

# Research and Developement Ideas

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## 1. SPEECH SYNTHESIZER SOFTWARE

### Describe the problem:

The use of technology, specifically a virtual voice system, can convert sensory signals to voice. The problem addressed is that people who cannot speak are unable to explain what they feel or what they want, and sometimes miscommunication may cause major problems. One example of an existing solution is Stephen Hawkins' speech generating device which uses an eye tracking system and word processing. A speech generating device is usually expensive, and it is a physical device typically bigger than a mobile phone. Our main goal is to create software (open source application) which will be available for people who cannot afford such a device. Because everybody is using smart phones, we can create application software for the smart phone using sensors (there is no physical device).

### Who benefits:

People who are dumb, paralyzed, or lost their voice due to thoracic cancer or any other problem may not be able to express their feelings; so in order to help those people, we can use this technology. This can also be used by people who have speech difficulties and in special education programs as an easy way to communicate and participate in activities and events that require speaking.

### Solution you'd like to test:

This test process includes attaching a sensor to a Bluetooth which captures jaw movement and converting those signals into speech using algorithms, which will convert signals to text and from text. We can convert it into an automated voice in bilingual patterns, so it can be used by all people no matter what language they speak.

Our main goal is to create software (open source application) which will be available for people who cannot afford such a device.

### What have you done or learned:

I have researched different sensors and also found out how to create and use algorithms to convert signals to text. I read and researched about the software program which converts text to speech. Our biggest challenge will be binding all the separate functions together and bringing the expected solution.

### How will you measure and evaluate success:

This software can be uploaded in the Google Play store and also doctors can recommend it to the

patients who need speech generating devices. By the number of downloads from the store, we can measure and evaluate its success.

### SKILLS:

- Programming knowledge in .net and SQL
- Coding in Java and Oracle

## 2. ROBOTIC WALKING STICK

### Describe the problem:

This device addresses the problem of people, besides the blind, who cannot commute properly, even for short distances, such as the elderly or people who are losing their eyesight or hearing due to diabetes or any other sort of disease. The cane stick works only to find the obstacles in front of the person, so we aim to overcome this problem. The following solution will demonstrate this.

### Who benefits:

The robotic walking stick can benefit people

who have trouble with seeing, listening, and hearing, people with Alzheimer's disease, people who need assistance in order to commute, and people who are growing old in nursing homes.

This software can be uploaded in the Google Play store and also doctors can recommend it to the patients who need speech generating devices.



### Solution you'd like to test:

The sonar-based walking stick uses a sensor to detect obstacles along with wheels and GPS to guide the user. This GPS can also make connections with the traffic signals and will let the person know the color of the lights using vibrations. The GPS and robotic wheels are attached to the stick. This robotic walking stick can also take the user to previously recorded destinations using GPS and AI (Artificial Intelligence). It's more or less similar to holding hands of people who can see.

### What have you done or learned:

I took a class to create a fire-fighting robot. Using similar concepts, creating the robotic walking stick is possible, along with implementing GPS and Google Maps in order to record destinations and using microprocessors and microcontrollers to communicate with the nearby traffic signals.

### How will you measure and evaluate success:

Since this has combined all of the above facilities together in a compact machine, its success rate will be considerably high.

What resource would your team need to properly execute work in phase one:

Microprocessor and microcontroller source to communicate with the traffic signal

Speed can be controlled by programming the microprocessors

### SKILLS

- Already worked with sensors like UV and infrared
- Created a fire-fighting robot which will find a fire in a room as a project for my robotics class

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