

AUTOMATION OF THE HOME USING GESTURES

Ms. Vaddempudi Sravani¹ , M. Manasa²

^{1,2} Assistant professor,

KSR Institute of Technology and Science, Guntur, Andhra Pradesh, India

Abstract

Home automation has come a long way since its start, both technologically and in terms of the services it offers. Interactions between humans and machines are more important in modern society. Through the use of physical gestures, humans will get a more intuitive understanding of and control over technologies like computers. Gestures made with the hands are the primary means of command. For this aim, flex sensors that can recognize several hand gestures might be used. Inexpensive vision systems and data glove are now available and can be utilized to run real-world gesture devices. Flex sensors may be used to save expenses and simplify the rollout process. In this study, we concentrate on a flex-sensor based gesture recognition system. User hand movements are translated into character traits via the Arduino's flex sensor readings.

Keywords: Intelligent home automation, gesture-recognition home appliances, Flex SENSOR, and an Arduino UNO

Introduction

1. A gesture is any movement of an arm, hand, or other body part used to emphasize words spoken. Gesture recognition studies aim to develop a system that can recognize individual gestures made by humans and use them as a means of communication or for manipulating electronic devices. A state-of-the-art home automation system can be controlled with simple gestures. Different hand gestures may be used with the gesture kit. A state-of-the-art home automation system can be controlled with simple gestures.
2. One such paper is "An Efficient Hand Gesture Recognition System Based on Deep CNN," by H. Chung, Y. Chung, and W. Tsai, published in the

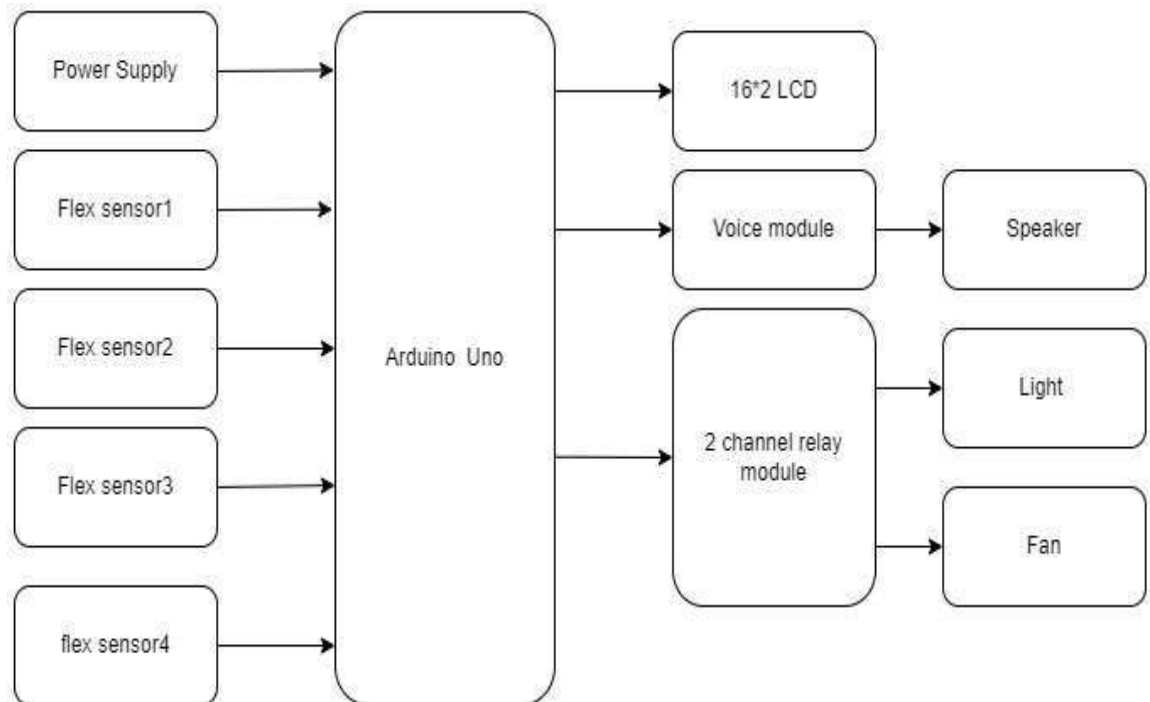
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8.[5] Home Automation Using Hand Gestures Savitha, J. Nandhini, Kokilavani, Kalaiarasi, and Narmadha, A. S. are the authors. Page(s): 312-321.

9.Using convolutional neural networks (CNNs), K. S. Varun, I. Puneeth, and T. P. Jacob were able to recognize hand gestures for the disabled. This research was presented at the 2019 International Conference on

12. Methodology



Block diagram of Gesture Based Home Automation

The hardware implementation of Gesture based home

Communication and Signal Processing (ICCSP) in Chennai, India.

10. Gesture-based home automation is an example of the Internet of Things-based technology used in the suggested approach. This allows us to manage our household appliances independently. The elderly and those with physical impairments are the primary users of this.

11. This study is divided into four parts: Section 1, an introduction; Section 2, the methodology for the suggested approach; Section 3, the findings and discussions; and Section 4, a conclusion and future directions.

automation consists of Micro controller (Arduino UNO),

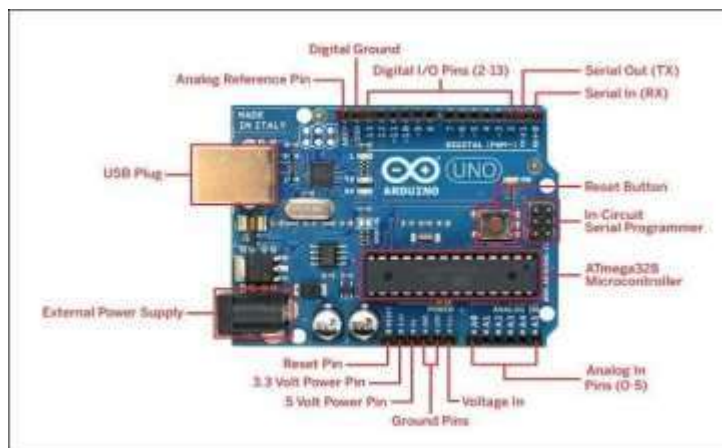
Flex sensors, Voice module, LCD, Relay Module, home appliances and power supply. The flex sensors are connected to the Arduino and power supply is given to arduino. The Arduino measures the flex sensor signals generated by a users hand motions to identify the character. The text is displayed on the LCD and voice output will generate from the voice module and also in addition to these we are implementing the gesture based home automation in these system itself.

12.1 Arduino Uno

Arduino is an open-source

electronics platform based on easy-to-use hardware and software. Arduino board can read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online. You can tell your board what to do by sending a

set of instructions to the microcontroller on the board. To do so you use the Arduino programming language (based on Wiring), and the Arduino software language (IDE) based on processing.



12.2 Flex Sensors

12.3 Fig 1: Arduino Uno board

A flex sensor is a kind of sensor which is used to measure the amount of deflection otherwise bending. The designing of this sensor can be done by using materials like plastic and carbon. The carbon surface is

arranged on a plastic strip as this strip is turned aside then the sensor's resistance will be changed. Thus, it is also named a bend sensor. These sensors are classified into two types based on its size namely 2.2-inch flex sensor & 4.5-inch flex sensor.

The size, as well as the resistance of these sensors, is dissimilar except the working principle. Therefore the suitable size can be preferred based on the necessity. Here this article discusses an overview of 2.2-inch flex-sensor. This type of resistance throughout bending.

sensor is used in various applications like computer interface, rehabilitation, servo motor control, security system, music interface, intensity control, and wherever the consumer needs to modify the



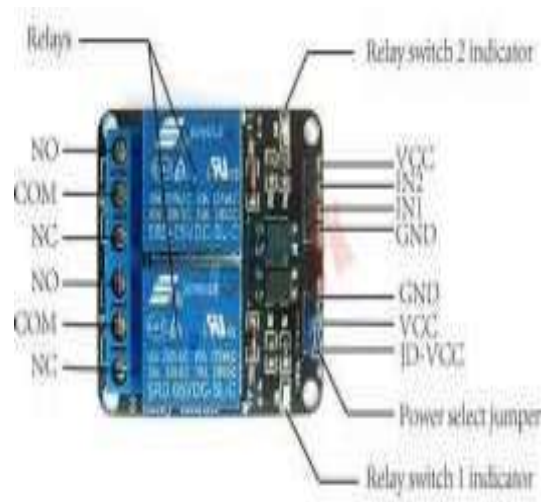
Fig 2: FLEX sensor

12.4 Channel Relay Module

The two-channel relay module is designed to allow your Arduino to control two high-powered devices. It has two relays, each with a maximum current rating of 10A at 250VAC or 30VDC. Modules with one, four, and eight channels are also available. You can choose the one that best meets your needs.

A relay typically has five pins, three of which are high voltage terminals (NC, COM, and NO) that connect to the device being controlled. The device is connected between the COM (common) terminal and either the NC (normally closed) or

NO (normally open) terminal, depending on whether the device should remain normally on or off. Between the



remaining two pins (coil1 and coil2) is a coil that acts as an

electromagnet.

Fig 3: Channel Relay Module

12.5 Voice module

The voice module is a powerful audio processor along with high-performance audio analog-to-digital converters (ADCs) and digital-to-analog converters (DACs). The IC is a fully integrated solution offering high performance and unparalleled integration with analog input, digital processing, and analog output functionality. This is

specially designed for the simple key trigger. The user can record & play the message averagely for 1, 2, 4, or 8 voice message(s) by a switch and be adjusted the sample rate by using different values of resistors. It is suitable in a simple interface or needs to limit the length of a single message, e.g. toys, leave messages system, answering machine, etc.



Fig 4: Voice Module

12.6 16x2 LCD

The term LCD stands for liquid crystal display. It is one kind of electronic display module used in an extensive range of applications like various circuits & devices like mobile phones, calculators, computers, TV sets, etc. These displays are mainly preferred for multi-segment light-emitting diodes and seven segments. The main benefits of using this module are inexpensive; simply

programmable, animations, and there are no limitations for displaying custom characters, special and even animations, etc. A 16x2 LCD has two registers like data register and command register. The RS (register select) is mainly used to change from one register to another. When the register set is „0“, then it is known as command register. Similarly, when the register set is „1“, then it is known as data register.



Fig 5: 16x2 LCD

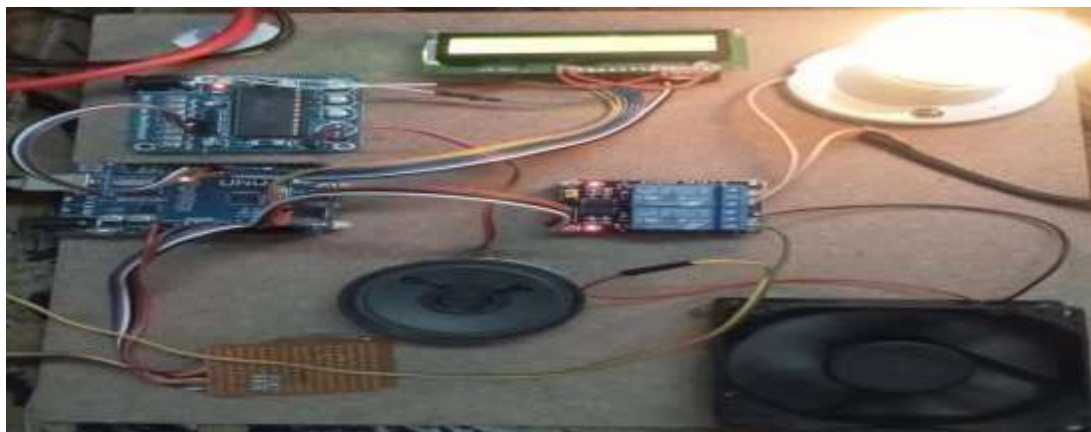
12.7 Appliances

The appliances required here are the Bulb holder, bulb and a fan. These appliances are used to check the functioning and operating of the project model. These are connected to the flex sensors internally and a code is written in C language to operate the appliances, along with the bulb and fan a voice module and speaker is also connected to give the voice commands as output.

13. Results & Discussions

In the process of implementation, the hardware components are connected

through the suitable pins on the board. Here we used the four flex sensors these are the main component. The four flex sensors are connected to the arduino board. The sensors which are connected with appliances are connected to the pins A4,A5 in the arduino board through the help of relays i.e 2 channel relay board. And the voice module is connected to the pins 8,9,10,11 in the arduino board. We give the voice commands which has to be produced as output, internally using the voice module.



The LCD display here is used to know the sensor values of the Flex sensors when they are bent. The speaker gives the output as voice commands and it is connected to the 8 channel voice module. In this way the model is built for the elder and challenged people to control the appliances

14. Conclusion & Future Scope

Gesture recognition has attracted a lot of interest from several fields of study, including human-computer interaction and image processing. Humans will be able to more instinctively control computers and machines with the use of physical gestures, which will substantially simplify the interaction process. A system is developed using gesture recognition as the main purpose for the transmission of information. There are currently two main approaches to gesture recognition: vision-based and accelerometer-based. Vision-based methods have their drawbacks, such as a sluggish dynamic

response, unanticipated ambient optical noise, and a huge amount of data to acquire.

If deaf-blind persons are taught braille, we think they will be able to better interact with their loved ones and the rest of the community.

The elderly and others with physical disabilities who rely on human assistance would benefit the most from this Proposed Model. In addition to its formal usage in the private sector, this project's development on the IoT-based Technology makes it particularly well-suited to advancing the state of the art in Home Automation.

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