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Smart Fan Speed Controller

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***Abstract:** This paper presents a smart fan speed controller. More specifically this paper presents a cloud-based fan whose speed is controlled automatically. With the rapid increasing demand of autonomous, large number of industries were established that provides or manufacture the things which are automatically controlled. Therefore, this paper proposes a novel controller to control the speed wirelessly without much efforts. It comprises of an internet of thing (IOT) server that is interface with a controlling module to control the fan smartly, a monitoring device for monitoring the fan speed and temperature of room. The user can control the speed of fan by the help of user interface*

***Keywords**—cloud server, IOT server, controlling module, use interface.*

I. INTRODUCTION

With the passage of time, the modern world is shifting towards autonomous. Now everyone wants that all the existing things should be automatically control without involving in manual operation [1]. Hence due to the increasing demand of automation, various industries were stablished that provide the things which are automatically control without much human efforts such as smart home, smart kitchen, automatic fridge, smart car etc [2],[3],[4]. The automation saves the electricity by turning of the appliances remotely when it is not needed. Since home appliances are wirelessly controlled therefore, the customer can switch off the appliances when they are not at home and saves the electricity [5]. A device can be developed to improve the security system of home. One of the popular systems can be established to interface the established system with the user interface with the help of an application installed in their mobile phones. On combining the hardware and software together developed a new system which provide a great control over automation appliances and put everything in user's hand. This paper proposes a new and non-obvious controller that control the speed of fan remotely simply just by using the smartphone.

II. LITERATURE REVIEW

In present era, the fans which are used at homes can be switch on or off manually and the speed of these ceiling fans are also controlled by using speed regulator. Several types of speed regulator are developed which can control the speed of fan by twisting it in a particular direction [6]. Since these regulators emits a lot of heat and consumes much power [7].

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Also, in some places there exist a user that are handicap and cannot control the fan speed manually. Therefore, it is required to eliminate these uneconomical speed regulators with a smart and wireless speed controller which controls the speed of fan more economically without the manual interfere of the users [8].

III. WORKING OF SMART FAN CONTROLLER

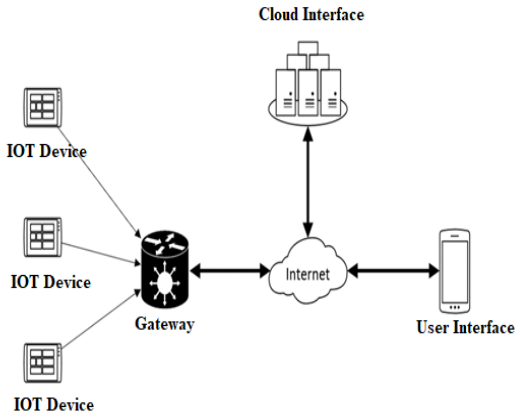

Fig.1 Architecture of smart fan controller

The architecture shown above comprises of internet of things device which is attached to the fan. The device is a temperature sensor for sensing the temperature of room and send it to a gateway. The gateway is a controlling module that receives the signal transmitted by temperature sensor and if user wants to control the speed of fan according to the room temperature then the controlling module sends a command to control the speed of fan. The user interface is associated with the controlling module through communicating channel and the data is stored in a cloud infrastructure. All the data stored in the clouds are viewed by installing the application in the user interface. The user interface may be a smart phone, desktop or laptop.

When the fan start rotating and after certain period of time if the room temperature falls below a threshold then the temperature sensor detects the decrease in room temperature and send it to the controlling module. The temperature detected by sensor is displayed on the user interface, if the user wants to control the temperate of room then the user has to sends a command to controlling module and this module will control the temperature of room by controlling the speed of fan remotely. The controlling module is connected to wireless module to transmit and receive data wirelessly. Many people are handicap in nature and cannot switch off the fan. The handicap person has to take a support of another person for going towards the speed regulator for controlling the speed which is very difficult task.

In some cases, it may also happen that the user forgot to turn off the fan before exiting the room due to which there is a huge wastage of electricity. Hence to eliminate such problems, this paper deals with the smart fan controller that control the speed of fan remotely.

IV.RESULT AND DISCUSSION

The following results are obtained by performing an experiment with single phase ac motor. For controlling the

speed of ac motor, the firing angle is controlled at different angle and the output waveform obtained after controlling the firing angle is shown below:

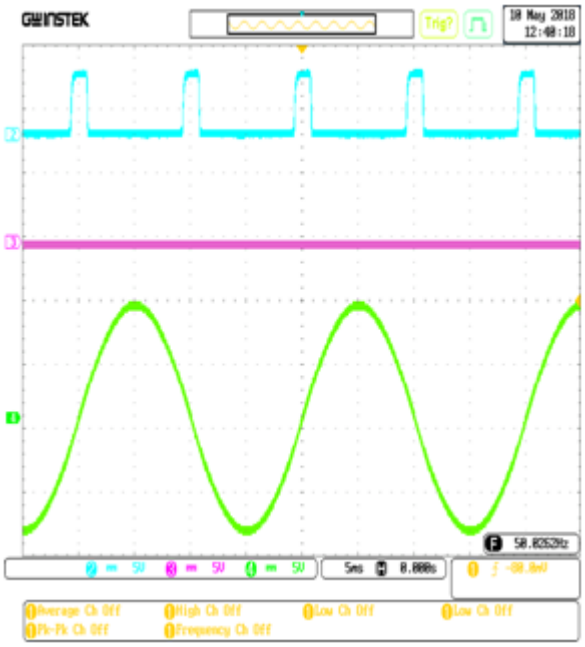

Fig. 2.a speed control with firing angle 0◦

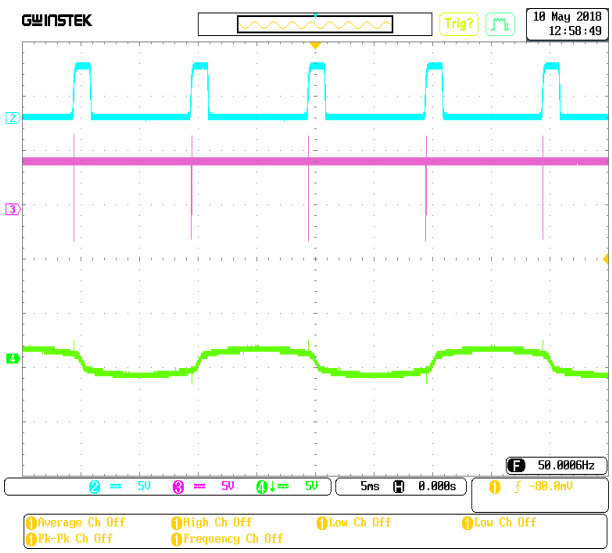

Fig. 2.b speed control with firing angle 45◦

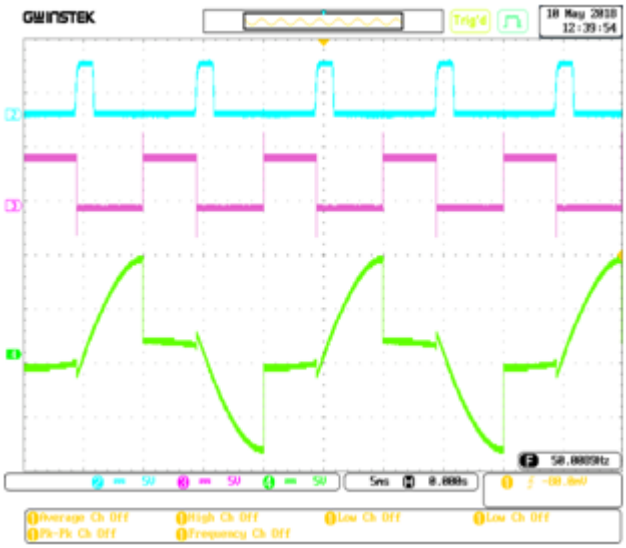

Fig. 2.c speed control at firing angle 120◦

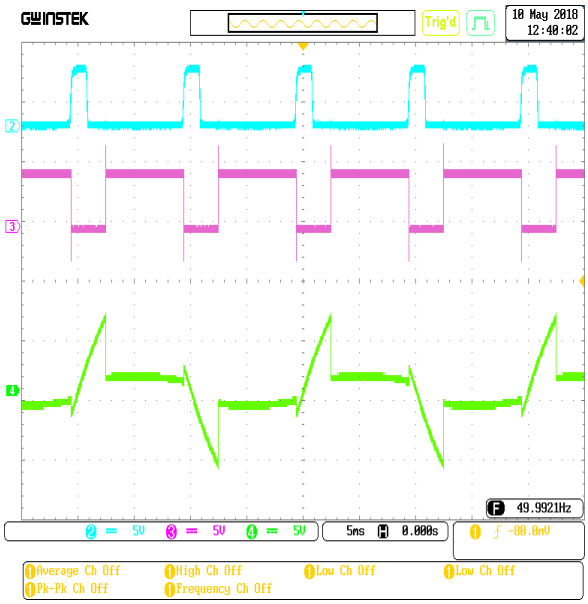

Fig.2.d speed control at firing angle 180◦

Fig. 2(a), (b), (c) and (d) shows the speed control of ac motor by controlling the firing angle at different angle. It is observed that the time response of speed controlling is very fast and highly reliable. TRIAC is used for controlling ac motor with different firing angle. In figure there exist three waveforms upper one is for zero crossing; middle one is for firing angle control and lower one is phase to phase voltage of fan. At the firing angle of 180◦ the terminal voltage is said to sinusoidal and at 0◦, 45◦ and 120◦ the terminal voltage is said to be constant.

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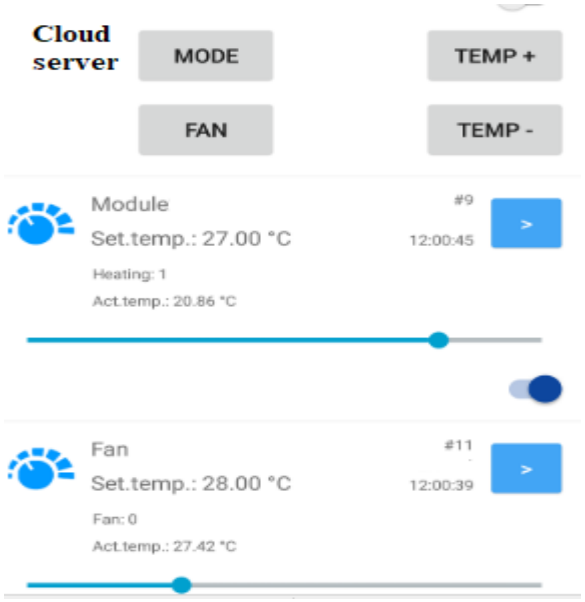

Fig.3 Cloud Server of Smart Fan Controller

The above figure.3 represents the cloud server for storing all the data related to speed of fan, room temperature and humidity. Once the user set a point at which the temperature of room is to be maintain, the controller controls the speed of fan according to the set point. All the stored data can be seen by installing appropriate software in a smartphone. The smartphone monitors the speed controlling of smart fan.

V. CONCLUSION

An IOT based smart fan controller has been designed and tested successfully with the TRAIC in the laboratory. The speed of fan is controlled by using Traic control concept and the speed is wirelessly control by using smart phone through cloud server. For controlling the fan remotely, a program is developed which is fed into the microcontroller. The microcontroller sends and receive the input signal from suitable senor and control the fan accordingly. Hence the user can operate the fan if he is not at home or any other location by using the smart phone. The smart fan controller is very much helpful for the handicap person who cannot control the speed of fan manually. The speed of the fan is automatically controlled without controlling it physically by implementing suitable temperature sensor and humidity sensor. The temperature sensor senses the temperature of the room and set the speed at the desire level according to the user's needs. The data related to the room temperature, humility or speed of fan are stored in cloud server and all the stored data is monitored and controlled through the user's smart phone.

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