

EYE MOVEMENT DETECTION FOR PARALYZED PATIENT USING PRESSURE SENSOR

Madhumathy P, Prashanth G, Rashmi B.R, Sri Lekha

Dayananda Sagar Academy of Technology and Management, Bangalore

ABSTRACT:

The project aims to develop a self-sufficient tool which provides home automation to the quadraplegian patient by taking patient's breath and eye movement to control electric devices. By taking into consideration the fact that in all the cases of paralyzed patient only eye and breath were the active parts in patient's body Using patient's breath fan and motor is control and using eye moment (left, right, open and close) patient can send a message to any person that he needs a doctor or food and controls switching on and off of the light.

Keywords - quadraplegia.

1. INTRODUCTION

As we know there are three types of paralyzation of human body : hemiplegia , paraplegia and quadriplegia .We have seen that there are many helping tools are provided for stroke patients like Electrode implants , Robotic Arms , canes and some other devices are still under research . To control these devices a patient should have fingers to be active which is not possible by quadriplegic patient. And these devices are not economically efficient. In the above three cases eyes and breaths are non injured and most active parts. Hence these two are taken as the input to this device. Here we use embedded and matlab together to switch the electrical appliances and sending the message to the person who is monitoring the paralyzed patient in case of emergency.

and calibrated. This series is used for wide range of applications especially for those systems which uses microcontroller or microprocessor with analog to digital converted inputs. The pressure it can measure up to 0 to 50 kPa (0 to 7.25 psi) and output voltage of 0.06v -2.82 v.

Table 1. Maximum ratings

RATING	SYMBOL	VALUE	UNIT
Maximum pressure	Pmax	200	kPa
Storage temperature	Tstg	-40-125 °c	° c
Operating temperature	TA	-40-125 °c	° c

2. TECHNICAL BACKGROUND

2.1 Integrated silicon pressure sensor

(MP3V5050)_This pressure sensor is on chip signal conditioned, temperature compensated

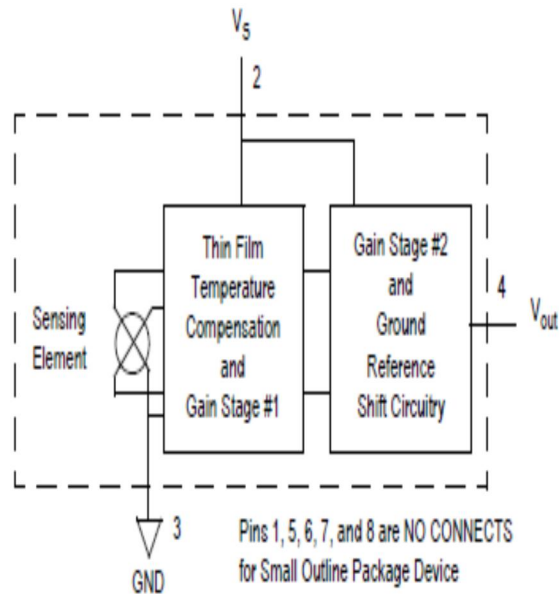


Figure 1. Block diagram of internal circuitry integrated on pressure sensor chip

2.2 GSM SIM300/900:

It works on 850 MHz, 900MHz, 1800 MHz and 1900MHz .It has RS232 level converter designed which makes it directly interface to serial port. Using patient's eye movement message can be sent via GSM.

2.3 Arm 7 Microcontrollers:

It has huge number of uniform register file. It has simple addressing modes with load store architecture.

2.4 Zigbee:

There was a need for a standard based, interoperable wireless technology that can be used to address the unique needs of low data rate wireless control and sensor based systems. Hence it is used for transition and reception of the signal as given by pressure sensor and matlab

2.5 Matlab:

To detect the eye movement of the patient and corresponding to the eye movement function is executed .the detection is done using Viola and

John's algorithm with the help of haar like features shown in figure 2.

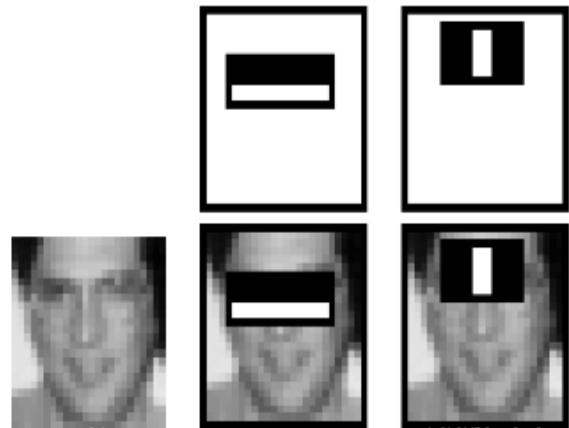


Figure 2. haar like features

3. PROBLEM STATEMENT

- Because of their limited movement make them difficult to control the switches.
- To engage a study and create a system or facilities that can help the paralyzed people to give them the best quality life..
- Developing a system we call "Home automation System" for paralyzed People using breath sensor and eye moment detection.
- Develop a system that can limit the usage of electricity, by saving human energy and makes patient life easier.

4. LITERARTURE SURVEY

In paper [1], J. Mander and D. Picopoulos proposed: single master device is limited to connect 7 devices in [1]. The realization of this technology will be applied in this project to control home_appliances

In [2], R. Piyare and M. Tazil provided a useful concept in connecting the appliances to a control board controlled by Atmega16 that uses relay

In [3], K. Atukorala, D. Wijekoon, M. Tharugasini, I. Perera, and C. Silva provided, 'The study carry out by achieved a very complete and moneywise concept by using GPRS as the medium to switch home appliances. It concepts to map the appliances at home from the web which would provide a neat configuration

In [4] H. Kanma, N. Wakabayashi created a modular system which was easier to install in conventional houses

5. PROPOSED SYSTEM

The smart home system project will be built using microcontroller LPC2148 and eye movement detection. It includes serial communication with LPC2148 and MATLAB via ZIGBEE. The signal that we obtain from the MATLAB script and pressure sensor, then use that to drive appliances controlled by microcontroller. The MATLAB program and code is written using *keil μ vision* does all the decision making for the switching control and sending message via GSM

To activate the fan and motor patient has to breath or blow through the pressure sensor and the threshold is set according to human breath and it has to be crossed for execution of functionalities. The breath is converted into digital voltage and transmitted.

Using MATLAB the patient left, right, close and open conditions are defined as follows:

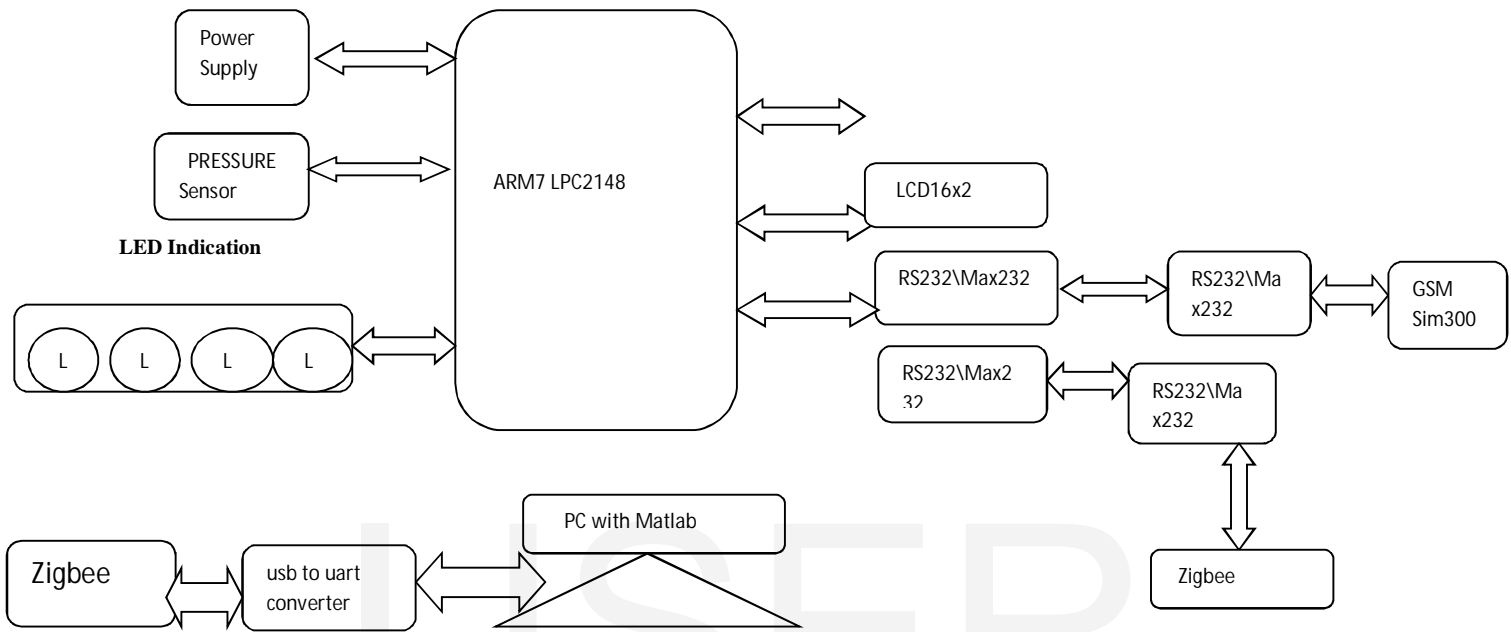
- i. Left movement for the sending message to other person that paralyzed patient needs food.
- ii. Right movement for sending the message as paralyzed patient needs a doctor.
- iii. Open eyes as input to the switching on light
- iv. Closed eyes to switch off the lights.

Eye movement detection:

Initially we set up the serial communication that will be used later for the interface between MATLAB and the controller. Then continuous video frames taken and input is sampled and saved as the screen shots. Then eyes are detected and movement can be detected by comparing the current position of the eye with the previous position. To avoid detection errors, which specifies a threshold for the height and width of a valid eye, by calibrating it for the user (patient)? After detecting the eye

6.BLOCK DIAGRAM :

Transmitter:



Receiver:

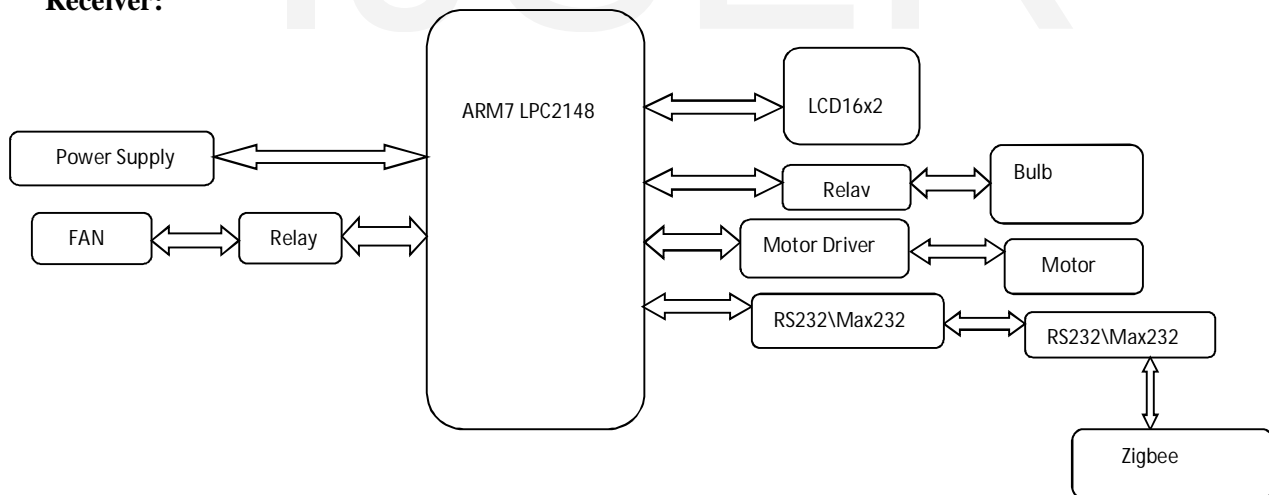


Figure 3: Block diagram of Transmitter and Receiver

8. CONCLUSION

The output was in millivolts (1-18mV).LPC-2148 operating voltage was 1-5 V.We have used a pressure sensor,which is induced by the breathe of a paralysed patient above human breath i.e., 2.1 psi to detect and send the required signals for control and coordination of the switch board .system through the ARM LPC2148 development board. Disabled person can control devices and use it for his day to day activities, being independent for small activities and matlab for switching of light and sending the message to atender inn case of emergency.

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