Final Project Proposal

Year: 2018 Semester: Spring Team: 16 Project: Track-on-Track

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Team Members (#1 is Team Leader):

Member 1: Nick Geirland Email: ngeirlan@purdue.edu

Member 2: Nathan McNally Email: nmcnall@purdue.edu

Member 3: Yunsheng Li Email: li1436@purdue.edu

Member 4: Aaron Kaiser Email: kaiser20@purdue.edu

1.0 Project Description:

Track-on-Track is a project which helps users to find their belongings. It is attached to user’s belonging and uses a SIM card module to connect with a phone app which shows the locations of the device. When the device is in shorter range, it uses a Bluetooth module and shows on the app whether the user is getting closer to the device. A smartphone application will allow the user to interact with the device. The user will be able to see the device’s location, activate a sound alarm on the device, and manipulate the devices settings remotely. The user will also be able to interact with the device’s settings through various buttons and an LCD on the device.

2.0 Roles and Responsibilities:

Nicholas Geirland will be the team leader for the project. This will involve making sure everyone is able to work on their portions of the project while also helping out with any design issues that may rise up. He is suited for this because he has been the team leader in all of his previous Computer Engineering class projects. He has also been the vice president of the Purdue Linux User Group since the end of his freshman year so leadership isn’t a new responsibility for him.

Nathan McNally has experience with both high level and low level programming languages. He has experience in Java, C, C++, assembly, and python. He has experience programming microcontrollers as well as working with phone apps. For these reasons, he will be the software engineer of the group, assisting in both microcontroller and app programming responsibilities.

Yunsheng Li will be the hardware engineer since he is highly interested in designing PCB and hardware aspects of the project. He is good at constructing circuit boards and doing math of circuits. He designed the circuit layout for his ECE 362 project. Also, he has some experience in using EAGLE for PCB design and 3D printing.

Aaron Kaiser will be the systems engineer due to his interest and experience in dealing with integrating software and hardware. He’s good at dealing with high level problems and assessing generic issues when they arise. He’s well versed in theories and concepts and in his past ECE 337 team he was responsible for creating many systems diagrams and tackling system wide bugs.

2.1 Homework Assignment Responsibilities

Homework responsibilities are detailed in Figure 1, below.

|  |  |  |  |
| --- | --- | --- | --- |
| *Design Component Homework* | | *Professional Component Homework* | |
| 3-Software Overview | NG | 9-Legal Analysis | NM |
| 5-Electrical Overview | YL | 10-Reliability and Safety Analysis | NG |
| 7-Mechanical Overview | NM | 11-Ethical/Environmental Analysis | YL |
| 8-Software Formalization | AK | 12-User Manual | AK |

Figure 1: Assignment Responsibilities

NG: Nicholas Geirland NM: Nathan McNally YL: Yunsheng Li AK: Aaron Kaiser

3.0 Estimated Budget

|  |  |
| --- | --- |
| **Item** | **Estimated Cost** |
| ***Mechanical*** |  |
| Packaging | $5.00 |
| ***Electrical*** |  |
| SIM Card | $9.00 |
| Cell Modem | $70.00 |
| PCB Fabrication | $50.00 |
| PCB Components | $30.00 |
| Rechargeable Battery | $40.00 |
| Microcontroller | $20.00 |
| Bluetooth Chip | $5.00 |
| Antennae | $15.00 |
| ***Other*** |  |
| Shipping | $50.00 |
| Cell Service Package (2 mo. time period) | $20.00 |
| ***Total Estimated Cost*** | $314.00 |

The first section is mechanical, which includes the physical non-electrical components of the device. For this project, this only includes packaging, as this design does not include any moving parts or major physical uses. The next section is electrical, which includes all physical hardware which is involved in electrical processes. For this project, this includes things involved in communication, such as a SIM card and a bluetooth chip, in addition to basic components such as a PCB and a microcontroller. The other category includes costs associated with services rather than physical items, and for this project includes shipping costs along with a cell service package.

The project is currently within the budget of $425 given by Purdue, but additional costs may be incurred throughout the development process, as components may be more expensive than anticipated, components may be broken during the testing phases, or because the PCB may have to be remade. If costs exceed the allotment of funds, additional costs will be split evenly among team members.

4.0 Project Specific Success Criteria

1. An ability to communicate with the user through Bluetooth in short distances.
2. An ability to communicate with the user through a cell modem over SMS in long distances.
3. An ability to display operating mode, battery life, and cell signal through an LCD.
4. An ability to detect the devices location.
5. An ability to control the device through a smartphone application.