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**RESEARCH ARTICLE**

# Interaction System with Smart Phones By Speech to Text and Accelerometer

**Monali P. Admane**

Computer Science Department, G. H. Raisoni College of Engineering & Technology, Nagpur, India
monaadmane1@gmail.com

**Ratnaprabha Jasutkar**

Computer Science Department, G. H. Raisoni College of Engineering & Technology, Nagpur, India
ratnaprabha.jasutkar@gmail.com

***Abstract— we all know that Smart phones with touch screen is being very much popular now a days with lots many entertaining applications in it. But in these smart phones there is one drawback that is touch screen. If anybody wants to use particular application they have to click on the small icon of that Application. So in order run any application we have to click small icon which is not at all safe particularly when user is driving. And if user wishes to use any application at the time of driving he/she can lose their concentration and this can lead to an accident. So to avoid this problem this paper proposes the proximity sensor based no-touch mechanism and Speech to Text (STT) system so that user can easily call or message through speech. And if any accident happened it will send message to the emergency. This accident detection is done with the help of accelerometer's reading. As this is no-touch mechanism, this application can be initiated by waving the hand over the proximity sensor there is no need to touch the screen in order to initiate this application.***

***Keywords— Smart phone, no-touch mechanism, proximity sensor, accelerometer, STT***

## I. INTRODUCTION

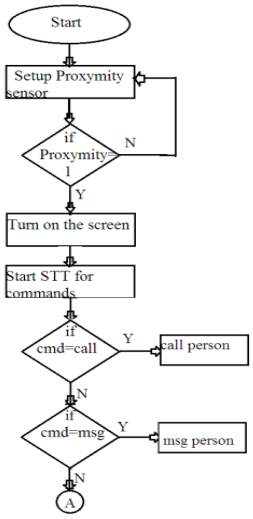
In this Era, smart phones with touch screens have been so much popular and almost every one use this because of its popularity and the entertaining applications in that. But these smart phones are not at all safe when users access their phones at the time of driving. And many applications of the smart phones could not get initiated because at the time of driving it is not that much easy to touch the small icon, and this may lead to the accident. To overcome this issue there is no-touch mechanism with the help of proximity sensor, speech recognition and Accelerometer which notifies accidents if happens. Here is the use of proximity sensor which is present near the ear cap of the smart phone. A proximity sensor is a sensor able to detect the presence of nearby objects without any physical contact. This sensor can sense the vicinity up to 5cm. A proximity sensor emits an electromagnetic field or a beam of electromagnetic radiation , and looks for changes in the field or return signal. The object being sensed is referred to as the proximity sensor's target. And speech recognition system (STT) [2] is used in order to call or message any one through speech, this may be helpful for the user when they are driving. Sound waves are captured by a microphone and converted into electrical signals. These electrical signals are then converted digital form to make them understandable by speech recognition system. Speech signal

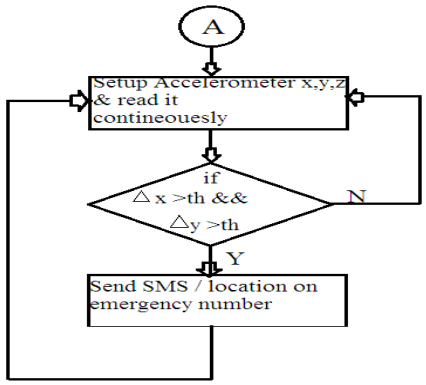
is then converted into discrete sequence of feature vectors, which is assumed to contain only the relevant information about given utterance which is important for its correct recognition [2]. And with the help of accelerometer we can analyze the activity of the user as it is used to measure the orientation and tilting motion of the mobile phones. It is used to display photographs are in correct manner either in landscape or portrait. Accelerometers can be used to examine movement of the smart phones and its rate of change of the speed [13].

## II. PROPOSED WORK

In this proposed methodology, firstly we have to setup the proximity sensor and if the proximity is equals to one then it will turn on the screen and will start the Speech to text system for the commands. If command is call it will call the particular person and if the command is message then it will message the person. Then we have to setup the accelerometer and take the continuous readings of that. And if the value will be greater than the threshold value then it will call or message to the emergency number.




Part: I




Part: II

Fig.1: Flow diagram of the proposed system

## III. SYSTEM DESIGN

In this system design the "no-touch" mechanism [1] for smart phones is to replace the action of touching panels by just waving the hand near the proximity sensor to initiate speech recognition. Proximity sensor is triggered, when a user is close to the handset. User have to just wave their hands on the top of the proximity sensor to initiate this application. Thus at the time of driving user need not to see their handsets to click small icons on the screen. This "no-touch" mechanism consist of basic functions such as event differentiation and speech conformation. Here is the "Waving hands testing mechanism (WTM)"[1] to

distinguish the events like application initiation and taking handset. The combination of WTM and speech recognition ensures "no-touch" mechanism[1] executing smoothly and correctly. In this project we have added the concept of Accelerometer for Accident detection, so that if any accident occurs, the accelerometer sensor will get activated which takes the readings of x, y and z axis and this noted readings would be sent to an emergency number which is pre-setted by the user. We have also extended the concept of Speech to Text for direct calling and Texting messages. The messaging and calling can be easily done through speech which is beneficial when user is driving. Apart from this whenever there is an incoming message it would be reading it out so that the user will not be disturbed while driving.

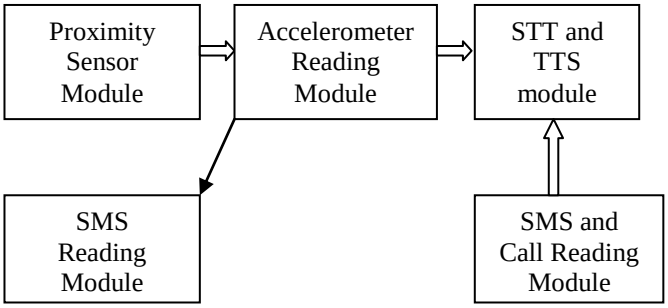



Fig.2: System Design

## IV. Experimental Results

### i) Accelerometer Reading Module:

The accelerometer in smart phones measures the acceleration of the device on the x (lateral), y (longitudinal), and z (vertical) axes [11].Accelerometers can be used to detect the movement of phone and the rate of change of the speed of movement. An accelerometer is a sensor which is used to measure the tilting motion and orientation of a mobile phone [13].Accelerometers are increasingly used in games where rotating and moving of the handset can control the onscreen actions and features. It is also used to measure proper acceleration of user.

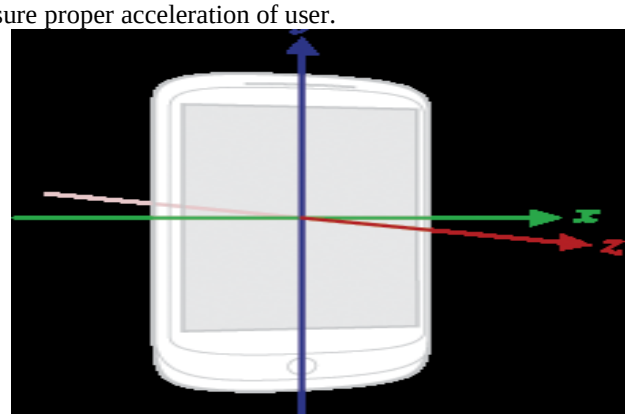


Fig.3: Accelerometer Axis of Measurement

In this project there is a concept of Accelerometer for getting the values of x, y and z and with the help of these values we can detect any accident happens for that we have to first decide the threshold values of x, y, and z. If the values of these x, y, and z is greater than threshold then this accelerometer shows that accident has been occurred and with this it also shows the measurement x, y and z axis. Reading of this accelerometer is shown below.


Fig.4: Snapshot showing the reading of accelerometer

ii) Proximity Sensor reading module:

The proximity sensor is common on most smart-phones which have a touch screen. This is because the main function of a proximity sensor is to disable accidental touch events [7]. The most common example of these accidental touch events is the ear coming in contact with the screen while on a call and generating touch events. For this reason i.e. to avoid these accidental touch events proximity sensor is placed near the ear cap speaker of the smart phone which will then detect an object in the vicinity of the speaker.


Fig.5: Proximity sensor

Proximity sensor senses when we are holding the phone up to your ear and either shuts off or locks the screen so we don't accidentally hang up the call. It enables our mobile to switch off lights during calls. Following is the snapshot which shows reading of proximity sensor.

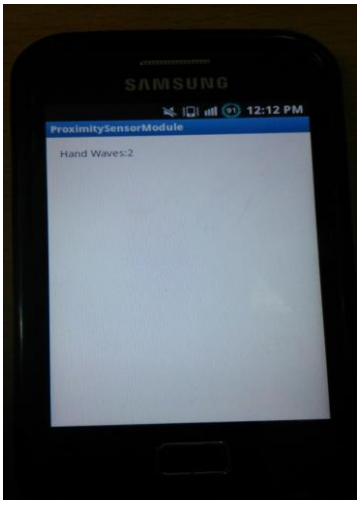
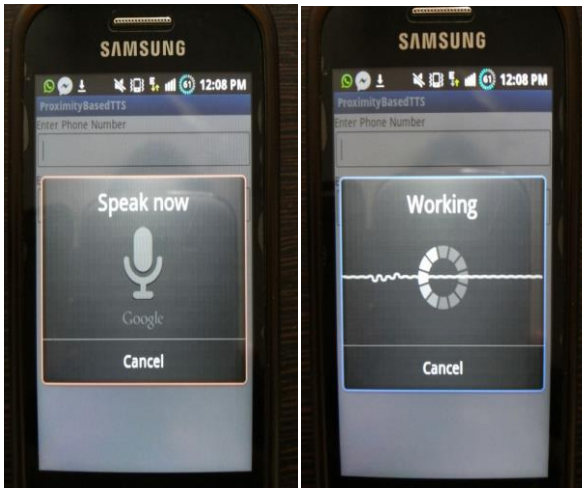



Fig.6: Snapshot showing the reading of Proximity sensor

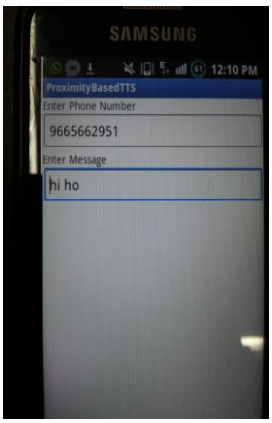
 

iii) Speech to text module:

In this module there is speech recognition system with the help of which we can directly call or message to our contacts with the help of speech. The main reason of using this is to make it useful to the user at the time of driving as it is very easy to message to a particular contact through speech. There are two fields, first field is entering phone number in which we can add the phone number through speech or can select it from contact list. And second field is entering message in which we can enter message through speech. We can directly call to particular contact by giving call command. Following is the snapshot showing the output of the Speech to text module.




(i) (ii)




(iii)

Fig.7: Snapshot showing the working of Speech to text module

iv) SMS reading Module:

In this module there is notification of accident to the emergency numbers which have been already presetted. If any accident occurs the message will be sent to this emergency numbers. Accident have been detected with the help of the reading of the accelerometer.If the value of x, y and z is noted greater than threshold value it came to know that the accident has been occur and message will sent with the help of GSM system. This message contains longitude and latitude of the place where accident has been occurred date and time of the accident. In this there is notification of the message throuch speech. Folowing is the snapshot of this module showing the message.

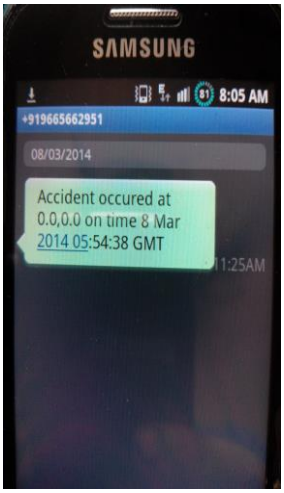



Fig.8: Showing the snapshot of the SMS reading module

## VI. CONCLUSION

In this paper, we have discussed about the smart phones and methodology that will help us to avoid the accident at the time of driving with the help of Accelerometer. With the help of proximity sensors we can initiate speech recognition application by just waving the hand on it. And this is called "no-touch" mechanism. There is also the notification of the accident with the help of accelerometer reading and GSM system. This system is very beneficial for users especially when they are driving.

## REFERENCES

[1] Chia-Yu Lin,Yu-Jin Chen, Li-Chun Wang, and Yu-CheeTseng, "A Proximity Sensor based No-touch mechanism for mobile applications on smart phones." National Chiao Tung University, Taiwan,2012.

[2] Preeti Saini, Parneet Kaur "Automatic Speech Recognition: A Review", International Journal of Engineering Trends and Technology- Volume4Issue2- 2013.

[3] Parwinder pal Singh, Er. Bhupinder singh, "Speech Recognition as Emerging Revolutionary Technology",International Journal of Advanced Research in Computer Science and Software Engineering, 2012

[4] Yu-Shuo Chang, Shih-Hao Hung, Nick Wang and Bor-Shen Lin, "CSR: A Cloud assisted Speech Recognition Service for Personal Mobile Device," IEEE International Conference on Parallel Processing(ICPP), 2011.

[5] Abdullah Saleh Alqahtani, Robert Goodwin,"E-commerce Smartphone Application," (IJACSA) International Journal of Advanced Computer Science and Applications, Vol. 3, No.8, 2012

[6] Eric De Thaey, Nills Franssens, Stijn Helsen "Smartphone power consumption", 2010

[7] Ken Hinckley, Jeff Pierce, Mike Sinclair and Eric Horvitz, "Sensing Techniques for Mobile Interaction," ACM Symposium on User interface. software and technology, 2000

[8] Richard D. Peacocke and Daryl H. Graf, "An Introduction to Speech and Speaker Recognition," IEEE Computer Society Press Los Alamitos, 1990.

[9] Tapas Kumar Patra, Biplab Patra, Puspanjali Mohapatra, "Text to Speech Conversion with Phonematic Concatenation" International Journal of Electronics Communication and Computer Technology (IJECCT) Volume 2 Issue 5 (September 2012)

[10] Xinxin Wang1,Feiran Wu1,Zhiqian,"The Application of Speech Recognition in Radiology Information System",IEEE2010.

[11] Douglas Vail Manuela Veloso, "Learning from accelerometer data on a legged robot", Computer Science Department Carnegie Mellon University Pittsburgh, PA 15213 USA.

[12] Nipon Chinathimatmongkhon, Atiwong Suchato,Proadpran Punyabukkana, "Implementing Thai text-to-speech synthesis for hand held devices", Proc Of ECTI-CON 2008.

[13] Sauvik Das, LaToya Green, Beatrice Perez, Michael Murphy "Detecting User Activities using the Accelerometer on Android Smartphones" 2010.