Autonomous Insect Trap

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Aim

- Presently insect traps require regular manual checks every two weeks in order to monitor current insect populations.
- Proposed that the interruption of light from a flying insect and its wings could be used to categorise insect species by their wingbeat.
- A system of infrared emitters and sensors would collect data to train a machine learning algorithm for identifying insects.
- The trap would then transmit its findings to reduce the frequency of physical checks of the traps.

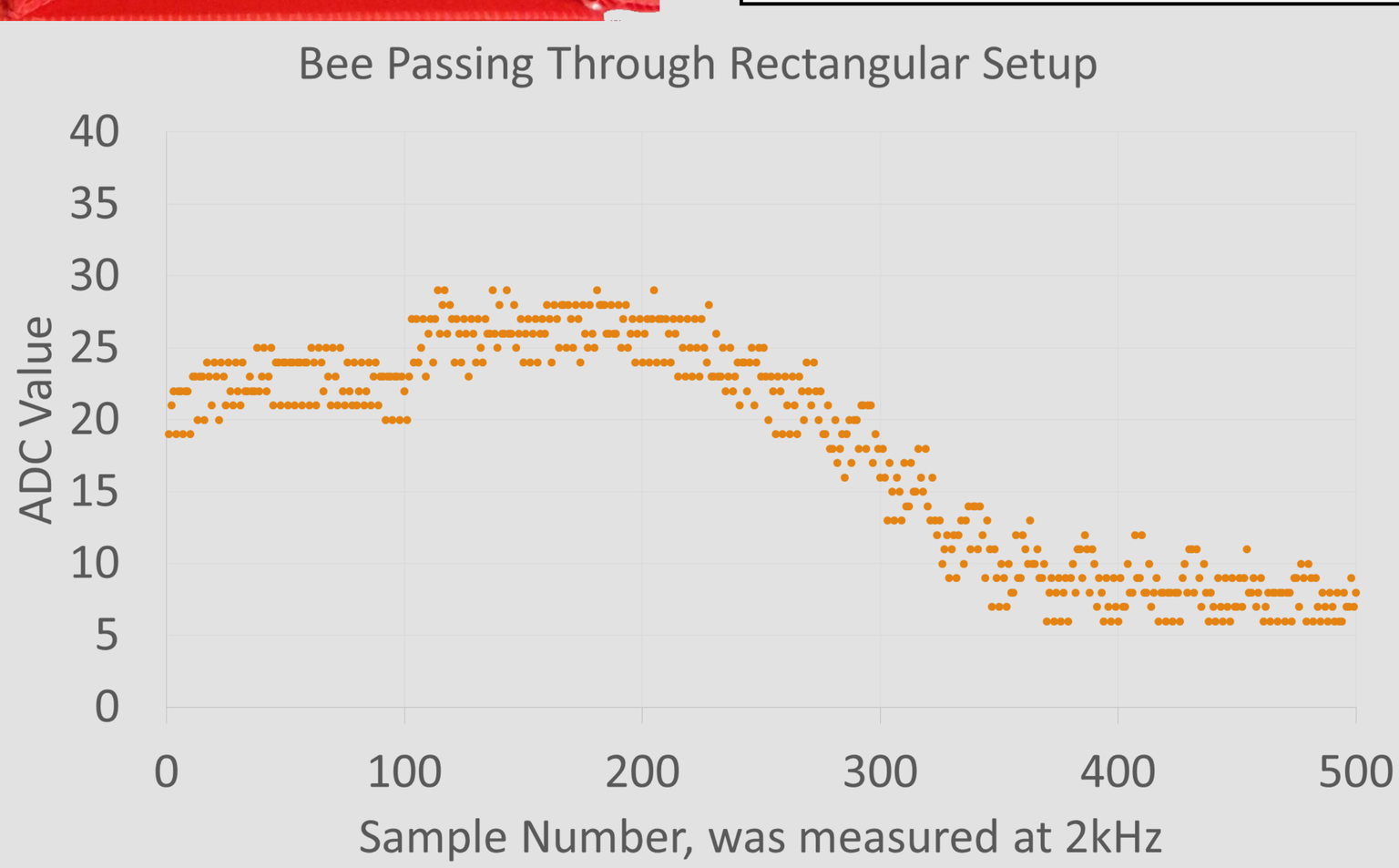
Method

A trap has two entrances, across which are infrared beams. When an insect enters the trap, its wingbeats and body modulate the beam, creating a signal unique to the species of insect. Traps will be arranged approximately 400m apart in a field or orchard, and will communicate with a base station over a radio link. The base station is responsible for classifying insect signals and notifying the owner when an invasive species is detected.

Results

The trap is able to detect an object that is 2mm wide.

- The trap can measure the six channels at a speed of 15kHz.
- Testing the power usage of the trap showed that when using a low level of illuminance the trap could last 6 days without the aid of the solar panel .



Trap detects insect

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Data is transmitted to base station

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Base station classifies the data and alerts the owner

Conclusion & Recommendations

So far a prototype that can record and transmit data has been made

Large volumes of data still need to be collected

This data would be used to train machine learning models to classify insect species

Further modifications to the prototype will be required before mass production such as waterproofing, cost reduction and reduced power consumption

References

[1] Y. Chen, A. Why, G. B, A. Mafra-Neto and E. Keogh, “Flying Insects Classification with Inexpensive Sensors.” Comp. Eng. Fin. Sci., Univ. River, Riverside, Nov. 15, 1987.