FrisBee

Sarah Demsky, Alex Arcuri, Brook Ford

Faculty Mentor: Dr. Puteri Megat Hamari

ECET Department, Minnesota State University, Mankato

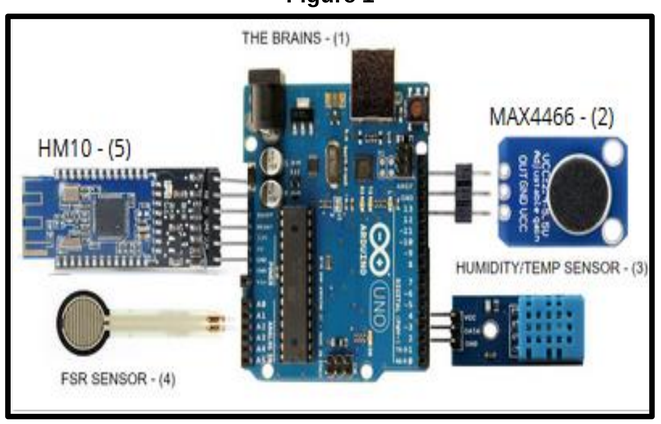
BACKGROUND

Beekeeping can be a time-consuming hobby. Beekeepers need a more efficient way to monitor their beehives. Some conditions that are important to keep an eye on in a beehive are temperature, humidity, weight, and sound intensity. The temperature and humidity are essential for keeping the bees healthy and well. Beekeepers must know when the hive is ready to harvest their honey. They know when it's ready by the weight of the beehive. The sound intensity is for the beekeepers to know if there is a swarm in the hive or not.

PROPOSED SOLUTION

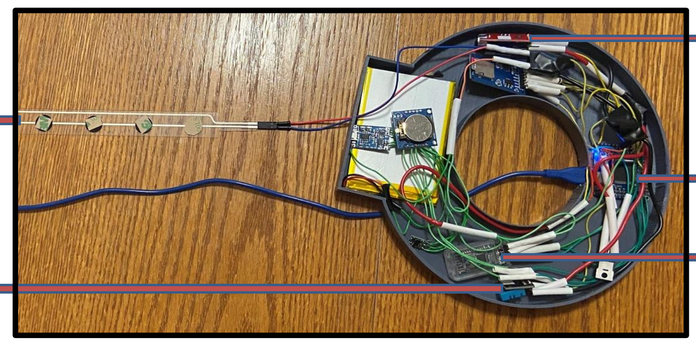
Our proposed solution is to create a device that will track the temperature, humidity, weight, and sound intensity inside of the beehive. It will be able to fit inside the hive without wasting and valuable honey-making space. It will communicate the data to the beekeeper's phone so that they can check on the hive from their home. This will allow the user to use less of their time monitoring all of these conditions manually. They will be able to use their extra time to take on more beehives to increase their honey production. The system block diagram is shown in Figure 1. Our product is shown in Figure 2.

Figure 1



SYSTEM DESIGN

Figure 2



FSR Sensor (4)
The FSR sensor will be able to measure the weight of the beehive. It allows us to measure the current and voltage that passes through it and find the resistance at any time and any weight.

Humidity/Temperature Sensor (3)
The humidity/temperature sensor is used to measure the humidity and temperature of the hive.

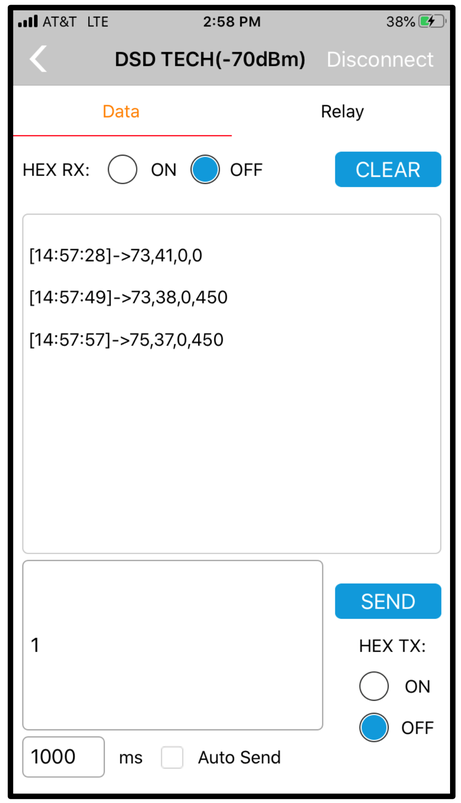
MAX4466 (2)
The MAX4466 is a microphone amplifier. It is used to measure the frequency inside the beehive.

Arduino Mega (1)
The Arduino Mega is used to connect all the modules together. It has a microchip on the board which allows us to execute code and read data from the sensors attached.

HM10 (5)
The HM10 is a Bluetooth module. It is our means of communication for the project.

RESULTS

Figure 3



You can see values obtained using the DSD TECH official app instead of the MIT inventor App due to an issue with updated libraries causing conflicts in connecting.

The first value (75) is the temp, the second value (37) is humidity, the third value (0) is the weight on the FSR, and the fourth value (450) is the frequency observed by the microphone.

REFERENCES

http://www.gammon.com.au/power
https://www.theengineeringprojects.com/2018/06/introduction-to-arduino-mega-2560.html
https://dronebotworkshop.com/real-time-clock-arduino/
https://learn.adafruit.com/fft-fun-with-fourier-transforms/spectrum-analyzer
https://www.youtube.com/watch?v=o4_NeqlJgOs

FUTURE DIRECTION

- PCB generation
- Code app in C#
- Commercialization

ACKNOWLEDGEMENTS

We would like to thank Undergraduate Research Center for funding our project as well as our Junior Design professor.

CONTACT INFORMATION

Feel free to contact us at sarah.demsky@mnsu.edu, alexander.arcuri@mnsu.edu and brook.ford@mnsu.edu with any questions or comments.