

Iot Based Home Automation And Health Monitoring System For Physically Challenged

BIJI ROSE¹, ANANTHAPADMANABHAN A², SORNAMUGI V³, VARSHINI S⁴
^{1,2,3,4} Department of Information Technology, Dr NGP Institute of Technology, Coimbatore, India

Abstract— Gesture can be originated from any bodily motion of state that commonly originated from the face or hand. Current focuses on the field include emotion recognition of the face and hand gesture recognition. In gesture recognition, the human body's motions are read by the sensors and the captured data is sent to the web application. The web application then makes use of this data as input to handle the home appliances or devices. Gesture recognition may also be referred as gesture control. Hand gestures constitute a powerful inter-human communication methodology; they can be considered as an intuitive and convenient mean for the communication between humans and machines. Gesture recognition helps computers to understand human body language. Apart from the gestures, it also consists of health monitoring sensors. This will help in monitoring the health of the patient. This helps to build a more potent link between humans and machines, rather than just the basic text user interfaces or graphical user interfaces (GUIs). These devices can ease the lives of many disabled people, particularly those with severe impairments, by increasing their range of mobility.

Indexed Terms — Gesture recognition, Hand gesture, Sensors, GUI, Arduino, Human computer interaction, Health monitoring.

I. INTRODUCTION

To ease patients to automate the home appliances. Also, it will monitor patient heartbeat and if abnormal activity detects means it will send through sms with the help of GCM. Gesture can originate from any bodily motion or state but commonly originate from the face or hand. Current focuses in the field include emotion recognition from the face and hand gesture recognition. In gesture recognition, the human body's motions are read by a camera and the captured data is sent to a computer. The computer then makes use of this data as input to handle applications or devices. Gesture recognition may also be referred to as gesture control. Hand gestures constitute a powerful inter human communication modality; they can be considered an intuitive and convenient mean as well for the communication between human and machines. This justifies the interest of the research community in the

development and advancement of hand gesture technologies.

One of the most important abilities of an efficient natural user interface is therefore its ability to recognize in real time hand gestures. Gesture recognition helps computers to understand human body language. This helps to build a more potent link between humans and machines, rather than just the basic text user interfaces or graphical user interfaces (GUIs). These devices can ease the lives of many disabled people, particularly those with severe impairments, by increasing their range of mobility.

II. PROPOSED METHOD

The block diagram for the proposed method is shown in Figure 1.

In this project we present a robust and effective method of hand segmentation by MEMS sensor. First we employed the motion detection of sensor to detect the moving target hand using the first few frames of the input. Then the hand appearance model is constructed from its surrounding super pixels. By incorporating the failure recovery and template matching in the tracking process. If MEMS sensor used to find the position of the hand movement and can easily identify to switch on or off Fan or Light. In this system we had included that heartbeat because the caretaker can't able to continuously along with that person. It will monitor patient heartbeat and if abnormal activity detect means it will be sent through sms with the help of GCM. Vibration Sensor will monitor patient whether fall or not and if abnormal activity detects.

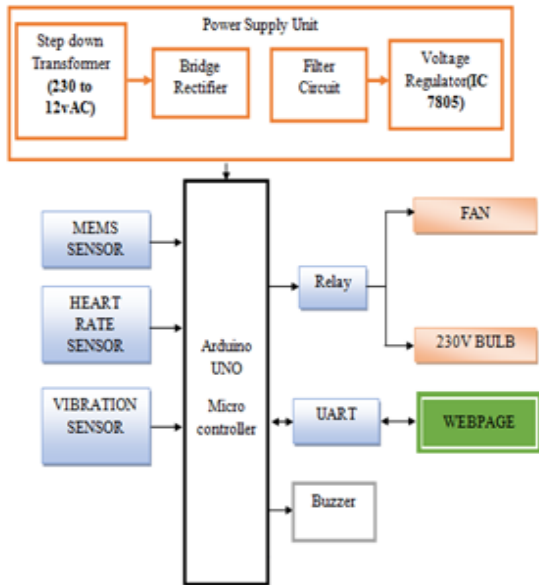


Figure.1. Block diagram of the proposed method

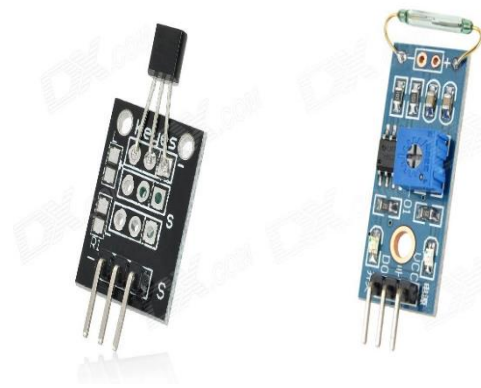
A. Gesture Spotting And Recognition

An important problem in the gesture recognition techniques is to segment a gesture from non-gesture movements, which is known as *gesture spotting*. In this section, we propose an algorithm for gesture spotting and gesture recognition.



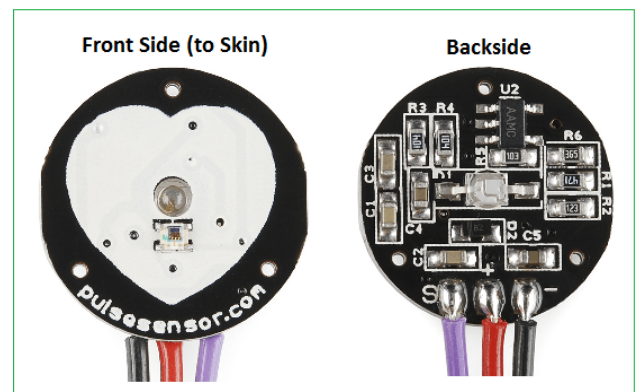
B. MEMS Sensor

MEMS have the ability to sense, control and actuate on the micro scale and also produce the output on the micro scale. The size of these devices is in the range of 20 micrometers to a millimeter. The elements which are integrated on the silicon chip using MEMS technology may include micro sensors, mechanical structures, and micro-electronics as shown in figure. A micro sensor detects the changes of the system's environment by measuring chemical, thermal, electromagnetic and mechanical information's, whereas these physical variables are processed by Micro-electronics and the Micro actuators act according to the changes in the environment.



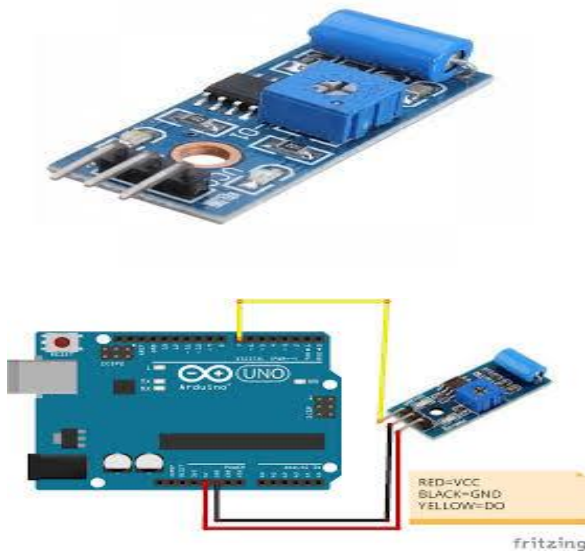
C. Heart Rate Sensor

The basic heartbeat sensor that is used in our device consists of a light emitting diode and a light detecting resistor or a photodiode. The heart beat pulses cause a variation in the flow of blood to different regions of the body. When any tissue in the human body is illuminated with the light source, i.e. light emitted from the led, it either reflects (a finger tissue) or transmits the light (earlobe). Some of the light is absorbed by the blood and the transmitted or reflected light is received by light detector. The amount of light absorbed depends on the blood volume in that human tissue. The detector output is in the form of electrical signal and it is proportional to the heart beat rate. This signal is a DC signal which relates to the tissues and the blood volume and AC component synchronous with the heart beat and caused by the pulsate changes in arterial blood volume is imposed on the DC signal. Thus, the major requirement is to isolate that AC component as it is of prime importance.



D. Vibration Sensor

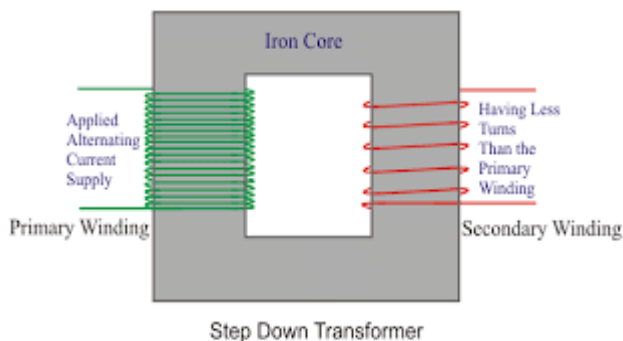
Vibration sensors provide an easy, cost effective means of monitoring and protecting the hardware device throughout the period. It protects critical equipment and avoids costly downtime with cost-effective transmitters in the device. It can be installed quickly and easily. Provides critical machine information. Avoids costly catastrophic failures.



E. Step Down Transformer

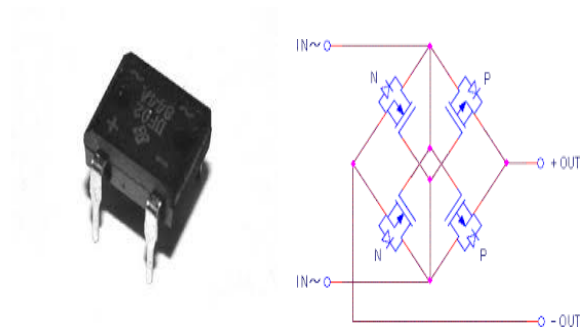
A Step down Transformer converts a high voltage at the primary side to a low voltage at the secondary side. The following formula is used to calculate the secondary voltage..

$$V_P/V_S = N_P/N_S$$



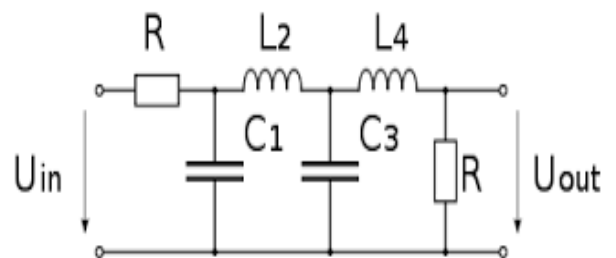
F. Bridge Rectifier

Bridge rectifier is used to convert Alternating Current (AC) into Direct Current (DC). Depending on the type of alternating current supply and the arrangement of the rectifier circuit, the output voltage may require additional smoothing to produce a uniform steady voltage. A drawback of the classic four-diode rectifier bridge is the unavoidable forward voltage drop (V_f) of two diodes when current is flowing. With conventional silicon diodes, this could typically amount to 1.5 volts or more. The result of this is wasted power and reduced efficiency in power supply applications.



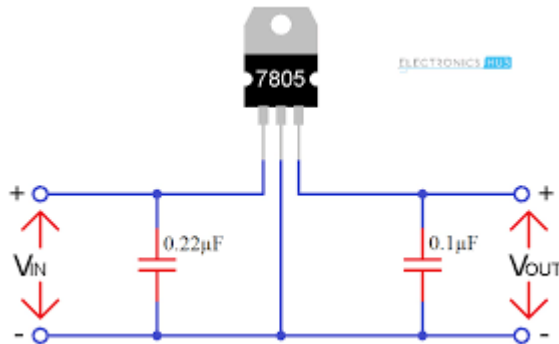
G. Filter Circuit

Filters are circuits which perform signal processing functions, specifically to remove unwanted frequency components from the signal, to enhance wanted ones, or both.



H. Voltage Regulation

A voltage regulator is designed to automatically maintain a constant voltage level. A voltage regulator may use a simple feed-forward design or may include negative feedback. It may use an electromechanical mechanism, or electronic components. It is used to regulate one or more AC or DC voltages.



REFERENCES

[1] Smart Home Control for the People with Severe Disabilities (2017)
 [2] Voice Controlled Home Automation System Using Natural Language Processing (Nlp) And Internet Of Things (Iot) (2017)
 [3] Development of a Smart Wheelchair for People with Disabilities (IEEE 2016)

[4] A Low Cost Home Automation System Using Wi-Fi Based Wireless Sensor Network Incorporating Internet of Things(IoT) (2017)
 [5] C. Wang, Z. Liu, and S.-C. Chan, "Superpixel-based hand gesture recognition with kinect depth camera," IEEE Transactions on Multimedia, vol. 17, no. 1, pp. 29–39, Jan 2015.
 [6] Y. Park, J. Lee, and J. Bae, "Development of a wearable sensing glove for measuring the motion of fingers using linear potentiometers and flexible wires," IEEE Transactions on Industrial Informatics, vol. 11, no. 1, pp. 198–206, 2015.
 [7] Z. Ren, J. Yuan, J. Meng, and Z. Zhang, "Robust part-based hand gesture recognition using kinect sensor," IEEE Transactions on Multimedia, vol. 15, no. 5, pp. 1110–1120, Aug 2013.
 [8] Y. Li, "Hand Gesture Recognition using Kinect", Department of Computer Engineering and Computer Sciences, University of Louisville, Louisville, Kentucky, 2012.
 [9] Haar-Like Features and a Stochastic Context-Free Grammar" in IEEE Transactions on Instrumentation and Measurement, vol. 57, no.8, August (2008)
 [10] Z.R Yuan, Z. Zhang, "Robust Hand Gesture Recognition based on Finger-Earth Mover's Distance with a Commodity Depth Camera" in Proc. of ACM Intl. Conf. onMultimedia (ACM MM II), Scottsdale, Arizona, USA, (2011)