Fall Emergency Distress System
Progress Report

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Introduction

FEDS (Fall Emergency Detection System) is a wearable device with the purpose of detecting a user's falls. When the user falls on the ground, the device will start buzzing. If he or she does not cancel the warning alarm, an operator who is monitoring all connected FEDS devices will call for an emergency response team. The design concept of the product is currently in the final stage of integration. This project is divided into 3 parts: microcontroller/component programming, communication with the server, and the design of circuit board and the casing. Although slightly behind schedule, completion of the proof-of-concept device will be finished on time and before the demo.

Schedule

The Gantt Chart shown below is the new scheduled projection for FEDS. The schedule was updated to compensate for unexpected delays and the more notable changes are as follows:

- Presentation/demo preparation: updated from (28 November 2015 - 3 December 2015) to (8 December 2015 - 16 December 2015)
- Software Integration: updated from(8 November 2015 - 16 November 2015) to (8 November 2015 - 3 December 2015)
- Product Integration: updated from (16 November 2015 - 20 November 2015) to (16 November 2015 - 6 December 2015)
- Product Testing: updated from (20 November 2015 - 1 December 2015) to (3 December 2015 - 13 December 2015)
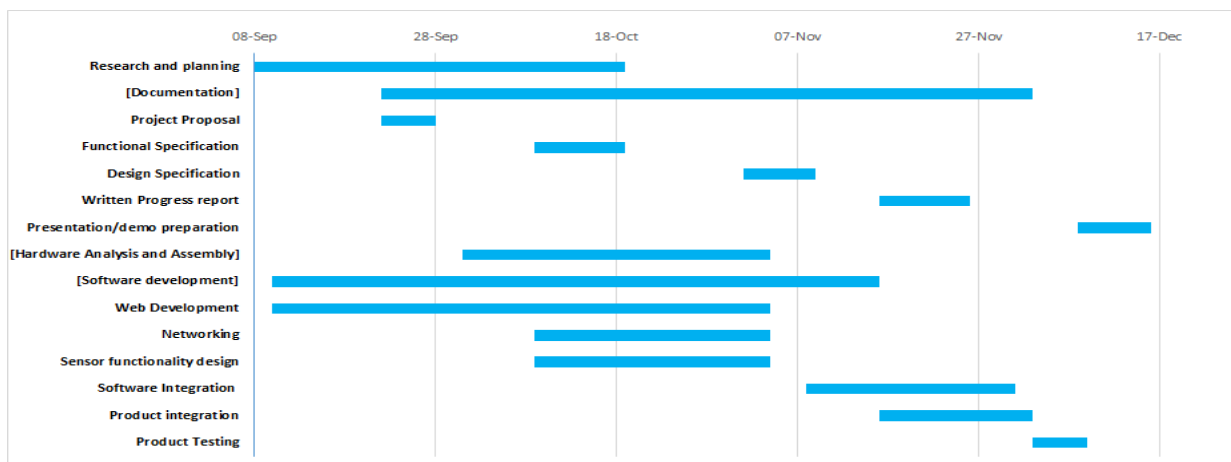

Figure 1: Gantt Chart of the updated schedule

Finances

4Life was given $500 from ESSS to build and test FEDS. To date, 60% of the funding from ESSS has been spent on hardware and a domain name. The remaining 40% will be allocated towards building a case and unforeseen expenses. FEDS has estimated the case to cost roughly $125 and that leaves $75 for unforeseen expenses.

Hardware and Domain Name Cost	$298.78
Estimated Casing Cost	$125.00
Estimated Total Cost	$423.78
Estimated Funding Remaining	$ 76.22

Hardware Component Progress

Hardware	Hardware Status	Software Status
Accelerometer	**Completed:** Integrated sensor with the Raspberry Pi	**Completed:** Installed necessary drivers into Raspberry pi to allow for interaction with the accelerometer Developed and tested the code for the accelerometer to detect falls
GPS	**Completed:** Integrated sensor with the Raspberry Pi	**Completed:** Configured the Raspberry Pi to use UART interface through the GPIO Developed and tested the code to acquire current longitude and latitude from GPS
On/Off Switch	**Completed:** Soldered and tested rocker switch to power supply cable	**N/A**
LED	**Completed:** Connected LED to Raspberry Pi and tested display of different colors	**Incomplete (due to software integration):** Program LED to display different colors according to the devices status
Button	**Completed:** Connected buttons to Raspberry Pi and properly sending/receiving signals to the Raspberry	**Incomplete (due to software integration):** Program buttons to cancel or call for help.

Software/Server Integration Process

Task	Completed Areas	Incomplete Areas
FEDS' Device Software Integration	Combined accelerometer, GPS and Wi-Fi geolocation, and LED functions Completed device and server database connection	Changing status of device through button Reconfiguring buzzer to output different frequencies according to the device's status
Operator Interface	Ability to display and modify user information on the server's database through the operator's interface Able to sort users by user priority level	N/A

Product Integration Progress

Type of connection	Status
Protoboard connection	**Completed:** Soldered all connection wires and resistors to the protoboard Tested connection of components to the protoboard and Raspberry Pi
PCB Design	**Completed:** Learned process and requirements for creating a PCB with Jamal Bought PCB board and etching solution **Incomplete:** Still required to design and etch PCB (roughly 5 days to complete)
Case Design	**Completed:** General model of wearable device **Incomplete:** Fine details according to PCB layout

Remediation

Compared to the proposed schedule, the project is currently behind schedule on software integration, product integration, and proof-of-concept device testing. This should not be an issue because on the proposed schedule, the predicted demo date was on December 3rd while the actual demo date is on December 16th. With 2 extra weeks, there should be enough time to complete the proof-of-concept device. If required, there are still ways to work around these incomplete sections.

The proof-of-concept device is not yet completed but the code for each component is complete. To compensate for the delay, each component has been tested with their individual code to confirm that it works accordingly. For software integration, a majority of the code has been completed and tested. The remainder of the code is expected to be completed by December 3rd. In regards to product integration, the PCB is not yet done. However, the circuity for the protoboard is complete. If the PCB cannot be completed by December 2nd, a case for the protoboard will be created and all components will be integrated together.

Conclusion

4Life Technology's team has deviated from the proposed schedule but is planning to finish all of the functions of the device before the demo date, as explained in the remediation section. Having completed preliminary tests, the current state of the device is able to detect falling with a 90% accuracy. The accelerometer, GPS, and Wi-Fi integration is complete and functioning properly. In terms of the budget, the money spent on designing and building FEDS is within the proposed plan. In summary, the proof-of-concept device for the Fall Emergency Distress System will be complete before December 16th, 2015.