Next Semester Plans for Canine Palpation Trainer

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Next semester, the canine palpation trainer project will add sensors to more organs. Currently, there are only sensors embedded inside the liver to show proof of concept. The end project will have between 40 and 60 sensors embedded inside the organs to give a complete pressure overview. Additionally, each organ will have an embedded RJ45 connector for ease of removal and replacement.

At this point, all the sensors are force sensitive. Force sensitive resistors will not work when the stomach, bladder, and intestines are monitored for pressure changes. They are ineffective due to the high compressibility of those organs. Because of this, barometric pressure sensors will be added inside each organ’s hollow air pocket. The ambient pressure will be monitored with the barometric sensor. This portion of the project will be finished by the end of August.

The project will also face some difficulties dealing with the sheer number of wires. With 40-60 sensors being monitored, the wires can become a mess. We have chosen to use ethernet cables to contain the mess inside the silicone dog model. However, once the ethernet is wired over to the controller, the mess will be come prevalent. To solve this issue, we will add external mux to mux between signals and lower the number of wires to the PSoC. Also, Cypress released a new prototyping board which can be soldered to. This board will greatly simplify the problem. This portion will be completed by mid September.

The microcontroller side will need organization. There will be 7 incoming ethernet cables which requires 7 RJ45 connectors. To organize the incoming cables, a 3D printed controller box will be added. On the outside, it will contain a power slot, a power button, and 7 RJ45 connectors. On the inside, it will have a PSoC 4, and wires connecting the RJ45
outputs to the PSoC or external mux. This portion will be completed by the end of September.

The dog model will also employ a bluetooth module to allow wireless communication between the model and the computer. This will simplify the model for the veterinarian students who will only need to turn the model on and open the software on the computer. This portion will be completed by mid October.

The last addition that the project requires is a graphical user interface (GUI). This computer model will take in pressure values from the microcontroller and show how much pressure is being applied and where it is being applied to. The pressure will be visually shown by using colors on a graphical representation of the dog. Green colors on the organ will indicate that the palpation is being performed with the correct pressure while red colors will indicate that the organ is being palpated with incorrect pressure. This portion of the project will be completed by the end of October.

The project will be finished by the end of October allowing for testing time during November. There is a high probability that the project will be commercialized for sale in veterinary schools throughout the country. As such, we will need to start reliability testing.