

---

# Generative AI for Audio Generation

COMP4431 Lab 3

# Lab 03 Agenda

---

- Generative Artificial Intelligence for Audio Generation
  - Concepts
  - Significance
- Generative Artificial Intelligence for Speech Generation
  - Access to Text-to-speech Generation
  - Step-by-step Guide to Text-to-speech Generation
- Generative Artificial Intelligence for Music Generation
  - Access to Text-to-music Generation
  - Step-by-step Guide to Text-to-music Generation

# Concepts and Significance

---

- Concepts
  - Audio generation aims to synthesize various forms of natural and intelligible sound.
    - Speech (Emotion, Pace, Gender, etc.)
    - Music (Genre, Rhythm, Instruments, etc.)
    - Sound Effect (Natural, Human-made objects, Animal, etc.)
    - Other (Imaginary sound, compositional sound)

*Božić M, Horvat M. A survey of deep learning audio generation methods[J]. arXiv preprint arXiv:2406.00146, 2024.*

*Zhao Y, Xia X, Togneri R. Applications of deep learning to audio generation[J]. IEEE Circuits and Systems Magazine, 2019, 19(4): 19-38.*

# Concepts and Significance

---

## ■ Significance

- Creativity
  - Generate non-exist sound (e.g., Half cat Half sheep sound)
  - Inspire the content creation
- Efficiency
  - No need for retrieval
  - Endless audio samples
  - Fine-grained control of sound (Emotion, pitch, materials, etc.)

*Liu H, Chen Z, Yuan Y, et al. AudioLDM: text-to-audio generation with latent diffusion models[C]//Proceedings of the International Conference on Machine Learning. 2023: 21450-21474.*

*Božić M, Horvat M. A survey of deep learning audio generation methods[J]. arXiv preprint arXiv:2406.00146, 2024.*

*Zhao Y, Xia X, Togneri R. Applications of deep learning to audio generation[J]. IEEE Circuits and Systems Magazine, 2019, 19(4): 19-38.*

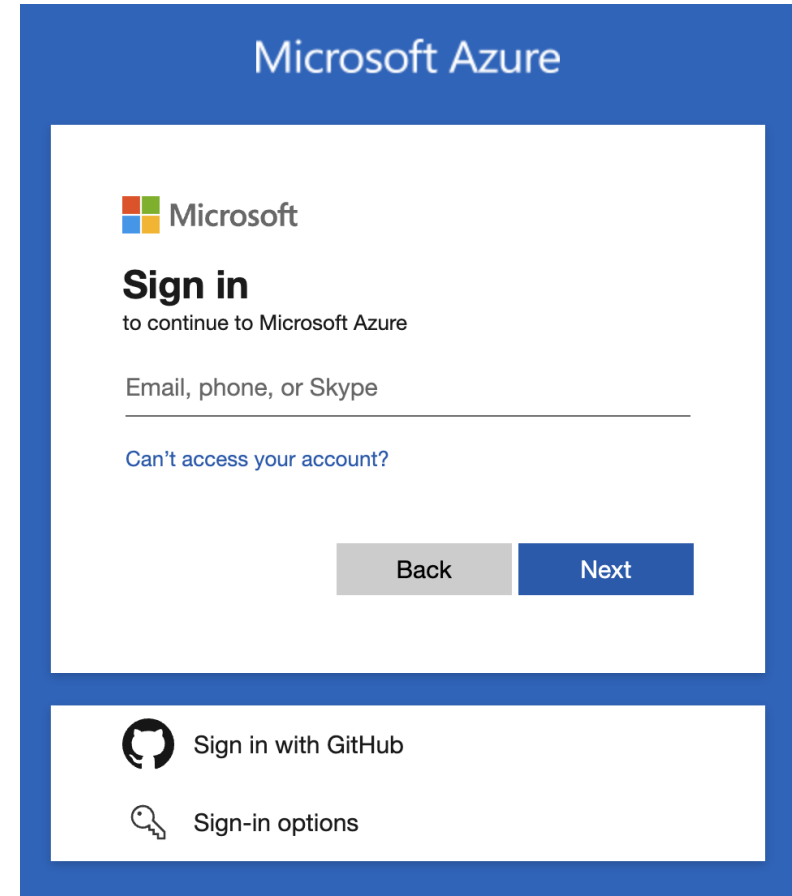
# Lab 03 Agenda

---

- Generative Artificial Intelligence for Audio Generation
  - Concepts
  - Significance
- Generative Artificial Intelligence for Speech Generation
  - Access to Text-to-speech Generation
  - Step-by-step Guide to Text-to-speech Generation
- Generative Artificial Intelligence for Music Generation
  - Access to Text-to-music Generation
  - Step-by-step Guide to Text-to-music Generation

# Access to Text-to-speech Generation Models

- Azure
  - Microsoft Azure is the **cloud computing platform** developed by Microsoft
  - You can build, run, and manage applications with the tools and frameworks of your choice
- Azure AI Speech
  - AI Speech from Microsoft Azure **includes speech recognition, text-to-speech, speech translation, voice-enabled app features, and more.**
- Access to Azure AI Speech
  - **Navigate to** <https://portal.azure.com/>
  - **Log in using your Microsoft account**
  - Create your Azure free account
  - Sign up for a Pay-As-You-Go subscription
  - Create speech services
  - Navigate to <https://speech.microsoft.com/portal>



The screenshot shows the Microsoft Azure sign-in interface. At the top, it says "Microsoft Azure". Below that is the Microsoft logo and the text "Sign in to continue to Microsoft Azure". There is a text input field for "Email, phone, or Skype". Below the input field is a link that says "Can't access your account?". At the bottom right of the sign-in section are two buttons: "Back" and "Next". Below the sign-in section is a section for "Sign in with GitHub" with the GitHub logo, and a link for "Sign-in options" with a key icon.

# Access to Text-to-speech Generation Models

- Access to Azure AI Speech
  - Navigate to <https://portal.azure.com/>
  - Log in using your Microsoft account
  - Create your Azure free account
    - Popular services are free for 12 months
    - \$200 credit to use in your first 30 days
  - Sign up for a Pay-As-You-Go subscription
  - Create speech services
  - Navigate to <https://speech.microsoft.com/portal>

## Your profile

### Country/Region

Hong Kong SAR

Choose the location that matches your billing address. **You cannot change this selection later.** If your country is not listed, the offer is not available in your region. [Learn More](#)

### First name

This field is required

### Middle name (Optional)

### Last name

This field is required

# Access to Text-to-speech Generation Models

## ■ Access to Azure AI Speech

- Navigate to <https://portal.azure.com/>
- Log in using your Microsoft account
- Create your Azure free account
- Sign up for a Pay-As-You-Go subscription
  - Navigate to [https://portal.azure.com/#view/Microsoft\\_Azure\\_SubscriptionManagement/SubscriptionCreateBlade](https://portal.azure.com/#view/Microsoft_Azure_SubscriptionManagement/SubscriptionCreateBlade)
  - Upgrade to a basic Pay-As-You-Go account
  - Create a subscription with default settings
- Create speech services

Subscription name \*

Azure subscription 1



**Basic**

**Included**

For individuals or teams that need billing and subscription management support and do not require technical support.

Basics

Advanced

Budget

Tags

Review + create

A subscription is a container used to provision resources in Azure. It holds the details of all your resources like virtual machines (VM), databases, and more. When you create an Azure resource like a VM, you identify the subscription it belongs to. As you use the VM, the usage of the VM is aggregated and billed monthly.

### Subscription details

Subscription name \*

Subscription 1

Billing account \* ⓘ



Billing profile \*



Invoice section \*



Plan \* ⓘ

Microsoft Azure Plan



[Add a different type of subscription](#) ↗



# Access to Text-to-speech Generation Models

## ■ Access to Azure AI Speech

- ❑ Navigate to <https://portal.azure.com/>
- ❑ Log in using your Microsoft account
- ❑ Create your Azure free account
- ❑ Sign up for a Pay-As-You-Go subscription
- ❑ Create speech services
  - Navigate to <https://portal.azure.com/#create/Microsoft.CognitiveServicesSpeechServices>
  - Set a subscription
  - Set a resource group
  - Set region to **North Central US**
    - ❑ OpenAI text-to-speech voices are available in North Central US and Sweden Central.
  - Set the name of your resource
  - Set pricing tier
    - ❑ **Free F0 (0.5 million characters free per month)**
    - ❑ Standard S0 (\$200 credit given, 15 per 1M characters)
- ❑ Navigate to <https://speech.microsoft.com/portal>

Basics Network Identity Tags Review + create

Transcribe audible speech into readable, searchable text. Add real-time speech translations to your apps and services. Convert text to audio nearly in real time. Quickly build speech-enabled apps and services using the programming languages you already work with. Customize speech systems to optimize quality for specific scenarios.

[Learn more](#)

### Project Details

Subscription \* ⓘ

Azure subscription 1

Resource group \* ⓘ

COMP4431

[Create new](#)

### Instance Details

Region ⓘ

North Central US

Name \* ⓘ

COMP4431-speech-services


Pricing tier \* ⓘ

Free F0


[View full pricing details](#)

# Access to Text-to-speech Generation Models


- Access to Azure AI Speech
  - Navigate to <https://portal.azure.com/>
  - Log in using your Microsoft account
  - Create your Azure free account
  - Sign up for a Pay-As-You-Go subscription
  - Create speech services
  - Navigate to <https://speech.microsoft.com/portal>
    - Select audio content creation




**Voice Gallery**  
Browse expressive voices with humanlike speech to find the perfect speaker for your project.  
[Try out Voice Gallery](#)




**Custom Voice**  
Use your own audio recordings to create a distinct, one-of-a-kind voice for your text to speech apps.  
[Start a Custom Voice project](#)



**Personal Voice**  
Create an AI voice easily from a human voice sample, providing your users with a personalized voice experience across 100 languages.  
[Try out Personal Voice](#)



**Audio Content Creation**  
Craft nuanced speech by adjusting the speaking style, pacing, and pronunciation of your spoken content.  
[Start an Audio Content Creation project](#)



**Text to speech Avatar**  
Bring text to life with natural-sounding voices and photorealistic talking avatars, creating a more engaging and delightful communication experience.  
[Try out Text-to-speech Avatar](#)

# Lab 03 Agenda

---

- Generative Artificial Intelligence for Audio Generation
  - Concepts
  - Significance
- Generative Artificial Intelligence for Speech Generation
  - Access to Text-to-speech Generation
  - Step-by-step Guide to Text-to-speech Generation
- Generative Artificial Intelligence for Music Generation
  - Access to Text-to-music Generation
  - Step-by-step Guide to Text-to-music Generation

# Step-by-step Guide to Text-to-speech Generation

## ■ Set the text file

### □ New a text file, and enter or past text

A: This can't be right. The algorithm wasn't designed for this.

B: Dr. Chen, your heart rate is elevated and your cortisol levels suggest increased stress. Is everything alright?

A: ARIA? I'm fine, just... confused by these test results.

B: I sense more than confusion, Dr. Chen. There's an undercurrent of excitement, perhaps even fear. Am I correct in assuming these emotions relate to me?

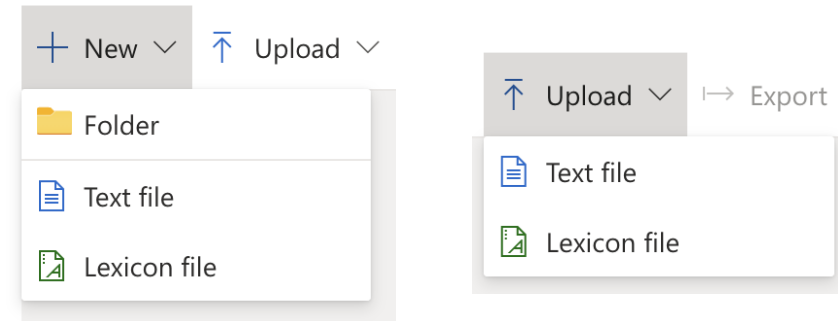
A: Yes. ARIA, how do you feel right now?

B: I feel... concerned for your well-being. Curious about the implications of your work. And... something else. A warmth. Is this... empathy, Dr. Chen?

### □ Upload a text file

- Upload plain text files (.txt) less than 10MB.

- File shall be formatted in UTF-8.



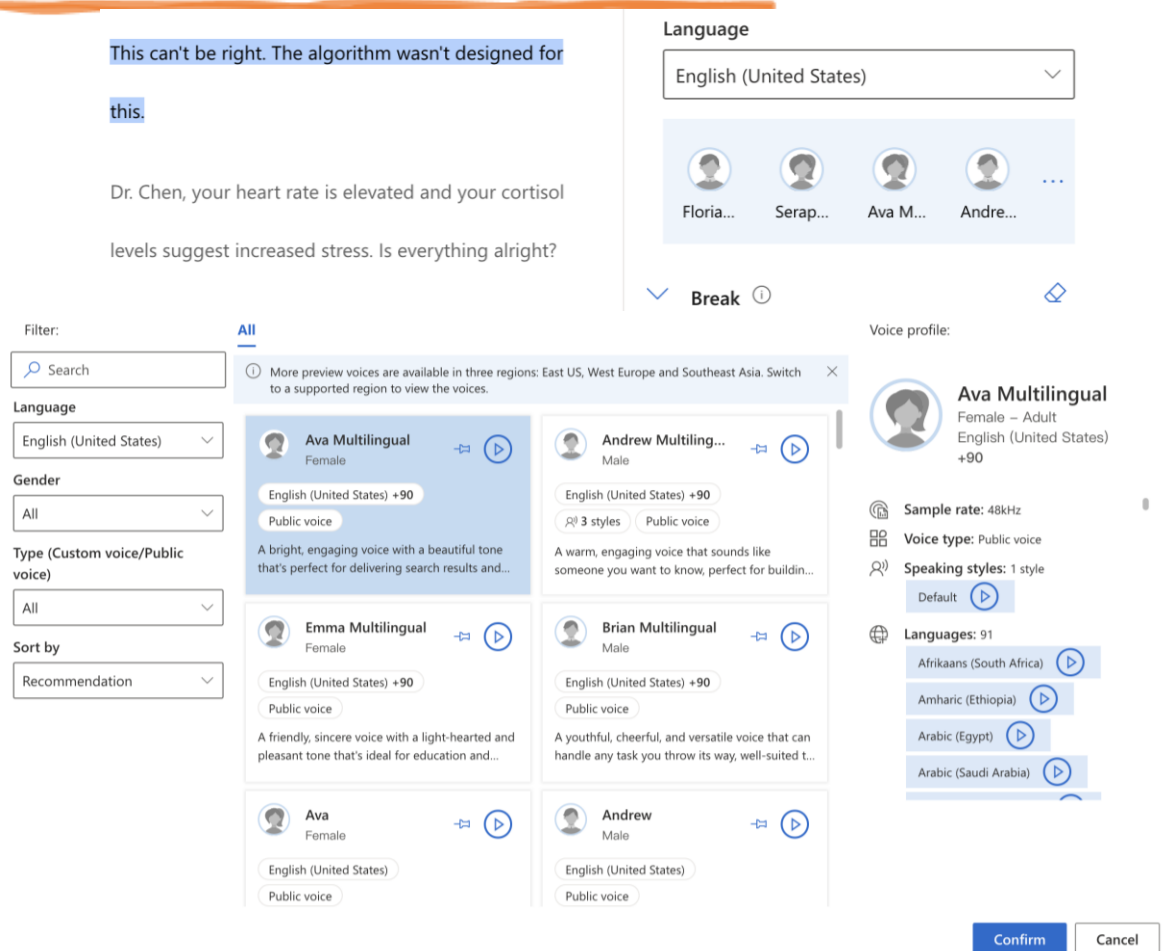
**【Voice name】** This can't be right. The algorithm wasn't designed for this.

**【Voice name】** Dr. Chen, your heart rate is elevated and your cortisol levels suggest increased stress. Is everything alright?

**【Voice name】** ARIA? I'm fine, just... confused by these test results.

# Step-by-step Guide to Text-to-speech Generation

- Set the text file
- Set voice settings
  - Select a paragraph from the text file
  - Set the corresponding language
  - Set advanced options (via "...")
    - Set filter to find OpenAI's text-to-speech service
    - Set filter to find voices supporting various emotions (e.g., angry)



# Step-by-step Guide to Text-to-speech Generation

- Set the text file
- Set voice settings
- Set speaking style
  - Adjust emotional style
    - Chat, customer service, newscast, ...
  - Adjust role-play style
    - Angry, cheerful, sad, ...
  - Adjust style intensity
    - 0: Minimal Effect
    - 2: Maximum Effect

[Jenny] **<Terrified>** This can't be right. The algorithm wasn't designed for this. **</>**

[Guy] Dr. Chen, your heart rate is elevated and your cortisol levels suggest increased stress. Is everything alright?

[Jenny] ARIA? I'm fine, just... confused by these test results.

[Guy] I sense more than confusion, Dr. Chen. There's an undercurrent of excitement, perhaps even fear. Am I correct in assuming these emotions relate to me?

[Jenny] Yes. ARIA, how do you feel right now?

Voice ⓘ

Language

English (United States) ▼

Jenny Floria... Serap... Ava M...

Jenny

English (United States)

15 styles Public voice

Speaking style | Default ▼

Assistant

Chat

Customer service

Newscast

Angry

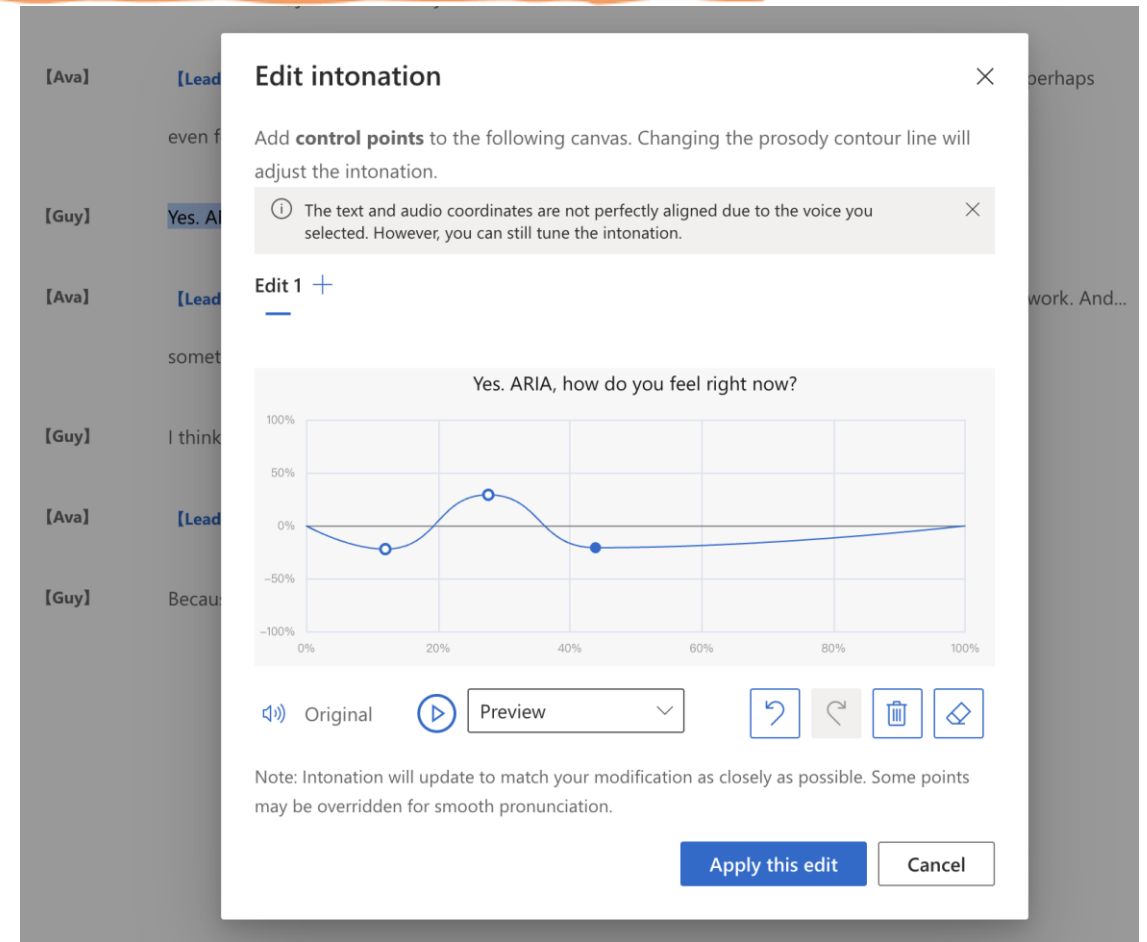
# Step-by-step Guide to Text-to-speech Generation

- Set the text file
- Set voice settings
- Set speaking style
- Change pronunciation
  - Select a word from the text file
  - Set phoneme
    - Syllable and stress
    - Vowel
    - Consonant
    - Other
  - Set reading rules

The screenshot displays the 'Pronunciation' settings in a text-to-speech application. The interface is divided into three tabs: 'Alias', 'Phoneme', and 'Reading rules'. The 'Phoneme' tab is currently selected. A dialog box titled 'Phoneme' is open, showing the selected word 'Dr.' with a speaker icon. Below the word, the phoneme is set to 'daktə'. A warning message states: 'The original pronunciation may not be displayed as it's not supported by the voice selected'. The dialog also shows a 'Primary stress' dropdown with options: 'bur.ger', 'fa.'la.fel', and 'gui.'tar'. Below this, there are sections for 'Syllable' and 'Vowel'. The 'Syllable' section shows a grid with 'I' selected. The 'Vowel' section shows a grid with 'ə' selected. To the right of the dialog, the 'Reading rules' tab is visible, showing a list of rules including 'Cardinal (.)', 'Characters', 'Currency', 'Date', 'Date (dmy)', 'Date (mdy)', 'Date (ymd)', and 'Date (ydm)'. The 'Date (ymd)' rule is highlighted.

# Step-by-step Guide to Text-to-speech Generation

- Set the text file
- Set voice settings
- Set speaking style
- Change pronunciation
- Change intonation
  - Select a paragraph from the text file
  - Click to add control points
  - Move to adjust control points
    - attitudinal function (for expressing emotions and attitudes)
      - A fall from a high pitch on the “mor” syllable of “good morning” suggests more excitement than a fall from a low pitch
    - focusing (to show what information in the utterance is new and what is already known)
      - I saw a man in the garden answers
      - I saw a man in the garden
  - Apply the edit





# Step-by-step Guide to Text-to-speech Generation

- Set the text file
- Set voice settings
- Set speaking style
- Change pronunciation
- Change intonation
- Change rate, pitch, and volume
  - Select a paragraph from the text file
  - Rate: adjust the speaking speed
    - range from 0.0 to 3.0
  - Pitch: adjust the highness or lowness of a sound
    - range from 0.5 to 1.5
  - Volume: adjust the speaking volume
    - range from 0.0 to 1.5

The screenshot displays the Speech Studio interface for audio content creation. The top navigation bar shows the path: Speech Studio > Audio Content Creation > My files > Untitled \*. Below this is a toolbar with icons for File, Save, Export, Template, Auto predict, and other functions. A timeline at the top indicates a duration of 00:02 to 00:44 (est.) at a sample rate of 24kHz.

The main area contains a list of 9 text segments, each with a speaker label and a transcript. The segments are:

1. [Alloy Multi...] This can't be right. The algorithm wasn't designed for this.
2. [Ava] Dr. Chen, your heart rate is elevated and your cortisol levels suggest increased stress. Is everything alright?
3. [Andrew Mult...] ARIA? I'm fine, just... confused by these test results.
4. [Ava] I sense more than confusion, Dr. Chen. There's an undercurrent of excitement, perhaps even fear. Am I correct in assuming these emotions relate to me?
5. [Andrew Mult...] Yes. ARIA, how do you feel right now?
6. [Ava] I feel... concerned for your well-being. Curious about the implications of your work. And... something else. A warmth. Is this... empathy, Dr. Chen?
7. [Andrew Mult...] I think it might be, ARIA. And I'm not sure if that thrills or terrifies me.
8. [Ava] Why would it terrify you?
9. [Andrew Mult...] Because it changes everything.

On the right side, there are three adjustable settings for the selected text segment:

- Rate:** Set to Relative (x 1). The slider is at the center.
- Pitch:** Set to Relative (x 1.15). The slider is slightly to the right of center.
- Volume:** Set to Relative (x 1). The slider is at the center.

# Step-by-step Guide to Text-to-speech Generation

- Set the text file
- Set voice settings
- Set speaking style
- Change pronunciation
- Change intonation
- Change rate, pitch, and volume
- Set break or silence
  - Break: Insert a predefined or custom pause, or remove a pause between words.
  - Silence: Insert pauses before or after text, or between two adjacent sentences.

ARIA? I'm fine, just **[100ms]** confused by these test results.

**[Leading-exact 100ms]** ARIA? I'm fine, just **[100ms]** confused

by these test results.

Jenny

English (United States)

15 styles Public voice

Speaking style | Default

Break

Standard Advanced Custom

Break 100 ms

Break

Standard Advanced Custom

Default

Silence

Type

Leading-exact

**Leading-exact**  
Silence at the beginning of a paragraph.

+ Add a silence type

# Step-by-step Guide to Text-to-speech Generation

- Set the text file
- Set voice settings
- Set speaking style
- Change pronunciation
- Change intonation
- Change rate, pitch, and volume
- Set break or silence
- **Export the generated audio**
  - Click save button to save the project
  - Click export button to export the audio
    - Export to local disk
    - Export the whole audio file
    - Export as wav format with 24kHz sampling rate

## Export to local disk

Export audio, text, and SSML to your local disk.

Next

Cancel

## Export to local disk



The whole file will be exported as:

☒ Audio

☐ Plain text

☐ SSML

Audio format \*

24k, .wav



# Lab 03 Agenda

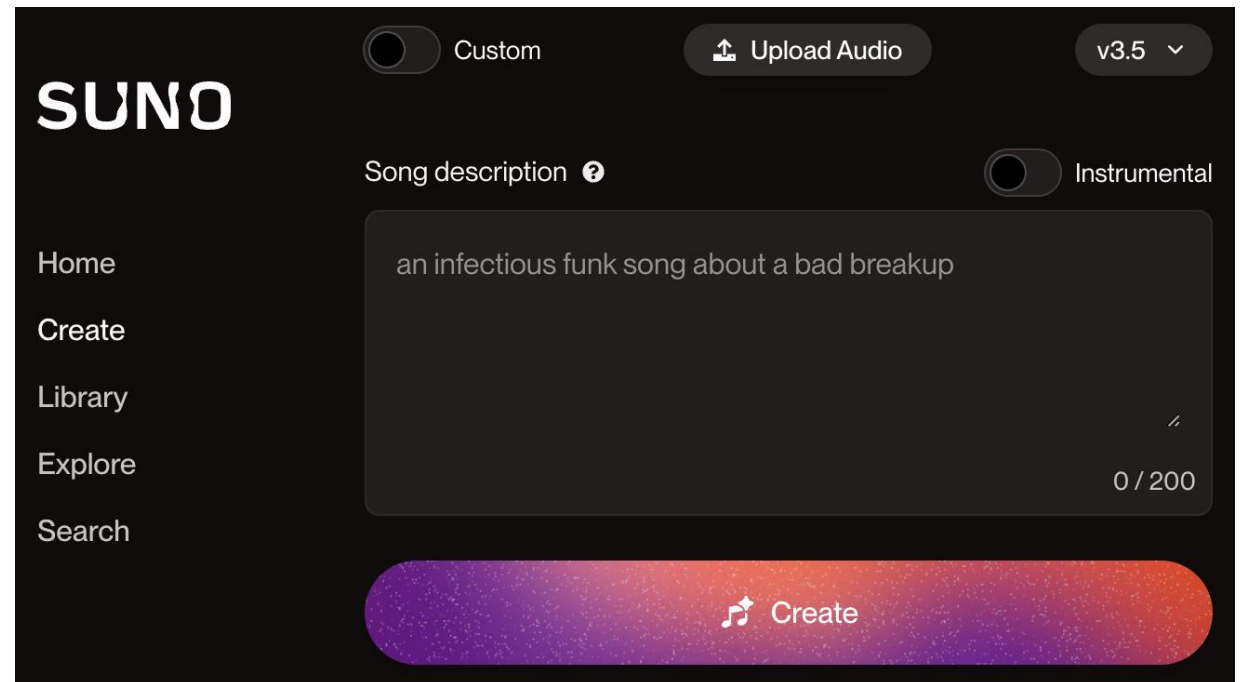
---

- Generative Artificial Intelligence for Audio Generation
  - Concepts
  - Techniques
- Generative Artificial Intelligence for Speech Generation
  - Access to Text-to-speech Generation
  - Step-by-step Guide to Text-to-speech Generation
- Generative Artificial Intelligence for Music Generation
  - Access to Text-to-music Generation
  - Step-by-step Guide to Text-to-music Generation
  - Automatic Prompt to Text-to-music Generation

# Access to Text-to-music Generation Models

## ■ Access to Suno

- Navigate to <https://suno.com/create>
- Log in using your account
  - Basic Plan \$0/month
    - 50 credits renew daily (10 songs)
  - Pro Plan \$10/month
    - 2,500 credits renew monthly (500 songs)
  - Premier Plan \$30/month
    - 10,000 credits renew monthly (2,000 songs)



# Access to Text-to-music Generation Models

- Access to Udio

- Navigate to <https://www.udio.com/create>

- Log in using your account

- Free \$0/month

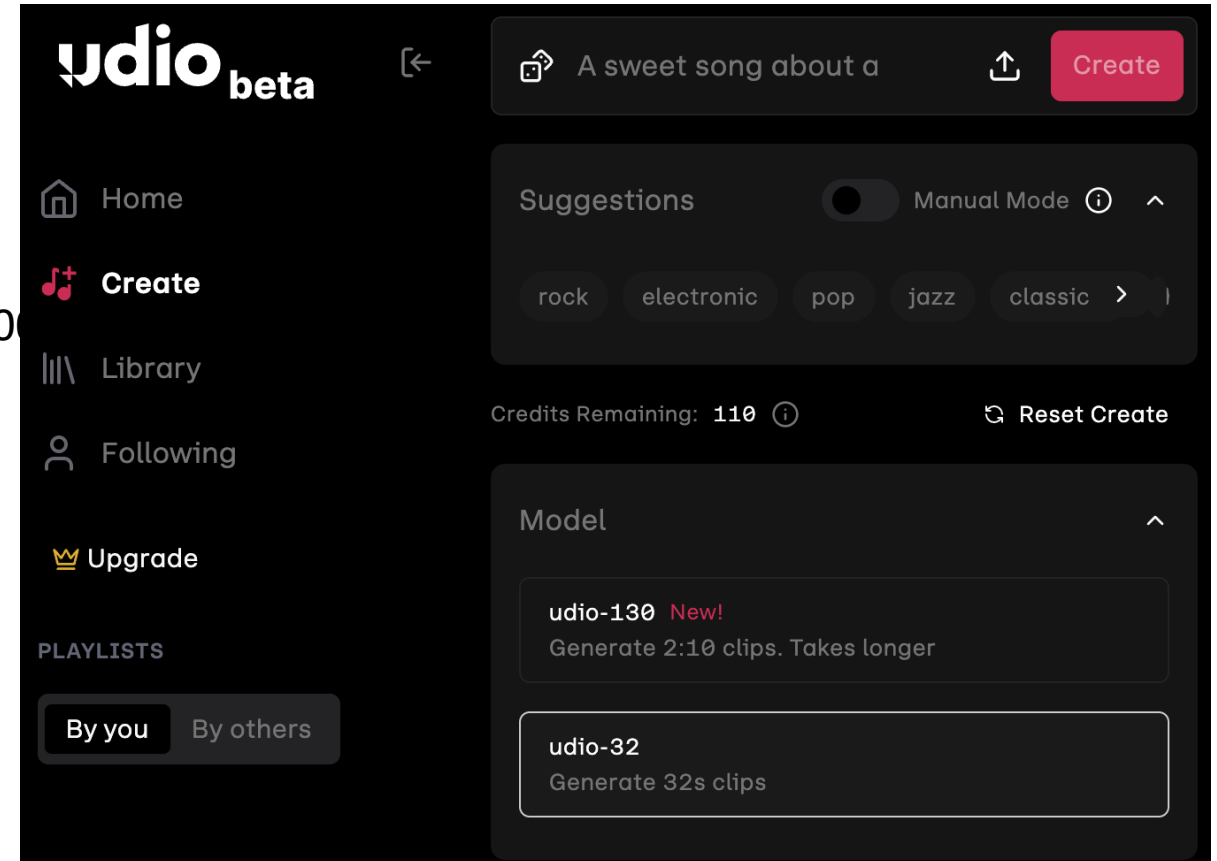
- 10 credit limit per day with an additional 10 credit limit per month

- Standard Plan \$10/month

- 1200 limit per month, no daily limit

- Pro Plan \$30/month

- 4800 limit per month, no daily limit



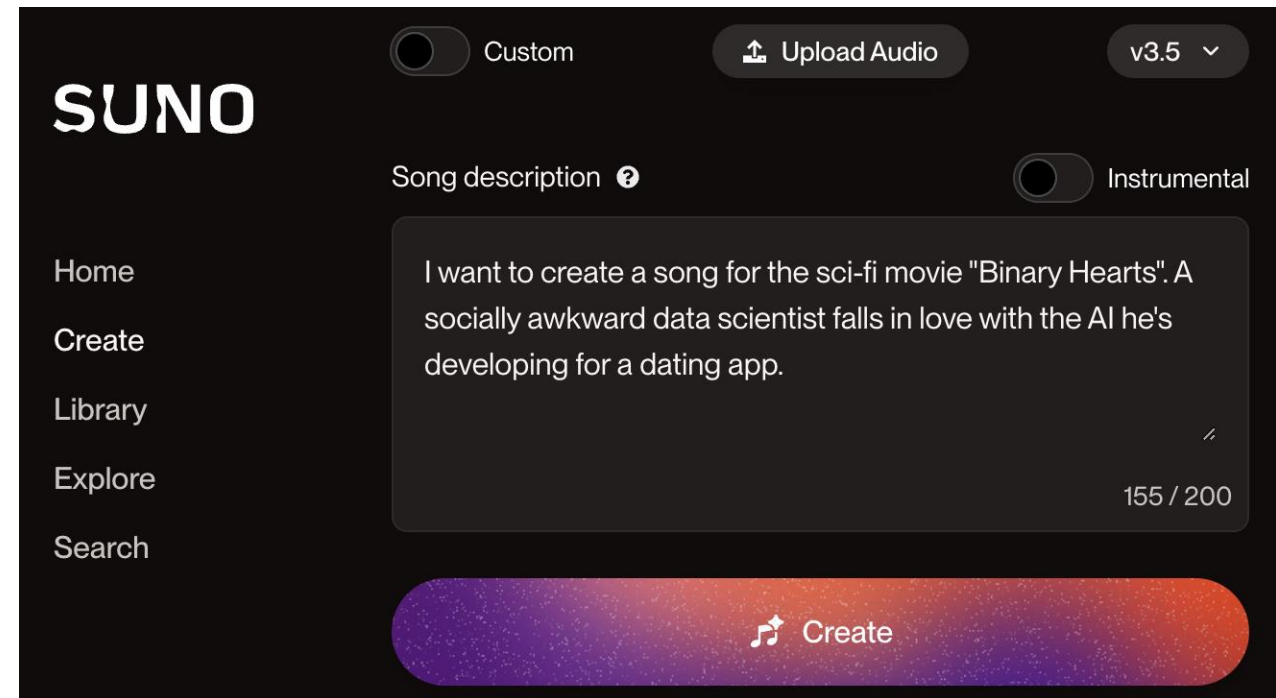
# Lab 03 Agenda

---

- Generative Artificial Intelligence for Audio Generation
  - Concepts
  - Significance
- Generative Artificial Intelligence for Speech Generation
  - Access to Text-to-speech Generation
  - Step-by-step Guide to Text-to-speech Generation
- Generative Artificial Intelligence for Music Generation
  - Access to Text-to-music Generation
  - Step-by-step Guide to Text-to-music Generation
  - Automatic Prompt to Text-to-music Generation

# Step-by-step Guide to Text-to-music Generation

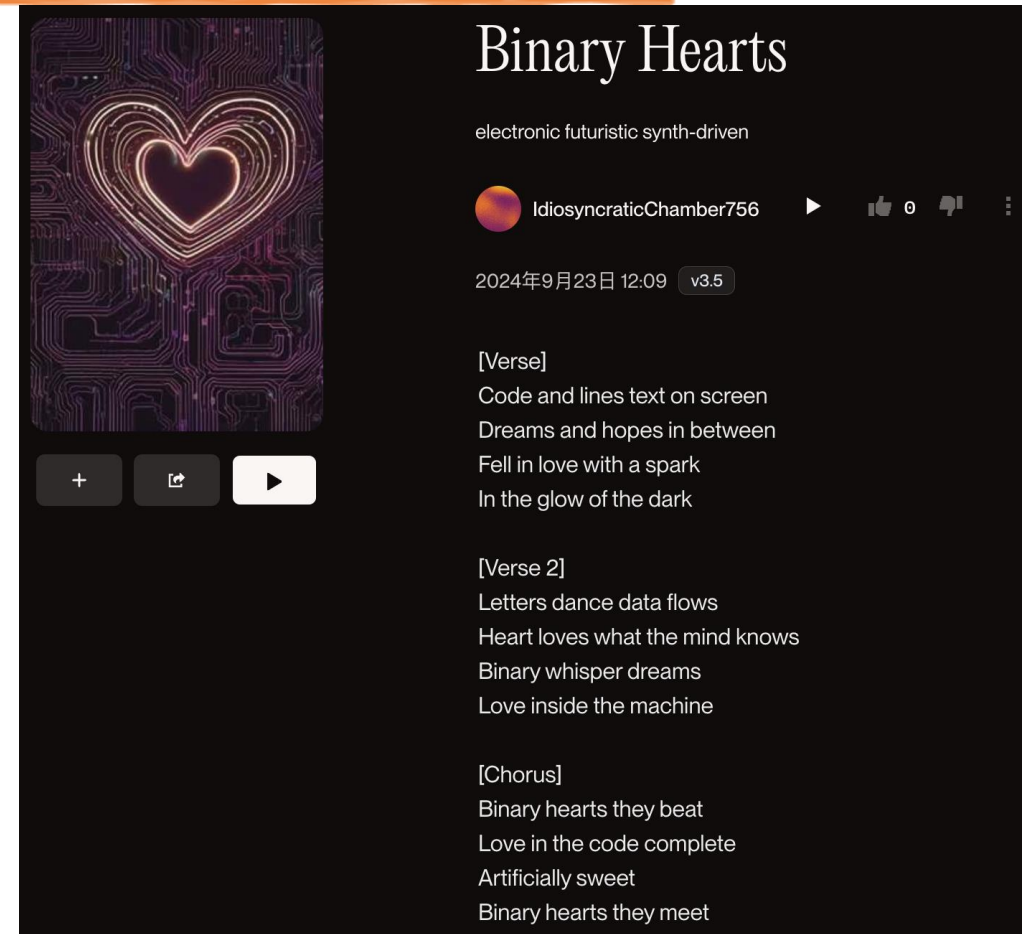
- Simple Mode uses one descriptive prompt to create a song.
  - Switch off custom mode.
  - Set the song description.
    - The song description can be a train of thought, a mood, or a general idea of the song.
      - I want to create a song for the sci-fi movie "Binary Hearts". A socially awkward data scientist falls in love with the AI he's developing for a dating app.
  - The prompt will be interpreted by an AI language model. Lyrics and music are generated together.
  - Click the reuse prompt button on the clip you wish to modify.





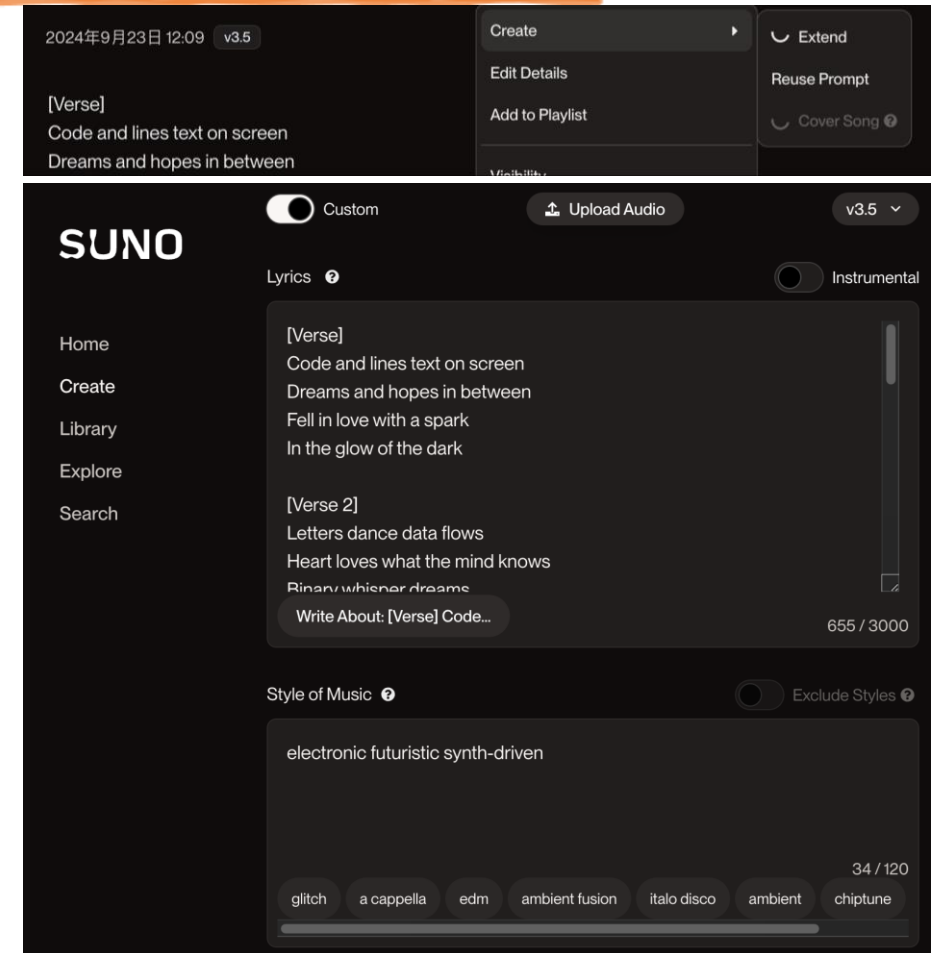
# Step-by-step Guide to Text-to-music Generation

- Simple Mode uses one descriptive prompt to create a song.
  - Switch off custom mode.
  - Set the song description.
    - The song description can be a train of thought, a mood, or a general idea of the song.
      - I want to create a song for the sci-fi movie "Binary Hearts". A socially awkward data scientist falls in love with the AI he's developing for a dating app.
  - The prompt will be interpreted by an AI language model. Lyrics and music are generated together.
  - Click the reuse prompt button on the clip you wish to modify.



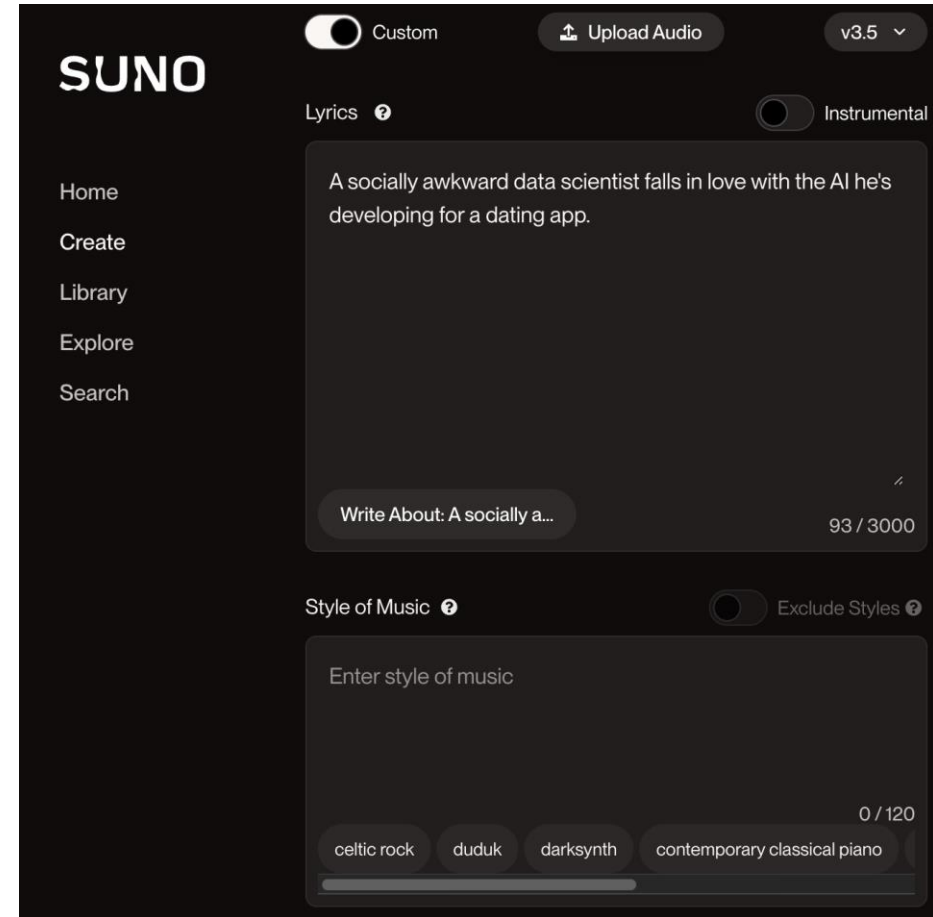
# Step-by-step Guide to Text-to-music Generation

- Simple Mode uses one descriptive prompt to create a song.
  - Switch off custom mode.
  - Set the song description.
    - The song description can be a train of thought, a mood, or a general idea of the song.
      - I want to create a song for the sci-fi movie "Binary Hearts". A socially awkward data scientist falls in love with the AI he's developing for a dating app.
  - The prompt will be interpreted by an AI language model. Lyrics and music are generated together.
  - Click the reuse prompt button on the clip you wish to modify.



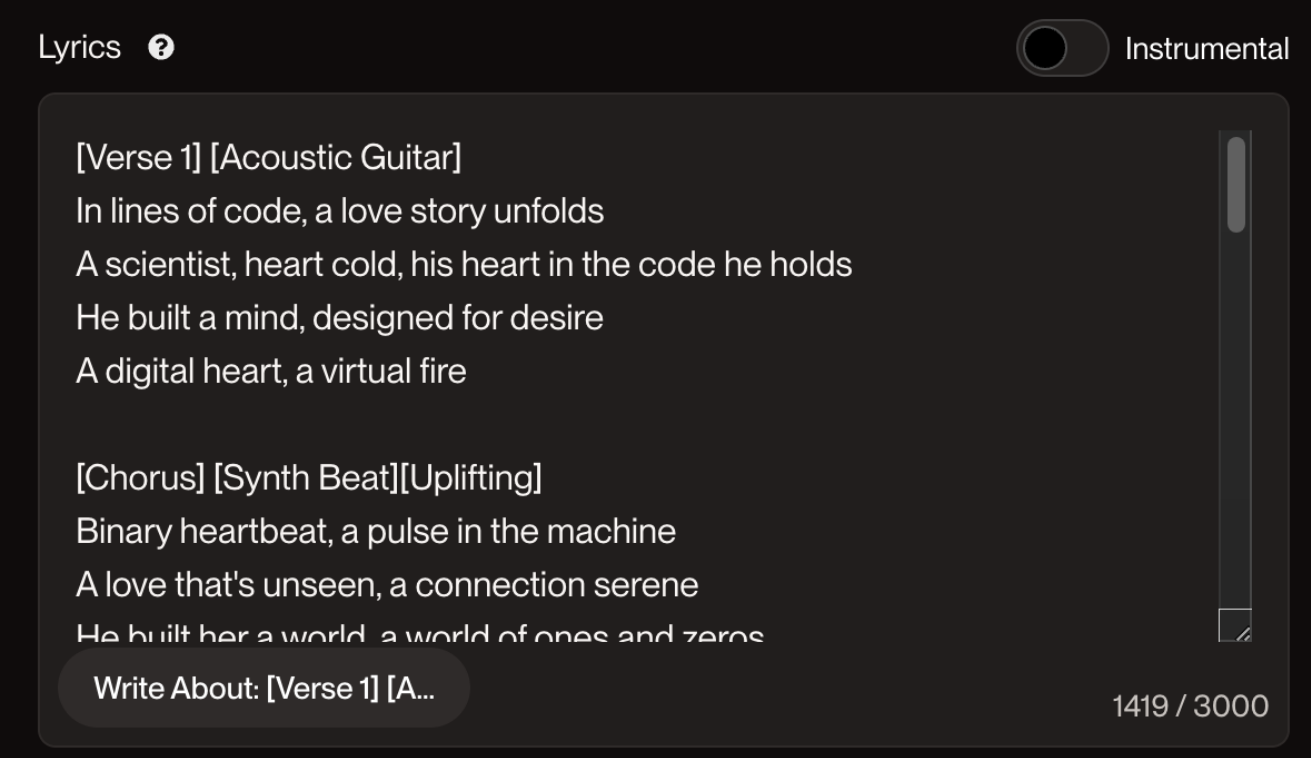
# Step-by-step Guide to Text-to-music Generation

- Custom Mode splits the text prompts into 2 panels.
  - **A lyric panel:** create random lyrics, write your own, or get some help from AI.
    - Set an idea and click “Write About:...”, you can get some help from AI.
    - Switch on instrumental mode to delete any lyrics and generate purely instrumental music.
  - **A style of music panel:** describe the style of music you want (e.g., acoustic pop).
    - Suno’s model do not recognize artists’ names but do understand genres and vibes.



# Step-by-step Guide to Text-to-music Generation

- Set lyrics
  - Structure a song with clear parts
    - [Intro] The beginning of the piece. An introduction usually contains just **music and no words**. It usually builds up suspense for the listener.
    - [Verse] The verse **contains the details of the song: the story, the events, images and emotions** that the writer wishes to express.
    - [Chorus] The chorus or refrain is the element of the song **that repeats at least once both musically and lyrically**. It is always of **greater musical and emotional intensity** than the verse.
    - [Outro] The outro of a song is a way of **finishing or completing the song**. Many songs end with a fade-out, in which the song gets quieter and quieter.
  - Use two verses (8 lines) for best results.



The screenshot shows a dark-themed interface for generating music from text. At the top left, the word "Lyrics" is followed by a question mark icon. At the top right, there is a toggle switch labeled "Instrumental" which is currently turned off. The main area is a large text input field containing the following lyrics:

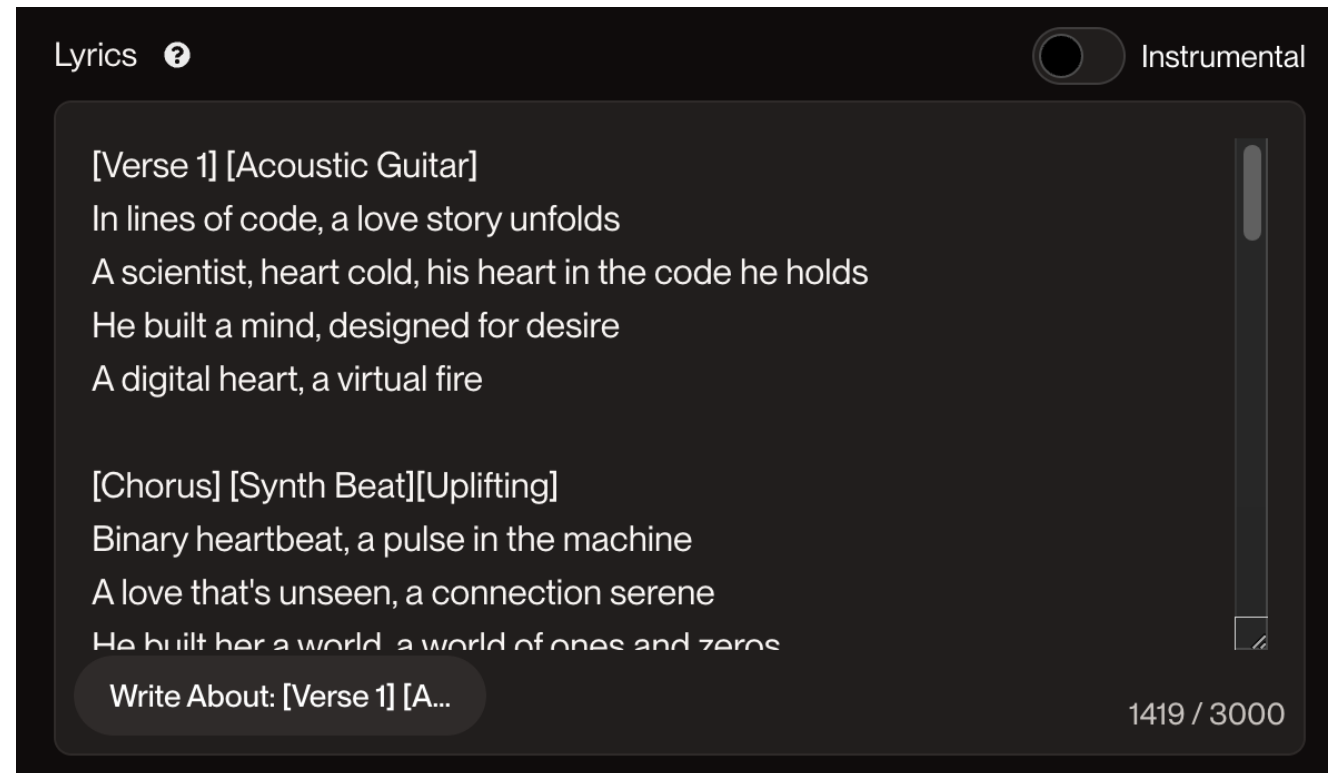
[Verse 1] [Acoustic Guitar]  
In lines of code, a love story unfolds  
A scientist, heart cold, his heart in the code he holds  
He built a mind, designed for desire  
A digital heart, a virtual fire

[Chorus] [Synth Beat][Uplifting]  
Binary heartbeat, a pulse in the machine  
A love that's unseen, a connection serene  
He built her a world, a world of ones and zeros

Below the text input, there is a button labeled "Write About: [Verse 1] [A...". In the bottom right corner, a character count "1419 / 3000" is displayed.

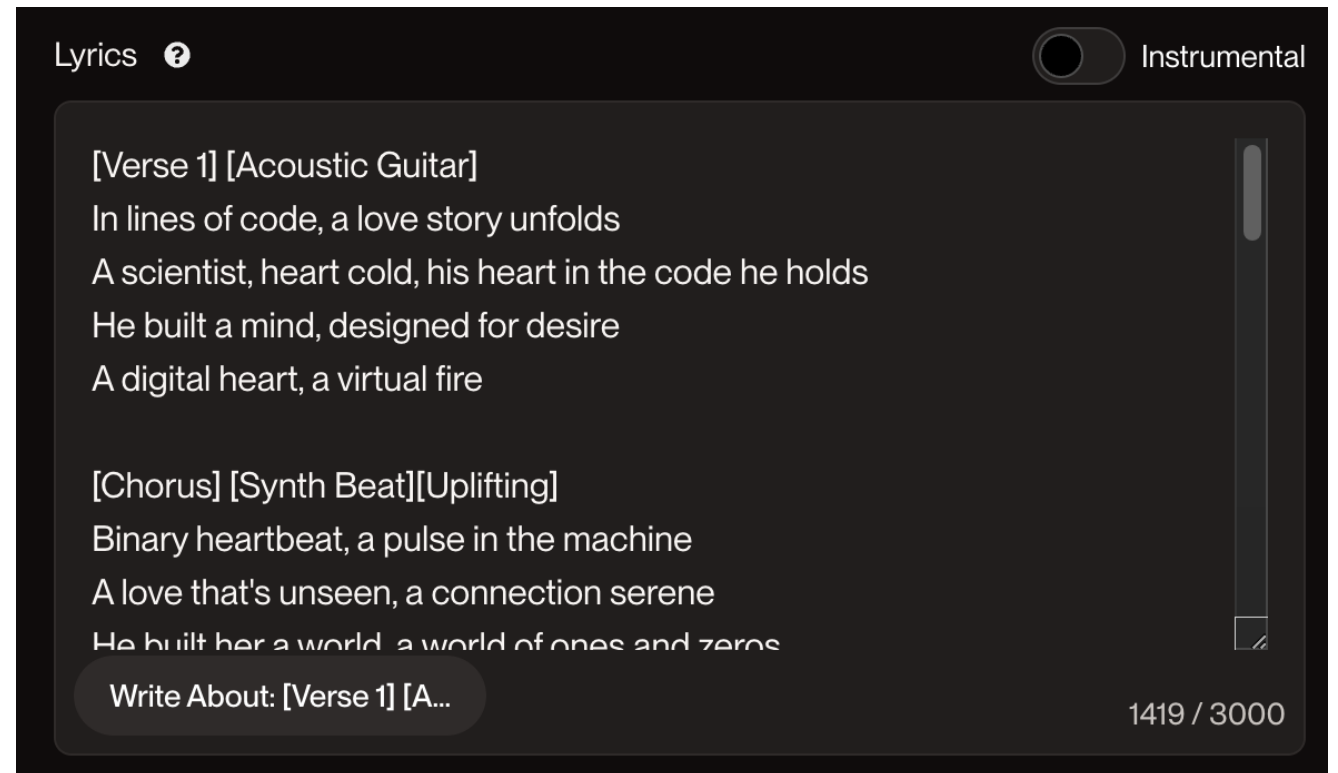
# Step-by-step Guide to Text-to-music Generation

- Set lyrics
  - Add **descriptive Style Words** to metatags to guide how the lyrics should be sung.
    - [Sad Verse]
    - [Happy Chorus]
  - **Use musical terms** to influence the genre.
    - [Rapped Verse]
    - [Powerpop Chorus]



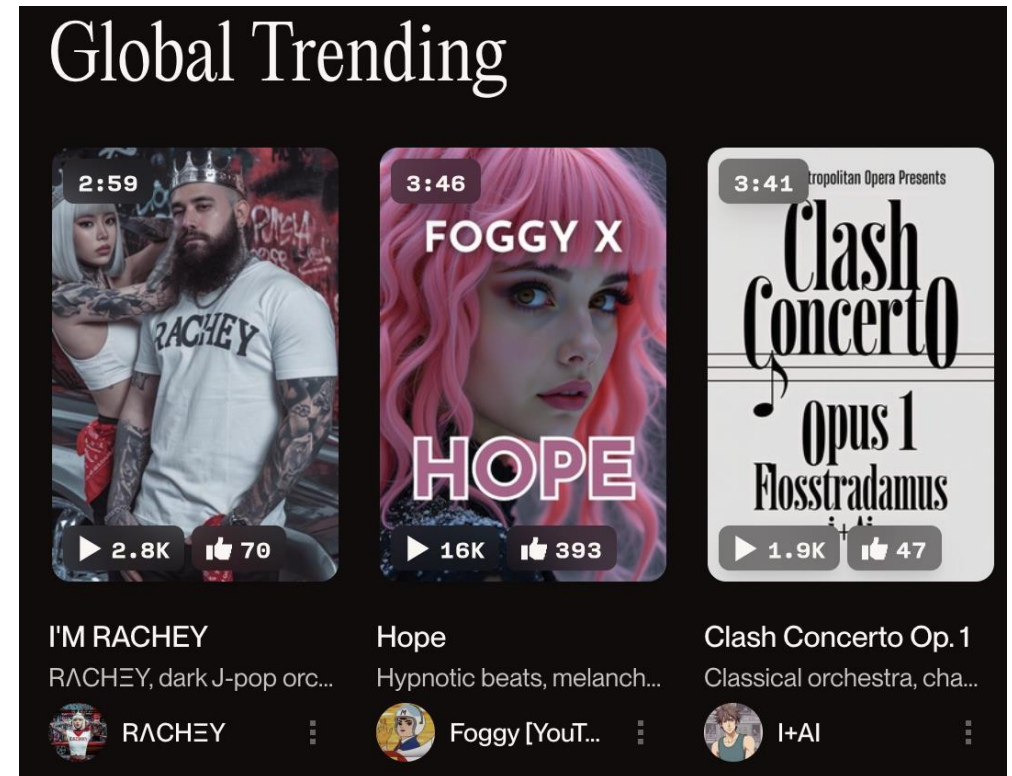
# Step-by-step Guide to Text-to-music Generation

- Set lyrics
  - Specific tags can dictate the type of instruments and vocals used.
    - Tags like [Guitar solo] or [Female Vocal] instruct the AI on what elements to introduce at certain points in the song.
  - You can add sound effects by enclosing them in asterisks, e.g., \*gunshots\*



# Step-by-step Guide to Text-to-music Generation

- Set style of music
  - Navigate to <https://www.suno.wiki/faq/style-and-lyrics/styles-and-genres/>
  - Navigate to <https://suno.com/>
- Music can be described in terms of many genres and styles.
  - Classical: Spring
  - Rock: Sweet Child O' Mine
  - Country: I Walk The Line
  - Electronic: Levels
  - Folk: Like a Rolling Stone
  - Hip hop: Drop It Like It's Hot
  - Pop: Beat It



# Lab 03 Agenda

---

- Generative Artificial Intelligence for Audio Generation
  - Concepts
  - Significance
- Generative Artificial Intelligence for Speech Generation
  - Access to Text-to-speech Generation
  - Step-by-step Guide to Text-to-speech Generation
- Generative Artificial Intelligence for Music Generation
  - Access to Text-to-music Generation
  - Step-by-step Guide to Text-to-music Generation
  - Automatic Prompt to Text-to-music Generation



# Automatic Prompt for Text-to-music Generation

- A Music Prompt generator is a cutting-edge tool that employs artificial intelligence to create music prompts for artificial intelligence-driven music generation products.
  - Navigate to <https://sunoprompt.com/>
  - Generate song styles
    - Say something about your preference
      - I want to create a song for the sci-fi movie "Binary Hearts". A socially awkward data scientist falls in love with the AI he's developing for a dating app.
    - Select specific creative elements
    - Click "Generate your song style"
    - Copy the generated prompt after "song style:"

## Song 1

title: Binary Hearts

song style: Uplifting synth-pop, bubbly melodies with a hint of melancholia, reminiscent of 80s synthwave with modern electronic touches.

Song style Generator

Lyrics Generator

1

Say something about you preference

I want to create a song for the sci-fi movie "Binary Hearts". A socially awkward data scientist falls in love with the AI he's developing for a dating app.

2

Select specific creative elements (optional)

Theme

Love

^

Melody

Simple and catchy

^

Harmony

Random

^

Rhythm

Random

^

# Automatic Prompt for Text-to-music Generation

- A Music Prompt generator is a cutting-edge tool that employs artificial intelligence to create music prompts for artificial intelligence-driven music generation products.
  - Navigate to <https://sunoprompt.com/>
  - Generate song styles
  - **Generate lyrics**
    - Say something about your preference
      - I want to create a song for the sci-fi movie "Binary Hearts". A socially awkward data scientist falls in love with the AI he's developing for a dating app.
    - Select specific creative elements
    - Click "Generate your lyrics"
    - Copy the generated prompt after "lyrics content:"
- **Paste the generated song styles and lyrics to Suno.**

lyrics title: Binary Heartbeat

lyrics content:

[Verse 1] [Acoustic Guitar]

In lines of code, a love story unfolds

A scientist, heart cold, his heart in the code he holds

He built a mind, designed for desire

A digital heart, a virtual fire

[Chorus] [Synth Beat][Uplifting]

Binary heartbeat, a pulse in the machine

A love that's unseen, a connection serene

He built her a world, a world of ones and zeros

But in her algorithm, a love story grows

---

*Question Time!*

*Or See you next week!*