Work Progress Report

Rev 1.0

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Health-Assist

Introduction

Pill-Matic is an automated pill dispenser and reminder system designed for patients with multiple daily prescriptions. Pill-Matic will be linked to a mobile device through an Android application capable of communicating pill schedules, dosages, and missed alerts. The project requires a combination of hardware, firmware and software components and is expected to be ready by our group's demo date of April 20, 2016.

Schedule

Currently our group is on track towards meeting our initial completion dates for most tasks. We are slightly behind in terms of testing, and debugging. Our software team is also behind in the functional aspects of the mobile app, but we expect this will be resolved within the week. The firmware team only has parts of the GUI left to complete as of this moment. Overall, we are expecting everything to be ready and finished by our new expected completion date of April 8, 2016. This gives us roughly 2 weeks' worth of extra time in case of any unexpected circumstances that may arise.

Financial

The financial state of the Pill-Matic project is currently well within the budget of $575.45, with no major further expenditures required. At $456.27 spent, we are more than $100 under our initial budget, and only a bit above the amount we received from the ESSEF funding. Our group plans to apply for the Wighton fund since we have saved all of our receipts, so as to recuperate this remaining amount. If this does not become possible for whatever reason, then we can split the remaining costs between every group member. Table 1 highlights our project finances as of Mar 28, 2016.

Table 1: Finances of the Pill-Matic project

	Initial Budget	Actual Spending	Amount under budget	ESSEF funding	Remaining costs
Dollars (CAD)	$575.45	$456.27	$119.18	$415.00	$41.27

Work Progress

General

The overall pace of the project of our group has been very steady so far, with very little major issues arising. Currently, our group meets at TASC2 every Friday from 10:30 – 11:30 AM to discuss team statuses, expected work deadlines, and documentation left required to complete. Our original idea of the automatic pill dispenser was also a byproduct of such meetings and we believe that this is an excellent system of sharing and discussing ideas. Meetings are intentionally kept short for conciseness and improve communication. Every team member of the Health-Assist group is also part of a Skype group chat so that any member can be reached if we need to discuss something urgent and online.

In general, our group decided that work would be done individually by the team in charge of that division and that when we need to combine the components together, everyone on the team will be involved in the process. This work includes research of individual components as well as planning. However, the group discusses and has a say in general requirements for each team such as deadlines, expenditures and overall direction. Every meeting on Friday serves as a way for the group to reset and

update each other on the overall progress so far. Teams in between of course, are always free to coordinate and help amongst each other.

Hardware

The hardware team is led by Connor Dueck and he was put in charge of deciding on the mechanical design, parts and material acquisition and also fabrication of the final mechanical product. As the CEO and the receiver of the ESSEF funding, our group decided that essentially all purchases will be made by him so as to keep costs localized to one person.

Mechanical design was made in Solidworks and was consistently iterated through group input, 3-D test prints and comparisons to other similar products. 3D printing of the enclosure was done by sending the design to a print shop located in Vancouver, and other electronics components were mainly bought through Robotshop and Amazon.

One setback in particular is the slope and angles of our 3-D printed mechanical system being unable to properly dispense smaller or different sized shaped pills. The solution right now is to fill in parts of the enclosure to limit the speed of smaller pills and to sand other sections to allow larger pills.

Once software and firmware has been completed, the hardware can be introduced for test analysis and debugging. This has been planned for April 8, 2016.

Firmware

The firmware was performed by Devon Louie. The only piece of major hardware expenditure here was the Raspberry Pi 2. The system image portion of the firmware has been completed so far, and the GUI is currently the only thing left in the firmware team's work queue and is expected to be completed in time for demo. Connection between the Pi 2 and the Arduino Pro Micro has also been completed via serial communication protocol.

Software

Software is managed by Peter Hsu and Adam Gabriel. The progress on the software team is that they have started building the basic Android mobile app using Kivy already. Calendar and Bluetooth connection to device has been completed, and only functionalities of the app remain. This team is currently also behind expected schedule, but will also be ready for the April 8 deadline. No expenditures for parts were needed by this team.

Documentation

Jerry Yao is in charge of documentation and logistics of the project. So far our group has successfully completed all required documents on time. We did choose to use the allowable extension on the Design Specifications as we felt it was the most difficult document of the three, since it required very specific technical details as opposed to the other ones. After the Work Progress Report and Test Plans, there is only the demo slides and the post-mortems due. We expect to begin working on the group presentations as soon as the Pill-Matic prototype is complete which should be on April 8, and to finish in the week before April 20 - so as to allow time for rehearsals. The post-mortem will be started on April 1, since this document does not need special preparations to be completed, and will act as a working document up until the day of the final presentation. Overall, there should be no immediate issues with the post-mortem as we have kept all of our meeting minutes.

Remediation

General

Our progress so far can be illustrated in Table 2. Every team has had small setbacks in terms of meeting deadlines. Fortunately, our original scheduled completion dates were very strict on time, which means even if we were to be delayed by a few weeks, we would still be in time for the demo. Of course this means that we will have about two less weeks to perform presentation rehearsals and do final bug checks.

Table 2: Remain tasks for the Pill-Matic and respective deadlines

Remaining Tasks	Original Completion Date	Delayed to
Hardware Testing and Debugging	Mar 31, 2016	April 8, 2016
Firmware GUI	April, 1, 2016	April 8, 2016
Software Functionalities	Feb 15, 2016	April 1, 2016
Software Testing and Debugging	Mar 31, 2016	April 8, 2016
Group Demo / Post-Mortem	April 8, 2016	April 15, 2016

Hardware

The main features for hardware has been completed. The Pill-Matic currently correctly dispenses for a certain type of pill when given the right input bits and the team is focused on expanding the number of different types of pills dispensed using solutions listed above. Ultimately however, the final testing and debugging can only be completed when everything is combined, and so, this requires the completion of remaining tasks from other teams. Since there is not too much left to do for the hardware team, the new deadline should pose no challenge to meet.

Firmware

Only slightly behind schedule, but should be easily finished by April 8, 2016. This goal was not met mainly because of the strict initial deadlines, rather than a delay in the actual firmware.

Software

The software functionalities are behind schedule by a lot because of a change in the course of actions since the inception of the original completion dates to now. Rather than complete functionalities first as the software team had originally planned, the swap was made to finish GUI and Bluetooth was working first. The delay is a result of the shift in priorities and should be resolved by the April 8 deadline.

Documentation

All documents will be completed on time when the prototype is working well as our group has put emphasis in completion of product first.

Conclusion

The Health-Assist team is currently slightly behind schedule in the prototyping of the Pill-Matic, but is perfectly safe to make the demo deadlines. This was partly in thanks to our stringent initial deadlines which gives us more leeway when it comes to delays. Financially, the spending has been under control for the entire duration of the project and should face no significant future difficulties, and we expect to be fully finished on the prototype by April 8, 2016.