IoT Based Home Automation And Health Monitoring System For Physically Challenged

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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.*

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

1.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 as well an intuitive and convenient mean 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.

2. PROPOSED METHOD

The block diagram for the proposed method is as 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 the 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, MEMS sensor used to find the position of the hand movement and can easily identify to switch on or off Fan or Light.

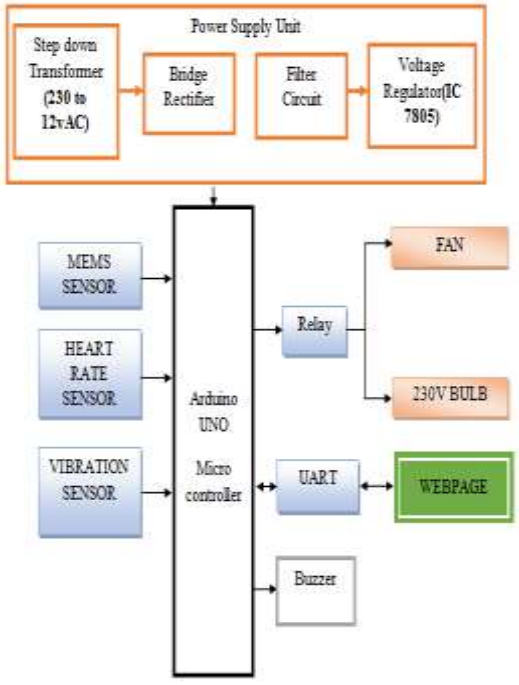
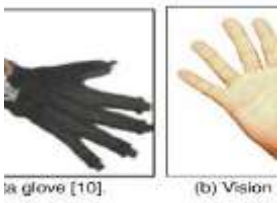


Figure.1. Block diagram of the proposed method

In this system we had included that heartbeat because the caretaker can't be able to continuously be along with that person. It will monitor patient's 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 detect.

2.1 Gesture Spotting And Recognition

A problem considered in the gesture recognition techniques is that to part a gesture from non-gesture movements, which is known a *gesture spotting*. Now we propose an algorithm for gesture spotting and gesture recognition.

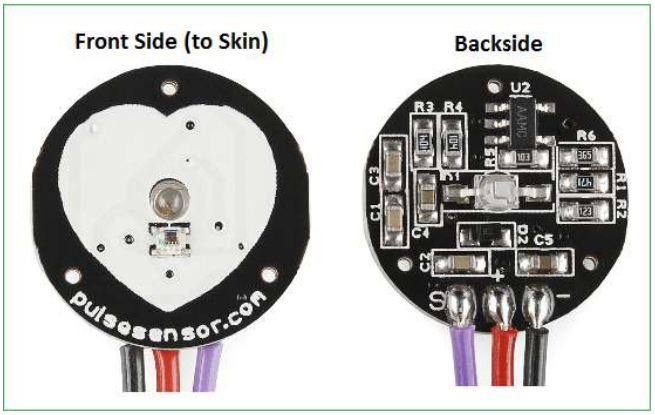


2.2MEMS Sensor

The ability of MEMS is to sense, control and actuate on the micro scale and produce the output on the micro scale. The size of these devices ranges from 20 micrometers to a millimeter. The elements which are integrated on the silicon chip using MEMS technology includes micro sensors, mechanical structures, and micro-electronics. A micro sensor detects the changes of the system's environment by means of measuring chemical, thermal, electromagnetic and mechanical information's, while these physical variables are processed by means of Micro-electronics and Micro actuators will act according to the environment's change.

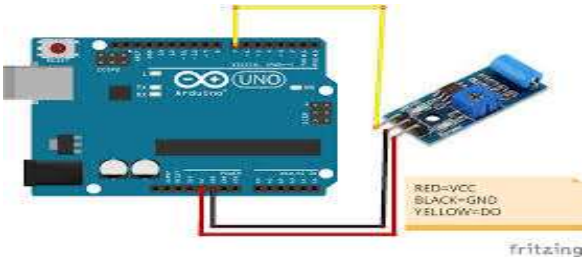
2.3 Heart Rate Sensor

The heartbeat sensor that is been used in our device consists of a light emitting diode and a light detecting resistor or a photodiode. The heart beat pulses will cause a variation in the flow of blood to different regions of the body. When any tissue in the human body is irradiated with the light source, i.e. light emitted from the led, it either reflects or transmits the light. Some of the light is sponge up by the blood and the transmitted or reflected light is received by light detector. The amount of light absorbed depends up on the blood volume in that human tissue. The detector output is of the form electrical signal and it is proportional to the heart beat rate. This signal is a DC signal which relating 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 been imposed on the DC signal. Thus the major demand in it is to detach that AC component as it is of prime importance.



2.4 Vibration Sensor

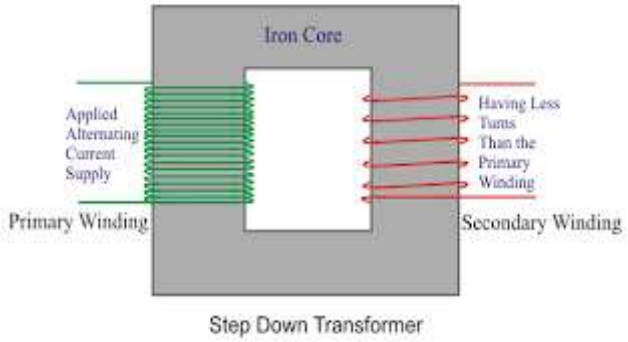
Vibration sensors gives an easy, cost effective means of monitoring and protecting the hardware device for the whole period. It protects critical equipment and avoids costly downtime with cost-effective transmitters in the device. It can be Installed quickly and easily. Gives critical machine information. Avoids costly awful failures.



2.5 Step Down Transformer

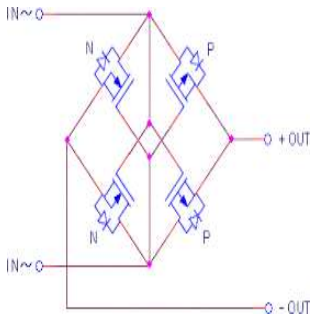
A Step down Transformer is used to convert a high voltage at the primary side to a low voltage at the secondary side. The following formula is used to calculate the secondary voltage..

$V_P/V_S = N_P/N_S$



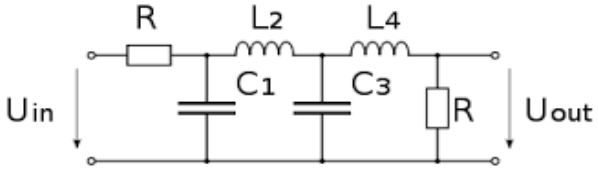
2.6 Bridge Rectifier

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 would require additional smoothing to produce a uniform steady voltage. A drawback of the classic four-diode rectifier bridge is the inevitable forward voltage drop (Vf) 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 the wasted power and reduced efficiency in power supply applications.



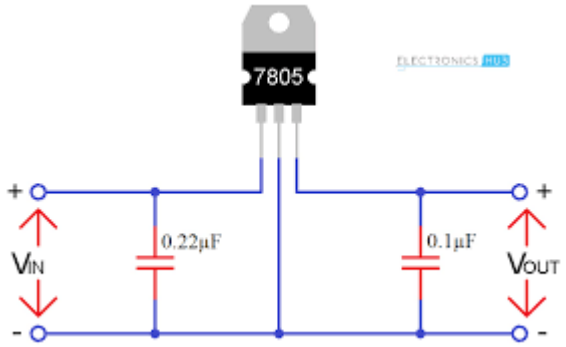
2.7 Filter Circuit

Filters are circuits which carry out signal processing functions, especially to remove unwanted frequency components from the signal and to enhance wanted ones, or both.



2.8 Voltage Regulation

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



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