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Breathe Sensor Based Interaction System using GSM

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Abstract:

When a person is home alone and undergoes medical emergencies like Cardiac arrest ,Dyspnea, Asthma attack etc, so at that time immediate medical assistance is required and moreover a person with disabilities like speech impairment and handicap needs to communicate about his/her basic requirements.Also in case of burglary, the person wants to contact the police / neighbourhood by sending text alert.Hence at such times we try to develop a mask which will sense the breathing pattern and sendtext messages accordingly.Project is designed for the people with disabilities like speech impaired, physically handicapped, paralysed etc. to send alert messages by breathing pattern.

Keywords — **GSM, Breathing Analysis.**

I. INTRODUCTION

According to WORLD HEALTH ORGANIZATION (WHO), 20% of the world population die-out because of lack of immediate medical assistance given to them. Suppose a person is home alone and out of nowhere feels a tremendous pain in his chest that is he might be having a cardiac arrest, due to which he would be conscious for a small amount of time before going completely unconscious so in that span of time he will probably would not be able to contact his family members or his doctor for help. Another instance is the severely handicapped often uses breath pressure for an input method to control various instruments such as TV,motorized bed,

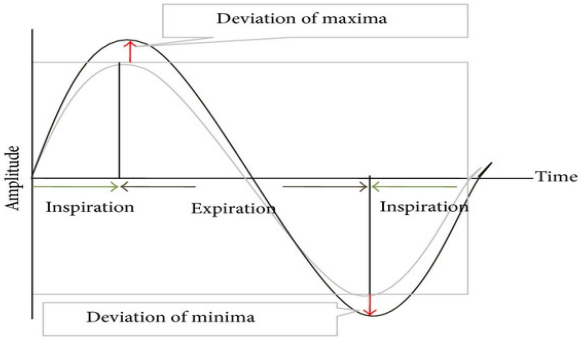


Figure (1) Basic Response of Human Respiration

Curtain, air conditioner in everyday life. Most of the. input devices are ON/OFF (digital) type for the control of equipments. But in case of emergencies, we need preciseness and quickness for safety. It is believed that human respiration (breath rhythm) is generated by inspiratoryneuron and expiratory neuron inthe brain stem which is called respiration centre.

The functionof respiration works usually unconsciously. However, we can also change the breath rhythm consciously. This study uses the conscious respiration as a remaining function of the severely handicapped people. In this method, we have to note that the use of conscious respiration should not interfere the normal respiration for ventilation. In the experiment, subjects regulate their breath pressure according tothe specified pattern.

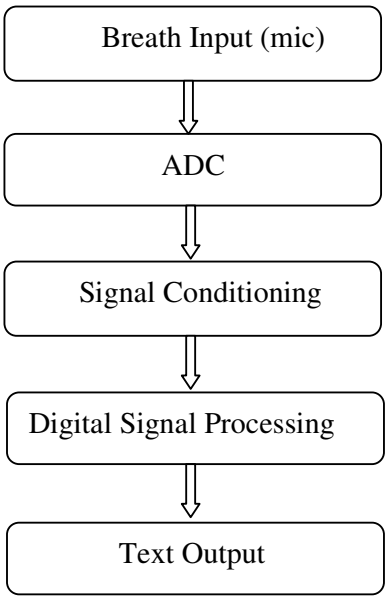
II.PROJECT OBJECTIVE

The main objective of this project is to provide immediate medical assistance and Preventing unfortunate events by sending emergency text

messages to the respective family members and doctors.

- To develop a mask which will sense the breathing pattern and send text messages accordingly.
- Project is designed for the people with disabilities like speech impaired, physically handicapped, paralysed etc. To send alert messages by breathing pattern

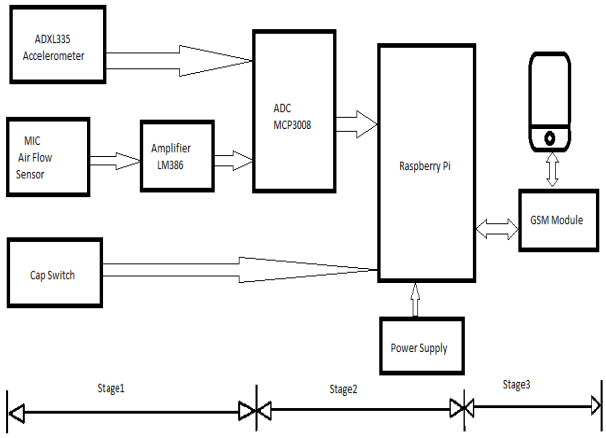
III.BREATH PROCESSING SYSTEM



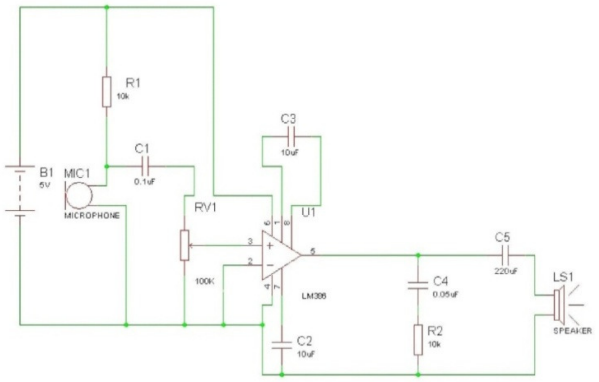
Figure(2) Design of Proposed System

Proposed Block Diagram Explanation

The block diagram of Breathe Sensor Based Interactive System Using GSM is drawn and shown below. It basically consists of Raspberry pi, GSM module, ADXL335, LM386, cap switch and microphone. The GSM module is one of the important component used here which acts as communication media that runs via the AT commands which has been coded using Python on Raspberry pi to perform various functions at certain situations whereas the Raspberry pi 3+ module which is specially designed for interfacing with GSM Module is used here so as to make the circuitry a bit easy and to get an instant output as it is faster when compared to the previous models of it.



Figure(3) Proposed Block Diagram of Breathe Sensor



Figure(4) Proposed Circuit Simulation of Stage1

The Block Diagram is basically divided in 3 stages:

Stage 1: MIC or air flow sensor senses the vibration of the breathe signals and it acts like a transducer which converts human breathe signals into electrical signal (approximately

10mV). LM386 suppresses surrounding noise disturbance and enhances input breathe pressure signals (approximately 300mV). ADXL335 is an accelerometer which sense movement or vibrations of breathe signals and it is 3 axis analog output device.

Stage 2: The output of both LM386 an ADXL335 is analog. This needs to be converted into digital pulses so that it can be given as an input to Raspberry PI. This is done with the help of Analog to digital convertor MCP3008 i.e.3.22mV SAR (Successive Approximation Resistor). Output of MCP3008 and cap switch (which helps in digital signal processing of signal) is given to Raspberry PI where a Tolerance band is set and the signal is programmed.

Stage 3: In this stage desired message is sent based on the signal interpretation via GSM SIM900a.

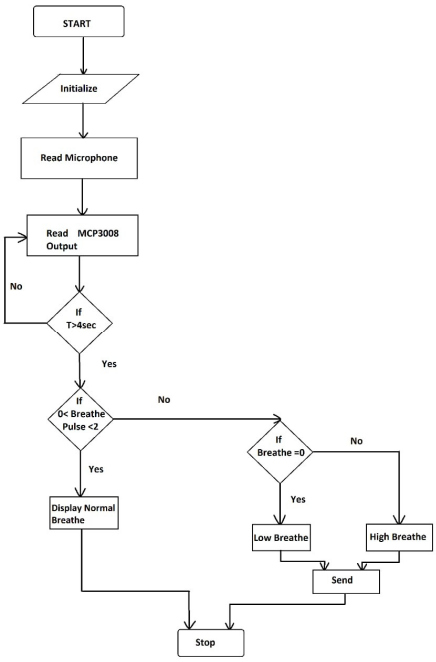


Figure (5) Flowchart of proposed system

IV. FUTURE SCOPE

- There is a possibility of implementing a system which will detect hypertension using pulse and alert the emergency contact.

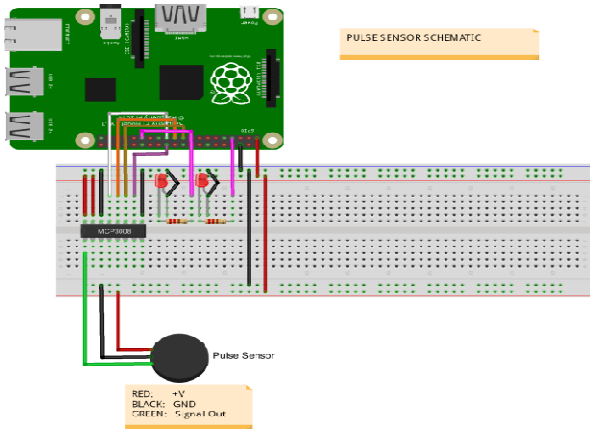


Figure (6) Interfacing of pulse sensor with Raspberry pi 3

- There is also a possibility to add Google assistant which will not only convert the breathing pulses into text but also will change the breathing pulses into speech.

V. CONCLUSION

With the help of Breathe sensor based interaction system using GSM , breathing signalsor breathe pulses can be converted into text form so that communication is possible using breathing signals only.

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