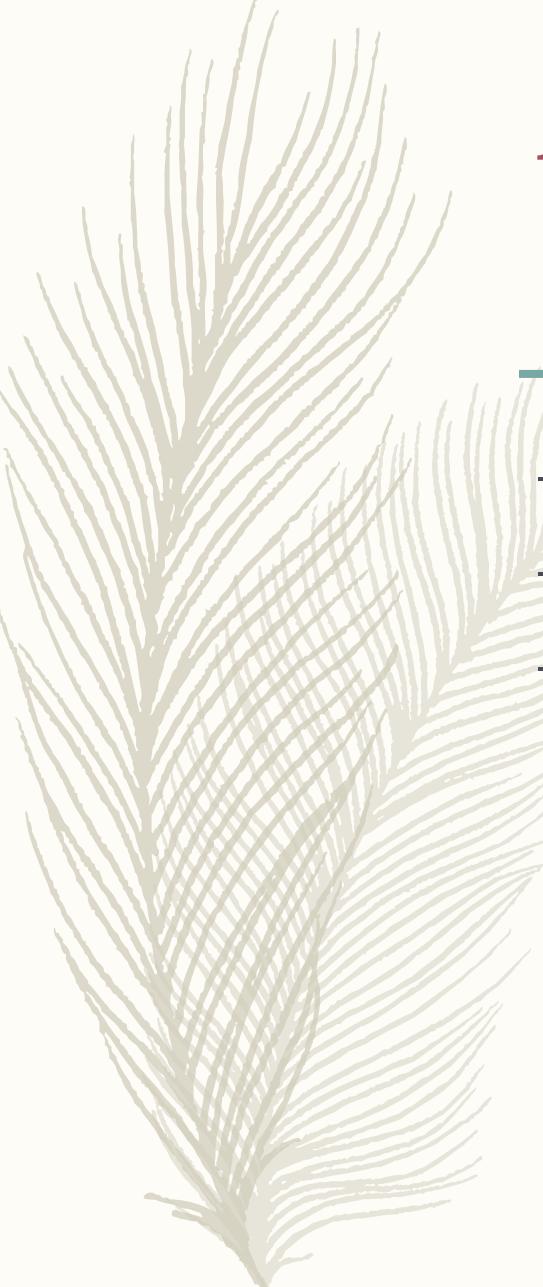


Paint With Sound

Sprint 1 presentation

Team 330 /
Jingwei Fan (jingweif)
Jing Xu (jxu2)



Application Goal & Design

- Transform sound into images.
- Light-weighted social function(Not our focus!).
- Three modes
 - Real-time image generation according to microphone input
 - More complicated & styled image generated from user-uploaded audio file
 - Image selection combining simple speech analysis



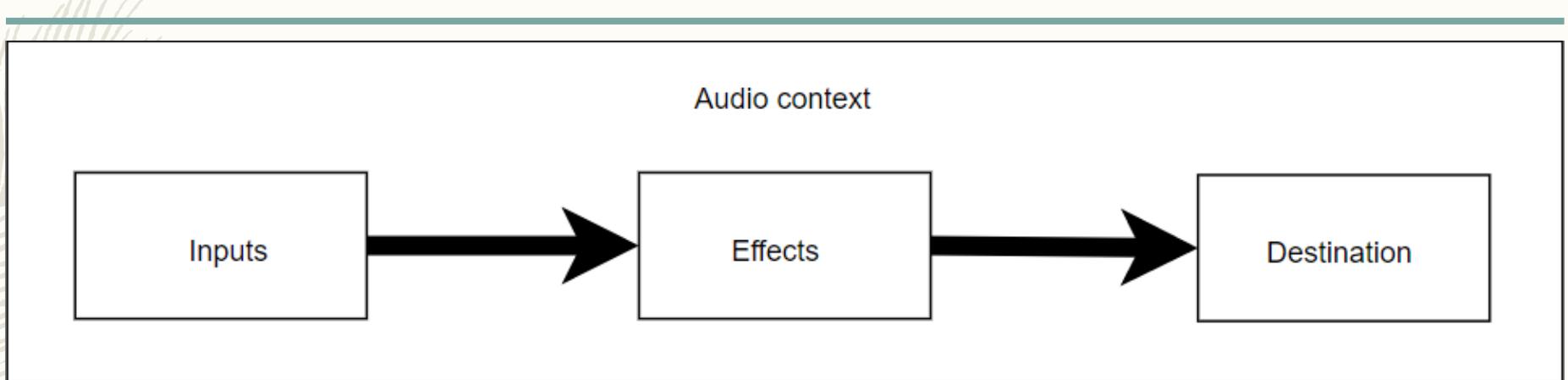
Path for Model Implementation

- Straight-forward 2-phase thinking
 - Extract data from audio input
 - Generate image using the extracted data
- Real-time feedback
 - No complicated calculation, the generated images are relatively simple
 - Focus mainly on front-end
- Utilize JS library to achieve our goal
 - Web Audio API – record microphone input and extract data
 - D3.js – Visualize data and display

Sprint 1

Product owner	jxu2				Progress			Status
Feature	Task	Cost	Member	Begin	End			
User Interface Design	UI Design	2	jxu2/jingweif	10/22	10/22	Completed		
	Implement HTML(1,2,3,4)	24	jxu2	10/23	10/27	Completed		
	Implement HTML(5,6,7,8,9,10)	24	jingweif	10/23		In progress		
	Input-Web Audio API	12	jxu2	11/1	11/5	Completed		
	Output-D3.js Drawing	36	jingweif	11/1	11/5	Completed		
Data models and backend server	Build Django server	24	jxu2/jingweif	10/27	11/5	Completed		
	Data analysis algorithm	24	jxu2/jingweif	11/3	11/5	Completed		
	Generate Output	6		11/3	11/5	Completed		

Sound to Data: Web Audio API



► Audio Routing Graph

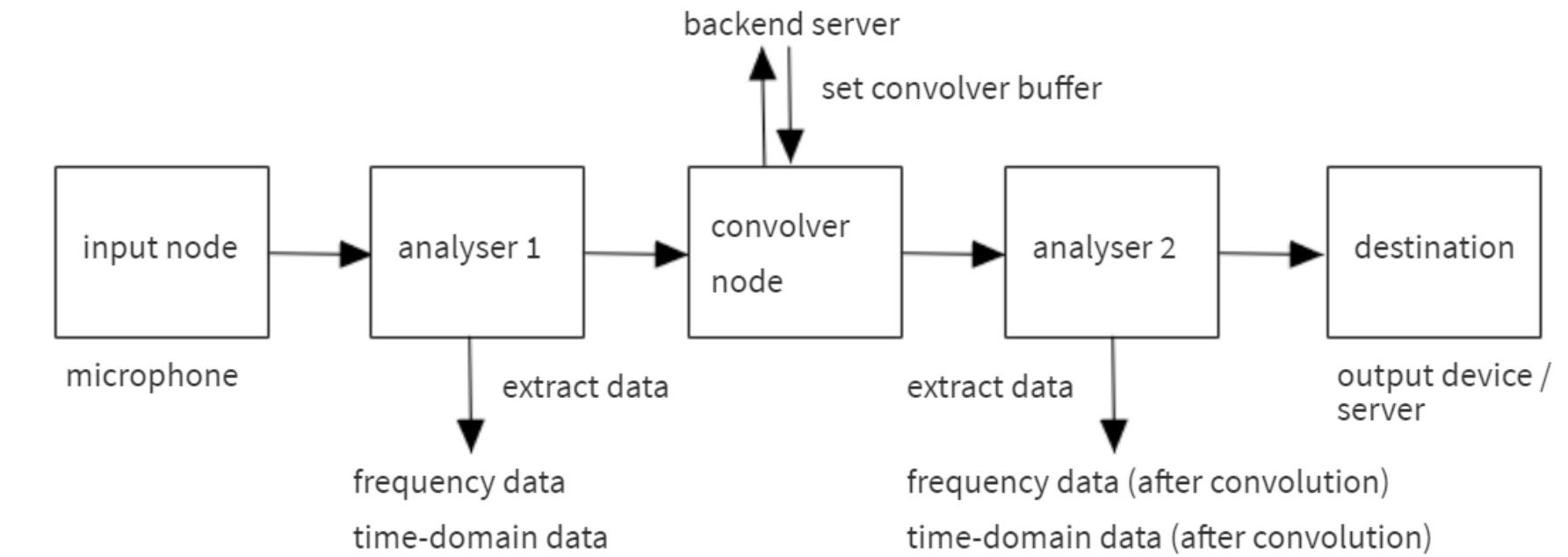
- ▶ Audio operations are handled inside an **audio context**
- ▶ Basic audio operations are performed with **audio nodes**
- ▶ Audio nodes are linked to form a audio routing graph

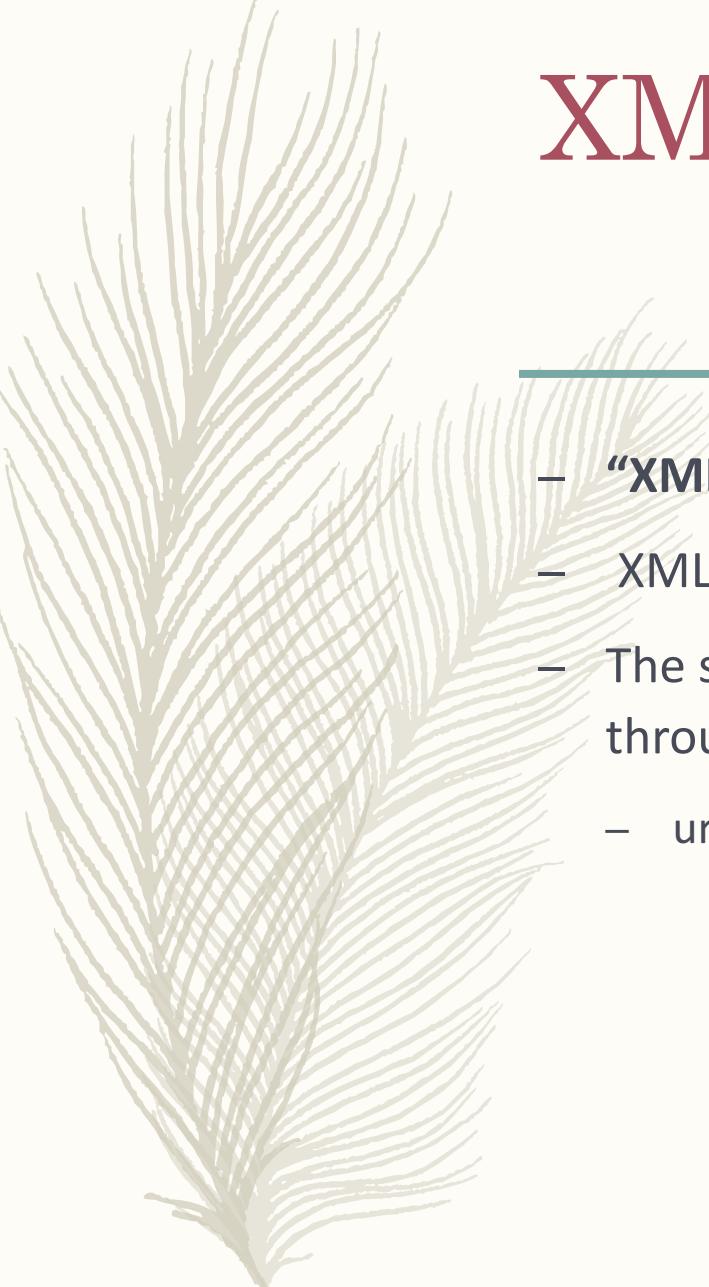


Sound to Data: Web Audio API

- Source of the ARG: audio stream input through microphone
- Destination of the ARG: currently output device (will be saved to server)
- User **analyserNode** to extract data
 - Current frequency data of the audio stream
 - Current waveform, or time-domain data, of the audio stream
- Use **convolverNode** to create more audio data
 - Conduct a convolution on the original audio stream, then grab the frequency and the waveform data of the processed audio stream.

Sound to Data: Web Audio API





XMLHttpRequest

- “**XMLHttpRequest is the core of Ajax.**”
- XMLHttpRequest can be used to retrieve any kind of data, not just XML.
- The source of the **AudioBuffer** used for convolution is retrieved from the server through an XMLHttpRequest.
 - url: /get_conv_audio/



Data to Image: D3.js

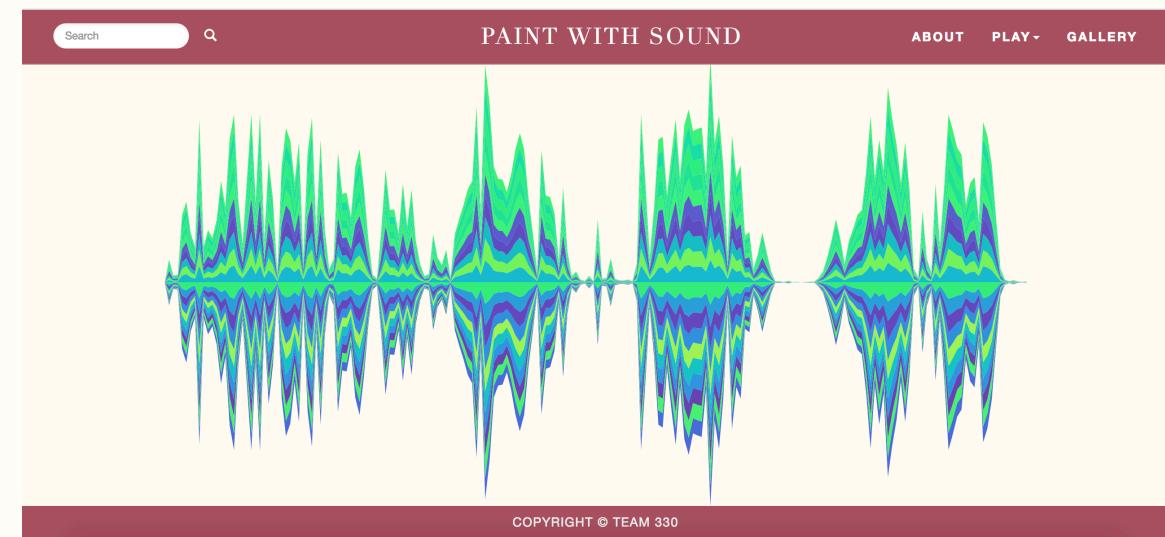
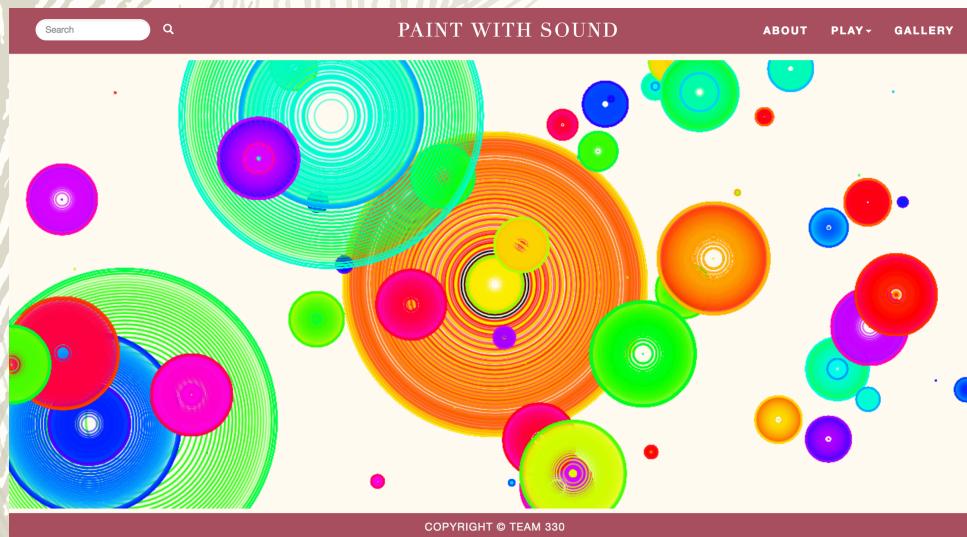
- Data Virtualization
- “D3.js is a JavaScript library for manipulating documents based on data. **D3** helps you bring data to life using HTML, SVG, and CSS. ”
- HTML5 :
 - CANVAS (2D Bitmap):
 - SVG (Scalable Vector Graphics):



Data to Image: D3.js

- Animation:
- Stack
- Streamgraph
- **D3.transition()**
- **D3.duration()**
- **D3.ease()**
- **D3.delay()**
- ...

Demo Presentation





Problem & Reflection in Sprint 1

- Work left to be done:
 - We are kind of fall behind our original schedule.
 - Add more patterns for image generating.
 - Limit the length of user input audio stream.
 - Save image and audio for user.
- For next sprint:
 - Fix the problems ASAP
 - Implement the second mode
 - Backlog can be divided more specifically