3D Printing Airway Trainers

Progress Report 11

Client: Dr. Kristopher Schroeder

Advisor: Dr. John Puccinelli

Date: 11/22/2024

Team:

Maribel Glodowski mjglodowski2@wisc.edu (Co-leader)

Jack Sperling jwsperling@wisc.edu (Co-leader)

Maiwand Tarazi mtarazi@wisc.edu (BWIG)

Elle Heimer eoheimer@wisc.edu (Team Communicator)

Nathan Klauck nklauck@wisc.edu (BSAC)

Ilia Mikhailenko imikhailenko@wisc.edu (BPAG)

Problem Statement

Airway management is important in keeping a patient stable in various medical environments. While novel techniques and innovative devices for better airway management have decreased the difficulties medical professionals face, developing airway management skills in difficult and unique scenarios is essential to positive and effective patient outcomes. Developing a method of using 3D printing and existing patient imaging to create realistic airway training manikins would allow medical professionals to practice airway management skills with physiologically consistent results.

Brief Status Update

The team's main focus this week was printing all parts needed for the base of the airway, and continuing to model as much as possible with the amount of airway imaging available

Summary of Team Role Accomplishments

- Maribel Glodowski
    - Completed modeling the interior components of the trainers
    - Began creating and organizing documents needed to complete the final deliverables
- Jack Sperling
    - Try out OnShape to see if STL tools are better
    - Discuss with the client the realistic potential of creating the model in Slicer compared to asking an RT to segment for us
    - Discussed with client's industry colleagues to get scan
    - Worked with Makerspace to reprint failed airway prints
    -
- Maiwand Tarazi
    - Continued searching for open access CT head and neck scans that are unrestricted; found one database with chest (lower neck) CTs
    - Noted difficulties in lab notebook regarding obtaining open access CT head/neck scans
    - Waiting for response from Synopsis – seems unlikely
- Elle Heimer
    - Updated lab archives
    - Communicated our progress with client
- Nathan
    - Attended for BSAC meeting
    - Prepared for BSAC exec meeting
- Ilia
    - Continued modifying the SOLIDWORKS base design
    - Visited the makerspace to inquire about options for rendering the headpiece of our model

Weekly/Ongoing Difficulties

- Procuring a DICOM file of an airway

Upcoming Team and Individual Goals:

The team's goal is to finish the fabrication of feasible parts and start testing.

- Maribel Glodowski
    - Continue adding printed pieces to enhance the functionality of the trainer base
    - Perform FEA on the SolidWorks-designed pieces
    - Continue working on final deliverables
- Jack Sperling
    - Work on final deliverables
    - Check with Makerspace to ensure final models are printed
    - Print dog bone sample for tensile testing
    - Conduct MTS testing
- Maiwand Tarazi
    - Continue searching for unrestricted open-source head/neck CTs
    - Work on final deliverables
- Elle Heimer
    - Work on final deliverables
    - Prepare poster presentation
- Nathan Klauck
    - Further develop airway trainer model and modeled other pieces in onShape
- Ilia
    - Finalize slides for presentation
    - Practice presentation with team to ensure it is cohesive

Activities Timesheet

Team Member	Time for the Week	Total Time for the Semester
Maribel Glodowski	6	40
Jack Sperling	8	46
Maiwand Tarazi	3	26
Elle Heimer	1	26
Nathan Klauck	5	30
Ilia Mikhailenko	2	26

Expenses:

- Approximately $45 on 3D prints at Makerspace

Project Timeline:

Task	Sept.			Oct.				Nov.					Dec.
	13	**20**	**27**	**4**	**11**	**18**	**25**	**1**	**8**	**15**	**22**	**29**	**6**
Project													
Brainstorming	**X**	**X**	**X**	**X**	**X**	**X**	**X**						
Researching	**X**	**X**	**X**	**X**									
Manufacturing					**X**	**X**	**X**	**X**	**X**	**X**	**X**		

Testing/Remodeling											X		
Deliverables													
Progress report	X	X	X	X	X	X	X	X	X	X	X		
PDS		X		X									
Mid-semester			X	X	X								
Final											X		
Meetings													
Team	X	X	X	X	X	X	X	X	X	X	X		
Advisor	X	X	X		X	X	X		X		X		
Client	X			X									
Website													
Update	X	X	X	X	X	X	X	X	X	X	X		