The Knotorious Five

January 22 - January 29

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 began outlining our semester goals and future work. We are in the process of scheduling meetings with two professors, Dr. Amit Numinkar and Dr. Paul Campagnola, to evaluate Raspberry Pi options and image augmentation methods. The team researched those topics as well on our own.

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.

Individual Accomplishments:

- Lucy: This week I met with the team to discuss next steps to advance our prototype. I communicated with Dr. Numinkar, Dr. Campagnola, and the team to schedule meetings and begin preparing questions for productive meetings.

- Presley: This week I researched different types of cameras we could incorporate into our machine learning model system. I also research image augmentation techniques and learned about k-fold cross-validation.
- Maddie: This week I researched Raspberry Pi cameras and modules options to use for the implementation of our design. I found that module 3 and the AI cameras would be the best option to allow for the integration of our TensorFlow model.
- Kate: Met with the team to discuss next steps forward for the project. Researched k-fold cross validation and AI raspberry pi camera.
- Sadie: This week, I met with the team to discuss how we plan to move forward with the project this semester. I also researched raspberry pi cameras and k-fold cross validation.

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: Meet with Dr. Numinkar and Dr. Campagnola. Conduct research to gain more background on raspberry pi. Meet with the team to prepare for preliminary presentations next week.
- Presley: Meet with Dr. Numinkar and Dr. Campagnola to help us with raspberry pi and image augmentation strategies. Order materials and work on code and/or the camera stand for the machine learning system.
- Maddie: Meet with Dr. Numinkar and Dr. Campagnola to guide us in our model refinement and Raspberry Pi integration. I also want to do heavy research on types of image augmentation for our model.
- Kate: To meet with Dr. Numinkar and/or Dr. Campagnola to help us decide the best method to house our model. Additionally, split into teams working on the electronics portion/model/building the housing fixture. Lastly, order any materials needed (like camera) asap.
- Sadie: Meet with Dr. Campagnola to learn more about ways to optimize our dataset (based on his comments following the poster presentation) and Dr. Numinkar to get his insight on hardware to build a user interface. Order materials and prepare for the preliminary presentation.

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	Scheduled
	Advisor Meeting 2	1/30	Scheduled
2/6 - 2/12 Week 3	Preliminary Presentations	2/6	Not Started
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