Voice Recognition System for Beekeeping Hardware + Data Collection

CSE496
Third Presentation

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Content

- Project Scheme and Description
- Hardware Components
- Hardware + Voice Data Collection
- Placement of Hardware
- Mobile Application Screens
- Mobile Application
- Recording of Audio Files
- Project Timeline
- Success Criteria
- Resources

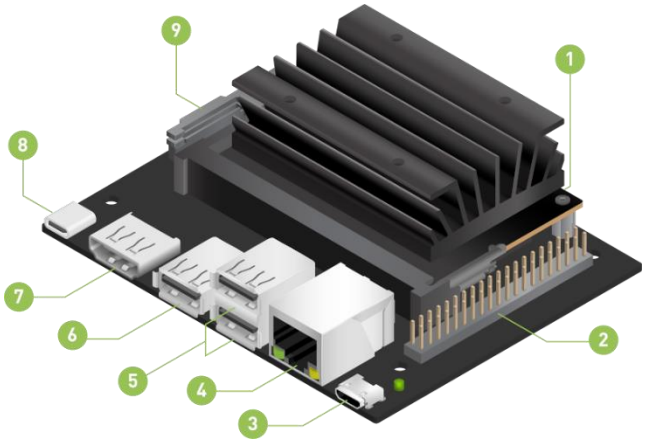
Project Scheme and Description

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

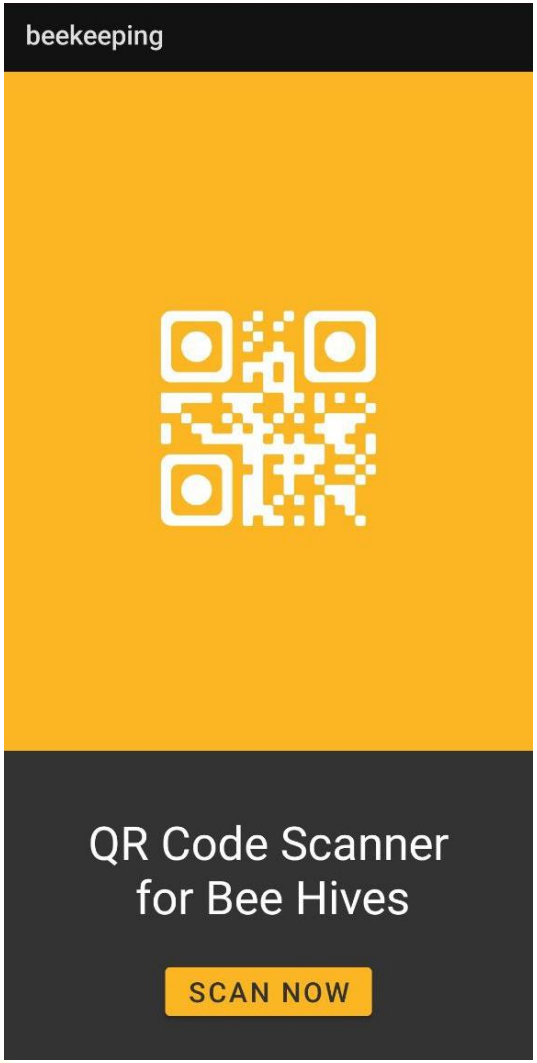


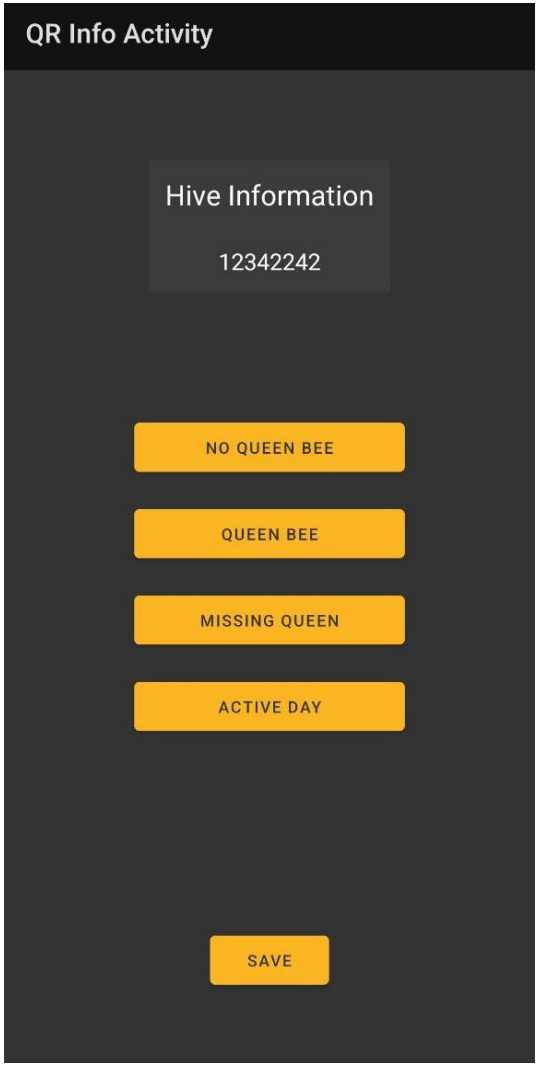
Hardware + Voice Data Collection

- 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



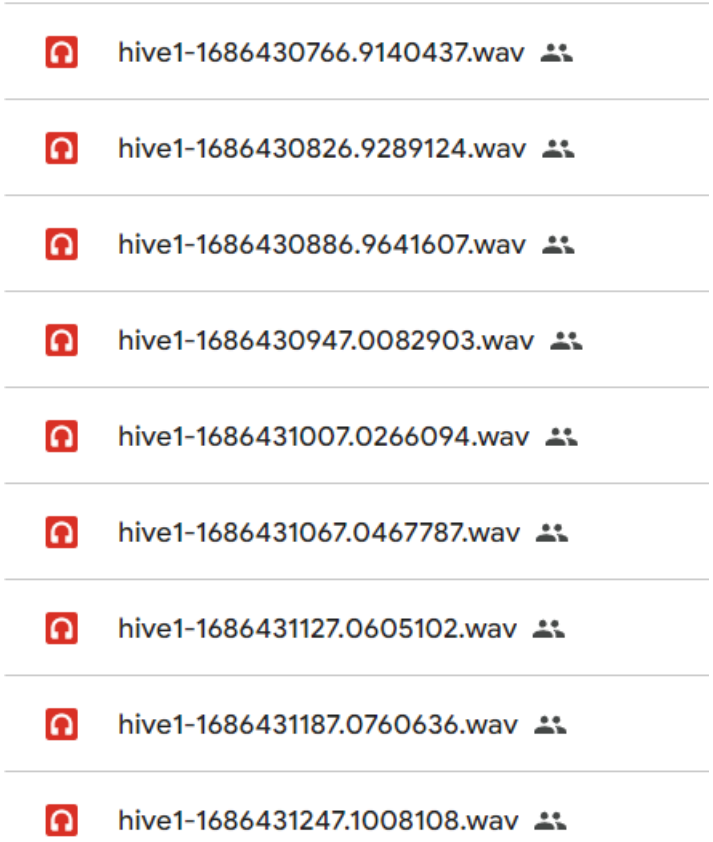


Mobile Application

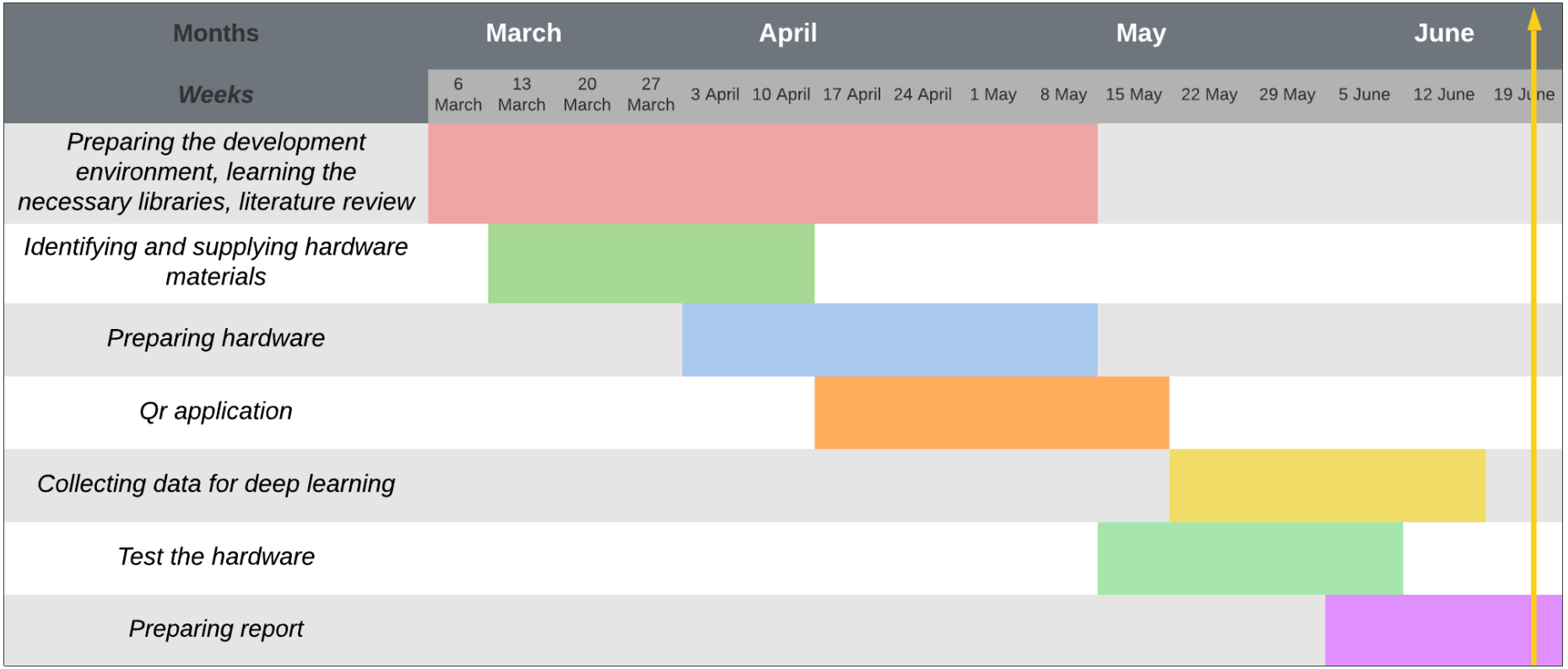
- Generate QR codes for beehives
- Scan QR codes in the mobile app.
- Save the beehives status in the specific format (hivenumber-timestamp-label.wav) in the mobile app.

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.



Project Timeline



Success Criteria

- %75 memory usage in Jetson Nano per day
  7 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