

# Ubiquitous and Mobile Computing

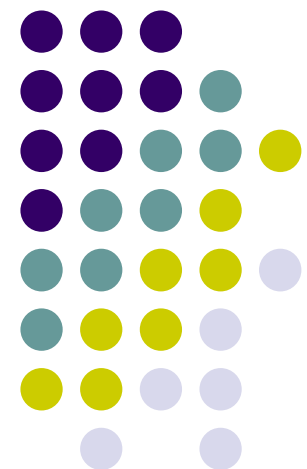
## CS 528: Find Your Voice

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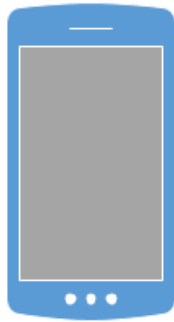
*Worcester Polytechnic Institute (WPI)*



# Introduction



Using microphone to get the voice file of user



APP

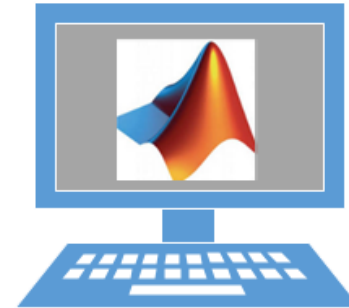
Display the results to user

Get the file from the phone, send it to server



Get the similar singer song file and return results

Calculate and get the feature value from user voice file



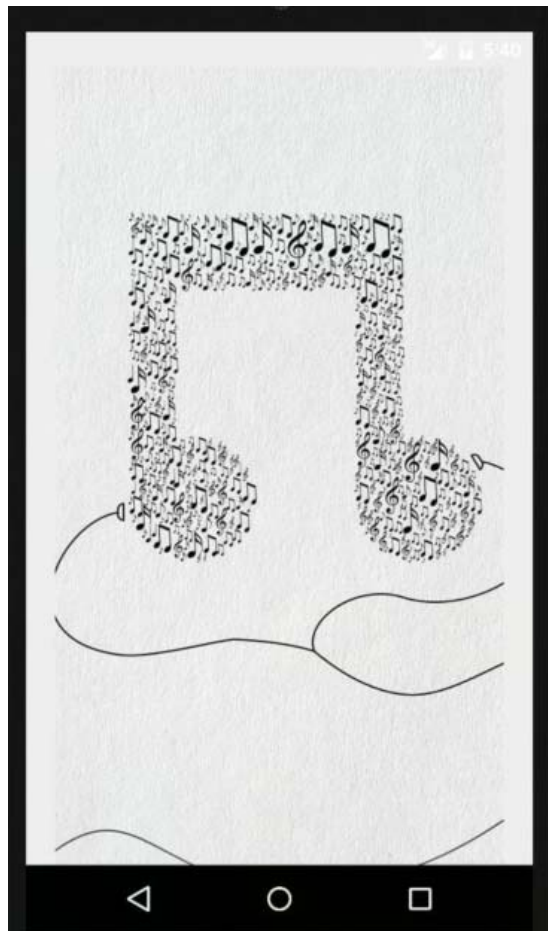
SERVER

Find the similar voice from singer database

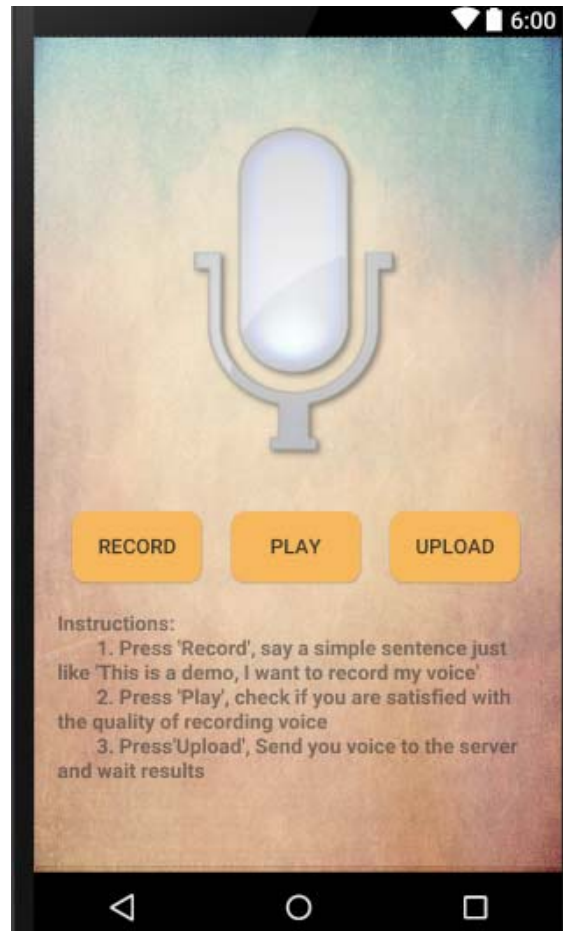
# Methodology-App part



- Layout



Splash



Record



Result

# Methodology-Server part



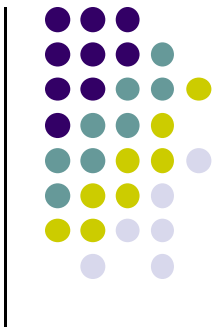
- Using Java Socket to transfer the file

**Upload:**

```
Problems @ Javadoc Declaration Console x
Servercomplete [Java Application] C:\Program Files\Java\jre1.8.0_92\bin\javaw.exe (Apr 27, 2016,
Waiting for client
Find client
Start receiving!
Server has already recieved the file, Size is 20480 KB
```

**Download:**

```
Problems @ Javadoc Declaration Console x
Client [Java Application] C:\Program Files\Java\jre1.8.0_92\bin\javaw.exe (Apr 27, 2016,
Waiting for Server
Find Server
Client start receiving!
Client recieve the file from Server, Size is 20480 KB
```

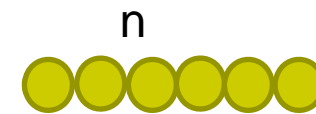
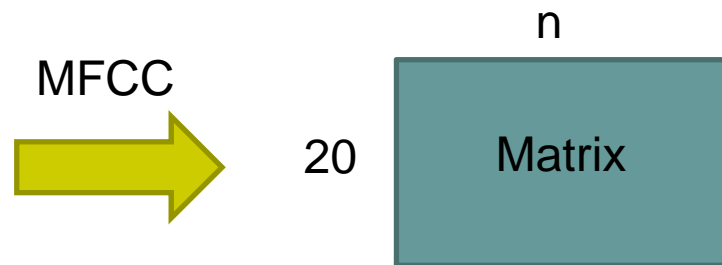


# Methodology-Matlab part

- MFCC: Mel-frequency cepstral coefficients



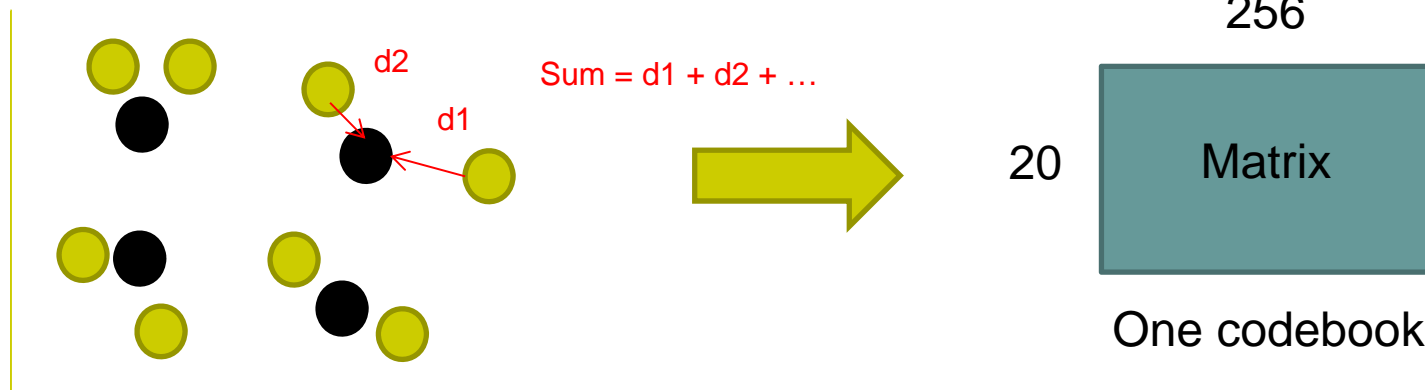
Sample from a singer



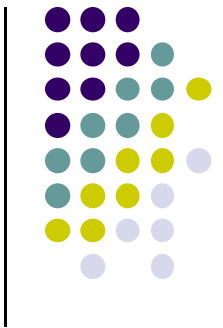
20 dimensional

- VQ: Vector Quantization (Fixed-point)

256 black points (codewords)



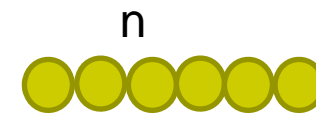
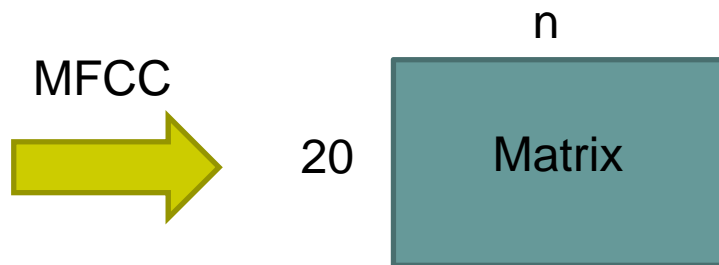
# Methodology-Matlab part



- MFCC: Mel-frequency cepstral coefficients

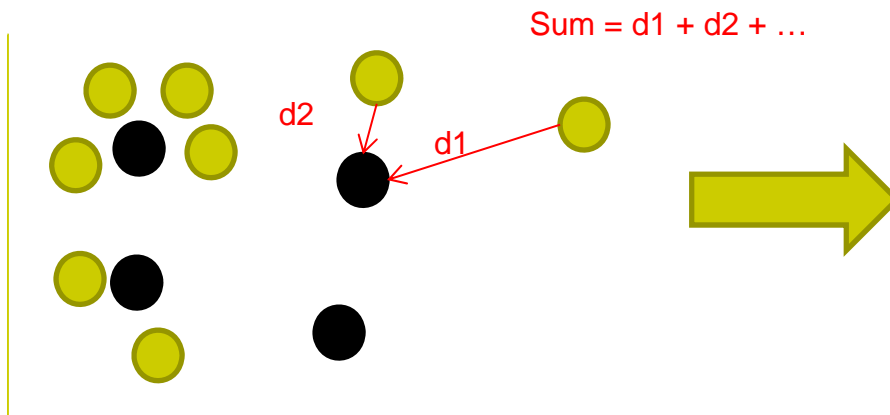


Sample from a person



20 dimensional

- Calculate the distance to each codebook



one number for one codebook



# Methodology-Matlab part

- Test – Who is talking?
- Codebooks from 5 students (This is a demo)
- Samples from same 5 students saying same sentences

	A	B	C	D	E
cbA demo	4.17E+03	5.95E+03	5.34E+03	4.98E+03	6.35E+03
cbB demo	5.94E+03	5.07E+03	5.73E+03	5.68E+03	6.27E+03
cbC demo	5.14E+03	6.36E+03	5.08E+03	5.55E+03	6.87E+03
cbD demo	5.13E+03	6.14E+03	5.97E+03	4.68E+03	6.55E+03
cbE demo	6.73E+03	6.99E+03	7.75E+03	6.39E+03	3.97E+03





- Samples from same 5 students saying different sentences

	A	B	C	D	E
cbA demo	5.66E+03	5.95E+03	7.08E+03	5.78E+03	8.92E+03
cbB demo	6.31E+03	5.46E+03	7.08E+03	6.14E+03	7.78E+03
cbC demo	5.81E+03	6.04E+03	7.08E+03	6.27E+03	9.43E+03
cbD demo	6.47E+03	6.18E+03	7.73E+03	6.16E+03	8.78E+03
cbE demo	7.05E+03	6.64E+03	7.92E+03	6.16E+03	7.26E+03



# Methodology-Matlab part

- Codebooks generated from 5 singers (part1)
- Samples from different part (part2)



	Neyo - part2	Mars - part2	Adele - part2	Taylor - part2	Beyonce - part2
Neyo - part1	9.31E+03	1.18E+04	6.74E+03	7.19E+03	1.56E+04
Mars - part1	1.24E+04	1.11E+04	9.08E+03	8.22E+03	2.05E+04
Adele - part1	1.25E+04	1.42E+04	6.84E+03	6.19E+03	1.29E+04
Taylor - part1	1.29E+04	1.45E+04	7.52E+03	5.31E+03	1.30E+04
Beyonce - part1	1.29E+04	1.54E+04	6.92E+03	6.50E+03	1.04E+04

It can detect the voice belongs to whom







# Methodology-Matlab part

- Test – Who is similar?

- Codebooks generated from 5 songs

- Samples from 4 people



	A, male, high	B, female, low	C, male, high	D, female, low
So Sick, Ne-yo	2.98E+04	4.26E+04	4.34E+04	6.98E+04
Grenade, Bruno Mars	2.62E+04	4.53E+04	3.94E+04	6.79E+04
Rolling In The Deep, Adele	3.45E+04	6.05E+04	4.74E+04	9.30E+04
Love Story, Taylor Swift	2.99E+04	5.40E+04	4.12E+04	6.28E+04
The Windmills Of Your Mind, Barbra	2.81E+04	4.66E+04	4.14E+04	5.50E+04
What Do You Mean, Justin Bieber	2.64E+04	4.19E+04	4.74E+04	6.66E+04
Numb, Linkin Park	3.29E+04	6.25E+04	4.73E+04	9.16E+04

# Challenge and Uncompleted Work



- It is very difficult to find a clean voice
- Pitch, tone, rhythm all influence the result
- We have not combined the matlab part with the server



*Thank you !!*