Progress Report
Display Augmentation System

DAEDALUS
Technologies

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The Display Augmentation System (DAS) proof of concept model is nearing completion as we expected. All major mechanical, electrical, and software components have been constructed and are operational. Integration and unit testing is also nearing completion. We are continuing to test individual systems and tune them accordingly while not detracting from a fully operational system. Electrical, mechanical, and software have had their share of problems though and have required retesting several areas. Our proof of concept model should be tuned to our standards within the coming week and ready for presenting by December 19th.

The few weeks will be critical for our project as we plan on being done within this time. Everyone has basically finished with the important course work and will be worrying about studying for exams soon. Emphasis will be on testing and bug finding in preparation for our presentation. Our original timeline has changed originally and a more accurate one is as follows shown in the figure below:

ID	Task Name	Start	Finish	Duration	Sep 2011			Oct 2011					Nov 2011				Dec 2011	
					11/9	18/9	25/9	2/10	9/10	16/10	23/10	30/10	6/11	13/11	20/11	27/11	4/12	
1	Proposal	12/09/2011	22/09/2011	1w 4d														
2	Research	12/09/2011	10/10/2011	4w 1d														
3	Functional Spec	23/09/2011	13/10/2011	3w														
4	Design Spec	13/10/2011	18/11/2011	5w 2d														
5	Implementation	21/10/2011	30/11/2011	5w 4d														
6	Final Integration	29/11/2011	13/12/2011	2w 1d														
7	Debugging/Testing	01/11/2011	09/12/2011	5w 4d														
8	Software Research	03/10/2011	21/11/2011	7w 1d														
9	Hardware Research	16/09/2011	03/11/2011	7w														
10	GUI Development	03/10/2011	02/12/2011	9w														
11	Face Tracking Development	03/10/2011	29/11/2011	8w 2d														
12	Stand Development	27/09/2011	10/11/2011	6w 3d														
13	Electrical Development	10/10/2011	18/11/2011	6w														
14	Software Testing	28/10/2011	13/12/2011	6w 3d														
15	Hardware Testing	17/10/2011	02/12/2011	7w														

Figure 1 Gantt Chart

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Hardware

The monitor stand, mounting plate, and nacelle have been completed for several weeks. We ran into several problems related to the motors, and encoding mechanism at the beginning and middle of the project but it did not hinder hardware advancement. A more recent and unexpected wiring failure also hindered testing for a few days

Originally, we had purchased stepper motors to allow the linear actuator and nacelle to move. As it turned out, only high-end stepper motors could provide the torque and stability we required so using 12V DC motors and creating our own actuating mechanism was a must. Unfortunately, the new linear actuator ran into alignment problems and required a redesign. We eventually fixed both problems a few weeks ago by realigning and remounting the vesa plate tilt mechanism while including a slide potentiometer. The range-of-tilt motion was not affected and we were able to meet our functional spec range of movement in the end.

Last weekend, we discovered that the wire used in one of the optocoupled transistor modules broke despite being encased in super glue and secured onto the frame. This took about two days worth of fixing but we were back on track for Monday

Electrical & Arduino

The PCB bas been operating normally since it's completion in early November and integrated with our system nicely. No problems were detected at the time and we have encountered no resistance while in use with the Arduino. The Arduino programming is mostly completed but code is being added as testing progresses to increase the robustness of our system. The arduino we were using did run into problems around the beginning of November. Some part of the USB interface blew so we were forced to program the chip directly until another Arduino was purchased a week later.

Integration

Software has been a long, uphill battle from the start. Linking OpenCV with other algorithms in Matlab proved to be a major stepping stone and any subsequent development was considerably easier. We were missing a few pieces of information on how to pass information between GUI functions but luckily for us, several of our friends had spent entire Co-op terms learning Matlab inside-out and shared some of their wisdom with us. Subsequent work on the GUI involved testing and debugging the timer functions and using the profiler to determine how the system could be optimized.

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A majority of our headaches came from the facial recognition code itself. That being said, there was still a lot of work to be done on top of that. We experimented with numerous algorithms and programs available for download but most had problems with false matches or not returning enough multi-face information to provide adequate feedback for our Matlab scripts. This was the last system to get up and running fully but have gotten the code to a point where we are comfortable with it's stability. It now handles multiple faces through sending reliable data required some work because without a training image set for the algorithm to analyze, anything that possesses face-like features gets detected as a face on a regular basis.

The last step with integration is to finish integrating this almost complete software with the almost completed Arduino code. We expect this to progress for the next few weeks.

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Budget

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We are on budget as anticipated. We have spend most of our $500 ESSEF award funding on PCBs, a second Arduino, and new motors. The rest went toward raw materials for the stand and electrical components. There are a few more parts both mandatory and backup to be purchased which will bring us above the $500 mark. We have also been offered funding from Dr.Ash Parameswaran which should cover the remaining funds.

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The team at Daedalus Technologies has made significant progress towards the completion of DAS. Most of the sections are either on schedule, or will be back on schedule within the next weeks. Many major milestones have been met, and there are only a one major milestones left before DAS will be fully functioning. Also, the budget has been well adhered to and CHAD should be completed with a total cost close to or even under the initial estimate outlined in the project proposal. Our team will continue to work smart and efficiently in order to complete DAS on schedule, and in accordance with the design specification.

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Conclusion

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