

# Finite State Automata Implementation for State based Text Entry

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## ABSTRACT

The recent trend in small device applications is single handed input and eyes-free technology. Decreasing the usage of keypads are necessary for mobile phones. For this purpose, there are few keys to operate on the input device. Accelerometer is added to mobile devices so that the movements of the device will be notified along with input signals. These mobile devices makes use of accelerometer tilts as input signals and the output of the respective tilt is received as characters. Trigger switch is used to send the message to hub. In this paper, we are using an accelerometer and microcontroller to convert gesture to word. This word is further transmitted to any computing device using GSM network. This system can do the work really fast.

**Keywords:**Single-handed input, eyes-free, accelerometer, trigger.

## I. INTRODUCTION

Gesturing and touchscreen are used to input text on PDA's and smart phones. Text and command input are being noticed by the movements of the device. A MEMs based accelerometer detects accelerations which is major part of our project. [1] Tilt position of the device is gained from the acceleration and is depicted as characters. Tilt directions presented in our project are front, back, up, left, right and four diagonal directions.

One of the important drawback of majority of people is visual disability. People suffering from this condition cannot do text entry to any electronic device such as mobile phones, laptops etc. using this technology, we are making a system such that this problem will be solved in the future days. In earlier time's disabled people had to ask help from strangers, but in modern time's technology can guide disabled people in solving their problem. We hope visually disabled people can do text entry easily. [2]

MEMs based accelerometer will attain the alignment of the device based on the position, tilt which will process the data and converts the content which user want to enter. Our device plays quite a similar roles as mobile phones in our project that is when we single click on the button we will get letter 'a', double click on the button we will get letter 'b', triple click on the button we will get letter 'c'. Similar method is being performed in our project to get better results.

## **II. RELATED WORK**

Accelerometer is used as control device using Dasher US software. This improves the capabilities of communication skills with people having disabilities. Assistive technologies can be applied by accelerometers in various ways. Accelerometers can be used in rehabilitation systems. Accelerometers and gyroscopes are worn in wrists and ankles to find out the exact movements in a tele rehabilitation system design.

Using an accelerometer a mouse device is implemented in Predictive System Text Entry Controlled by Accelerometer with any Body Part. Dasher US lets people to do text entry very fast so that it improves the disabled people work efficiently.

Dasher is a predictive text entry system. This shows all the letters of the alphabets. Dasher is a software that is able to predict the writings of the user. Interesting system in Dasher US is learning of various parameters such as text entry rate, usability fatigue. These parameters will be recorded in Dasher US software.

## **III. PROPOSEDWORK**

### **3.1 Methodology**

MEMs based accelerometer is important part of our system. In MEMs technology, accelerometer is capacitive in nature and acceleration measurement of the accelerometer is 3-axis. Different information like tilts, alignments, positions, hand motions can be obtained from this device and each tilt or alignment can be appointed a letter to it. [3]

Accelerometers have to be digitized so we are using ADC converter or microcontroller having inbuilt ADC. Data is being obtained from microcontroller using ADC from an accelerometer. When information is received for all 3-axis, it begins the procedure and it tries to gather a character from the action obtained from accelerometer output. Manual input should be needed for organizing text message in the form of state switch and trigger switch.

Content and triggers are transmitted to transmitter part or receiver part wirelessly. Given digital data is encoded and is transmitted to RF transmitter or 2.4GHz based RF module. [4]

At receiver part: Texts and triggers are received by RF receiver of identical frequency. Decoding is processed after receiving the content. Final data is sent to microcontroller for debugging purpose. [5] Once trigger is received it will communicate with GSM modem using AT commands via Max232, and SMS will be sent to fixed number.

3.2. Block Diagram

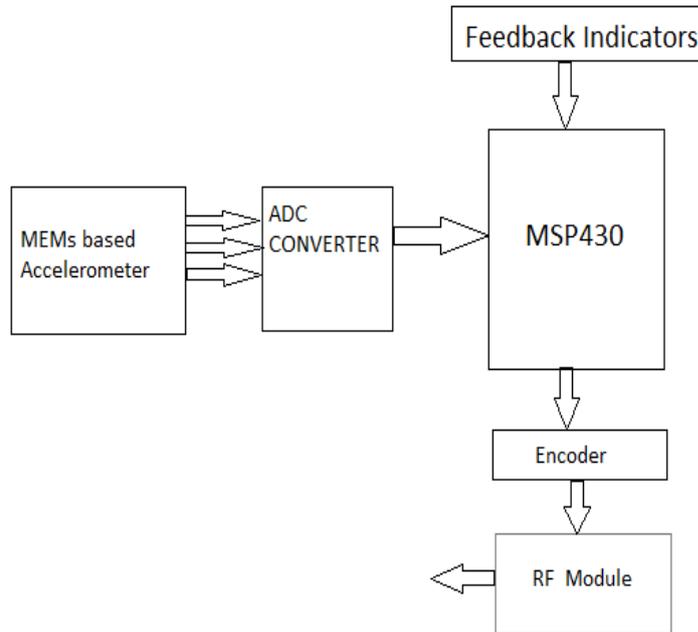


Fig. 1 Transmitter side

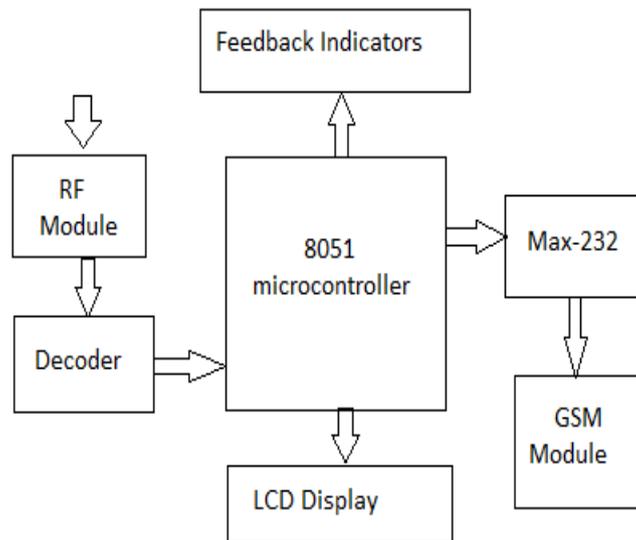


Fig. 3 Receiver Side

#### IV. EXPERIMENTAL RESULTS

Accelerator tilt is detected by the device to form a letter, numerical or special characters. Detected letter is sent to RF receiver module further it is sent to RF transmitter module wherein RF transmitter /receiver are not connected in the device. The received output will be displayed on the LCD screen. When the trigger is pressed, the output displayed will be sent as message through GSM module to the fixed number. The following figures shows the illustration of our project. Figure 5 shows that the message is being sent to the given number. Figure 6 shows that the message has been sent to the given number. Figure 7 shows that the message is received through GSM module.

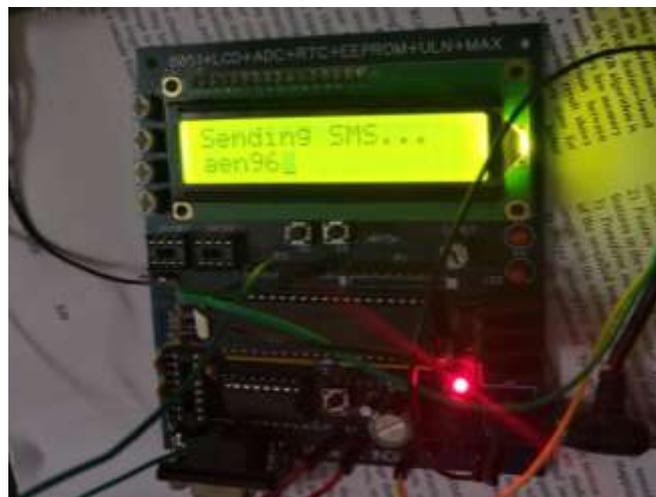


Fig 4: Message being sent to the given number.

Figure 4 represents that the decoded data is sent to GSM module. This will function in the form of sending the message which is being detected by acceleration tilt.

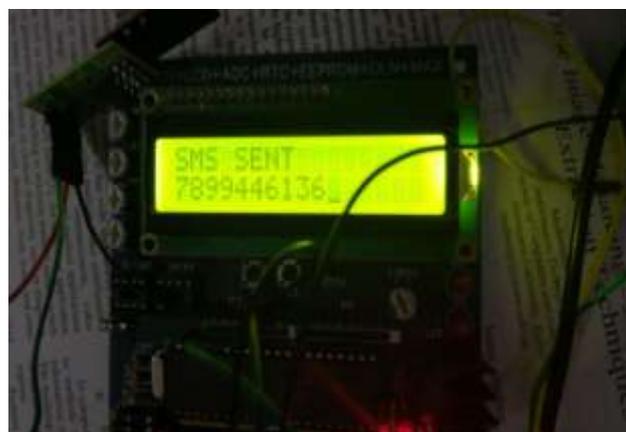


Fig 5: Message has been sent to the given number.

Figure 5 depicts that received information or text has been sent to the fixed number. LCD display will show the notification of message being sent.

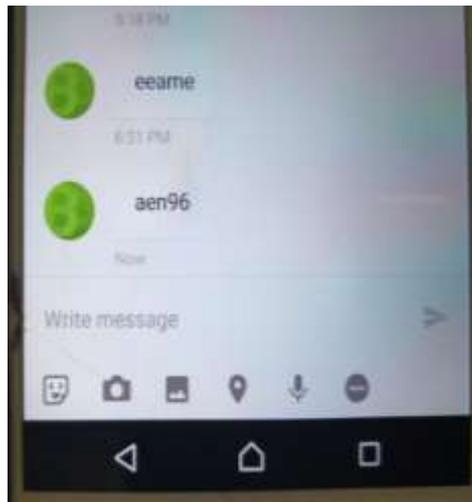


Fig 6: Message is received through GSM module.

Figure 6 shows that the message is received to the given number which is been sent by GSM module.

## VI. CONCLUSION

Project was started with study of different systems which can be used by disabled persons for their convenience. It was discovered that accelerometer is trending technology for text entry system. So we started knowing and its benefits of the accelerometer. Accelerometer is useful for these kind of projects wherein successful results are found. There are three states in our device first two states contains 26 letters of our English alphabets that is first state consists of letters starting from a-p (16), second state consists of q-z (10) and it also contains backspace and punctuations. Third state consists of special characters. Extra switch is added in our device that is trigger switch which will send the text received through GSM module. The sent text will be sent to given number.

## REFERENCE

- [1] Dr. Robert Pastel, Dr. Jindong Tan, Dr. Steven Carr STUDY OF ACCELEROMETER ASSISTED SINGLE KEY POSITIONING USER INPUT SYSTEMS (Copyright 2011 by ProQuest LLC)
- [2] Sweta Rajput<sup>1</sup>, Amarjeetsingh Thakur<sup>2</sup>, Pradeep Hunoor<sup>3</sup> An ISO3297: 2007 Certified Organization Vol. 5, Issue

[3] uWave- Accelerometer-based Personalized Gesture Recognition and Its Applications by Jiayang Liu & Lin Zhong.

[4] Anita L. Shelke, N. R. Kolhare, R. V. Sarvadnya, Devices, Circuits and Systems (ICDCS), 2016 3rd International Conference.

[5] The 8051 microcontroller by Kenneth J. Ayala.