Project Report

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Project Name: Take Me There

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Introduction

This document will provide information about the project. In this document will give an overview of what was accomplished, what went wrong, what I learned and what I would do differently. Also included will be a description of the project and if it matches up to the specification.

Final Submitted Project Description

The final project that I have submitted is a monitor for people with Alzheimer's and other brain diseases. Included in this project is a web client and a device that is used to monitor the patient.

Web Client

When the web client first loads there are shown the main homepage which will give a bit of information about the web client and will give them the option to either login or register

To gain access to the features of the client the user must first register. The user must give all the details required by the client to register. The user is only able to register an email address once, so if they try to register with the same email again they will be redirected back to the register page and given an error.

Once registered the user must login with the email address and password they registered with. If they enter in the incorrect details they will be redirected to the login page with an error telling them that the details are incorrect. When they login they are brought to their homepage and have access to the features of the web client.

In the web client you can view the history of the patient, for example you can see where they have been and if they have fallen, it also displays the time and date of where they have been and if they have fallen in that location or not.

The location page shows the user the current position of the patient on a map.

You also get the option to add/edit the patients name, the device details, and set their boundary limits and their curfew time.

Galileo Board with 3G/GPRS Shield and Accelerometer

For the device once it is powered on and connected to the computer you are able to select a few options.

The first option gets the GPS data of the Take me there device which works once the wearer is outside.

The next option is the boundary detection. For this part to work I had to set up some dummy data to be able to demonstrate that it works. I created two arrays one was a dummy location of the patient and the other was the boundary coordinates. It then gets the two arrays and performs the distance formula on them and if the distance of the two coordinates is greater than the boundary radius the device sends a text to the registered number for the carer to let them know that the patient has left the boundary.

The last option is the fall indicator. This uses the accelerometer which reads in data from the x, y, z axis and gets the G-force of each. Once it gets the G-force of each axis it gets the G-force of all three axis combined. For demonstration purposes I have it set to if it is above a certain G-force it sends a text to the carer to let them know that the patient has fallen over.

Does The project Match The Design and Specification Document

For this project the web client matches up to the design document and the specification document as there was no issues or complications when creating the web client. The device that was created by using the Galileo board, 3G/GPRS shield and an accelerometer does not match the two documents exactly. The problems with the Take me there device was due to the technology used because Galileo did not allow the use of some libraries that help get the GPS coordinates from the 3G/GPRS shield.

The boundary section of the Take me there device does not work to the documents because I was unable to get any connection to the internet with the 3G/GPRS shield. I tried a couple of different tutorials to get some kind of connectivity but they did not function the way they were supposed to. The two examples I used for the project to test the connection was one was to send an email from one account to another account and the other was to make a http connection to a server and say if it made the connection which it did not. To get this section of the Take me there device to work even slightly I had to create dummy data to use to show that the potential of it working is there.

The section of the Take me there device that gets the GPS data works but not to the extent of the documents. The Take me there device gets the data from the satellites in a NMEA sentence format which needs to be converted. Unfortunately due to the technology the device does not always get the GPS data so I was unable to convert it from NMEA sentence to the proper format needed to send the data to the database. I have in the Technical manual shown some example code to try the conversion but it does not work.

The fall indicator in this device works but there were complications with the accelerometer. The problem was that once it was calibrated after 10 minutes or so the accelerometer would not be

calibrated and with the set data to indicate a fall it would not be right as the G-forces become greater than the set G-force used to indicate a fall. Also as mentioned above I am unable to send the data to the database due to the technology. The device does still send the text message to the registered number to demonstrate that it has the potential.

What Did I Learn?

Technical

From this project I have learned a lot about Arduino programming and how to interact with the Galileo board and Arduino boards through C programming. Also with this project learned how to connect other shields and different boards to the Galileo board. At the beginning I was going to use python on the board to interact with the 3G/GPRS shield and the accelerometer so I installed Clayton which was a cut down version of Linux but was not able to gain access to them.

For the project I also had to create a database and web client and my knowledge for databases was not great but now after doing this project I feel more confident with creating and managing database then I did at the beginning of the project. With the web client I knew how to create small web clients but I did not have the knowledge to complete the tasks that were required for this project, so I did research what I had to do to get a web client that I needed for this project and I learned a lot about creating web clients and how to manipulate data from the database to display it the way it was needed in the web client.

Personal

What I learned personally from this project is how to manage time a lot better than I previously did. I improved my communication skills by conferring with other lecturers in the college that I needed to talk with to help me with the basics of coding for the Galileo board and coding in python for creating my web client. I also improved my presentation skill by presenting my project to my fellow classmates and telling them about what I had to learn to get it to the stage it was at the time of presenting. I added new skills to my technical skills by learning more about python, databases and programming for the Galileo board.

Review of My Project

What Went Right

The part of this project that went right was the web client and the database. The web client works the way I wanted it to and the way it needs to work for this project. The hardest part of creating the web client was setting up the database to interact with the web client as I had not much experience interacting with a database.

Also I am able to send text messages from the Take me there device to the phone number that is set in the Take me there device.

What Went Wrong

The part of the project that went wrong was the Take me there device that I had to create for the project. The major problems for this part to go wrong was the technology and the delivery of the parts took about 3 months. The main board for the project was the Intel Galileo gen one board and the main problem with that was that it did not support certain libraries that are used to help get the GPS data and converting it from NMEA to degrees.

The 3G/GPRS shield would not get the GPS data when it is indoors I had to be outdoors to get the data so I was unable to create a converter to change it from NMEA to degrees. When I had the Take me there device outside it only picked up the data from the satellite once and was unable to get the GPS data again. To test the connectivity of the board to the internet as stated above I tried a couple of examples to try and get connection but it would not connect. One of the examples I tried was sending an email by logging in on the Galileo board and sending an email to another email address. The Take me there device would get to connecting to the mail server and would get no further.

The Accelerometer after 10 minutes is not calibrated anymore. The accelerometer needs to be calibrated in order to get the proper data needed from it. This part of the Take me there device is really important because the accelerometer is used to check whether the patient has fallen or not because it could send false texts to the carer that the patient has fallen over when in fact they have not.

What Didn't Get Done

Due to the length it took for the parts needed for the project the device part of the project changed. The main feature of the project was that you would press a button and the Take me there device would direct you home and the features mentioned above were suppose to extra functions but then became the main features of the device. The part that not get done was the guiding the patient home if they get lost because of time constraints. Also I was unable to get the Take me there device to connect to the database because of the technology not working properly.

What Would Be Done Differently

If I was able to do this project again I would choose the Intel Galileo gen two board or an Arduino board because they support the necessary libraries needed to get the GPS data and to convert the data. I would also take more time into choosing the parts needed as the parts I got for this project had a lot of problems and took a lot of work to get it to the point it is in now. The 3G/GPRS shield did not do what I needed to do for getting the GPS data because I had to be outside to get the GPS data and even when I was outside it did not always pick up the GPS data. The shield could not make any internet connection which was needed to connect to the database to update it and add new data. The accelerometer would not stay calibrated and it was not able to measure an impact with it so I would change it to an impact sensor.

Acknowledgements