

SMART DEVICE FOR DUMB PEOPLE

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ABSTRACT

PROBLEM STATEMENT:

There are situations where dumb people cannot find any medium to convey their message (ex: paper and pen).so, our aim is to design a smart device which consists of a screen where the person can write and it is converted into speech using a speaker

HOW THE STUDY ADDRESSES THE PROBLEM:

A user friendly interface is created using python code, where a keyboard and some of the commonly used words are provided with space to type. When the user clicks 'OK', the data written in the provided space is converted to speech using text to speech tool.

KEY RESULTS:

- **GUI**
- **TEXT TO SPEECH CONVERSION**
- **USER FRIENDLY DEVICE**

INTRODUCTION

Muteness is an inability to speak, often caused by a speech disorder or surgery. Someone who is mute may be so due to the unwillingness to speak in certain social situations.

Those who are physically mute may have problems with the parts of the human body required for human speech (vocal cords, lungs, trachea, oesophagus, mouth, tongue etc.).

Trauma or injury to Broca's area, located in the left inferior frontal cortex of the brain, can cause muteness.

Selective mutism previously known as "elective mutism" is an anxiety disorder very common among young children, characterized by the inability to speak in certain situations. It should not be confused with

someone who is mute and cannot communicate due to physical disabilities. Selectively mute children are able to communicate in situations in which they feel comfortable. About 90% of children with this disorder have also been diagnosed with social anxiety. It is very common for symptoms to occur before the age of five and do not have a set time period. Not all children express the same symptoms. Some may stand motionless and freeze in specific social settings and have no communication.

'Alalia' is a disorder that refers to a delay in the development of speaking abilities in children. In severe cases, some children never learn how to speak. It can be caused by illness of the child, illness in utero, mutism of the parents or guardians, the general disorders of the muscles, the shyness of the child, and certain genetic disorders, among other causes.

'Aphonia' is the inability to produce any voice. In severe cases the patient loses phonation. It is caused by the injury, paralysis, and illness of the larynx.

Conversion disorder can cause loss of speaking ability. Most intellectually disabled children learn to speak, but in the severe cases they cannot learn speech. Children with Down syndrome often have impaired language and speech.

Some mute patients have adapted to their disability by using machines that vibrate their vocal cords, allowing them to speak. Oesophageal speech can give some speaking ability. Others learn sign language to communicate.

Computers facilitate communication, both with smart phones and the Internet. Many augmentative and alternative communication devices exist to allow people to communicate; these include "**text-to-speech**" devices and/or software programs, which turn typed text and/or a button loaded with messages into electronic vocalizations, enabling the mute and the speech-impaired to "**speak**".

LITERATURE REVIEW

The project is done by using hardware components and installing required softwares in the system. The hardware components required are Raspberry Pi, TFT

LCD Touch screen, headphones and the softwares required are Raspbian OS, Python IDE, Kivy library, gTTS library.

First, a graphical user interface (GUI) is created which consists of frequently used words and a text box with a virtual keyboard. This is done using python language and Kivy. Kivy is a python library for developing multi touch applications. Next, Google text to speech (gTTS) library is installed and the code is written to convert the typed text to audio. Here, headphones are used to listen to the audio. A point to be noted is that gTTS module requires internet connection in order to work.

To test all these, the code is run on a laptop installed with the required softwares and the result obtained is successful interaction between user and the GUI, thereby converting the given text to audio.

Now, to test the code on the raspberry pi, raspberry pi 3 model b is connected to the touch screen with the pins. Here, 3.5 inches TFT LCD touch screen is used which fits exactly on top of the raspberry pi 3B with 26 pins connected to each other. Now, certain drivers are installed for the touch screen to function properly. Then, the code is dumped in the Raspberry Pi and it is executed. The required audio output is heard and verified.

The last step in this process is executing the python code on start up. The .py file is added to the pi boot up code so that it gets automatically executed when the power is supplied to the raspberry pi.

The final output observed is, when the pi is powered on, the GUI created is opened where the user is able to type any text and that text is converted to audio which is heard through earphones. This is touch friendly device which simplifies the task of the user. All the above process is executed and the result is verified.

METHODS AND MATERIALS

We have designed a smart device that consists of a screen where a person can type and it is converted into speech. We have started by writing the required code in python which is open-source. For this, we have to install Kivy by using certain links that are provided in the Google, after installation successfully we are ready to write the required code. In our code, we have written for the virtual keyboard, GUI interface, commonly used words as buttons, converting text to speech and we have run it in raspberry pi to check the output, then we have done it in the device called raspberry pi screen which is having a protective case, it provides the best available.

DATA AND RESULTS

From the census 2011, it shows that around 18,88,692 people have a disability in speech, out of which 11,22,987 male and 8,75,705 female, in which most people who have aphonia(a loss of the ability to produce any voice) are in their middle to late years. Men and women are equally affected. It is estimated that approximately 80,000 individuals acquire aphonia each year. Functional speech disorders with no known cause, such as alalia, affect 10 per cent of the population, 8–9 per cent serious enough to require treatment. Paralysis is a loss of strength in and control over a muscle or group of muscles in a part of the body, about 6 million people are having this problem. This device is very much helpful to such people as it simplifies their lives.

The device was tested and got correct results. The typed text was instantly converted to speech. Also, the commonly used buttons concept was an easy way to convey most commonly used words. People found it very useful.

The GUI created is shown below in Fig. 1 and Fig. 2.

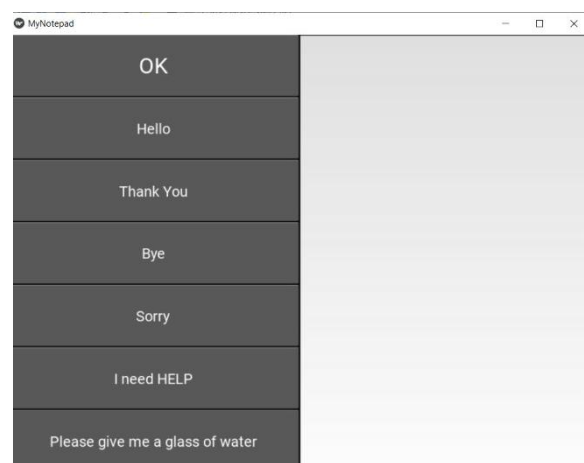


Fig. 1 Commonly used words are shown as buttons in the left side and text box is shown in the right side

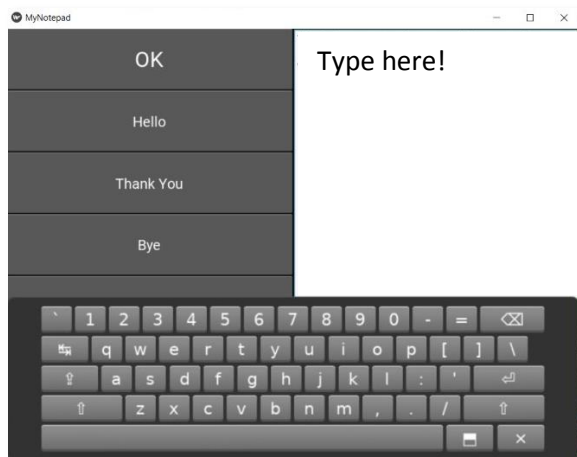


Fig. 2 Virtual keyboard is shown below where the user can type text which is converted to speech on pressing “OK” button at the top

DISCUSSION AND CONCLUSION

As per the information, we have designed a device that can be helpful to a person, wherein some cases of paralysis lose the ability to speak but still their hands will be working. In such cases, this device can help them to convey their message and it is also beneficial to the people who lost their voice in accidents.

Limitations:

- The device cannot be used in noisy areas.
- As the device may get damaged, it is advised not to use it in rains.

Recommendations:

- In future, we can try to convert languages other than English from text to speech.
- Possibility of adding a feature which translates the typed text to the desired languages.
- A button can also be added which would increase and decrease the volume

Since speech disability is not illness, there is no treatment. Instead they can use these devices which will help them lead a better and simplified life. They can lead a meaningful, satisfying, and productive lives, by coming out with lot of determination and self-confidence, provided with adequate support. We are always proud of the families and others who have worked for the improvement in the lives of these deserving citizens.

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