

Activity: Differences Between Machine Learning Algorithms and Generative AI using Bird Calls

What is Machine Learning?

Machine learning uses algorithms trained by experts in the field and their data to automate the process of recognizing and identifying patterns for quicker sampling and data processing. This code iterates through the data after being trained on similar datasets and is able to determine the output through a set of “rules”. This is the backbone of many tools used in many fields, for example the plant identification app Seek and the Merlin Bird ID app that you will be using in this exercise.

What is Generative AI?

Generative AI or Gen AI uses a more advanced version of machine learning models called deep learning to generate content to match the prompt that it is fed. Deep learning requires many transformations to occur to the input data using neural networks to reach the final result, how it reaches the end result is not always linear.

Objective

Compare real bird calls that are captured and identified with the Merlin Bird ID app from the Cornell Lab of Ornithology to generated content using Elevenlabs to identify the differences in authenticity and accuracy.

Note: You **should not** have to put in any credit card information to complete any of this! If it asks that as an option, **skip** it!

Learning Outcomes

1. Use an audio generator to create audio
2. Understand the role machine learning has in helping nonprofits achieve conservation goals
3. Evaluate the differences between two large subsets of AI

A note on bird recording ethics: playing bird recordings can cause stress in real birds and should only be done for research or educational purposes (e.g. during a structured owl prowl event), for this reason please **do not** play the audio recordings you create loudly while outside, when listening recordings back try to use headphones or keep your phone volume low.



Figure 1: Eastern Screech Owl

Instructions

Part 1: Merlin

1. Download the Merlin app from the app store

About the Merlin Bird ID app: as part of Cornell's mission, this app is free to use forever and your data will not be shared or sold to others. See the [Cornell Lab of Ornithology Terms of Use](#) for more information. Cornell Bird Lab will only use that email to send emails that you are free to unsubscribe from at any point. However, if you are worried, the app allows a 5-day trial period (that I have apparently been on for years so unsure they ever boot you) before requiring your email address.

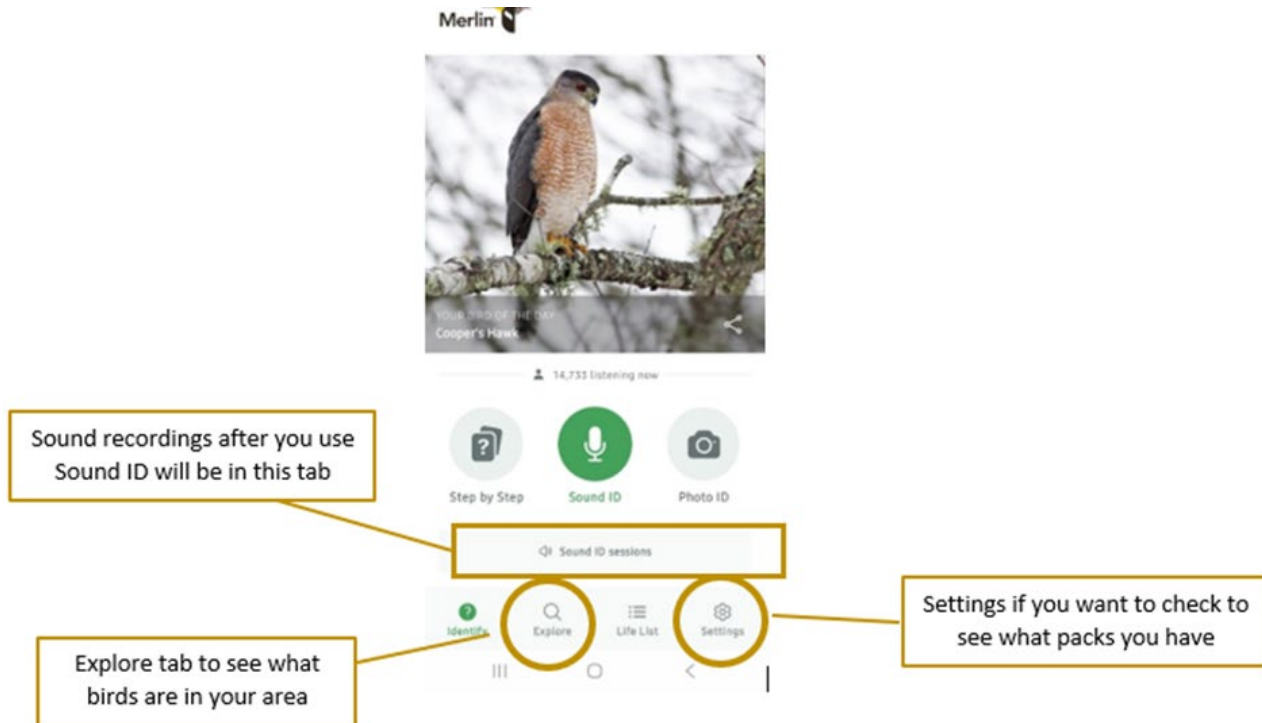


Figure 2: Merlin app home screen with "Sound ID" recording button, "Sound ID sessions" button to access previous recordings, and toolbar with "Explore" tab to see a list of birds in your area and "Settings" tab to adjust downloaded sound packs.

2. Open the app and install the correct bird pack for your area, it should prompt you to do this—if you are unsure (or if its migration season!) you can download the entirety of the United States but this will make the app take up more space. Make sure location is on and available for the app to give you the most accurate information.

If you are not prompted or if you already have the app but don't know what packs you have installed, you can check by tapping the Settings tab at the bottom, under "My offline birds" (see Figure 2). This will show you which packs you have downloaded, and you can tap "Add Region" to add the correct pack.

3. Use the "Explore" tab to look at which birds are likely to be heard near you today.

Stop. Answer Question 1.

4. Go outside to an area that is relatively quiet (ex. park, backyard, outside on campus).
5. In the Merlin app, press the Sound (or sound ID) button (see Figure 2), stand/sit and listen quietly (don't try to do this while walking, the noise distortion is high) and wait for Merlin to detect at least two birds. This should take a couple seconds.
6. Choose a study species from what you heard. Examples include: Gray catbird, Red-winged blackbird, Tufted titmouse, etc. This is what you will use for the next part of the lab.

Stop. Answer Questions 2-3

7. Check to make sure that your species was actually observed. To do this, go to the species profile of the species you selected. In the 'Sounds' section of the profile, play a few recordings to get an idea of what your species sounds like. Go back to your own recording and select the magnifying glass icon next to the species you chose, this should take you to a point in the recording that the algorithm identified as being your bird.

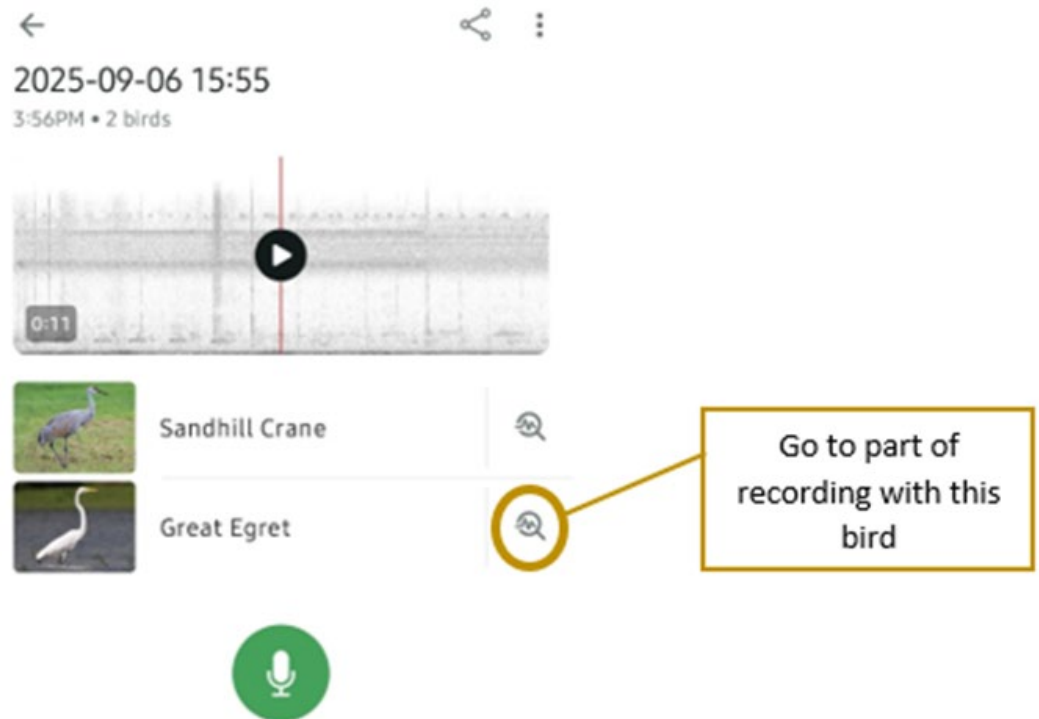


Figure 3: Merlin Sound ID recording screen. Below an audio visualization are two identified species. The magnifying glass icon next to each species directs to the part of the recording where the species was identified.

8. Does it sound like your bird? If not, you may need to try again or select a different species. If it does, congrats! Time to save the recording.

Stop. Answer Question 4.

9. To save the audio recording of your species, click on the "Share" icon at the top of the screen. Email yourself the .wav file that Merlin has created for you.

Part 2: Elevenlabs

1. Go to the [Elevenlabs website \(https://elevenlabs.io/\)](https://elevenlabs.io/)

Important information about Elevenlabs: your information such as full name and profile picture from a third-party login (Google, Microsoft etc.) can be collected by Elevenlabs to be used to train their models and may be distributed to third parties and vendors. For more information, see the [Elevenlabs Privacy Policy \(https://elevenlabs.io/privacy-policy\)](https://elevenlabs.io/privacy-policy). For this reason, using a throw away email through a service like [Temp Mail \(https://temp-mail.org/en/\)](https://temp-mail.org/en/) may be preferable to protect your digital privacy. If you choose to use a Temp Mail address for the signup, the verification email will be sent to your temporary email address. To further protect your privacy, you can use a different name and birthdate during the sign up process as well.

2. After creating your account, select the **ElevenCreative Platform**. We will be using the **free** version for this activity. **Skip when it asks you to pay**. Payment is **not necessary** for this activity.
3. To create your sound, select “Sound Effects” under the Playground section of the menu (see Figure 4).

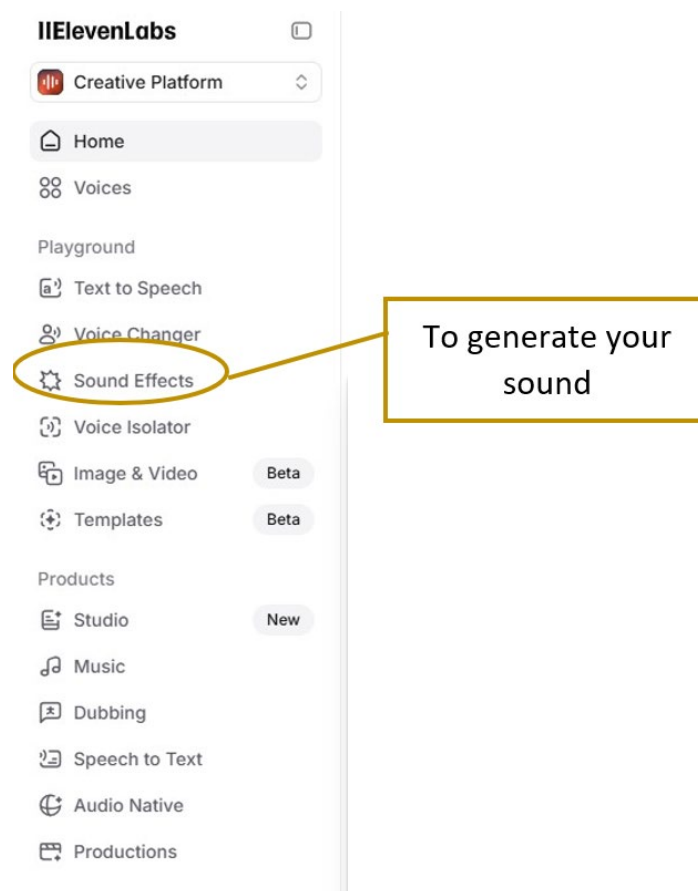


Figure 4: The ElevenLabs menu. To generate a sound, select "Sound Effects" in the Playground section of the menu.

4. Use the blank text box to describe your bird call (eg. “American Robin calling in a forest setting”). The settings allow you to select for looping audio, adjust the audio duration, and adjust how much the prompt influences the output (See Figure 5).

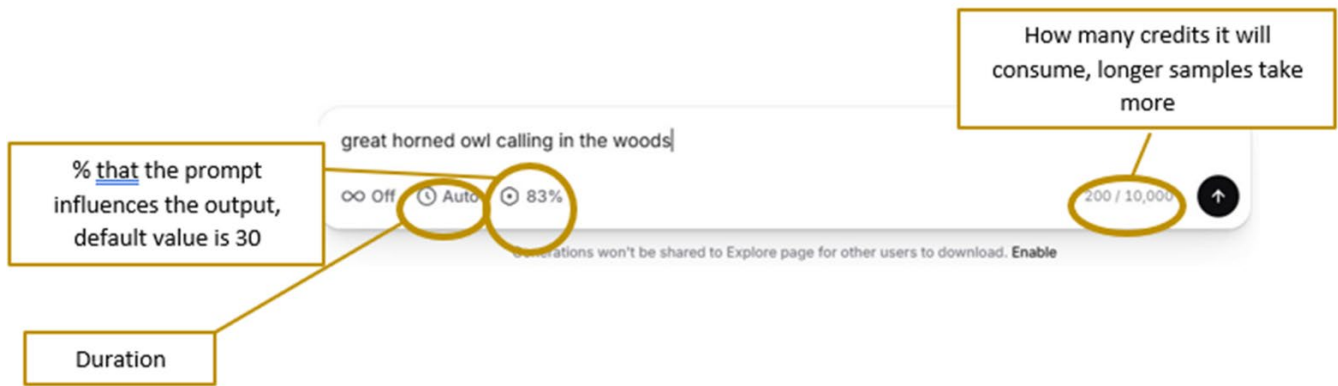


Figure 5: The Elevenlabs prompt entry box provides settings for duration, prompt influence, and displays how many credits the prompt will use.

5. Elevenlabs will generate four recordings. Select the recording that you like best and download it.

Submission

Submit the worksheet and two audio recordings (one from the Merlin Bird App and one from Elevenlabs) in in the AI Audio dropbox.

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