

Voice Recognition System for Beekeeping Hardware + Data Collection

CSE496
Third Presentation

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Project Scheme and Description





Beekeepers routinely inspect their hives to identify any potential issues.

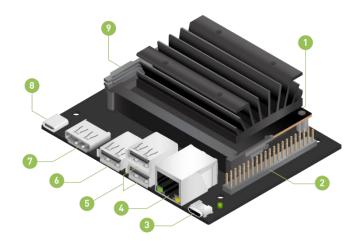
Detecting problems through the voice of the bees can save time, enabling the beekeeper to attend to more hives.

The purpose of this project is to collect voice data from bee hives and enable the beekeeper to define the current status of the hive via the mobile application.

Hardware Components











Hardware + Voice Data Collection GER



- Jetson Nano is placed under a beehive on the campus.
- A power cable and an ethernet cable is run to the beehive for Jetson Nano.
- The audio was recorded using a microphone. The microphone is placed inside the beehive and is entered the beehives through the entrance used by the bees.
- Audio files are recorded in the specified format.
 (hivenumber-timestamp.wav)



Placement of Hardware





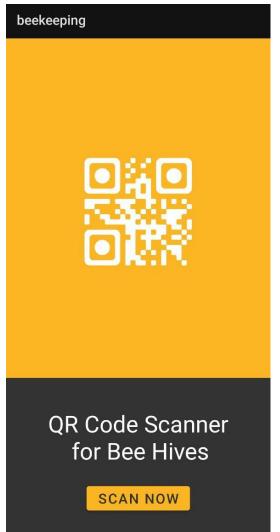


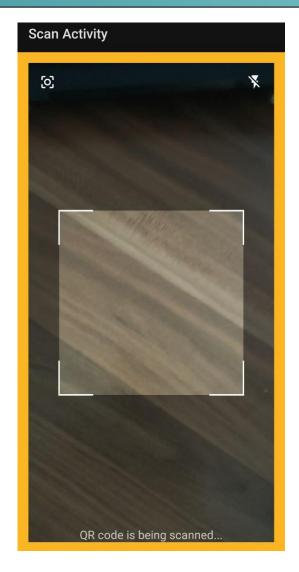


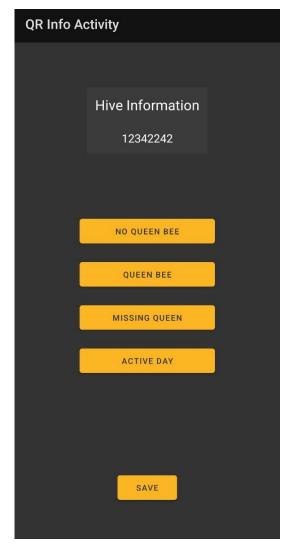


Mobile Application Screens











Mobile Application



- Generate QR codes for beehives
- Scan QR codes in the mobile app.
- Save the beehives status in the specific format (hivenumber-timestamp-label.wav) in the mobile app.



Recording of Audio Files



- The data from the device to Drive, regularly.
- Initially, audio was recorded every minute throughout the day.
 The size of the 1440 audio files is 7 GB.
- Currently, 1 minute of audio is being recorded, followed by a 10 minute sleep. The size of 131 audio files is 700 MB.

n	hive1-1686430766.9140437.wav
n	hive1-1686430826.9289124.wav
n	hive1-1686430886.9641607.wav
n	hive1-1686430947.0082903.wav
Ω	hive1-1686431007.0266094.wav 😃
n	hive1-1686431067.0467787.wav
n	hive1-1686431127.0605102.wav
n	hive1-1686431187.0760636.wav
n	hive1-1686431247.1008108.wav



Project Timeline



Months	March				April					May					June		
Weeks	6 March	13 March	20 March	27 March	3 April	10 April	17 April	24 April	1 May	8 May	15 May	22 May	29 May	5 June	12 June	19 June	
Preparing the development environment, learning the necessary libraries, literature review																	
Identifying and supplying hardware materials																	
Preparing hardware																	
Qr application																	
Collecting data for deep learning																	
Test the hardware																	
Preparing report																	



Success Criteria



- %75 memory usage in Jetson Nano per day7 GB (1440 audio files)700 MB (131 audio files)
- %20 GPU usage in Jetson Nano (128-core NVIDIA Maxwell GPU in Jetson Nano)
 %10 %25
- The mobile application use less than %10 of the CPU



Resources



- 1. https://developer.nvidia.com/embedded/learn/get-started-jetson-nano-2gb-devkit
- 2. https://www.kaggle.com/code/mpwolke/to-bee-wav/input
- 3. https://developer.nvidia.com/embedded/jetpack
- 4. https://developer.nvidia.com/sdk-manager
- 5. Microsoft Bing Create Image used for images
- 6. https://www.figma.com/community/file/1214837612730924876/QR-Code-Scanner-App

