DTMF Based AC Devices Handler Using Cell Phone

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Abstract-Farming can be done using various new technologies to increase the growth of crops and their more production. This project proposes a new system for remote control of agriculture devices. The project here is all about automated control features with latest electronic technology. The project works automatically and hence reduces the man power. The aim of this project is to develop a cost effective solution that will provide remote control of agriculture devices like water motor, sprinkler etc. through mobile phones. The mobile user in the world has a tremendous rise during the past few years. Automation and remote monitoring of processes, machines, etc., is popular due to advances in technology and reduction in hardware cost. The agriculture devices will operate through mobile phone so that farmers can operate them from anywhere. This will save the time and energy of the farmers.

Index Terms-Automation, Remote control, Cost effective, Remote monitoring, Man power.

1. INTRODUCTION

Agriculture is the backbone of Indian Economy. Because without agriculture living is impossible since agriculture produces the main source of food for us. The farmer has to take lots of efforts to produce crops and generate the revenue. Also today the availability of labor for carrying out agricultural activities is less, therefore the automation in agricultural process is needed. Also our Prime Minister has started Unnat Bharat Abhiyan to enable higher educational institutions to work with the people of rural India in identifying development challenges and evolving appropriate solutions for accelerating sustainable growth. Unnat Bharat Abhiyan is inspired by the vision of transformational change in rural development processes. So by inspiring with this Abhiyan we are developing a project which will lead development of rural areas. In order to get the maximum production in agricultural process, it is necessary to supply the optimum quantity of water, and it should be supplied periodically. This is achieved only through a systematic irrigation system. Many times farmer misses their farming tasks because he/she is not able to remember all the activities and their correct timing on which it is necessary to perform that activity. This is achieved only through a systematic irrigation system. The previously made system used ARDUINO, Raspberry-pi for controlling the agriculture devices such as water motor, sprinkler, etc. In this project, instead of using such a costly microprocessors or microcontrollers we are using a single IC called MT8870 Decoder IC which is available at very low cost in the market as compare to above components. So, it makes affordable for farmers to buy the system and used it in their farms for many purpose such as watering the farm and scheduling it as per the need of the crop fields. Thus, increasing its applications and efficiency as well as the reducing cost of purchasing high cost devices regarding agriculture.

2. LITERATURE SURVEY

India is an agricultural country. In India due to uncertainty of rain, river water is used to water the fields. Electric irrigation water motor pumps are used from many years for this purpose. But farmers are facing lots of problems while operating the irrigation pumps. The major problems faced by the farmers are-
1.Physical effort and inconvenience
2.Frequent damage of irrigation equipment
The paper IOT Based Smart Sprinkling System represents a strong motivation to create a simple device to achieve water efficiency. Home sprinkler water flow systems do not take into consideration the current state of the surroundings, which lead to high wastage of water. In this research paper, a conceptual smart traveling sprinkler composed of a water pump and a motion motor is proposed. The suggested circuit design includes sensors that are capable of detecting soil conditions, such as moisture level and object proximity. The device power is provided by a solar panel that is connected to the water tank, which incorporates a level indicator. The method of control and the monitoring through a mobile phone is used to enter the field size, duration etc. The desired objective is the reduction of water consumption. Also the paper GSM Based Motor Control for Irrigation System describes the automatic control of motor pumps by checking the level of well and bore well as a source for irrigation process. This paper presents the controlling and monitoring the level in well and bore well using GSM network. Level sensor is used to check the level in well and bore well. After checking the level controller sends the information to the user, depends on the level in the well and bore well the user sends the message to the controller to turn on/off the motor by using GSM network.

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3. NEED OF PROPOSED SYSTEM

We experience a daily reality such that everything can be controlled and worked naturally, however there are as yet a couple of imperative areas in our nation where robotization has not been received or not been put to an undeniable use, perhaps as a result of a few reasons one such reason is cost. One such field is that of agriculture such field is that of agriculture. Agriculture has been one of the essential occupations of man since early human advancements and even today manual mediations in cultivating are unavoidable.

Because of the dangerous spread of the advanced mobile phone and the quick improvement of data innovation, the utilizations of the PDA were broadly created in an assortment of fields, for example, web news, diversions, industry applications, and general living information. Information innovation was likewise used to create applications for the agribusiness developing framework, seeding framework and Irrigation System.

The principle thought behind the proposed framework is to structure framework, which would be utilized as a stage which gives the administrations expected to perform remote control of agrarian gadgets. Commonly client misses their cultivating assignments since he/she can't recall every one of the exercises and their right planning on which it is important to play out that activity. The agriculturist ought to have the capacity to on/off the Irrigation Device and control the cultivating gadgets remotely.

4. PROJECT DESCRIPTION

4.1. Power Supply

Power supply is a reference to a wellspring of electrical power. A power supply unit can be characterized as a framework that gives electrical or different sorts of vitality to a heap or gathering of burdens associated with it. Here in our framework we require a 5v DC control supply for every electronic segment engaged with the venture.

4.2. DTMF Decoder

The DTMF Decoder (MT8870) is a device which is used to decode the DTMF tones generated by the dialer keys of a cell-phone. It integrates both the band split filter and digital decoder functions. The decoder utilizes the digital counting techniques to detect and decode all 16 DTMF tone-pairs into a 4-bit binary code. For e.g. - if a user dials 1 in his keypad the output generated by the decoder is 0001 and so on. The output of the DTMF decoder can be used to drive agricultural devices.

Fig. 1: DTMF Decoder (MT8870)

4.3. Four-Channel Relay Module

A relay is a device which allows us to turn on or turn off a circuit with voltage and/or current. Relay provides complete isolation between the low-voltage circuit placed on the microcontroller side and the high-voltage side which is connected to the load. For this project we have used a 4 channel, 5V relay. It can be used to control various agricultural devices. It has a standard interface that can be controlled directly by microcontroller.

Fig. 2: Four-channel Relay Module

4.4. NodeMcu

NodeMcu is advancement board for ESP8266, Which is Wi-Fi chip with 32 bit microcontroller. NodeMcu is an open source IOT stage. It incorporates firmware which keeps running on the ESP8266 .The ESP8266 is an ease Wi-Fi chip with full TCP/IP stack and microcontroller capacity. This little module enables microcontrollers to interface with a Wi-Fi arrange. The expression "NodeMcu" of course alludes to the firmware as opposed to the improvement packs. The firmware utilizes the Lua scripting language.
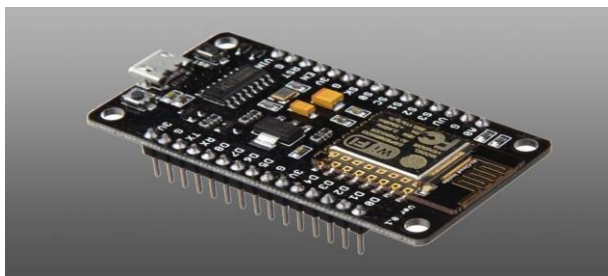
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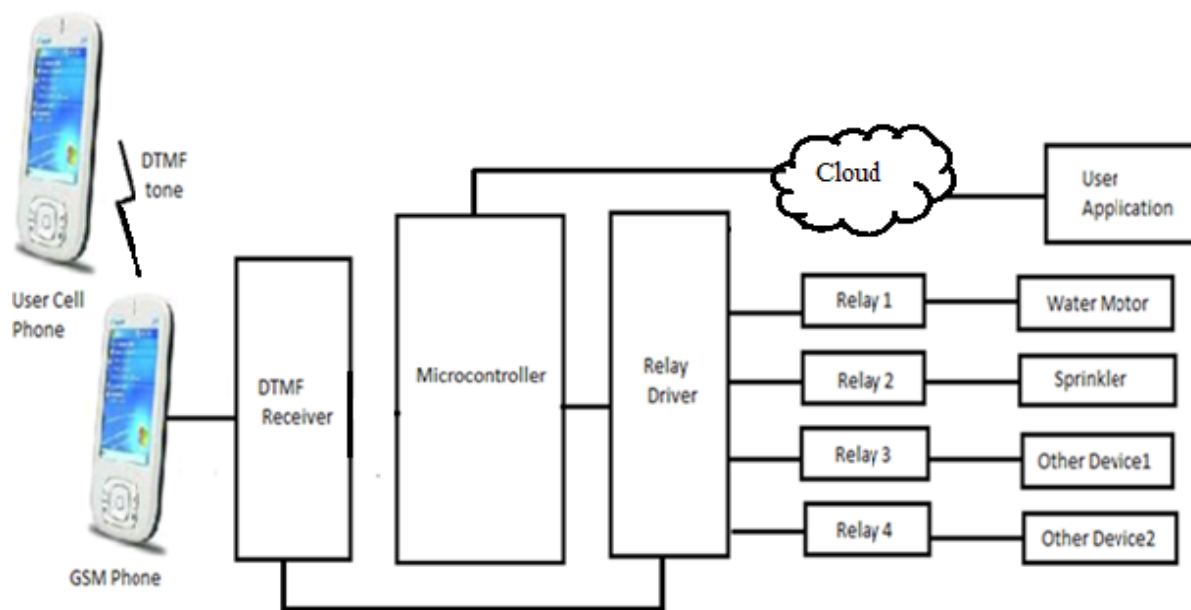
Fig. 3: NodeMc

5. BLOCK DIAGRAM

Fig. 4: Block Diagram

The above figure (4) shows the block diagram of the entire system. When the user dials the some number from his mobile phone the mobile phone at the agricultural field rings and if nobody picks the call, then the system picks up the call automatically. In the proposed system only authenticated users can access the devices. When we press any number on the phone keypad it generates a particular frequency, which is received by the other phone and then the code/number is decoded by the DTMF decoder /receiver. Here the decoder decodes the frequency of the tone generated by the particular code/number. There is one application and user can control the devices through the application also.

The user can access the application through the cloud. Then the DTMF decoder generates a binary output which is given to the microcontroller. A program code is fed to the microcontroller which activates the relay module according to the key pressed by the user. At the output of the microcontroller the devices are connected to a 4-channel relay module. It is a driver which drives the agricultural devices based on the microcontroller output. Thus, when the relay drive is activated by the microcontroller, the agricultural device either gets switched ON or is switched OFF as per the requirement of the user whenever he/she needs.

6. RESULTS

In our testing we found that our system is operating successfully. When the call is initiated and the keys are pressed upon the cell-phone, the DTMF decoder decodes the signal into binary form. This is further processed by the microcontroller to generate the specific signal to drive the relay module for driving the output devices connected to it. The key pressed by the user, the binary code output by the DTMF decoder and the resulting action performed by the driving circuit is shown in Table 1 below.

KEY PRESSED	BINARY CODE	ACTION PERFORMED

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0	0000	All devices will be OFF
1	0001	Device 1 will be ON
2	0010	Device 2 will be ON
3	0011	Device 1 & 2 will be ON
4	0100	Device 3 will be ON
5	0101	Device 1 & 3 will be ON
6	0110	Device 2 & 3 will be ON
7	0111	Device 1,2 & 3 will be ON
8	1000	Device 4 will be ON

TABLE 1: Output Obtained

7. ADVANTAGES
- Low cost.
- Remote control from anywhere in the world.
- Utilized for irrigation purpose.
- User friendly.
- Saves time and energy.

8. LIMITATIONS
- The receiver must reside in a location where a signal with sufficient strength can be received from a cellular phone network.
- The controlled agriculture devices will have to have an electrical interface in order to be controlled by microcontroller.

9. APPLICATIONS
- Industrial automation.
- Can also be used for security purpose after modification.
- In places where control of action has not any time limit.

10. FUTURE SCOPE
This project is aimed towards average users/Farmers who wish to control Agricultural devices remotely from their cell phones provided that devices are electrically controllable. Right now we have designed the project for controlling the agricultural devices but it can be further expanded with a voice interactive system facility. Also it can be expanded by adding a multimedia camera to see what is going inside the farm by sitting in home or somewhere else. In this way we can keep track of our devices when we are busy and without any worry we can perform our task.

11. CONCLUSION
We have developed a cell-phone controlled agricultural device system. It is an excellent device to operate any electronic equipment from anywhere in the world. This system can prove to be very useful in rural areas as well as the device control can be applied in various fields like home, factories etc. The utilization of mobile communication in device control has been thoroughly justified and the previous drawbacks and problems have been overcome. Also with add security feature in the proposed system only authenticated users can access the devices. So with the utilization of this large telephone network we can control our agricultural devices easily and economically.

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