

Smart Home Automation and Security using MSP430

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Abstract:- Today's world gives more attention towards save time, energy and money. This paper present a smart and secured home automation based on MSP430 microcontroller which uses Wi-Fi technology. This prototype is for those people which are physically disable or those very busy in their work. We can control home automation system manual or automatic based on Wi-Fi network. In this we provided a web access which store the all sensors data, display and control it. We control the various home appliances based on sensor like MQ2, temperature sensor, soil moisture sensor and LDR. In this we proposed the gardening of the home.

Keyword:- MSP430, Wi-Fi, buzzer, Smart home automation, MQ2 sensor, temperature sensor, soil moisture sensor, LDR.

I. Introduction

In now a day people will manually operate various types of home appliances which at times is not feasible for working people and individuals with physical disabled people[3]. Home Automation involves introducing an automatic control to certain electrical and electronics home appliances[13]. There are demands increasing rapidly for smart homes, where home appliances control automatically when environmental condition is changed and can be easily controlled through one or more small common devices or computers.

On the other hand, automatic systems installed in various buildings or Homes will increase the comfortness to the people, but as well as allow control of the lighting, cooling, gardening and security[2].

In the last few years, wireless technologies reached their breakthrough. The range of wireless system used everywhere varies from home networks to open the doors[]. The client communicate with the Wi-Fi module to control the home appliances.

This paper requires very less human involvement once installed. This circuit is based on MSP430. The aim of this paper is to develop the smart home automation system which measures the moisture present in the soil and automatically turns on or off the motor, also measures the temperature and decides the state of fan. A properly soil moisture sensor will be can save up to 60 percent of water used in the irrigation system[14]. The home automation system can be used in the turf grass and small garden[14]. We can control the home appliances by manual or automatic switching based on MSP430 microcontroller.

II. Proposed Method

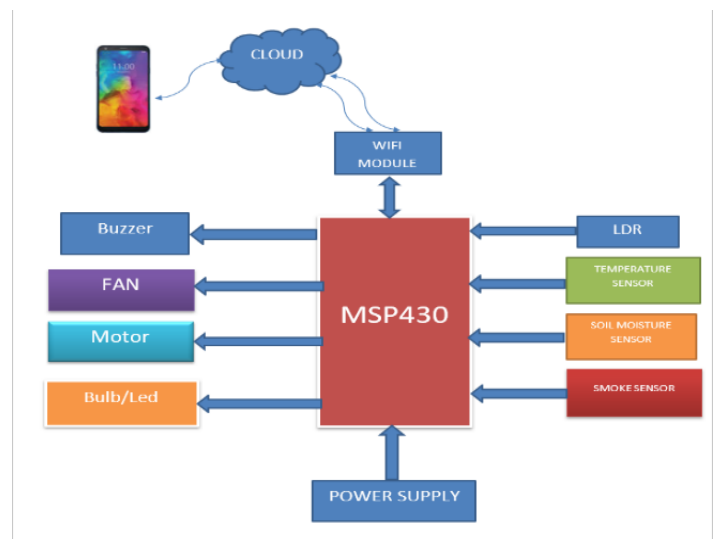


Fig1. Block diagram of Smart home automation and security using MSP430.

Above fig1. Shows the component used in smart home automation and security using MSP430. There are various type of sensor are used in the system to control the home automation. We provide Wi-Fi connectivity to the system for web access. Microcontroller read the sensor data and according to that value controlling action taken place. Wi-Fi module give manual as well as automatic switching to the home automation.

2.1 Flow chart of home automation:-

Fig2. Shows the after execution of program firstly we check Wi-Fi will connect or not. After the connection establishment will access the adafruit.io web page. It will give access to control the devices. This will control on the bases of mode of control. If it is in 'Manual' mode then we operate the devices manual, there is human involvement is required. If it is in 'Auto' mode then automatically home appliances will turn ON/OFF according to the value of sensor. It will continuously update the sensor data on the dashboard.

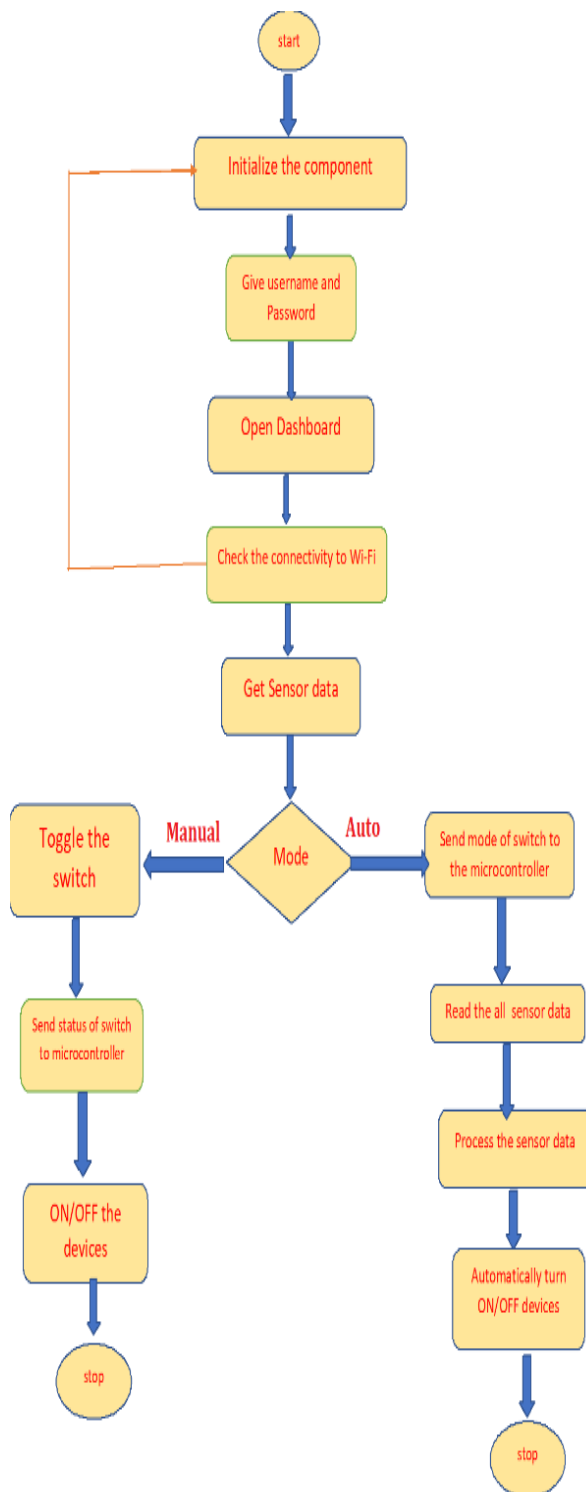


Fig2. Flow chart of home automation

2.2 Sensor:-

Smart home automation system uses temperature ,smoke, light, soil moisture sensor. This sensor are used to control the various devices. We will set the limit value to the all the sensor and according to that limit value home appliances will turn ON or OFF.

2.3 Wi-Fi:-

We use ESP8266 Wi-Fi module which is Wi-Fi enabled system on chip(SoC) module developed by Espressif system[16]. We used MQTT protocol to transfer or receive the data. Wi-Fi module used serial communication to communicate with the controller.

III. Result and Discussion

In the figure shows test result of home automation . we test the performance of all the sensor. We used MSP430G2553 microcontroller to control all the operation of sensor. When the controller is in “Auto” mode then system work on the basics of values of sensor, as the values of sensor goes above threshold value then device like fan ,motor ,bulb, buzzer will turn ON/OFF.

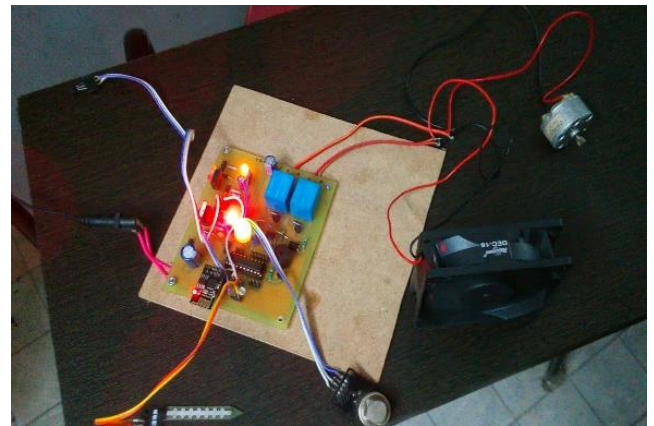


Fig3. Hardware Setup

In the below fig4. shows the adafruit dashboard . There are various types of field are present like Mode, Fan, LED, Motor. When the system is in “Manual” mode then we can turn ON/OFF the device using field of adafruit dashboard. Status of Soil moisture sensor and smoke sensor display on dashboard. To connect the adafruit dashboard to the Wi-Fi we have to add username and password to the server.

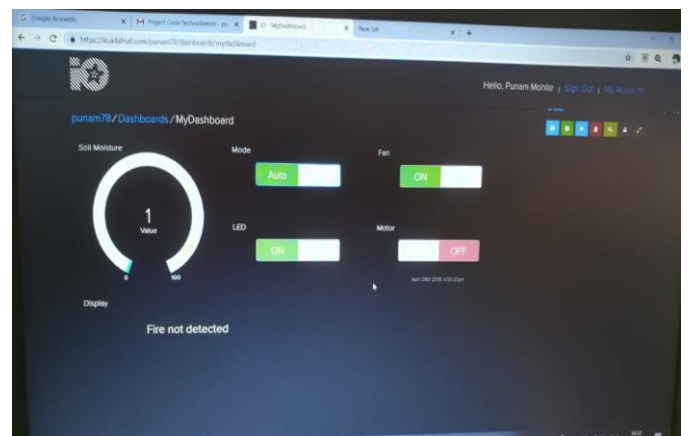


Fig4. Adafruit dashboard

IV Conclusion

This paper proposed low cost home automation system based on MSP430 microcontroller. We provide manual as well as automatic mode control. This system is easy to use and has good reliability and real time features. This system provide remote control for home automation. The designed system monitor the sensor data as well as process the sensor values according to the requirement.

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