Gesture Based Smart Class

Course: Human Computer Interaction

Author:

Mehadi Hasan Reaz, 20-42841-1

Kazi Faiz Ahmed Sadnan, 20-43160-1

Shuvro Kumar Saha, 20-43536-1

Mahmudul Hasan Shanto, 20-42224-1

Monayem Hasan, 20-42222-1

Instructor:

Dr. Muhammad Firoz Mridha

Department of Computer Science

Faculty of Science & Technology

American International University Bangladesh

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ABSTRACT: Controlling system through the sensor-based applications are on demand on the world currently where we want to make our home, office, class-room smart. For that we will use some smart components and system applications. The most used tools where we can control the basic applications and system very easily. We are proposing a Smart classroom management system. Here we will try to use some sensors like APDS9960 GESTURE SENSOR to detect hand gesture.

We want to make the controlling system easier to use. Home Automation is a new trend in a consumer market. so, we want to make it in practical operation-based system. We want to make sensor-based control rather then the remote. Here the user can swipe through the devices and switch the application off and on by moving a finger in an upward or downward direction. The Arduino Uno has the user interface. Arduino code is written in the Arduino AVR.

INTRODUCTION: There are many home-based automation systems. This system is made to use instead of the remote. So, in this project we will control the system by the gesture. The APDS-9960 gesture sensor is used in a mobile system. The sensor has ambient light, detection, color measuring, proximity detection and gesture sensing features.

Also, the sensor has on-chip UV and IR blocking system. Interface for communicating with controllers. As we already told the Arduino code is written on the Arduino IDE. The relay circuit is controlling the appliances with the Arduino based remote control which will be controlled by the fingers forward. when the connected circuit is powered then the Arduino board loads the libraries. The proximity detection feature of the module is used to control all the appliances together. We will further discuss the procedure.

COMPONENTS:

1)Arduino UNO

2) 5mm LED

3) 10k ohm PRESET

4) 7805 and 7812 voltage regulators

5) 12 V Relay

6) Transistor (BC547)

7) Bulb holder

8) Two pin plug

9) APDS-9960 gesture sensor

Methodology:

Arduino Uno: Arduino Uno is a type of Arduino board that is provided as open- source board which uses a microprocessor in the board. The name of the microprocessor is ATmega328p. Arduino Uno has a set of pins that are input and output which are used to connect with the board to the other components or types. The board has the USB connection that can also be used as a power supply. The 14 digital pins take input. Among them 6 are output pins. There is also ICSP header and other components.

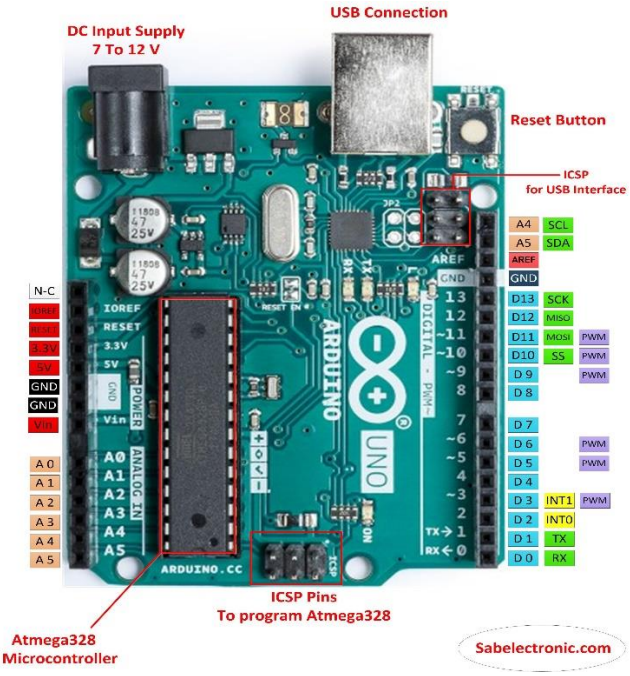

Figure 1: Arduino Uno

APDS-9960 gesture sensor: The device has LED which does the process like the IR signal. Any kind of gesture is generated by the LED or the black surface of the obstacle. It has 8 pin packages like SDA, INT, LDR, LED, LEDK, VLEDA, SCL and VDD. This device features ambient light sensing and RGB color sensing detection in an optical module.

Figure 2: APDS-9960

Transistor (BC547): Here Bi- polar NPN Transistor, DC Current Gain which is 800 maximum. Base is used 5mA maximum. BC547 is usually used for current amplifier, quick switching and pulse-width modulation (PWM). Therefore, if we need to control the speed of a motor or actuator in some of your projects, you can simply use this transistor to achieve it.

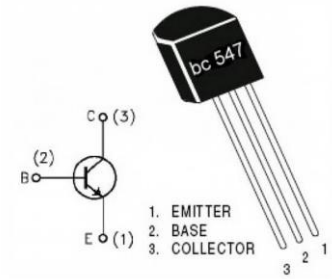

Figure 3: BC547

Block Diagram:

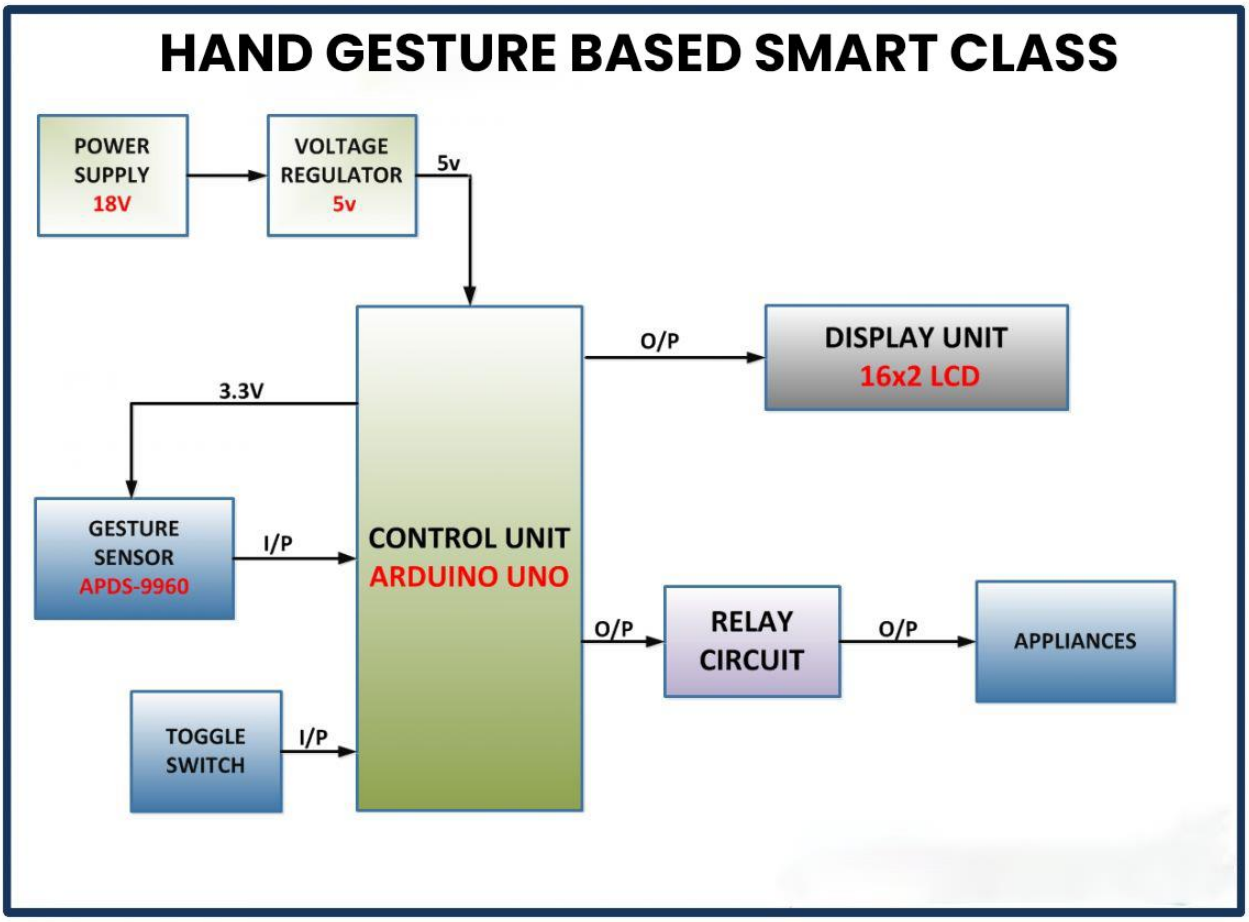

Figure 4: Block Diagram

PROTOTYPE:

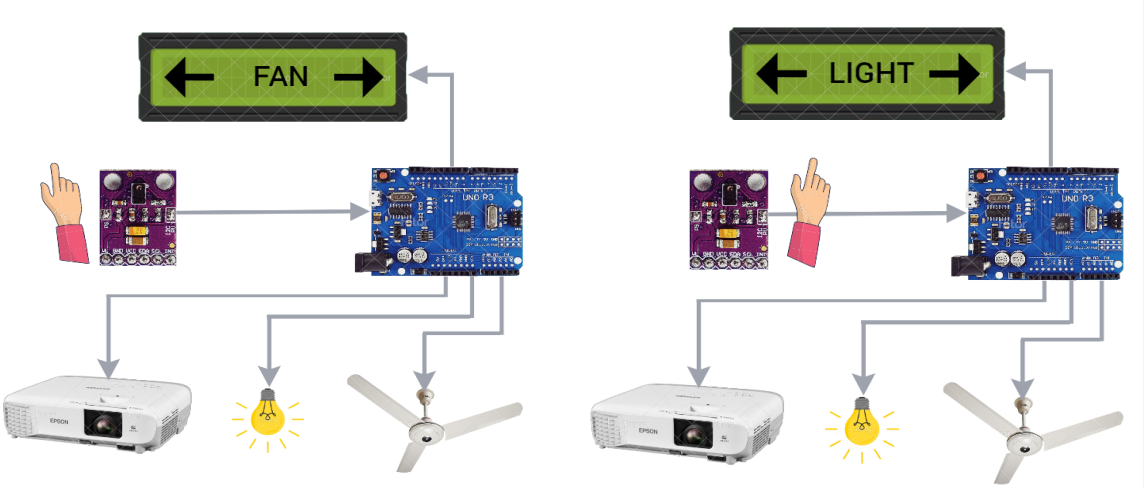

Figure 5: Selecting Desired Option

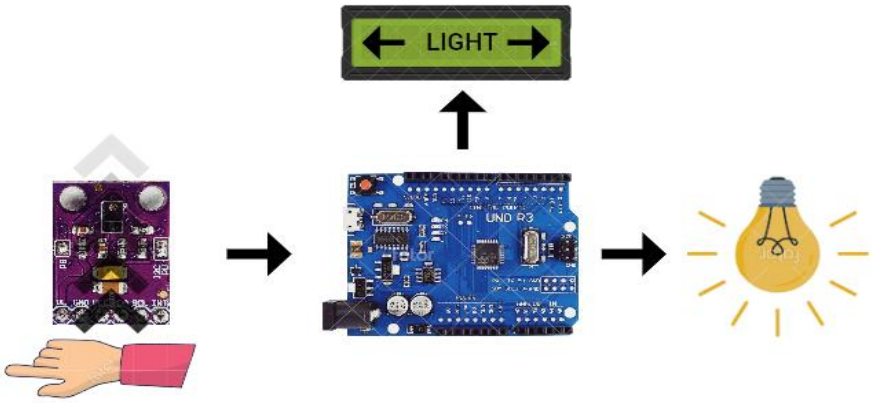

Figure 6: Turning On Switch

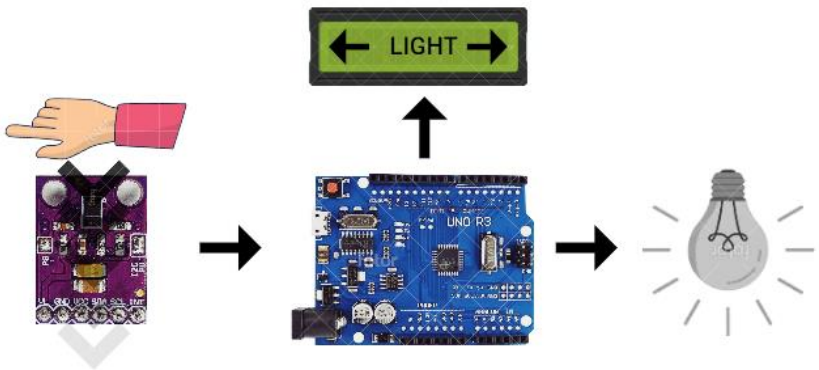

Figure 6: Turning Off Switch

ADVANTAGE: The system is based on the sensor which means we don't have to touch any particles. Also, the smart Ai based system controls everything auto - generated. According to this everything is getting in a smart based application which means human are interacting more easily with the computer system.

1) Major interaction with the system
2) Sensor-based system building
3) Controlling more gesture of the system
4) No physical interaction with the devices
5) Timing saving and no difficulty on using devices
6) No dependency on physical interaction
7) Command-based interaction with the system
8) Interaction of multiple devices at a time and no direct using method

CONCLUSION AND FUTURE WORK: By applying the gesture based commands we are able to make a better solution for not only the class, it can be any effective project or features based project in future. By using APDS sensor we can also use finger-based movement it can also be implemented on eye contact gesture in future. So this project is only a small instruction of the following system we are thinking to improve in future but it can also be implemented in different fields. In future we would able to open any device by this way. In future we have a plan to update a system which will detect all the operations of any device by the movement of human instantly.

Now let's define the scope of the project that we will mainly focus in future

* The medical sector: We will try to make it useful as much as for the medical purpose and for the stroke patients so that they can control anything only by some movement.

* Smart conference: We will make it environment friendly and make applicable for any international standard conference and controlling system.

Human interaction with machine: We want to reduce the control-based system which can be remote based or anything. The sys should be performed in just movement of our physical activities and onwards.