



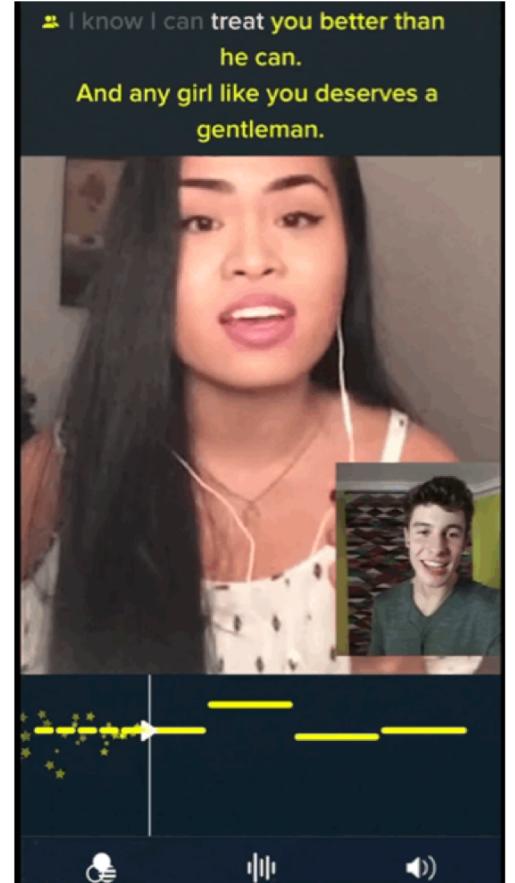
SMULEMATES: A KARAOKE SINGING STYLE RECOMMENDATION SYSTEM

CATHERINE MAGSINO

Bringing People Together!

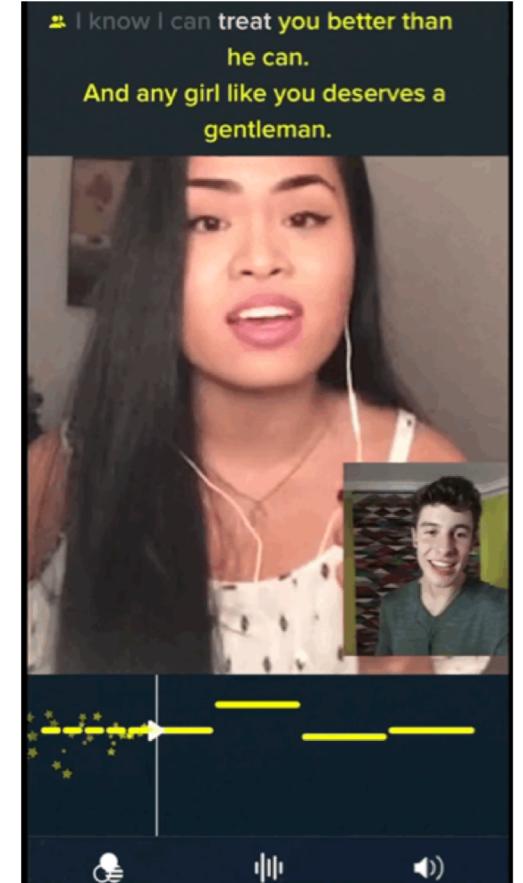


50 Million+
monthly active users



Bringing People Together!

With millions of other users,
how does a user choose who to
collaborate with?



Will You Be My Smulemate?

Objective:

Create a recommendation system for other singers with similar singing styles.

Methodology

Vocal Audio

Source	Stanford Digital Archive of Mobile Performances (DAMP) Dataset
Audio	Acapella singing
# Performances	24,874
# Songs	14
# Singers	5,429

Methodology

Vocal
Audio  MFCC

Mel-Frequency Cepstral Coefficient

Extracted 12 Features for each 5 second audio clip

12 x 216 matrix flattened to 1 x 2592



librosa

pandas

$$y_{it} = \beta' x_{it} + \mu_i + \epsilon_{it}$$

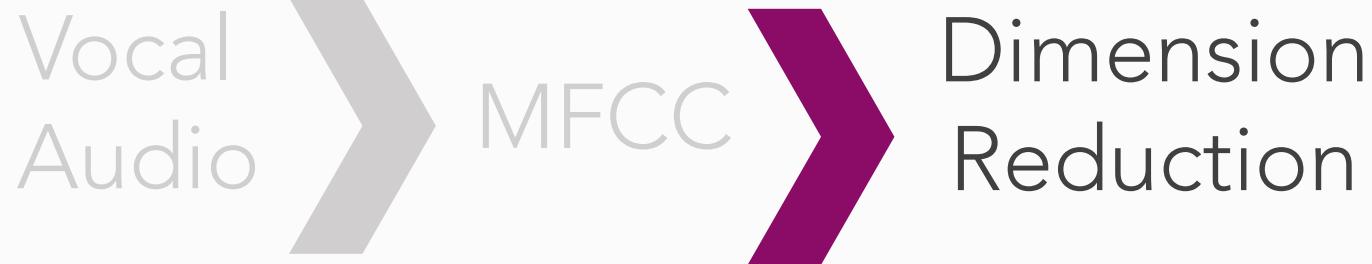


python™



NumPy

Methodology



Normalized using Standard Scaler

Principal Component Analysis
(2592 to 1000 components)



Methodology

Vocal
Audio



MFCC



Dimension
Reduction



Content-Based
Recommendation

Compare each performance against all 25K performances

Top 3 performances with highest cosine similarity

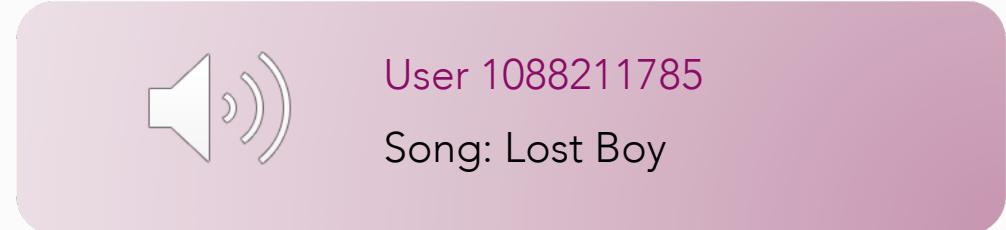
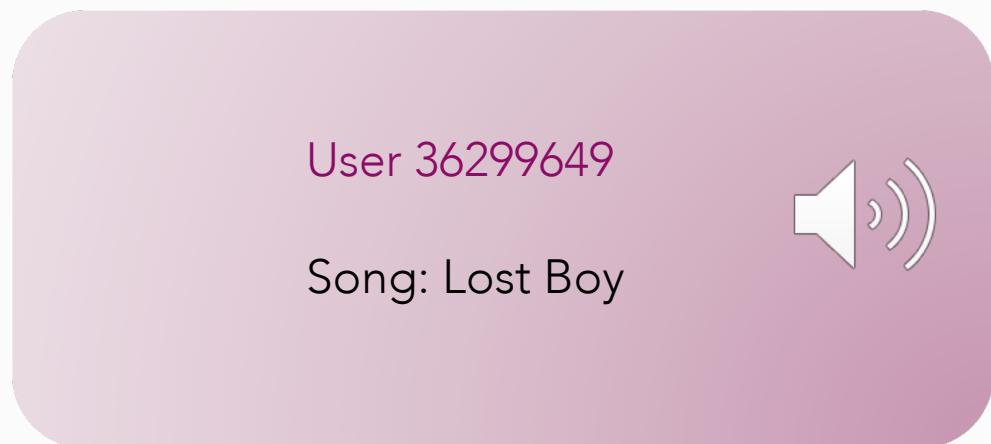


HEAPQ



Smulemate Recommendations!

Top 3 based on highest cosine similarity



Let's Give That Duet a Try!



Conclusion

With singer recommendations a user may:

- Explore singers with similar singing styles
- Choose to collaborate with the singer
- View other performances by the singer

Future Work

- Larger dataset
- Recommendation system for different singing styles

Thank You!



CATHERINE MAGSINO



catherinekay@outlook.com



/in/catherinemagsino

Appendix

Principal Component Analysis!

