The Knotorious Five

January 30th - February 5th

Client: Dr. Margene Anderson, Dr. Sara Colopy. Dr. Paul Merkatoris
Advisor: Professor Wally Block

Team Members:
Madison Michels (mmichels2@wisc.edu), Leader
Lucy Hockerman (lhockerman@wisc.edu), Communicator
Presley Hansen (pmhansen3@wisc.edu), BWIG
Sadie Rowe (skrowe2@wisc.edu), BPAG
Kate Hiller (khiller@wisc.edu), BSAC

Problem Statement:

In veterinary training, mastering the skill of applying appropriate suture tension is essential for successful wound closure and patient recovery, However, novice practitioners often struggle to judge the correct amount of force needed, leading to either insufficient tension or excessive tension, which can cause plastic deformation of the suture material or tissue damage. Currently, the evaluation of suture technique relies heavily upon subjective instructor feedback, lacking objective, real-time metrics to guide learners. This gap hinders consistent skill development and increases the risk of procedural errors. There is a critical need for a real-time suture tension measurement and feedback system to help students learn to apply optimal tension, prevent material or tissue compromise, and improve surgical outcomes through data-driven training.

Brief Status Update:

This week, the team met with Royal Oakes to discuss more about Raspberry Pi boards and peripheral components. The team researched these topics as well on our own and worked on the Preliminary Presentation slides that we will present to our advisor on Friday.

Team Goals:

- In the upcoming week, the team plans to revamp our model training to accommodate the augmented images and order a Raspberry Pi system for prototyping.
- Present the Preliminary Presentation to our advisor on Friday.

Individual Accomplishments:

- Lucy: This week, I researched basics in Raspberry Pi and methods to upload our machine learning model. I discovered the Edge Impulse platform that could be a user-friendly back-up system for augmentation and model deployment. I continued communication

with professors and TA's for Raspberry Pi advice. Additionally, I met with the team to discuss our preliminary presentation and prepared assigned slides. Finally, I attended the beginning of the meeting with Royal Oakes for Raspberry Pi hardware suggestions.

- Presley: This week, I attended a meeting with Royal to discuss Raspberry Pi options and components. We discussed the Raspberry Pi Compute Module board and got connected to Dr. Peter Adamczyk for further help with our Raspberry Pi portion of the project. I also researched further on the Raspberry Pi AI vs HQ camera and worked on the slides for the preliminary presentation.
- Maddie: This week I attended a meeting with Royal to evaluate Raspberry Pi options and get connected with more knowledgeable contacts in the area. He pointed us towards the Module 4b and 5 boards with any USB camera. We were also connected to Dr. Peter Adamczyk, the professor for Robotics, to discuss his use of Pi in that class. Lastly, I research K-folds validation and determined that the k for our model should be equal to 5.
- Kate: Attended team meetings and a meeting with Royal Oakes about the Raspberry Pi hardware and software to use for the project. Worked on the preliminary presentation and completed research on implementing the ML model on the raspberry pi.
- Sadie: This week, I researched hardware needed to implement our model on a Raspberry Pi. I worked on the preliminary presentation slides and met with Royal Oakes to ask questions about the project.

Individual Struggles:

- Lucy: No struggles this week.
- Presley: No struggles this week.
- Maddie: No struggles this week.
- Kate: No struggles this week.
- Sadie: No struggles this week.

Individual Goals:

- Lucy: Next week, I hope to schedule and attend a meeting with Dr. Adamczyk. Also, I hope to work with the team to order the appropriate hardware and conduct research to answer any remaining questions about Raspberry Pi.
- Presley: Next week, I hope to order the necessary materials with the team and split into two groups to begin image augmentation and coding of the Raspberry Pi.
- Maddie: Next week, I hope to have the Pi components ordered and start implementing k-folds cross validation into our model.
- Kate: To order the hardware and continue researching how to get the ML model on the Raspberry Pi and how the Raspberry Pi works in general.
- Sadie: Next week, I will work with the client to order materials to begin prototyping. I will conduct k-fold cross validation on the model.

Project Timeline:

Week	Description	Date	Status
1/22 - 1/29 Week 1	Team Meeting 1	1/26	Complete
	Advisor Meeting 1	1/23	Canceled
1/30 - 2/5 Week 1	Team Meeting 2	2/4	Complete
	Advisor Meeting 2	1/30	Complete
2/6 - 2/12 Week 3	Preliminary Presentations	2/6	Scheduled
	Team Meeting 3	2/9	Scheduled
	Advisor Meeting 3	2/13	Scheduled
	Order Raspberry Pi Camera and Board	2/13	Researching Options
2/13 - 2/19 Week 4			
2/20 - 2/26 Week 5	Preliminary Deliverables	2/25	Not Started
2/27 - 3/6 Week 6	Submit Patent to WARF or IDR	3/6	Not Started
3/7 - 3/13 Week 7			

3/13 - 3/19 Week 8			
3/20 - 3/26 Week 9	**Show and Tell**	**3/20**	Not Started
3/27 - 4/2 Week 10	Select Design Award	4/1	Not Started
	Executive Summary (Draft)	4/1	Not Started
4/2 - 4/8 Week 11			
4/9 - 4/15 Week 13			
4/16 - 4/22 Week 14	**Executive Summary**	4/17	Not Started
4/23 - 4/29 Week 15	Final Pressentations	4/24	Not Started
4/30 - 5/5 Week 16			
Winter Break			

Expenses

Item	Description	Manufacturer	Mft Pt#	Vendor	Vendor Cat#	Date	QTY	Cost Each	Total	Link
Force Sensor Resistor	Force sensor that outputs resistance in a voltage divider circuit (2 in pack)	Haosie?	N/A	Amazon Prime	N/A	10/1	1	$7.59	$7.59	Link