

Learning Module #6 - Alexa Raspberry Pi
Sienna Kachala and Ian Behn
Cover Sheet

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Final Write Up

Goals:

- **What were your original goals for this Learning Module?**
 - Originally, Sienna and Ian planned to create an Amazon Alexa using a Raspberry Pi. They wanted to use the same voice and capabilities of Amazon's Alexa. To do this, they would need an Amazon developer account, and download their code onto their pi. They wanted to be able to ask their Alexa questions into a microphone, and get an audio response from a speaker.

Accomplishments and Problems:

- **What did you actually accomplish?**
 - At the end of this Learning Module, Sienna and Ian successfully created a product similar to the Amazon Alexa, but instead of Amazon, they used Chat GPT. They were able to ask questions to their chat bot, and get an audio response in one to two sentences.
- **What problems did you encounter and how did you deal with them?**
 - Throughout the course of the learning module, Sienna and Ian faced many challenges. Right in the beginning, the main issue they encountered was the fact that Amazon no longer offered the API keys necessary to complete their project, so they had to steer in a different direction. Another problem they encountered was when the pi would not allow them to download the libraries that they needed. To fix this, they created a virtual environment within the pi, so that they could use the libraries that were being blocked from their pi. Because they were in the virtual environment, when they ran their python code, it could not find the libraries, because the file was not in the right place. They had an accidental duplicate file, and were able to find the file, delete it, and move the other one to the correct location.

Learned

- **What did you learn from this activity?**
 - From this activity, Sienna and Ian learned a lot about the raspberry pi, and the different commands. They also learned about how speech recognition and audio works, specifically with AI. Going into this, they had very little knowledge about how the speech recognition works and how it would translate into words able to be put into ChatGPT, but they feel like this learning module gave them a lot more knowledge on the subject.
- **What would you have done differently if you did this again?**
 - If they were to do this again, Sienna and Ian would have tried to incorporate more additives into their project. They wanted to see if they could create a custom

voice, and make it sound like Mr. Eisner. They also would like to see if they would be able to play music from their speaker when prompted.

Future Learning Modules

- **What suggestions do you have for others who might pursue this activity?**
 - Sienna and Ian suggest that others who want to do this activity do a lot of research on the subject beforehand, to really understand what they are getting into. They also suggest giving yourself time to try and add in more fun aspects to the project.
- **What additional things could you pursue with this activity in the future?**
 - In the future, Sienna and Ian could try to create a custom voice that the chat bot speaks instead of the basic google voice. They could also try being able to have real time and location data, and maybe be able to play music from their device.

Learning Module #6 - Alexa Raspberry Pi

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Log

In School

Day 1

1/8/2025

Sienna and Ian Present

<https://predictabledesigns.com/how-to-turn-your-raspberry-pi-into-an-amazon-echo-dot-using-alexa/>

Sienna and Ian read through the entire tutorial, and gathered all of the materials they will need for the project. They also installed an operating system onto the SD card for their raspberry pi

Day 2

1/9/2025

Sienna and Ian Present

Sienna and Ian began hooking up the raspberry pi to the desktop, and they tried to test the speaker. The pi had to do multiple updates, so it took a while, and the speaker was not working, so they are going to try and find another speaker to use.

Day 3

1/10/2025

Sienna and Ian Present

After Sienna went home and tried to create an Amazon developer account, she realized that Amazon no longer allows API keys without certifications. So, they found another way to use chat-gpt to create their voice assistant. During class, they read through the github repository to get an idea of what they wanted to do.

Day 4

Sienna and Ian Present

1/14/2025

Today, Sienna and Ian read through a chat-gpt generated guide to creating their voice assistant. They plan to use this guide because it is an interactive chat, and can answer any questions they have along the way. They also discovered more options for hardware to be used, but have not decided on anything yet.

<https://chatgpt.com/share/678690fa-c15c-8007-a3fe-53fcd43449da>

Day 5

Sienna and Ian Present

1/21/2025

Sienna and Ian connected a bluetooth speaker and made sure it worked. They checked and confirmed that the microphone works. Then they began coding the text-to-speech code on python.

Day 6

Sienna and Ian Present

1/22/2025

Sienna and Ian continued to write all of their python code onto their Raspberry Pi. They were able to create the listen, speak and chat with chatgpt methods, and are ready to start running their project tomorrow.

`Source my_voice_assistant_env/bin/acitvate`

Day 7

Sienna and Ian Present

1/23/2025

Sienna and Ian finished coding everything they needed in python. After that they were ready to test. They encountered some errors with not recognizing the speech recognition library, and that took them to the end of class.

Day 8

Sienna and Ian Present

1/24/2025

Sienna and Ian continued working on fixing the error they were encountering. They had a duplicate file with the same name, and the file they needed was in the wrong folder. After they fixed that, they were able to get the command line to say it was listening, but then it ended quickly. They will try to figure out that issue on Monday.

Day 9

Sienna and Ian Present

1/27/2025

Sienna and Ian worked through errors, and were able to get the computer to recognize and print what they said into the microphone. They were not able to get a response back, and they will talk to Mr. Jaw about unblocking github on the pi tomorrow.

Day 10

Sienna and Ian Present

1/28/2025

Sienna and Ian tried to run their code again, and the github link was still not working. So, they emailed Mr. Jaw about unblocking github, and they were not able to do anything else besides wait.

Day 11

1/29/2025

Sienna and Ian Present

Sienna and Ian were able to finally run their code once they got github unblocked. They had a few errors, but eventually they were able to get their chat bot working. The volume of the bot was really low, so they will try to fix that tomorrow.

Day 12

Sienna and Ian Present

1/30/2025

Sienna and Ian worked on increasing the volume of their chat bot. They were able to do so, and they also changed the speed at which the bot spoke. The bot sounded too robotic for their liking, so tomorrow they will try to import another voice to make it sound more human. Hopefully, this will also fix errors with skipping through some words.

Day 13

Sienna and Ian Present

1/31/2025

Sienna and Ian changed the voice of the assistant. Instead of using the default text to speech method in python they used the google text to speech that is used for things like google translate. They also looked into adding a wake word but didn't have enough time to implement it. They also thought about training an AI voice model on one of the teachers in the school with videos posted online.

Day 14

Sienna and Ian Present

2/3/2025

They worked on cleaning up the responses and the user experience. They did this by making the responses no longer than 2 sentences and making the word to end the conversation goodbye instead of exit.

Log - At Home

Sienna:

1/9/2025 - 60 minutes 8:30-9:30

- Sienna tried to create an amazon developer account, but realized they no longer offer API keys without certifications, so she researched more options.

1/15/2025 - 40 minutes 10:00-10:40

- After the midterm, Sienna and Ian updated and downloaded everything that they would need on the raspberry pi.

2/2/2025 -1 hour 30 minutes 7:30-9

- Sienna started to try and clone Mr. Eisner's voice. She was able to download his videos and extract the audio from it, and then she tried to connect that file to the raspberry pi, but it would not work.

Ian:

1/15/2025 - 40 minutes 10:00-10:40

- With the time left after the exam they updated and downloaded everything that they would need to prepare for actually making everything.

1/27/2025 - 20 minutes 10:00-10:20

- Researched the error that they were getting in class and decided that the initial assumption of the github link being blocked was most likely correct.

2/2/2025 - 1 hour 4:00-5:00

- Researched how to get a custom voice for the assistant.

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Resources

- Raspberry Pi
- Monitor
- Keyboard
- Mouse
- USB Microphone
- Bluetooth Speaker

<https://github.com/judahpaul16/gpt-home/blob/main/README.md>

<https://www.youtube.com/watch?v=11ATPsPnCrc>

<https://www.raspberrypi.com/news/make-a-homemade-ai-home-assistant/>

<https://github.com/Infatoshi/chatgpt-voice-assistant/blob/main/README.md>

API KEY:

sk-proj-mgX8mdazIqCAvCEzNu3zKLr3ELofyowJBYeMYkX4P4zhpm-yKy5dqYA5psljqBr2yt
sbiWRUNFT3BlbkFJVuv5O5hugmpGHk13pqTShuhNFKwSjLhn3eoLGLff0cQr9HsPTeuKodh
_BlfDK1VyKB0KcjsJAA

<https://chatgpt.com/share/678690fa-c15c-8007-a3fe-53fed43449da>