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Design and Implantation Smart Irrigation System Observed Using GSM System

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Abstract: In Iraq one of the risks faced by agriculture sector is inadequacy of rain water during dry season for irrigation and the lack of technology such as irrigation system to support the farmer, causing the production of crops to be hugely affected. This problem inspired to the idea of having an auto watering system that able to cope with this situation. Auto watering system is a system which consists of an Arduino Uno, a self-made moisture sensor, a relay board, an electronic pump and a GSM system to observe the operation of watering system. The watering system developed is suitable for any plant, since, the system able to customize with different sand and with different plant that need different kind amount of water.

Key words: Arduino Uno, GSM, smart irrigation, watering system, electronic pump, moisture sensor

INTRODUCTION

An automatic watering system is to in charge of providing a system which will scale back the number of man power required for watering plant, besides providing a system that produces a plant grow healthier as we have a tendency to square measure ready to make sure the plant grow in keeping with the encircling that favors their growth (Razali *et al*., 2013).

Technology brings positive impact on the agricultural sector, precise irrigation permits farmers to own higher yield of crops. This project, the most focus is going to be the incorporation of technology into the irrigation system, to create it automatic, time saving and to produce correct irrigation. The effectiveness of this car irrigation system will be gauged by, however, well the system will give an applicable growing atmosphere to the plant and whether or not it's water saving as compared to the traditional ones. This technique may additionally save the number of water usage for irrigation as wet device is employed to confirm the valve of the water system are going to be closed once the watering of plant is completed (Razali *et al*., 2013; Raghvendra *et al*., 2017).

This example will be take a look at for its performance in water the plant within the time desired and stop watering once it reach the extent of wet that user desired and another testing will be created by confirm what proportion water will it save as compared to the traditional version of irrigation system that victimization timer (Yadav *et al*., 2016).

The sensible water irrigation system developed by our team is an adaptive plants and crops irrigation system. the needs of our sensible water irrigation system square measure to produce a water delivering schedule to the crops to confirm all the crops have enough water for his or her healthy growth, to cut back the number of water wasted in irrigation and to reduce the economic value for the users. Choudhari *et al*. (2018) and Kumar *et al*. (2017a, b) during this study knowledge is taken in real time of the water content of the plant as input argument, combines it with alternative parameters equivalent to water value schedule and precipitation on the crop field, runs the designed linear improvement system sporadically and outputs the foremost economical quantity of water the plants want that is translated by a selected exploit time of the water pumps.

MATERIALS AND METHODS

Smart irrigation algorithm: This section is going to be discussing the project flow chart. This additionally used as a reference for programming afterward. associate degree algorithmic rule is shown within the flow sheet of system overall algorithm:

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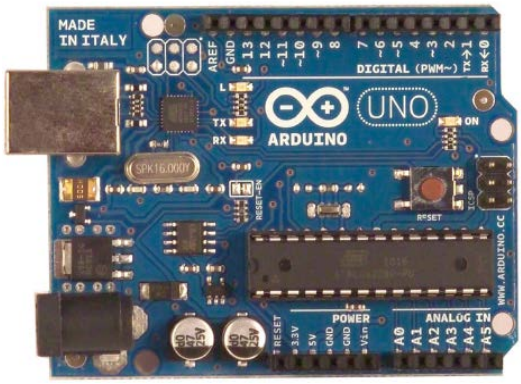

Fig. 1: Arduino Uno

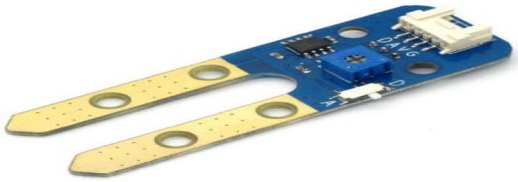

Fig. 2: Soil moisture sensor

Algorithm:
Step 1: Start
Step 2: Read sensor 1
Step 3: Check the Moisture in soil of ground
Step 4: If sensor 1< threshold value
Step 5: Motor 1 is denergized
Step 6: GSM message is transferred
Step 7: If sensor 1> threshold value
Step 8: Motor 1 is energized
Step 9: GSM message is transferred
Step 10: Read sensor 1 and repeat step 3
Step 11: End

The number of moisture sensors are three to control the water wasted in irrigation in three parts of garden to reduce the water waste, the cost of message and plant in the garden (Gawali *et al*., 2016).

Smart irrigation system configurations: In this paragraph the smart irrigation system configuration has been discussed in details.

Arduino Uno: The Arduino Uno may be a microcontroller board supported the ATmega 328, it became as main brain of good irrigation system, it reads the worth of wet sensors and energized the electrical motors and send GSM message (Kumar *et al*., 2017a, b) (Fig. 1).

Soil moisture sensor: Soil wet sensing element live the water content in soil measure soil wet is very important in agriculture to assist farmers manage their irrigation systems additional with efficiency (Fig. 2).

Fig. 3: GSM shield

Fig. 4: The 4 channel 5 V relay

Fig. 5: Electrical pump

GSM shield: The GPRS/GSM protect provides you some way to use the GSM mobile phone network to receive knowledge from a far off location (Fig. 3).

Relay Module: Relay module may be controlled directly by a large vary of microcontrollers similar to Arduino to be controlled the electrical motors (Fig. 4).

Diaphragm liquid pump NF 2.35: KNF diaphragm liquid pumps are supported the principle of the periodical displacement pump that is remarkably straightforward in style. The circular power from the motor is born-again into vertical movement by associate eccentric (Fig. 5).

RESULTS AND DISCUSSION

Smart irrigation implementation and practical results: The moisture sensor to control the water flow is targeted

Fig. 6: Prototype configuration

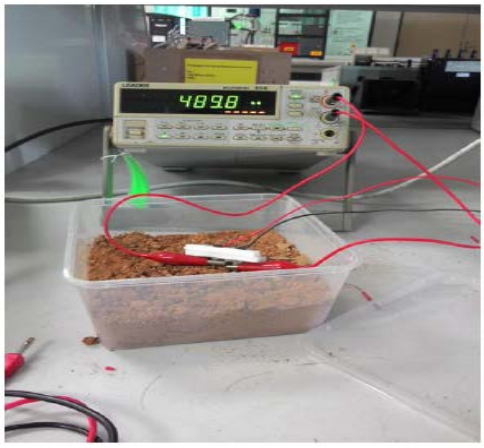

Fig. 7: Test soil moisture sensor

at small and medium farms. In short, the system will only water the soil until an optimum water level set by user is reached. Hence, by connect a 1k resistance to the sensor, the voltage drop of the sensor can be determine with the voltage drop of the resistance Fig. 6. Soil moisture level (V) = 5 (V)-Voltage drop at resistor (V) (1).

By connecting the resistor with a jumper wire and connected it to D 06 of the Arduino board, the Arduino will be reading the sensor reading through ADC (Analog Digital Value) (Fig. 7 and 8).

The GSM board used to notify the user regarding notify the user about the motors used in this project which is three in case if he is working the motor will send a short message including motor number, the time he worked and date, Fig. 9 and 10 show the SMS received from the GSM board.

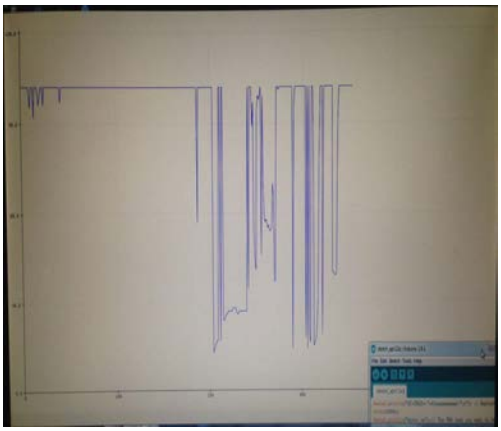

Fig. 8: Reading sensor at testing

Fig. 9: GSM messages

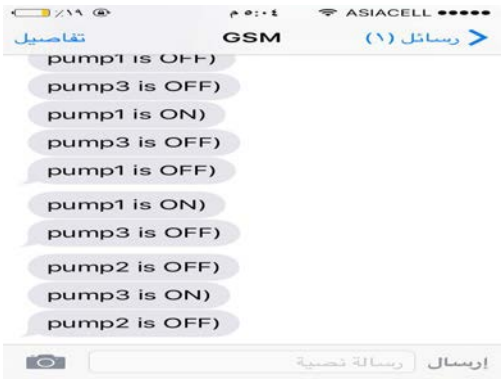

Fig. 10: GSM messages (GSM board)

Figure 11 shows the result of the wet soil after turn on the Arduino board to control the water wasted and shows the time of controlling the waters pumps and time of sending the SMS message.

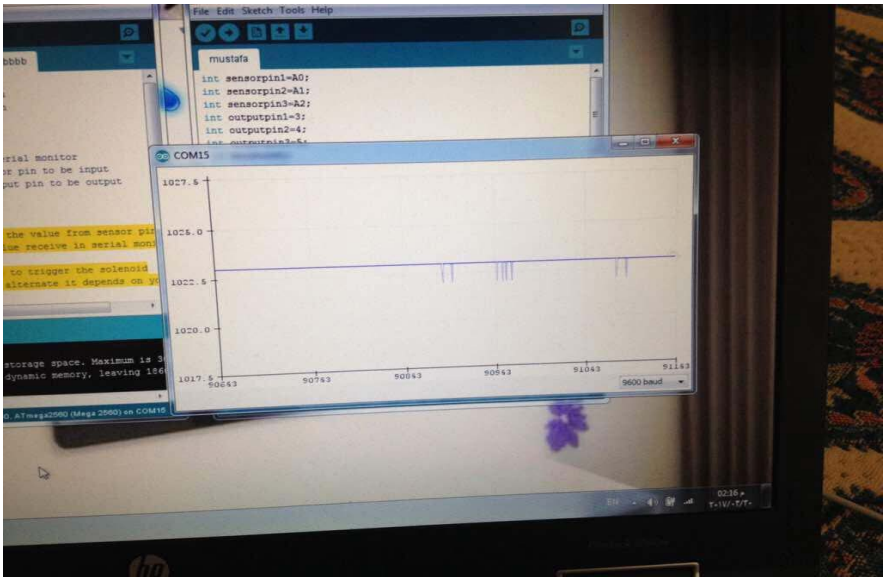

Fig. 11: Result of the wet soil

CONCLUSION

This sensible irrigation system paradigm was with success designed with operate adore automobile and manual mode of watering wherever user able to set the mode of irrigation to automobile or manual watering. Automobile watering are going to be the mode wherever it'll water the arranged with the time set by user and it'll solely water the plan till it's damp enough.

On the other hand, manual watering is that the modes wherever user will simply water the plant any time user desires it to be. Besides that, user able to monitor the soil wetness from time to time and this modify user to watch the amendment of wetness level of the soil which is able to show on the portable computer screen.

Although, this project was thought of a winning one, additional may be through with the standardization on the successful wetness detector to suit totally different quite plant, soil and size of farm. Besides that, GSM module board inserted into the system to apprize the user relating to apprize the user regarding the motors utilized in this project that is 3 just in case if he's operating the motor can send a brief message together with motor variety, the time he worked and date.

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