0.6330	0.4092896	0.4957265	11	1	Yes	0.6694112	0.06528818

## 15	0.7680	0.7538929	0.8034188	0	1	Yes	0.6694112	0.07841633
## 16	0.0516	0.7464839	0.9914530	9	1	Yes	0.6694112	0.06945683
## 17	0.5250	0.4407981	0.4700855	7	1	Yes	0.6694112	0.09857519
## 18	0.3680	0.7857758	0.9230769	8	1	Yes	0.6694112	0.09509094
## 19	0.6720	0.3625887	0.3589744	10	1	Yes	0.6694112	0.06933239
## 20	0.5530	0.5746967	0.6153846	0	1	Yes	0.6694112	0.07841633
## 21	0.5500	0.3714551	0.8205128	9	1	Yes	0.6694112	0.06945683
## 22	0.1780	0.6256075	0.6068376	6	1	Yes	0.6694112	0.11002344
## 23	0.7890	0.6416888	0.4444444	7	1	Yes	0.6694112	0.09857519
## 24	0.2870	0.3098144	0.8974359	5	1	Yes	0.6694112	0.09565091
## 25	0.7430	0.6005379	0.4700855	11	1	Yes	0.6694112	0.06528818
## 26	0.4010	0.4734978	0.9829060	0	1	Yes	0.6694112	0.07841633
## 27	0.6460	0.8164450	0.4444444	3	1	Yes	0.6694112	0.06124396
## 28	0.4270	0.6322945	0.9572650	1	1	Yes	0.6694112	0.11431653
## 29	0.4920	0.4802119	0.4102564	9	1	Yes	0.6694112	0.06945683
## 30	0.2030	0.3385840	0.9743590	2	1	Yes	0.6694112	0.08156874
## 31	0.6490	0.4969972	0.5641026	1	1	Yes	0.6694112	0.11431653
## 32	0.3990	0.5697062	0.5128205	6	1	Yes	0.6694112	0.11002344
## 33	0.5250	0.4428015	0.5641026	0	1	Yes	0.6694112	0.07841633
## 34	0.6360	0.4776986	0.4102564	2	1	Yes	0.6694112	0.08156874
## 35	0.3980	0.6748623	0.4529915	5	1	Yes	0.6694112	0.09565091
## 36	0.6160	0.4050121	0.4786325	8	0	Yes	0.3305888	0.09509094
## 37	0.0637	0.5863561	1.0000000	1	1	Yes	0.6694112	0.11431653
## 38	0.3250	0.7756912	0.6581197	5	1	Yes	0.6694112	0.09565091
## 39	0.5080	0.3703767	0.4188034	8	1	Yes	0.6694112	0.09509094
## 40	0.5850	0.3087134	0.4615385	7	1	Yes	0.6694112	0.09857519
## 41	0.1110	0.6293661	0.9230769	9	1	Yes	0.6694112	0.06945683
## 42	0.7090	0.6250840	0.4188034	5	0	Yes	0.3305888	0.09565091
## 43	0.6980	0.5433822	0.4529915	1	1	Yes	0.6694112	0.11431653
## 44	0.2880	0.7555173	0.5641026	1	1	Yes	0.6694112	0.11431653
## 45	0.5180	0.5724947	0.8717949	0	0	Yes	0.3305888	0.07841633
## 46	0.3310	0.3739955	0.5641026	1	1	Yes	0.6694112	0.11431653
## 47	0.5320	0.4146050	0.9829060	2	1	Yes	0.6694112	0.08156874
## 48	0.4840	0.6618943	0.7606838	7	1	Yes	0.6694112	0.09857519
## 49	0.1780	0.1617477	0.9401709	2	1	Yes	0.6694112	0.08156874
## 50	0.7400	0.4990727	0.4700855	5	1	Yes	0.6694112	0.09565091
## 51	0.6120	0.6558435	0.9487179	4	1	Yes	0.6694112	0.06103656
## 52	0.2860	0.4239407	0.9829060	7	1	Yes	0.6694112	0.09857519
## 53	0.6460	0.4528321	0.5213675	3	1	Yes	0.6694112	0.06124396
## 54	0.4360	0.5863065	0.4444444	1	1	Yes	0.6694112	0.11431653
## 55	0.1960	0.6356019	0.9401709	5	1	Yes	0.6694112	0.09565091
## 56	0.4640	0.8183356	0.5213675	11	0	Yes	0.3305888	0.06528818
## 57	0.5190	0.5660604	0.6495726	11	1	Yes	0.6694112	0.06528818
## 58	0.3480	0.3150260	0.4444444	2	1	Yes	0.6694112	0.08156874
## 59	0.4920	0.4190675	0.4444444	4	1	Yes	0.6694112	0.06103656
## 60	0.5800	0.5776567	0.9059829	0	1	Yes	0.6694112	0.07841633
## 61	0.5850	0.4303344	0.9914530	2	1	Yes	0.6694112	0.08156874
## 62	0.7820	0.4689540	0.4529915	0	1	Yes	0.6694112	0.07841633
## 63	0.4190	0.3594437	0.4444444	2	1	Yes	0.6694112	0.08156874
## 64	0.3040	0.6256255	0.9572650	9	1	Yes	0.6694112	0.06945683
## 65	0.9310	0.8598927	0.4358974	8	1	Yes	0.6694112	0.09509094
## 66	0.1760	0.4678531	0.4444444	7	0	Yes	0.3305888	0.09857519
## 67	0.7570	0.5119730	0.4871795	10	0	Yes	0.3305888	0.06933239
## 68	0.3030	0.4281640	0.9230769	9	1	Yes	0.6694112	0.06945683

## 69	0.1870	0.5687902	0.9658120	2	1	Yes	0.6694112	0.08156874
## 70	0.3250	0.4213010	0.4615385	1	1	Yes	0.6694112	0.11431653
## 71	0.4420	0.7809208	0.4786325	3	1	Yes	0.6694112	0.06124396
## 72	0.1280	0.6487594	0.9401709	8	1	Yes	0.6694112	0.09509094
## 73	0.5260	0.5556328	0.6495726	10	1	Yes	0.6694112	0.06933239
## 74	0.8820	0.3730660	0.4188034	3	1	Yes	0.6694112	0.06124396
## 75	0.7980	0.6211630	0.5128205	5	1	Yes	0.6694112	0.09565091
## 76	0.6620	0.7848012	1.0000000	6	0	Yes	0.3305888	0.11002344
## 77	0.7110	0.7102377	0.7521368	8	1	Yes	0.6694112	0.09509094
## 78	0.7520	0.3947108	0.4273504	11	1	Yes	0.6694112	0.06528818
## 79	0.3490	0.5587958	0.9572650	9	1	Yes	0.6694112	0.06945683
## 80	0.7180	0.3911327	0.6153846	1	1	Yes	0.6694112	0.11431653
## 81	0.3070	0.4059958	0.9401709	4	1	Yes	0.6694112	0.06103656
## 82	0.8280	0.4548716	0.3846154	0	1	Yes	0.6694112	0.07841633
## 83	0.7110	0.5415007	0.9572650	11	0	Yes	0.3305888	0.06528818
## 84	0.4650	0.4242520	1.0000000	0	1	Yes	0.6694112	0.07841633
## 85	0.5100	0.7009606	0.5726496	3	1	Yes	0.6694112	0.06124396
## 86	0.9250	0.5566074	0.4188034	8	0	Yes	0.3305888	0.09509094
## 87	0.3210	0.5414239	0.9572650	8	1	Yes	0.6694112	0.09509094
## 88	0.0976	0.4059236	0.9059829	5	0	Yes	0.3305888	0.09565091
## 89	0.3730	0.4288409	0.8376068	0	0	Yes	0.3305888	0.07841633
## 90	0.8810	0.7185400	0.4358974	5	1	Yes	0.6694112	0.09565091
## 91	0.8770	0.5550191	0.9059829	7	1	Yes	0.6694112	0.09857519
## 92	0.2980	0.5044377	0.5042735	5	0	Yes	0.3305888	0.09565091
## 93	0.4270	0.4414569	0.4700855	1	1	Yes	0.6694112	0.11431653
## 94	0.5560	0.5952631	0.9059829	10	1	Yes	0.6694112	0.06933239
## 95	0.2870	0.4193653	0.8034188	8	1	Yes	0.6694112	0.09509094
## 96	0.2980	0.7941008	0.9743590	3	1	Yes	0.6694112	0.06124396
## 97	0.7650	0.4909599	0.4358974	9	1	Yes	0.6694112	0.06945683
## 98	0.6160	0.3655758	0.4017094	2	1	Yes	0.6694112	0.08156874
##	similar_index							
## 1		2416						
## 2		25988						
## 3		9066						
## 4		24453						
## 5		24192						
## 6		11106						
## 7		36613						
## 8		1459						
## 9		13208						
## 10		9336						
## 11		13069						
## 12		24354						
## 13		41842						
## 14		7684						
## 15		26322						
## 16		40894						
## 17		41764						
## 18		1765						
## 19		5437						
## 20		9069						
## 21		5726						
## 22		14624						
## 23		41186						

## 24	44498
## 25	1052
## 26	18757
## 27	1109
## 28	18767
## 29	44613
## 30	47240
## 31	708
## 32	865
## 33	15052
## 34	11783
## 35	24360
## 36	1841
## 37	41869
## 38	5745
## 39	41198
## 40	5828
## 41	22941
## 42	1521
## 43	24375
## 44	12742
## 45	5650
## 46	13125
## 47	40385
## 48	2342
## 49	40909
## 50	24301
## 51	25892
## 52	12651
## 53	832
## 54	41185
## 55	46290
## 56	1985
## 57	2439
## 58	1171
## 59	9061
## 60	18312
## 61	1747
## 62	24354
## 63	1111
## 64	18704
## 65	11770
## 66	1119
## 67	24247
## 68	43111
## 69	40896
## 70	24317
## 71	978
## 72	40889
## 73	2343
## 74	1536
## 75	22622
## 76	37822
## 77	7502


```
## 78      1415
## 79      18906
## 80      33672
## 81      23499
## 82      15331
## 83      22397
## 84      19256
## 85      14901
## 86      36600
## 87      32740
## 88      46902
## 89      24830
## 90      24430
## 91      40941
## 92      24199
## 93      24289
## 94      24698
## 95      39468
## 96      11236
## 97      24431
## 98      7263
```

```
similar_song_id <- c()
similar_song_names <- c()
for (i in similar){
  similar_song_id <- c(similar_song_id,df$track_id[[i+98]])
  similar_song_names <- c(similar_song_names,df$track_name[[i+98]])
}
similar_song_names
```

```
## [1] "Kaha Jo Marne Ko Mar Gaye"
## [2] "Shri Ganeshay Namah (Kavach Stotra)"
## [3] "Mujhe Tum Nazar Se Gira To Rahe Ho"
## [4] "Payal Mori Baje"
## [5] "Jin Raaton Ki Bhor Nahin Hai"
## [6] "Aaj Jane Ki Zid Na Karo"
## [7] "Soch Ke Yaar (From \"Jigri Yaar\")"
## [8] "Duniya Ka Mandir Chhod Ke"
## [9] "Tujhse Naraz Nahin Zindagi (From \"Masoom\") - Male Vocals"
## [10] "Hamein Koi Gham Nahi Tha"
## [11] "Baoor Ho Gaye Lee Gori"
## [12] "Ruk Jao Na Jee"
## [13] "Introduction And Commentary On Morning Shlokas"
## [14] "Nigahen Milane Ko Jee Chahta Hai (From \"Dil Hi to Hai\")"
## [15] "Yello Jogappa"
## [16] "Kaar Milono Chao Birohi"
## [17] "Samgnachi Shej"
## [18] "Kisi Ki Nigaahon Se, From ''Love Marriage''"
## [19] "Hamen Chhod Piya Kis Des Gaye"
## [20] "Mohabbat Karne Wale"
## [21] "Deh Ka Pinjar Chod Ke Chal Man, From ''Ram Janma''"
## [22] "Bade Achhe Lagte Hain"
## [23] "Ham Hain Rahi Pyar Ke"
## [24] "Sunta Hai Guru Gyani - Kabir"
```

[25] "Jo Bijliyon Ki Shakh Pe"
 ## [26] "Sampoorna Sundarkand Part-2"
 ## [27] "Jab Tum Nahin To"
 ## [28] "Gajanan (Dhun)"
 ## [29] "Kopale Aaj Valobasar Jor Duet"
 ## [30] "Jo Na Mil Sakay"
 ## [31] "Megher Kole Rod Hesechhe"
 ## [32] "Aaja Piya"
 ## [33] "O Maheki Maheki Thandi Hawa"
 ## [34] "Yeh Sham Ki Tanhaiyan"
 ## [35] "Chahe Lakh Zamana Roke"
 ## [36] "Ehsan Tera Hoga Mujh Par (From \"Junglee\") - Male Vocals"
 ## [37] "108 Chants"
 ## [38] "Mujhko Tum Jo Mile, From ''Detective''"
 ## [39] "Jayen To Jayen Kahan"
 ## [40] "Tomay Dekhechhi"
 ## [41] "Ladki Pahadi - Bonus"
 ## [42] "Man Dole Mera Tan Dole With Been Music"
 ## [43] "Mud Mud Hum Ko Dekhta"
 ## [44] "Aa Bhi Ja Meri Duniya Me, From ''Daera''"
 ## [45] "Raghupati Raghav Rajaram"
 ## [46] "Oi Dure Bahu Dure"
 ## [47] "Distant Dreams"
 ## [48] "Mujhse Pehli Si Mohabbat"
 ## [49] "Rakho Rakho Re"
 ## [50] "Tu Bhi Piya Chikara Hoon"
 ## [51] "Kab Darshan Denge Ram Param Hitkari Rasta Dekhat Shabri Ki Umar Gayi Saari"
 ## [52] "Kaise Ke Kjelun Hori"
 ## [53] "Duniya Men Do Sayane"
 ## [54] "Ankhon Mein Kya Ji"
 ## [55] "Urr Jaon"
 ## [56] "Kuch Log Yahan Par Aise Hain - From \"Vardaan\""
 ## [57] "Abhi Dhoond Hi Rahi Thi (From \"Bewafa\")"
 ## [58] "Dharti Ki God Mein"
 ## [59] "Kahan Chale Ho Ji"
 ## [60] "Tum Jo Muskate The"
 ## [61] "Ye Zindagi Ke Mele, Duniyaa Men Kam Na Honge, From ''Mela''"
 ## [62] "Ruk Jao Na Jee"
 ## [63] "Bhagwan Teri Leela"
 ## [64] "Gayatri Mantra"
 ## [65] "Ho Saka Do Dilon Ka Na Mel Re"
 ## [66] "Jab Tum Nahin To"
 ## [67] "Chhoti Si Yeh Duniya"
 ## [68] "Pran Pratishthapana - Ganesh Puja, Pt. 1"
 ## [69] "Rakho Rakho Re"
 ## [70] "Preetam Daras Dikhao"
 ## [71] "Gaaner Swaralipi"
 ## [72] "Raga - Bhankar - Khayal Madhyalaya"
 ## [73] "Hamari Sanson Mein"
 ## [74] "Mohabbat Mein Meri Tarah"
 ## [75] "Pithi Choron Ne Pankh"
 ## [76] "Aj Kala Jora Pa"
 ## [77] "Ruturaj Saaj Saj Kar Aaye, From ''Shiv Kanya''"
 ## [78] "Shono Bandhu Shono"

```
## [79] "Suna Deel Mera"
## [80] "Ustad Barkat Ali Khan Ibne Maryam Hua Kare Koi"
## [81] "Roop Tera Mastana Kishore Lofi"
## [82] "Maine Dekha Ek Sapna"
## [83] "Ek Pagla Hai Meri Gali Ka"
## [84] "He Sainatha Guru"
## [85] "Aaj To Meri Hansi Udai"
## [86] "Zindagi Zinda Dile Ka Naam Hai"
## [87] "51 shakti peeth part 17"
## [88] "Mere Allah Tu Karim"
## [89] "Khola Janala Diye"
## [90] "Kuchh Kuchh Hone Laga"
## [91] "Yaadein"
## [92] "Aa Chal Ke Tujhe"
## [93] "Chhai Ghata Bijlee Kadki"
## [94] "Tum Pe Marte Hai"
## [95] "Ushirane Disali Tuzala Pandharichi Waat"
## [96] "Tum Mere Pas Raho"
## [97] "More Man Men Uthe Hai Pyar"
## [98] "Yeh Baat Kitni Sach Hai"
```

```
mean_distance <- c()
for (i in (1:dim(mat)[2])){
  mean_distance <- c(mean_distance, mean(mat[,i]))
}
```

```
mean_distances <- data.frame(mean_distance, index = seq(1,length(mean_distance)))
head(mean_distances)
```

```
##   mean_distance index
## 1      1.515477     1
## 2      1.668681     2
## 3      1.672133     3
## 4      1.579532     4
## 5      1.551907     5
## 6      1.505607     6
```

```
head(arrange(mean_distances, mean_distances$mean_distance))
```

```
##   mean_distance index
## 1      1.420876 13094
## 2      1.424737 23678
## 3      1.424737 23695
## 4      1.428321 15405
## 5      1.432181 19238
## 6      1.433078 45590
```

```
top_30 <- (arrange(mean_distances, mean_distances$mean_distance))$index[1:30]
```

```
top_30_song_id <- c()
top_30_song_names <- c()
```

```

for (i in top_30){
  top_30_song_id <- c(top_30_song_id,df$track_id[[i+98]])
  top_30_song_names <- c(top_30_song_names,df$track_name[[i+98]])
}
top_30_song_names

```

```

## [1] "Hamen Raston Ki Jaroorat"
## [2] "Mere Mehboob Qayamat Hogi, Pt. 1 (From \"Mr. X in Bombay\")"
## [3] "Mere Mehboob Qayamat Hogi, Pt. 1 (From \"Mr. X in Bombay\")"
## [4] "Hey Govinda Hey Gopala"
## [5] "Shaanti Mantra (For Inner Peace)"
## [6] "Hori In Mishra Pilu - Raga Mishra Pilu - Dadra"
## [7] "Lamha Lamha - From \"Doosri Dulhan\""
## [8] "Ganesh Atharvashirsha Recitation"
## [9] "Hori In Mishra Pilu - Raga - Mishra Pilu - Taal - Dadra"
## [10] "Ratnakar Pachchisi (From \"Ratnakar Pachchisi\")"
## [11] "Gair Banke Na Mile"
## [12] "Kyun Sharabi Sharab Pita Hai"
## [13] "Deewaron Se Milkar Rona"
## [14] "Je Hujjan Ha Kajjul"
## [15] "Gair Banke Na Mile"
## [16] "Shaanti Mantra"
## [17] "Shaanti Mantra"
## [18] "Bachna Ae Hasinon Lo Main Aa Gaya"
## [19] "Raat Banoo Main"
## [20] "Gair Banke Na Mile"
## [21] "Ranjish Hi Sahi"
## [22] "Yun Zindagi Ki Rah Mein"
## [23] "Kyun Sharaabi Sharaab Peeta Hai"
## [24] "Laya Hai Dil Pe Kitni Kharabi"
## [25] "Laya Hai Dil Pe Kitni Kharabi"
## [26] "Ek Main Aur Ek Tu (From \"Khel Khel Mein\")"
## [27] "Kiska Chehra"
## [28] "Kal Chaudhwin Ki Raat Thi"
## [29] "Kaanch Hi Baans Ke Bahangiya (From \"Chhath Mahima\")"
## [30] "Atharvashirsha Paath"

```

```

pc <- prcomp(df[,song_features_num],center = TRUE)

```

```

attributes(pc)

```

```

## $names
## [1] "sdev"      "rotation" "center"    "scale"     "x"
##
## $class
## [1] "prcomp"

```

```

print(pc)

```

```

## Standard deviations (1, ..., p=9):
## [1] 0.34502763 0.22710824 0.21601789 0.19021618 0.14062256 0.13196555 0.12622612

```

```
## [8] 0.10273330 0.04010357
##
## Rotation (n x k) = (9 x 9):
##
##          PC1          PC2          PC3          PC4
## danceability 0.24296388 -0.143804379 0.07848183 -0.288988073
## energy       0.43316303 -0.253160020 -0.01128153 0.263881019
## loudness     0.09618093 -0.008257179 0.04070756 0.041465241
## acousticness -0.64605410 -0.138520155 0.63165704 -0.075389611
## instrumentalness -0.38487703 -0.719584739 -0.57102755 -0.060134276
## liveness     -0.02564621 -0.204690857 0.18637077 0.875816846
## valence      0.41183659 -0.569373845 0.45503544 -0.251894425
## tempo        0.03527897 -0.023604750 0.02254164 0.004260041
## album_release_year 0.08402164 0.107377778 -0.15714231 0.072866409
##
##          PC5          PC6          PC7          PC8          PC9
## danceability 0.32500696 0.26782340 -0.29130961 -0.75260496 0.044507745
## energy       -0.63620279 0.10268839 0.33935183 -0.26748221 0.276611692
## loudness     -0.22172090 0.05725776 0.07456011 -0.13968956 -0.953831003
## acousticness -0.32711585 0.14388466 -0.03499956 -0.15994297 0.065098109
## instrumentalness -0.01730153 0.01091494 -0.02542934 -0.02014483 -0.053925305
## liveness     0.34696646 0.02080256 -0.17080279 -0.06493169 -0.038033211
## valence      0.11890199 -0.05590086 -0.10107381 0.45351805 -0.050387185
## tempo        -0.23410575 -0.84396171 -0.42730018 -0.21898820 0.007334561
## album_release_year -0.37924042 0.42165901 -0.75536300 0.24225548 0.022946881
```

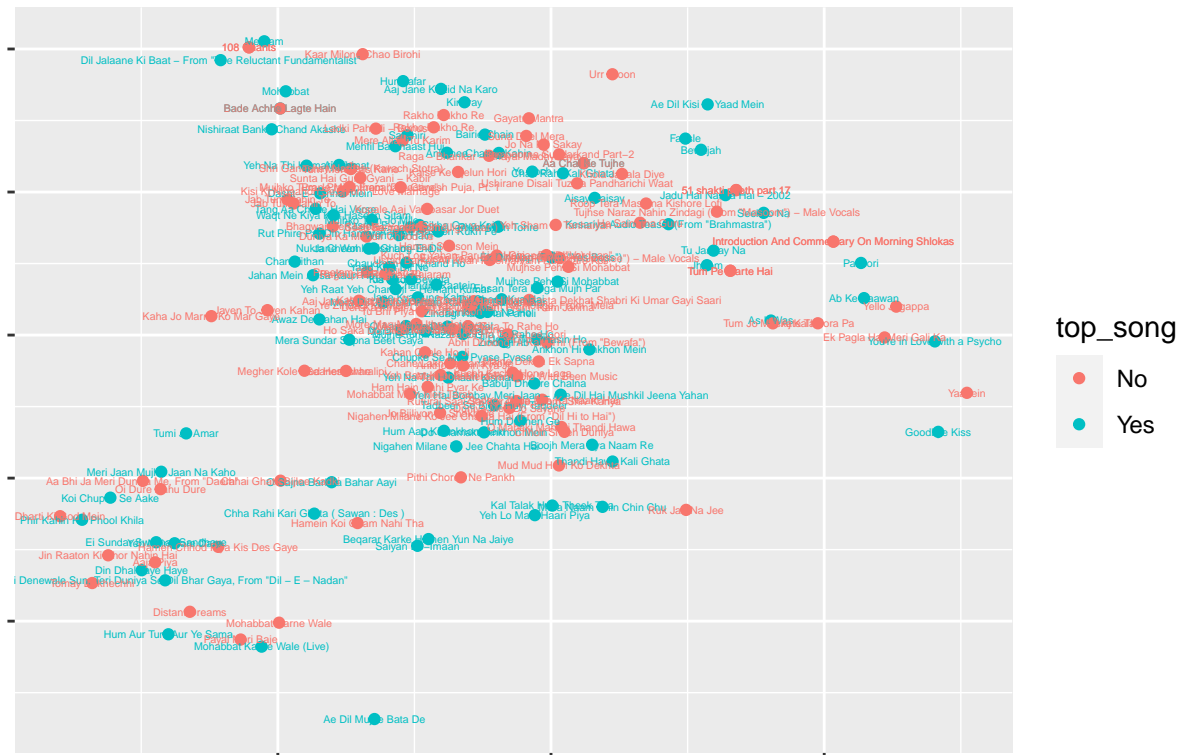
```
pca_df <- data.frame(predict(pc,df[,song_features_num]))
data_pca <- cbind(df,pca_df)
head(data_pca)
```

```
##          track_id          track_name danceability
## 1 5bozDHJ9RMQaAaYPe0ub7u Meri Jaan Mujhe Jaan Na Kaho 0.3385254
## 2 4zA2PuzWdzY4sbymDZ8wum Nukta Cheen Hai Gham-E-Dil 0.5669782
## 3 6D5YqPRZo10fpD2cy5hUz1 Mujhe Tum Nazar Se Gira To Rahe Ho 0.5327103
## 4 2YBt1Fy6ZLBCjxYjI8v2YW Ae Dil Mujhe Bata De 0.4839045
## 5 4EMqJd0w0s2a4dvImeWjve Yeh Nain Dare Dare 0.3032191
## 6 6IrL40TcJ49guEFPxiKMWu Awaz De Kahan Hai 0.5524403
##          energy loudness acousticness instrumentalness liveness valence tempo
## 1 0.2535070 0.8133040 0.9969880 6.921529e-01 0.1353535 0.339 0.8254468
## 2 0.3697395 0.8614983 0.9879518 1.217304e-02 0.1090909 0.403 0.4580932
## 3 0.3597194 0.7941958 0.9748996 9.909457e-05 0.2202020 0.741 0.5425926
## 4 0.6032064 0.8775740 0.9176707 7.535211e-01 0.1979798 0.818 0.3908529
## 5 0.3396794 0.7817559 0.9638554 7.927565e-01 0.1111111 0.426 0.3898557
## 6 0.1653307 0.8330643 0.9728916 3.631791e-05 0.8767677 0.450 0.3433353
##          album_release_year key mode top_song mode_prob key_prob PC1
## 1 0.5641026 5 1 Yes 0.6694112 0.09565091 -0.7133516
## 2 0.4188034 8 0 Yes 0.3305888 0.09509094 -0.3334535
## 3 0.8803419 8 1 Yes 0.6694112 0.09509094 -0.1614020
## 4 0.4358974 2 1 Yes 0.6694112 0.08156874 -0.3231878
## 5 0.5042735 10 1 Yes 0.6694112 0.06933239 -0.6888947
## 6 0.3504274 4 1 Yes 0.6694112 0.06103656 -0.4239872
##          PC2          PC3          PC4          PC5          PC6          PC7
## 1 -0.238872706 -0.24164908 -0.10440282 -0.059596575 -0.37661127 0.05448934
## 2 0.151011441 0.19828998 -0.14745654 0.084339972 -0.06481149 0.31332448
## 3 0.001900539 0.29551131 -0.09511499 -0.017096824 0.02583297 -0.12222420
## 4 -0.671069025 -0.07672891 -0.12618378 0.004851816 -0.02158002 0.36025001
```

```
## 5 -0.363869317 -0.29039947 -0.12568239 0.016795114 -0.04566674 0.31693432
## 6 0.027374302 0.36833220 0.45852534 0.545844302 -0.01226074 0.21172173
##          PC8          PC9
## 1 -0.09121998 -0.08507986
## 2 -0.20985665 -0.06090452
## 3 0.06972636 -0.01125087
## 4 -0.01441793 -0.08430064
## 5 0.04190734 -0.04833485
## 6 -0.15757947 -0.12527424
```

```
data_pca %>% filter(top_song == "Yes" | track_id %in% similar_song_id) %>%
  ggplot(aes(PC1,PC2,color = top_song)) + geom_point()+
  geom_text(aes(PC1,PC2,label = track_name),size = 1.5) + xlab("") + ylab("")+
  theme(axis.text.y=element_blank(),axis.text.x=element_blank(),
        plot.title = element_text(hjust = 0.5))+
  ggtitle("Individually Similar Songs")
```

Individually Similar Songs



```
data_pca %>% filter(top_song == "Yes" | track_id %in% top_30_song_id) %>%
  ggplot(aes(PC1,PC2,color = top_song)) + geom_point()+
  geom_text(aes(PC1,PC2,label = track_name),size = 1.5) + xlab("") + ylab("")+
  theme(axis.text.y=element_blank(),axis.text.x=element_blank(),
        plot.title = element_text(hjust = 0.5))+
  ggtitle("Overall Similar Songs")
```

Overall Similar Songs

