EASY WAY

WRITTEN PROGRESS REPORT FOR AUTO SHOPPING GUIDE

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The ***ASG***, Auto Shopping Guide, is a system that allows users to be able to locate the items on their shopping lists. The system consists of both hardware and software. The hardware part that features a robotic car and several ultra—sonic sensors for range detection is mainly in charge of guiding users to their targeted location. The software part that is comprised of a user interface, database and robotic programming is primarily taking care of data manipulating, signal processing and route calculating. The entire system operates on an Atmel AVR 8—bit microcontroller.

SCHEDULING

Over the past three months, Easy Way Inc. has completed the entire development phase 1 and finishing up development phase 2. The two phases were scheduled to be completed within the first three months. We did run into an issue during the software development phases which is causing us minor delay in respect to our original schedule. During each phase, component tests have also been performed correspondingly in order to ensure functional requirements and avoid modifications during the completion of the project. Detailed progress regarding hardware and software components will be presented in this document.

HARDWARE

The hardware part of the ASG system consists of a robotic car and ultra—sonic sensors. The background research, electrical schematics analysis, electronic component acquisition and process of assembly of the robotic car are completely covered in the development phase 1. The background research and electrical schematic analysis started before this term. Various ideas regarding the project topic were proposed by the members of Easy Way Inc. And the ASG system was selected during the meeting after our first lecture. In the following week, the comprehensive system overview was generated and it has been continuously improved till now. As well, the electrical schematics of the robotic car was obtained through internet. After the system diagram was presented and the original schedule was confirmed, Easy Way Inc. started the electrical schematics analysis and electronic component acquisition according to the schematics. The design team obtained the designed PCB and necessary electronic components including capacitors, resistors, and so on, straightly from Arexx Engineering. After analyzing the electrical schematics by our design team, the members in charge of the hardware part preciously soldered the electronic components including the Atmel AVR 8—bit microcontroller, the motors, and the IR receiver onto the PCB. We developed a simple self—test program via WinAVR open source software development platform for the robotic car and loaded onto the microcontroller to perform the functionality test for the purpose of ensuring the assembly was successful and all components were properly

functioning. The development phase 1 was completed within the second month. Currently the only objective left for hardware development is implementing the ultra—sonic sensors which is under way. The project entered the development phase 2 right after the completion of the assembly while running the functionality tests for the robotic car simultaneously.

SOFTWARE

The software part of the ASG system contains the user interface, the database and robotic programming. This part is in charge of data manipulating, signal processing and route calculating. It is going to be operated on mobile devices. The development of the software is included in both development phase 2 and phase 3. Following the completion of the development phase 1, phase 2 was initiated to design the user interface and the database. Based on our members' skillset and experience, HTML and JavaScript were selected as the scripting languages for designing the user interface, and PHP was used to design the database. By the time of doing oral progress presentation, the user interface and database were nearly finished and partially tested. The web—based user interface is capable of reading user inputs, and transferring user inputs to the database. And the database is able to store and load information. Our software development team is currently working on the JavaScript part which is taking care of the output coordinate calculation. Due to the time constraints, Easy Way Inc. has also started the phase 3 after the oral progress presentation, the development of robotic programming via WinAVR open source software development platform, which is used to calculate routes of the robotic car. The robotic programming takes the output coordinates from the user interface as its own inputs for route calculation. While our developers were coding the C programming for robotic car, we figured that it was hardly possible to build a connection between the user interface and the WinAVR compiler. With such connection existing, data transmitting would take place internally and users would not have to manually insert inputs for the compiler to run calculation. We proposed this issue during our presentation and also sought possible solutions from the TAs. We have come up with a few alternatives which will be discussed further in ***REMEDIATION*** section.

REMEDIATION

Remediation is already underway. Our focus has shifted from hardware to software. As the project is slightly behind the original schedule, Easy Way Inc. decides to implement software and hardware work simultaneously. For hardware part, since it is about 90% finished, we currently have one member who is looking into the design and implementation of the ultra—sonic sensors. For the software part, we have one member searching for possible solutions to the connection issue that is mentioned previously, and

two members working on the necessary functions of the robotic programming. We were suggested by the TAs to re—design the user interface and database in C or C# to establish an easy communication between the UI and the AVR compiler. As a result, we have our last member investigating the possibilities, and re—writing the UI and database. Each member is in charge of the functionality testing corresponding to their duties. We anticipate that the project will be completed five days prior to our final demonstration date, Apr 16th.

FINANCIAL STATUS

In total, we have spent approximately $290 on components for the system. Our budget came in $500 funds by our team members. At the moment, we have $210 left. We expected the total cost of the product was $510. However, because we ordered some components from abroad, the actual cost is lower than the expected cost. The following Table-1 Budget shows the values of each component.

Equipment	Quantity	Total Cost
Robotic	1	$100
Motors	2	$50
USB IR Transceiver	1	$60
Barrier Sensor	1	$50
Power Supply	1	$30

Table 1 Values of each component

CONCLUSION

As it is stated in the above sections, the overall design progress is essentially on track despite some minor hiccups. The hardware aspect meets our design requirements well ahead of schedule. The implementation of ultra—sonic sensors is the only task left. We are also planning to provide some improvements to the hardware such as increasing the range of IR transmitting if time permits. The software is slightly behind schedule, but we still have time left of fixing issues, providing alternatives and testing functionalities. The system should be completed on time. Obstacles should be cleared with efficient resource allocation to ensure the final prototype is delivered as expected.