

## **PRESSURE SENSOR-BASED EYE MOTION DETECTION FOR PARALYZED PATIENTS**

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### **ABSTRACT:**

By using the patient's breath and eye movement to operate electric gadgets, the project intends to create a self-sufficient tool that offers home automation to the quadriplegic patient. By taking into account the fact that in every example of a paralysed patient, the patient's only active bodily parts were their eyes and breath The patient may signal to anyone that he needs food or a doctor by controlling the fan and motor with his breath and by blinking his eyes (left, right, open, and closed). He can also turn on and off the light with these two actions.

*Keywords - quadraplegia.*

### **1.INTRODUCTION**

Hemiplegia, paraplegia, and quadriplegia are the three forms of paralysis of the human body that are known to exist. We have seen that various aids, such as electrode implants, robotic arms, canes, and other equipment still undergoing study, are available for stroke victims. A patient needs active fingers to operate these gadgets, something a quadriplegic patient cannot do. Additionally, these technologies are not cost-effective. Eyes and breathing are the most active and uninjured body parts in the aforementioned three scenarios. Therefore, this device accepts these two as its input. To switch the electrical appliances and transmit a message to the person watching the paralysed patient in this case, we use embedded and Matlab together.

### **2. TECHNICAL BACKGROUND**

*Integrated silicon pressure sensor*

( MP3V5050) This pressure sensor has on-chip calibration, temperature compensation, and signal conditioning.

This series is employed in a broad variety of systems, particularly those that have microcontroller or microprocessor inputs that have been converted from analogue to digital. It has an output voltage range of 0.06 v to 2.82 v and can measure pressures of up to 0 to 50 kPa (0 to 7.25 psi).

Table 1. Maximum ratings

<b>RATING</b>	<b>SYMBOL</b>	<b>VALUE</b>	<b>UNIT</b>
Maximum pressure	Pmax	200	kPa
Storage temperature	Tstg	-40- 125 □ c	c
Operating temperature	TA	-40- 125 □ c	c

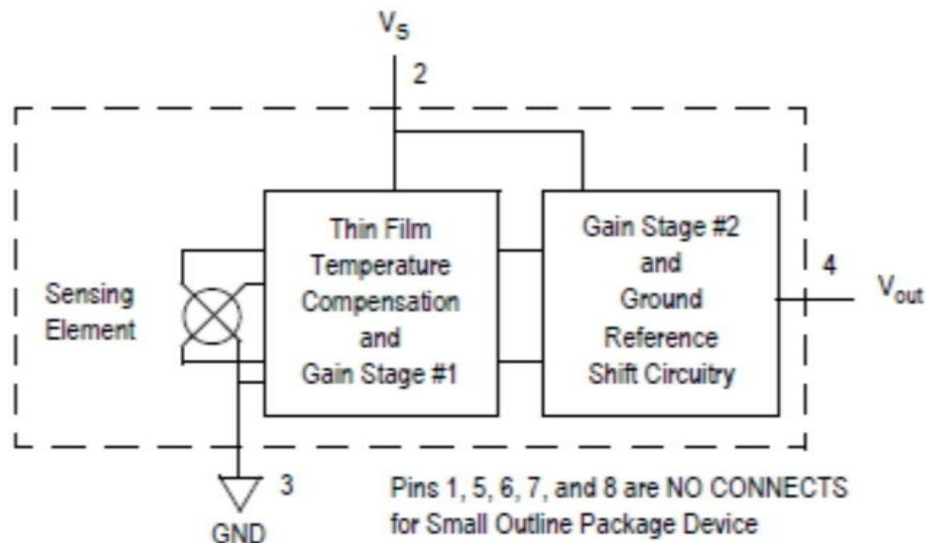


Figure 1. Block diagram of internal circuitry integrated on pressure sensor chip



Figure 2. haar like features

### 3.PROBLEM STATEMENT

- Their restricted range of motion makes
- 2.2 GSM SIM300/900:

It operates at 850, 900, 1800, and 1900 MHz. It includes an RS232 level converter built in, enabling direct serial port connectivity. GSM can be used to send messages using a patient's eye movement.

*Arm 7 Microcontrollers:*

There are a tonne of uniform register files there. It features load store architecture and straightforward addressing modes.

*Zigbee:*

A standard-based, interoperable wireless technology was required to meet the special requirements of low data rate wireless control and sensor-based systems. As a result, it is utilised for signal transition and receiving from the pressure sensor and Matlab.

*Matlab:*

The patient's eye movement is detected, and the appropriate eye movement function is run. The haar-like traits seen in figure 2 aid in the detection, which is carried out using Viola and John's technique. It is difficult to control the switches.

- To conduct research and develop facilities or a system to aid those who are paralysed in order to give

them the best possible quality of life.

- We are creating a "Home automation system" for paraplegic people that makes use of breath sensors and eye moment detection.
- Create a system that can reduce the consumption of electricity while conserving patient energy and making life easier.

#### **4.LITERATURE SURVEY**

J. Mander and D. Picopoulos proposed in article [1] that a single master device could only connect seven devices. This project will use this technology's implementation to operate home appliances. R. Piyare and M. Tazil proposed a helpful notion in [2] for attaching the appliances to an Atmega16-controlled control board via relays. In [3], K. Atukorala, D. Wijekoon, M. Tharugasini, I. Perera, and C. Silva proposed that the study was carried out by employing GPRS as the medium to switch home appliances, which resulted in a very thorough and cost-effective design. It proposes to map the home's appliances from the internet, which would result in a nice arrangement. N. Wakabayashi developed a modular system in [4] H. Kanma that was simpler to install in traditional homes.

#### **5.PROPOSED SYSTEM**

The LPC2148 microcontroller and eye movement detection will be used in the construction of the smart home system project. It features ZIGBEE-based serial communication with the LPC2148 and MATLAB. We use the signal generated by the pressure sensor and MATLAB script to operate microcontroller-driven appliances.

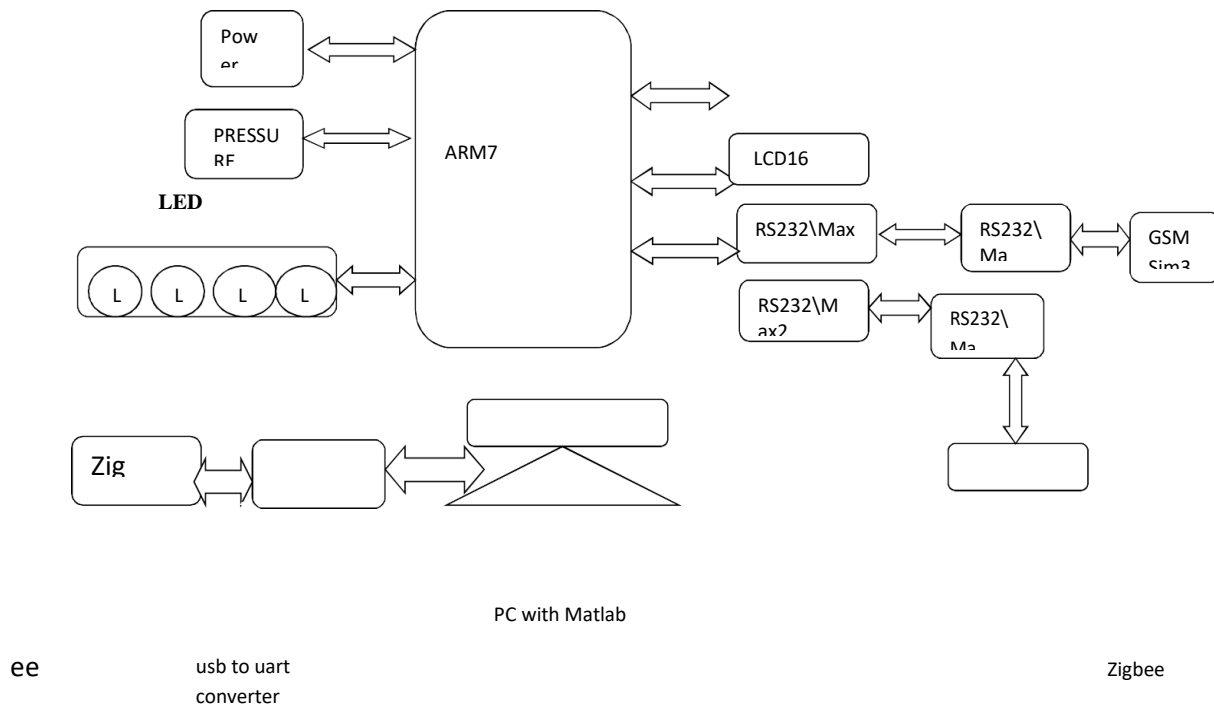
The serial communication that would eventually be utilised as the interface between MATLAB and the controller was first set up. After then, samples of the continuously captured video frames and user interaction are recorded as screen shots. The next step is to identify eyes, and movement can be determined by contrasting the eye's present location with its former position. By calibrating it for the user (patient), which defines a threshold for the height and width of a genuine eye, to prevent detection errors? Upon identifying the eye.

Keil is used to create the MATLAB programme and code, and vision handles all decision-making for switching control and transmitting messages via GSM. To activate the fan and motor patient has to breathe 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:

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

## BLOCK DIAGRAM :

### Transmitter:



### Receiver:

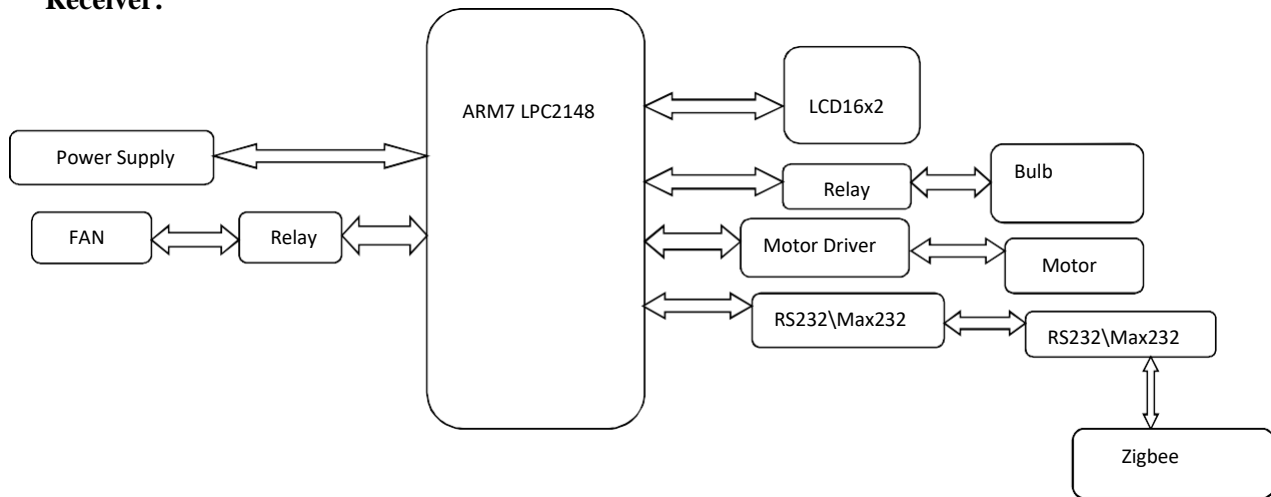
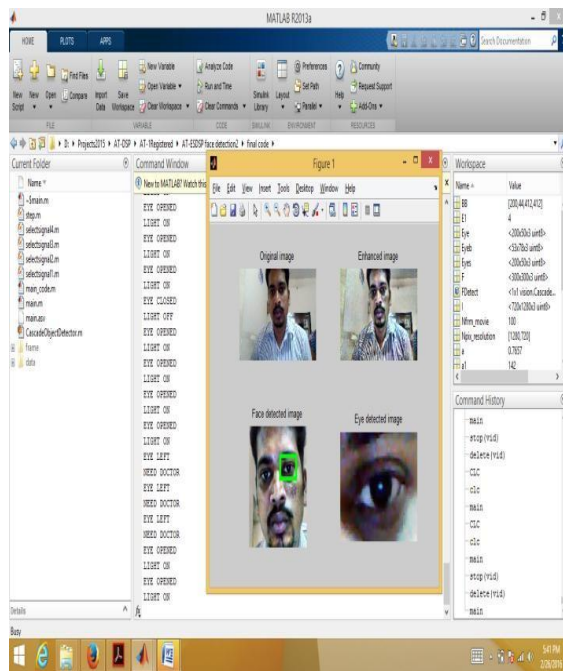


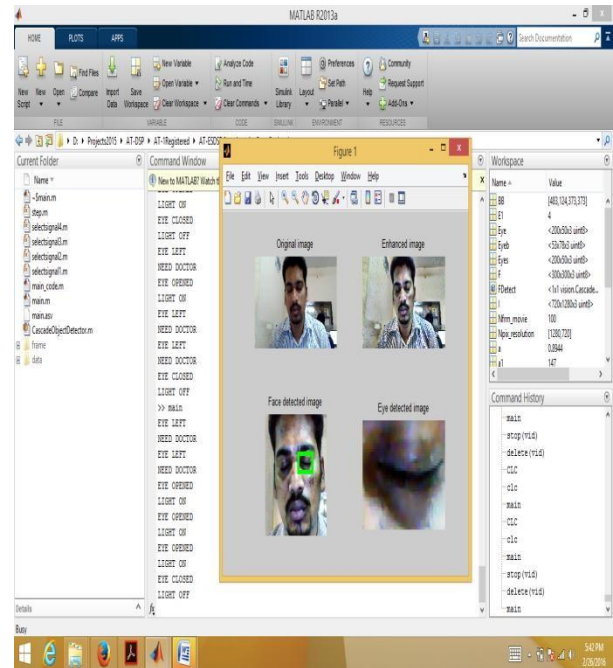
Figure 3: Block diagram of Transmitter and Receiver

## 6.RESULTS :

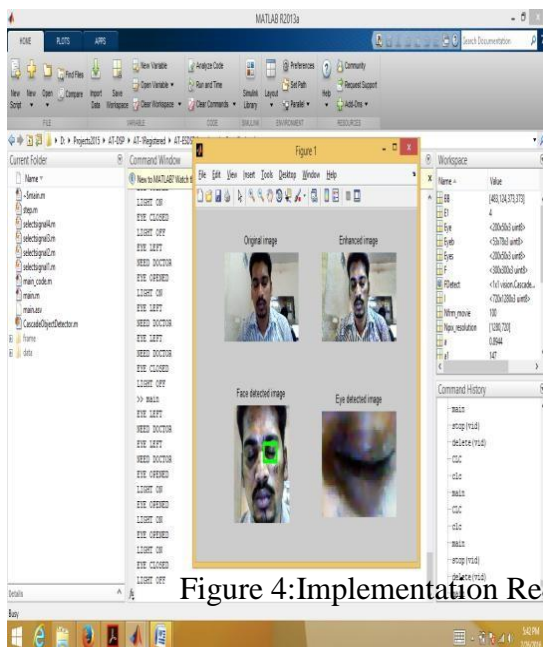
Eyes open: lights on



Eyes left: needs food



Eyes closed : lights off



Eyes right : needs doctor

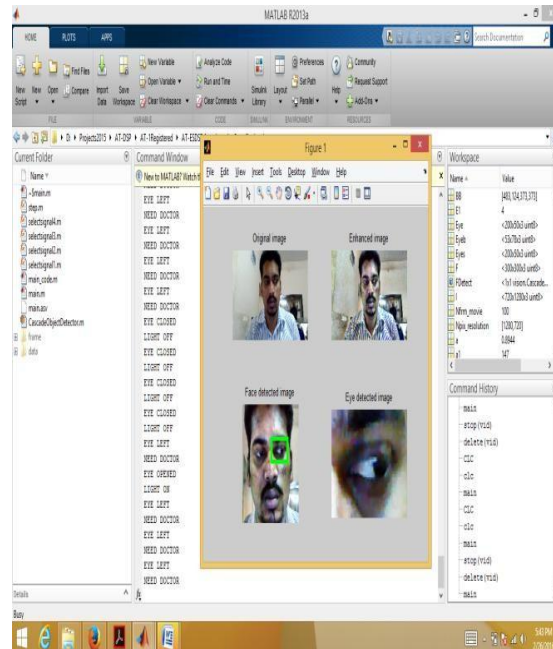


Figure 4:Implementation Results

## 7. CONCLUSION

It was measured in millivolts (1-18mV). Operating voltage for the LPC-2148 was 1–5 V. To detect and deliver the necessary signals for control and coordination of the switch board system through the ARM

LPC2148 development board, we used a pressure sensor that is induced by a paralysed patient's breath above human breath, or 2.1 psi. Disabled individual can operate equipment and use them for daily tasks, becoming independent for little tasks and using a computer programme to switch on lights and send messages to a helper in an emergency.

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