Voice Recognition System for Beekeeping Hardware + Data Collection

CSE496
Preliminary Presentation

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Project Scheme and Description

Beekeepers routinely inspect their hives to identify any potential issues.

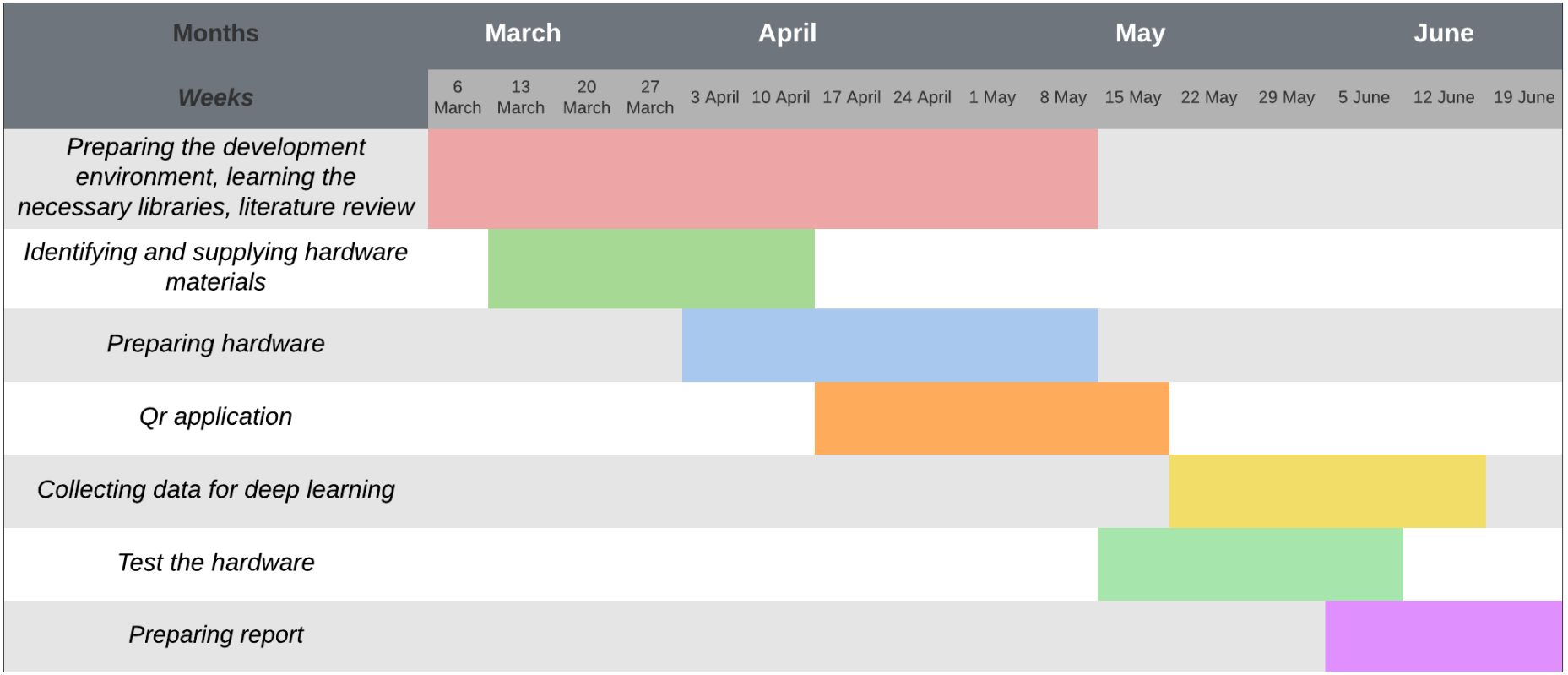
Detecting problems through the voice of the bees can save time, enabling the beekeeper to attend to more hives.

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.

Project Design Plan

- Voice data will be collected with microphone using Jetson Nano.
- A mobile application will be made so that the beekeeper can define the situation.
- The application will recognize the hive by scanning the QR code of the hive.

Project Timeline

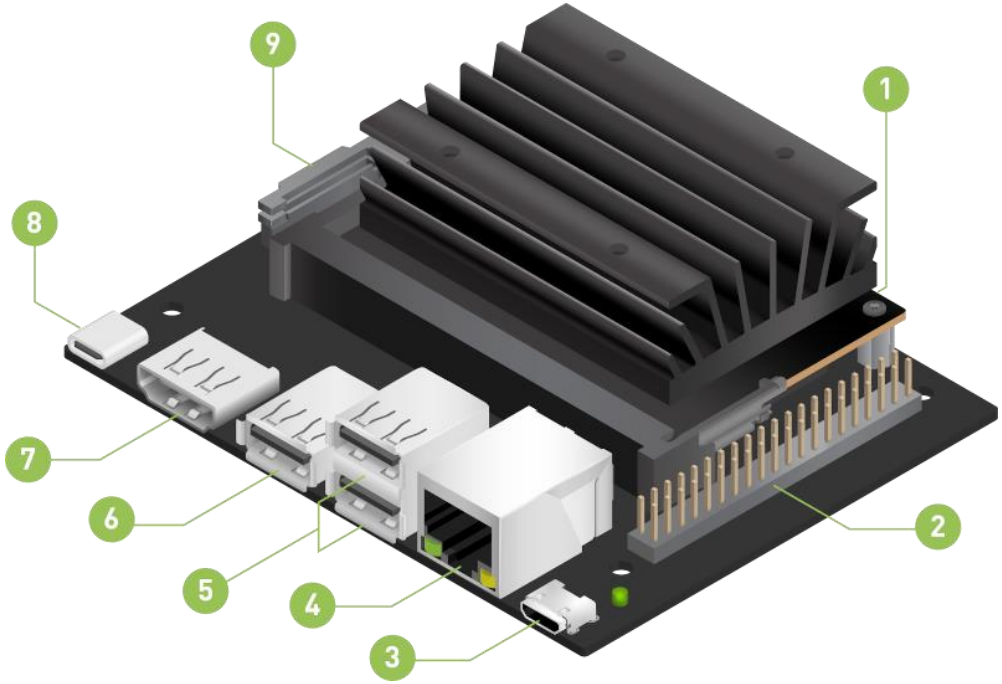


Project Requirements - 1

- Jetson nano setup
- Audio recording with microphone
- Storing audio files with minimum memory usage
- Generating QR code for bee hives
- Scanning QR code in mobile application
- Defining and saving the situation of the hive in mobile application

Project Requirements - 2

- Nvidia Jetson Nano 2GB Developer Kit
- USB Microphone



Success Criteria

- %75 memory usage in Jetson Nano per day (2 GB LPDDR4 Memory in Jetson Nano)
- %20 GPU usage in Jetson Nano (128-core NVIDIA Maxwell GPU in Jetson Nano)
- The mobile application running on Android 5.0 or higher.

Resources

1. https://developer.nvidia.com/embedded/learn/get-started-jetson-nano-2gb-devkit
2. Qandour, A. Ahmad, I. “Remote Beehive Monitoring using Acoustic Signals” Acoustics Australia / Australian Acoustical Society 42(3):204-209. December 2014.
3. Kulyukin, V. Mukherjee, S. Amlathe, P. “Toward Audio Beehive Monitoring: Deep Learning vs. Standard Machine Learning in Classifying Beehive Audio Samples” Appl. Sci. 2018, 8(9), 1573; https://doi.org/10.3390/app8091573
4. Terenzi, A. Cecchi, S. Spinsante, S. . “On the Importance of the Sound Emitted by Honey Bee Hives” Vet. Sci. 2020, 7(4), 168; https://doi.org/10.3390/vetsci7040168
5. Microsoft Bing Create Image used for images