Acapella

Team D5

Remote Sound Recording

Application area

- Free, easy to use web app
- Allows user to collaborate with ensemble members remotely
- Takes care of latency and audio delay

Django Server with peer-to-peer socket connection

Solution approach

- Django simple web server operations
 - Storing HQ audio on the server
- Sockets listening to each other in real-time
 - For monitoring ONLY
 - Minimal latency at the expense of quality

UI Demo

users user 1 user 2 user 3 room key	my conn Syn		click generator 4 · 120 bpm 4 · test						record		sav expo	ve ort)								
click track	1		2					3	-		4			5				6			
track 1 name																					
track 2 name																					
track 2 name																					
track 4 name user 3 input																					
add new track +																					



High-Level System Diagram



Sent on project save (multipart form data upload)

Sent on project load

User to User Connection



- Every user's audio will be sent through buffer
 - Sample buffer affects latency
 - Network buffer affects quality
 - Jitter buffer regulates incoming audio
- Prioritize minimizing latency over quality
- With multiple users, adjust to the user with the slowest connectivity

Django Model Diagram



+ user_id: CharField

+ username: CharField

+ password: CharField

+ group: OneToOneField (GroupModel)

TrackModel

+ volume: FloatField

+ metadata_audio: FileField(upload_to='musics/') + start time: DecimalField(default = 120)

GroupModel

- + members: OneToManyField (UserModel)
- + groupName: CharField
- + password: CharField

+ tempo: IntegerField

+ beatsPerMeasure: IntegerField # time signature

+ beatValue: IntegerField # time signature

Latency

Metrics and Validation

- How to measure?
 - With each packet sent, also send current (UTC) time
 - With each packet received, compare to current (UTC) time
 - Difference is the latency
- What is good?
 - 100ms perceived as instantaneous (1968 study by Robert Miller)
 - SoundJack 60ms

Additional Metrics

- Monitoring Quality
 - less than 5% packet loss
 - compare packets sent to received
- Intuitive UI
 - less than 5 seconds to navigate
- Risk Factors
 - Hardware malfunctions
 - Unstable network

Gantt Chart (Feb -March)

PEOPLE

Jackson Ivy Christy TEAM

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work on project proposal																																							
set up github																																							
design review																																							
final presentation																																							
Research																																							
Research websockets and real-time communication																																							
Research timing and synchronization																																							
Research visualization tools & websockets																																							
Website function creation																																							
Group formation & registration feature																																							
Audio recording / playback											_																												
click generator																																							
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Serve static files																																							
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audio waveform visualization																																							
adjustable click track / timeline																																							
improve recording synchronicity																																							
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Gantt Chart (April -May)

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