Project Narrative

Fire alarm:

Motivation

In today’s day and age, technology advancements are occurring at a rapid pace. There are new inventions being created every minute improving people’s lives and making the world a better and safer place. Our group saw that while technology is advancing and becoming a bigger part of our every day lives, one piece of technology that has not seen a major improvement in decades is the smoke detector. This device is a standard in everyone’s homes, offices, hotels and all other major buildings that we spend time in every single day but has been neglected as far as engineering advancement is concerned. The smoke alarm that you have inside your house is essentially the same one your parents had inside theirs. We thought we could do better. When looking at the average use case of a smoke detector, it was discovered that while they are useful, these devices do not provide the user with an abundance of information. Many times someone would hear the alarm go off and just frantically run to wherever they believe to be the nearest and safest exit without much of a plan. This scenario has the potential for disaster when you consider that there could be multiple people inside the building who do not know their way around and could be endangering themselves. People could be wasting valuable time or actually heading in a direction that is dangerous. We believe that a smoke alarm with improved functionality can help to eliminate this scenario and make everyone’s lives easier, and most importantly, safer.

Goals, Objectives, and Function

The goals for the smart smoke detector and fire alarm are to make an affordable, customizable, connected system of smoke alarms that alert employees and residents of the safest and fastest exit to the building in the case of a fire emergency. We would like this system to not be that much more expensive than existing options in order to convince the market to adopt our system. In the event of an emergency, these smoke alarms would sound off in an order that would lead people to the closest and safest exit. Users would just have to follow the sound that is projected from these alarms until they reach the exit to the building. These smoke alarms would be dynamic in the sense that they adapt to where the fire is located. This means that if a smoke alarm that is in the middle of a hallway goes off, people on the left of that area would be directed to the exit that is closest on their side of the fire while people on the right of that area would be directed to the exit that is closest on the other side of the fire and nobody is directed though the dangerous area. The system would also be able to handle hallway intersections and other confusing areas. This allows for residents to know where the fire is and what areas to avoid. For people that have hearing issues, these alarms will also have a visual display that will point people in the direction they should go to exit the building. This also allows for better handling of confusing areas where sound alone could be confusing.

Teaching Assistant

Motivation:

Education is the most important gift that can be provided to a person. At it’s most basic level, it provides someone with the baseline skills that are necessary to thrive as an adult in our ever changing society. Education has the ability to inspire, induce confidence, and make the world a better place. We feel, however, that public education can sometimes get left behind when it comes to innovation and an effort to improve. One of the major reasons behind this, as we can all assume, is government budgets and public funding. Education can be very expensive while schools and government agencies never seem to have as much funding as they need. This is the motivation for our project. One of the major initiatives for improving young education across the United States is the inclusion of iPads, tablets, and laptops into the classroom. While we believe that these devices can provide immense benefit to students, these devices can be very expensive. We sought out to design a device that students could use in conjunction with their teacher that could provide similar uses to those high cost devices but at a much better value. We believe that at a lower cost, educators, parents, and institutions would be more included to accept technology into their classrooms.

Goals, Objectives, and Function.

The goals for our teaching tool would be to create a low cost device that students could use to interact with and engage in challenging tasks to further their involvement in the classroom. This device would include a microphone and use speech recognition to take input from the user. This solves two issues. This allows for students at any age to be able to use the system while also limiting the amount of inputs to the system in order to keep the price low. The device would also include a small display so that users could read questions and tasks from the device. A large enough power supply would have to be included so that this device could be portable and used for a suitable amount of time. Lastly, this device would include memory and wireless connectivity in order to store results and transmit those results to a teacher in class. I strong example for this device would be young students trying to learn the alphabet or their multiplication tables. A teacher could give an assignment to the students where they are to study multiplication when they get home. The student would take out the device and the device would ask for the answer to simple math problems. The student would then say the answer into the device and the device would either accept the answer or tell the student that they were wrong and try again. The device would store the statistics for how well they are doing on this assignment and when the student comes in to class the next day, could transmit this data to the teacher. The student could also use the device as much as they liked and use it as a fun study tool. The teacher could then see how well the class is doing and how much they studied and practiced. We believe this device would be useful to both students and teachers and increase involvement inside and outside of the classroom.

Budget

Smoke Alarm System:

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| --- | --- |
| Wireless Adapters | $10 x 5 = $50 |
| Battery Harness / Power Supply | $3 x 5 = $15 |
| Speaker/Alarm | $1 x 5 = $5 |
| Various Electrical Components | $10 x 5 = $50 |
| Microcontroller for Hub | $30 x 1 = $30 |
| PCB boards | $10 x 5 = $50 |
| Smoke Sensors | $7 x 5 = $35 |
| Boot flasher | $15 x 1 = $15 |
| Estimated Total | $250 |

The initial estimated cost for this smart smoke detector project is $250. At the time of designing this budget, our group does not have a sponsor. This means that the project will be group funded by our members. We will add an additional $50 to this budget to account for broken parts, errors, and items that are unaccounted for. This brings the total cost of our project to $300.

Teaching Assistant.

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| --- | --- |
| Microphone/Voice Control Module | $25 x 3 = $75 |
| Speaker | $2 x 3 = $6 |
| Display | $10 x 3 = $30 |
| Memory/Ram | $5 x 3 = $15 |
| Rechargeable Battery | $20 x 3 = $60 |
| Microcontroller/Miscellaneous Parts | $15 x 3 = $45 |
| PCB boards | $10 x 3 = $30 |
| Wifi Adapter | $10 x 3 = $30 |
| Boot Flasher | $15 = 1 = $15 |
| Estimated Total | $306 |

The initial estimated cost for the teaching assistant project is $306. At the time of designing this budget, our group does not have a sponsor. This means that the project will be group funded by our members. We will add an additional $44 to this budget to account for broken parts, errors, and items that are unaccounted for. This brings the total cost of our project to $350.