# Canine Palpation Trainer

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## Objectives
The goal of this project is to create a realistic palpation model with intelligent feedback to train doctors and veterinarians on proper palpation techniques.

## Methods
### 6 Organs for Palpation
- **Kidneys**  
- **Stomach**  
- **Intestines**  
- **Bladder**  
- **Spleen**  
- **Liver**

We began with a canine liver due to its simplicity. We began by adding one pressure sensor on the main lobe as seen below:

### Rapid Prototypes
No electronic palpation models currently exist. Therefore, we created prototypes to teach ourselves about potential problems and "frontload" the project. One prototype trial consisted of using CapSense, a capacitive touch technology for both positioning and for pressure gathering.

### Design Considerations
1. **Pressure used in palpation**  
   - Incorrect pressure may cause incorrect diagnoses - could damage the organs
2. **Robustness of design**  
   - Model would experience hundreds of palpations a month.
   - Need to withstand wear and tear, without deterioration of sensitivity.
   - Modular design, e.g., using standard connectors (e.g., RJ45, USB, Bluetooth) makes replacements easier.

### Advantages
- Obtain the pressure values by measuring the capacitance change.
- Cheap and could give both an (x,y) coordinate.

### Disadvantages
- Added Bumps – bad for palpation
- Less precise

### References
- [https://www.sparkfun.com/datasheets/Sensor/fscap10000.pdf](https://www.sparkfun.com/datasheets/Sensor/fscap10000.pdf)

## Next Semester Plans
- Add air pockets inside the organs with an external air pump to simulate abnormalities like tumors or disease stages.
- Create computer or phone app to analyze pressure data.
- Add a Bluetooth module to wirelessly transmit the pressure data to a computer or phone.
- Create models for more animals - even human!