Hive Monitoring: Final Presentation

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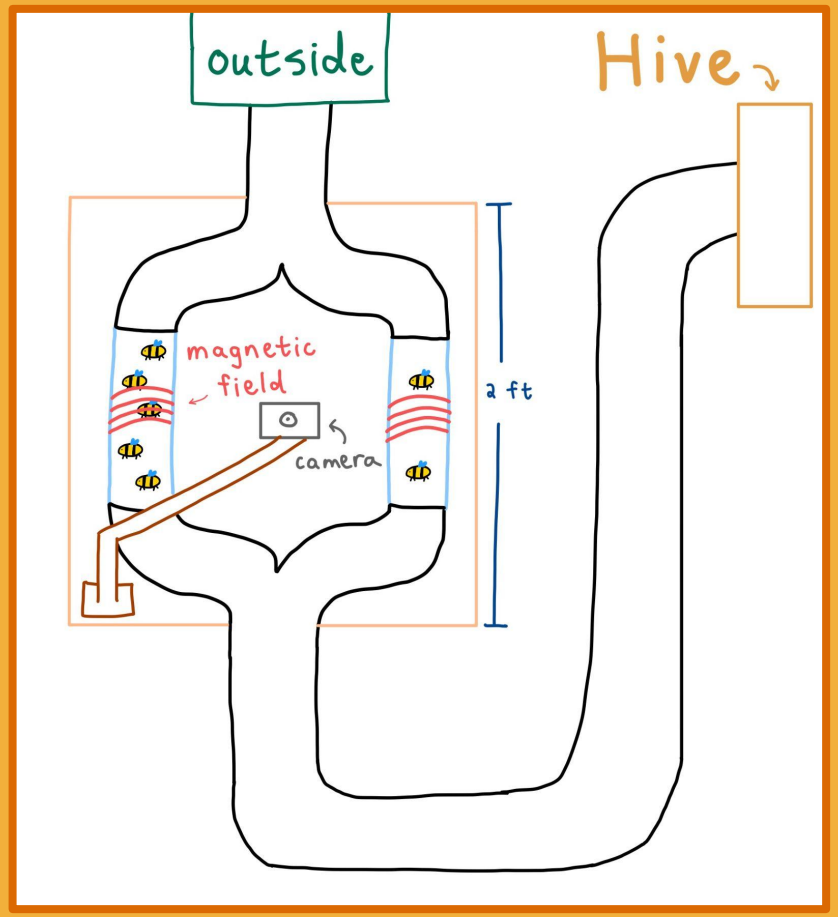
Objectives

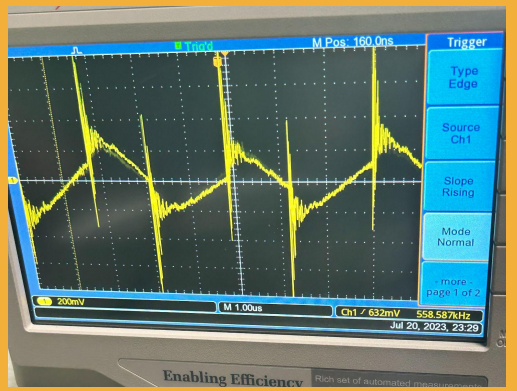
- **How are changes in the world affecting biological systems?**
- Determine if bees are impacted by electromagnetic radio frequency waves
  - Potential connection to increasing bee mortality
- Use machine learning to try to detect patterns in bee behavior in response to the magnetic fields


outside
Hive
magnetic field
camera
2 ft

SNAPPER

Circuits

- Built and programmed a DC circuit and attached it to the bee apparatus, collected data from the raspberry pi
- Wrote program for an AC current, soldered the wires, resistors and capacitors, and wrapped the coil around the glass tube, and attached it to the circuit board
- Collected data on the AC circuit

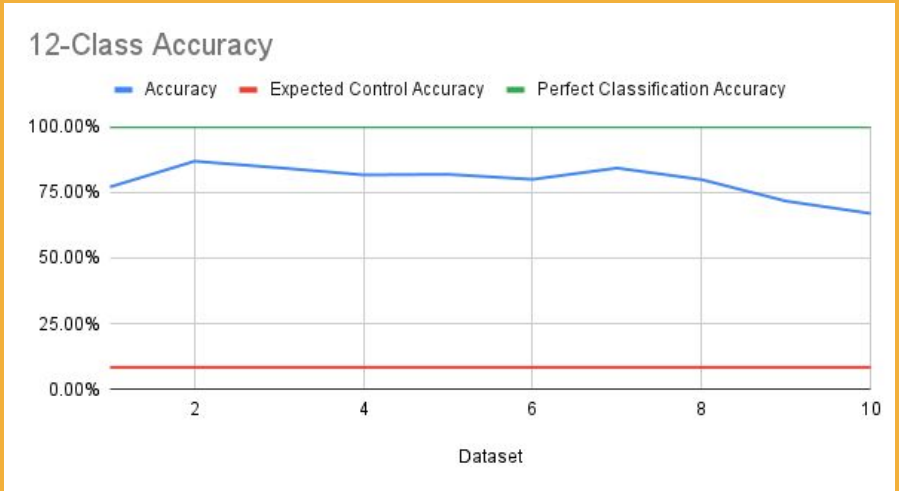


Machine Learning Software

- Using video data to train a neural network to predict the state of the magnetic field
- If the AI can accurately predict the state of the magnetic field, this indicates that there are changes in the behavior of the bees
- Debugged several issues with the existing software

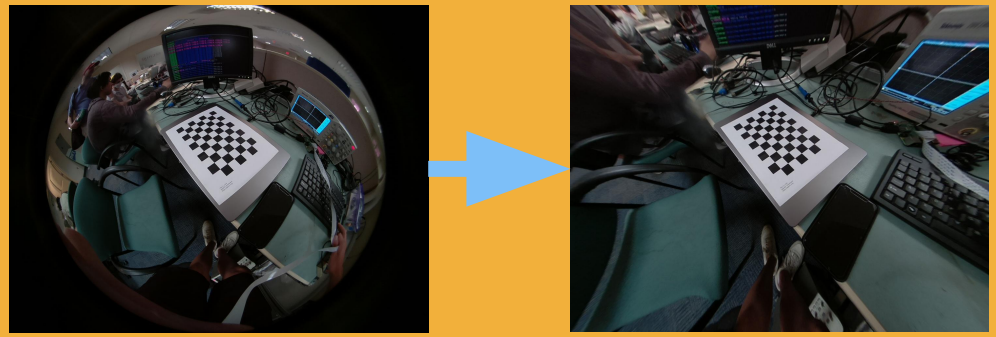
Machine Learning Results

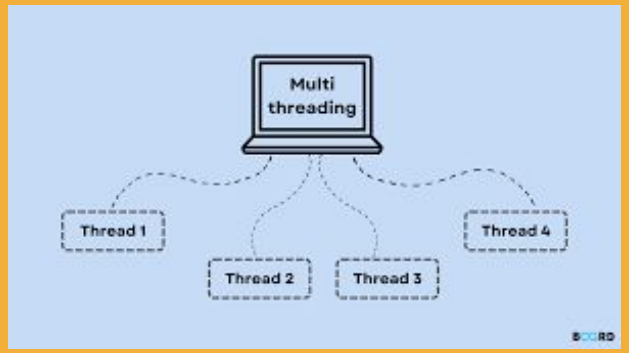
- Generated expected accuracies for control data
- Generated high accuracies from data due to strong temporal correlation of the daily routine of the bees

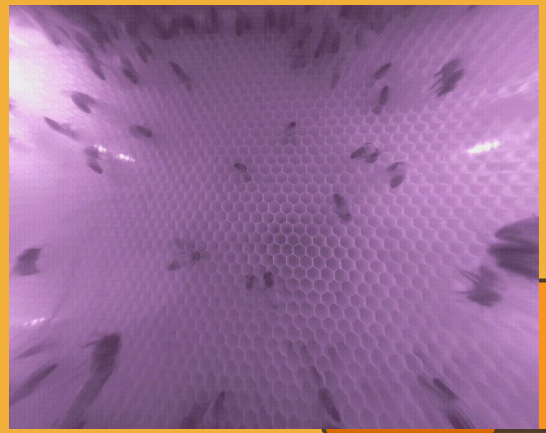


Camera (setup)

Camera (software)







Next Steps

- Randomize timing of classes when collecting data in order to avoid temporal correlation
- Run additional experiments with different fields in different tubes
- Using hive video for future experiments (counting bees to determine health)