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Automatic Plants Irrigation System

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ABSTRACT
Agriculture is the livelihood of the majority of Indians and has an unprecedented impact on the country's economy. The aim of this study is to improve the utilisation of water for crops using an automatic irrigation system. In this study, the automatic watering system senses the soil moisture content and switches the pump automatically on when power is activated. In this project, the Arduino soil moisture sensor and LM358 module automation of agricultural irrigation and control moisture. Sensing the moisture content of the soil and switching the pump when power is on, this autonomous irrigation system.
KEYWORDS: *Agriculture, LM358, Automatic irrigation system, Trim pot, DC Motor.*

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I. INTRODUCTION

A big imbalance in the agricultural sector's turnover is today's biggest crisis. Agriculture's large losses - material losses or financial losses – are mostly due to crop health and quality. This can lead to a loss if plants are discovered not to be equal. We need to protect crop quality and keep crops as healthy as possible to prevent this. This is almost impossible, practically speaking, for a farmer with huge properties. This is, however, managed manually at present. There is a risk there; many workers prefer to work on white collar occupations, which results in a big volume of work.

What is it? What is dry? ARTIFICIAL DROUGHT ABOUT BY MAN DANGERS BOUGHT

Table 1: Winter Wheat Planted and Harvested in Montana's Golden Triangle, 1998-2001

	Planted Acres			Harvested Acres			Acres Harvested ÷ Acres Planted, %		
Year	Following Fallow	Recrop	Total	Following Fallow	Recrop	Total	Following Fallow	Recrop	Total
2001	554,000	72,500	626,500	363,400	32,900	396,300	65.6	45.4	63.3
2000	644,200	91,000	735,200	619,300	61,500	680,800	96.1	67.6	92.6
1999	361,400	21,000	382,400	320,200	18,400	338,600	88.6	87.6	88.5
1998	562,600	49,000	611,600	496,600	40,300	536,900	88.3	82.2	87.8

Table 2: Spring Wheat Planted and Harvested in Montana's Golden Triangle, 1998-2001

	Planted Acres			Harvested Acres			Acres Harvested ÷ Acres Planted, %		
Year	Following Fallow	Recrop	Total	Following Fallow	Recrop	Total	Following Fallow	Recrop	Total
2001	1,245,000	246,000	1,491,000	858,300	138,000	996,300	68.9	56.1	66.8
2000	1,051,700	270,000	1,321,700	1,003,600	233,000	1,236,600	95.4	86.2	93.6
1999	1,522,300	325,500	1,847,300	1,489,000	310,200	1,790,200	97.2	95.3	96.9
1998	1,398,000	270,000	1,668,000	1,335,500	245,000	1,580,500	95.5	90.7	94.7

A drought in a specific location is a period average lower-average precipitation, leading to protracted water shortages in the air, surface water or groundwater. A drought might last months or years or can be declared only 15 days later. The influence on the ecosystem and agriculture of the region can be substantial and the local economy's hurt. Annual tropical dry seasons dramatically enhance the likelihood of drought and consequent bush fires. Heat periods can greatly exacerbate drought through the rapid evaporation of water vapour.

It can be observed that the turnover is only half the amount planted. This loss was due to inefficient irrigation. THE PROJECT'S AIM

THE PROJECT'S AIM

The motivation for this idea comes from countries with an agricultural economy, with a lack of rain and water scarcity due to the climatic circumstances. Most of our country is based on farming. The farmer in the land depends exclusively on the rain and the irrigation of the land. Although the farm property has a water pump, farmers' physical intervention is necessary to activate/off the pump whenever necessary.

The objective of the project is to detect dryness in the soil using sensors and properly deliver water for the plants. This project enables to effortlessly conserve the plants. We identify months of land in this project.

STATEMENT PROBLEM

Today's number of people who die of hunger is still extremely large, despite being an agricultural country. Access to food looks tough since prices and quantities of food remain beyond the capacity of the lower middle and lower classes. Inducing irrigation Agricultural failure every year is a key cause of crop loss, which has risen to large proportions throughout the ages of water crises. Farmers are obliged to boost crop efficiency with fast-moving technologies in order to meet the growing demand. This technique was developed and applied to deal with irrigation problems. Farmers usually need huge irrigation staff.

II. BACKGROUND

SYSTEM EXISTING

The steadily growing food demand necessitates rapidly improving technologies for food production. We are still not able to make full use of farm resources in a country such as India where the economies are mostly reliant on agriculture and climate conditions are isotropical.

The main issue is the lack of precipitation and the lack of water in land reservoirs. The constant extraction of water from Earth reduces the level of water as a result of which many land slowly arrives in areas where there is no irrigation. This is also related to the unexpected usage of water which causes a large quantity of water.

SYSTEM OPOSED

This method automatically irrigates all the lands for manual irrigation. This will reduce the time needed to monitor the field compared to the prior systems, where farmers need to monitor the field frequently and consistently for symptoms of dryness. It significantly reduces the necessity of high value for work. Even where the owner is gone for a little time, this system will function and so provide correct irrigation even in the absence of people. Water is also not squandered during the crossing.

Farmers have used irrigation technology in recent times by manually controlling the irrigation of the soil by turning it on/off if necessary. Sometimes this procedure consumes more water and sometimes the water delivery to the land is postponed because of the drying out of crops. Water deficit deteriorates the growth of plants prior to the obvious wilting. Besides this delayed pace of growth, light weight is due to water scarcity. This problem is entirely correct if we utilise an automatic irrigation system where water is irrigated only when the need for water is high, as indicated by the humidity in the soil.

HARDWARE REQUIREMENTS

The hardware components required for the project are listed as follows:

S.NO.	COMPONENT TYPE	COMPONENT	DESCRIPTION
1.	IC	LM358	Operational amplifier
2.	Sensor	Soil moisture sensor	-
3.	Switch	Relay board	12V supply
4.	Motor	DC motor pump	5V supply
5.	Potentiometer	Trim pot	RangeOf $M\Omega$

Table : list of components

OPERATIONAL AMPLIFER

• It can handle up to 20 mA per channel supply with 3-32VDC and source. If you need to operate two single operational amplifiers from one energy supply, the operational amplifier is excellent. Comes in a bundle of 8-pin DIP.

• The LM358 is a superb double channel operating amplifier that is very convenient to operate.

• Transducer amplifiers, DC gain blocks and all traditional operative amplifier circuits are part of LM358 applications.

FEATURES

• Large ranges of supply

O Single Provision: 3 V to 32 V (26 V for LM2904)

±1.5 V to ±16 V (±13 V to LM2904) o Dual Supply:

• Low current supply drain, regardless of the voltage supply, 0.7 mA Typical

• Bandwidth of wide unit gain: 0.7 MHz

• Common mode input voltage range Includes earth, allowing direct close terrain sensing

• Low Bias Input and Offset Settings

o Voltage Offset Input: 3 mV Versions Typical A: 2 mV Typical

Current input: 2 nA Typical input

o Current Input Bias: 20 nA Versions Typical A: 15 nA Typical

• Equal to maximum-rated supply voltage differential input voltage range: 32 V(26 V for LM2904)

• Open Loop Differential voltage recovery: Typical 100 dB.

• Internal compensation of frequency

• MIL-PRF-38535, products. Products

Unless otherwise specified, all parameters are tested. Production processing does not necessarily include testing all parameters for all other products.

SOIL SENSOR MOISTURE

Soil humidity sensors measure the volumetric soil water content.

[1] Since direct gravimetric soil moisture measurement requires sample removal, drying, and weighting, volumetric water contents are measured by soil moisture sensors indirectly using other soil properties, such as electrical resistance, dielectric constant, and neutron interaction, to be a moisture content proxy. [2].

There must be a calibration of the relationship between the measured property and soil moisture, and it can change depending on environmental conditions such as soil type, temperature and conductivity. Reflected microwave radiation is impacted by soil humidity and employed in hydrological and agricultural applications for distant sensing. Farmers or gardeners may employ portable sample instruments.

SENSOR BOARD AND PROBE:

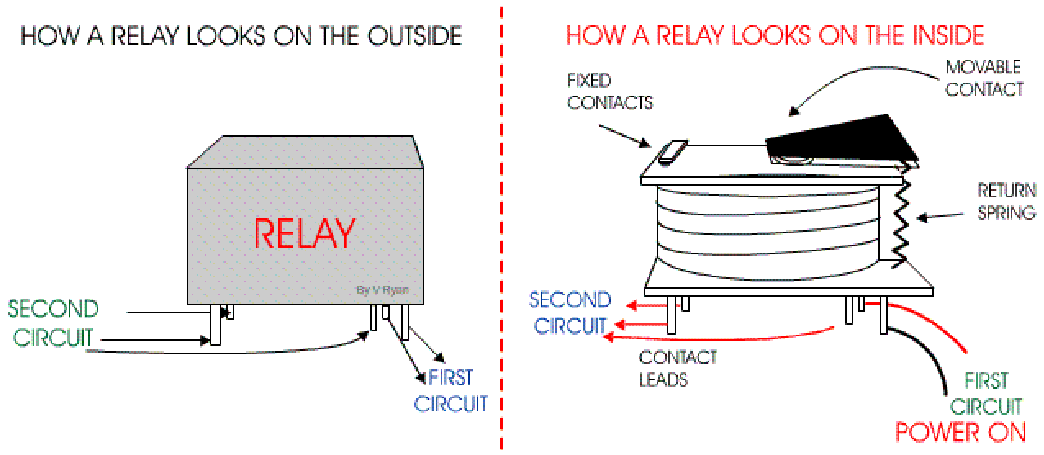
COMPONENT :

soil moisture sensor

BOARD RELAY

A relay is a switch activated electrically. Many relays employ an electromagnetic to operate a switch mechanically. However, different operating principles such as reinforced relays are also used. Relaxes are utilised whenever a separate low- power signal is needed for controlling the circuits or where a signal is required for controlling many circuits. The early relays were used as amplifiers in long-range telegraph circuits: the signal from one circuit was repeated and retransmitted to the other. Relaxation has extensively been employed for logical processes in telephone exchanges and early computers.
Electromagnetic relays are those relays that are electromagnetic. Modern protective relays are mostly based on micro-processors but are still based on electromagnetic relays. All the electromagnetic relays will take significantly more time to be replaced by static micro-processors.

OPERATIONAL DIAGRAM:



Relay operational diagram

DC MOTOR PUMP

A DC engine is one of a class of rotating electric machinery that transforms electrical direct current to mechanical power. The most prevalent types depend on magnetic field forces. Almost all types of DC engines possess an electromechanical or electronic internal mechanism for changing the current flow direction in portion of the engine.
As DC motors could be powered by existing direct-current lighting distribution systems, they have been employed as a first kind.The speed of a DC engine can be regulated Wide range, either employing a changeable supply voltage in its field windings or by alteration of current strength.

A DC motor pump is primarily a DC motor used for water circulation. The construction within is identical. The DC engine is enclosed in a watertight plastic box and the shaft is used for pumping water into an external arm. The pump requires a 5V source that can easily be supplied using batteries or AC.

COMPONENT STRUCTURE:

DC Moter

III. METHODOLOGY

Project development needed careful implementation of the design of the system, which was produced during the project design phase.

The extensive deployment of automated technologies in agriculture has shown to be cost-cutting. The functioning of an automated farm system may change the irrigation process and how it impacts the commercial and industrial sectors. Thus, this project was an expert or non-expert-based field surveillance method for the detection of dryness & field treatment.

PROJECT PLAN

The Objective of the project planning is to provide a framework that enables an owner to make reasonable estimate of the resources, cost and schedule. The project leader is responsible for designing the system precisely according to the requirement specified by the owner/ customer. He is also responsible for maintenance of the system for certain period of time, since in most cases, cost of maintenance is much higher than cost of developing the system. Thus to reduce development and maintenance cost and to provide the system within planned time, proper planning of system is necessary.

Initial design research:

The key phase of the project management of systems is to start the system inquiry, a master plan must be drawn up which details the procedures to be done, questions to be made and expected results. The initial study is to determine whether the request from the user has potential benefits The key steps are the definition of user needs, a review of the current system and a definition of candidate system performance to meet user requirements. The initial phase in the life cycle of the system is the identification of necessity. An established system may be changed, enhanced or enhanced by a user request.One approach of addressing these demands is by beginning study. The aim is to assess if the application is legal and practical before a

It is recommended that nothing should be done, the existing system should be improved or modified, a new system established.

Thus it is necessary to build APIS for an effective examination and written follow-up data from various conditions.

WORKING

This project comprises two parts: the external sensor unit and the integrated processing unit. In the external sensor device there is the basic need to sensitively react to sand or soil humidity, to detect strength and to deliver the input to the IC with the sensor arms.

When the soil is dry, due to its great strength it creates a considerable decrease of voltage and senses the soil moisture sensor, which leads to an output above the necessary threshold value by the operational amplifier. This means that the relay changes from open to closed - the relay starts.

The valve opens when the relay is turned on, and water flows to the plants through the pipes. With the increased water content in the soil, the soil resistance falls and the transmission of the samples begins to stop the operational amplifier triggering the relay. The valve attached to the relay will eventually stop.

Op-amp is set up as a comparator here. If the sensors feel the dry conditions, the comparator checks the sensors and the project switches on the motor and turns off the motor when the sensors are in a moist environment.It receives signals from the sensors from the comparator.

The relay is driven through a transistor during the soil moist. 5V dual piston

— The water pump is controlled by a double-through relay. Visual identification of the relay/load condition is provided with the LED indication. To negate the reverse EMF, a switching diode is attached to the relay.

This project works with the 5V power supply controlled for the internal block and uses a 12V power supply controlled for the relay board. LED power is tied to visual power status identification.

First, at a depth of 5cm from the ground at regular intervals on-the-ground sensor samples are placed into the soil at a given site in the field. The cables are constructed of

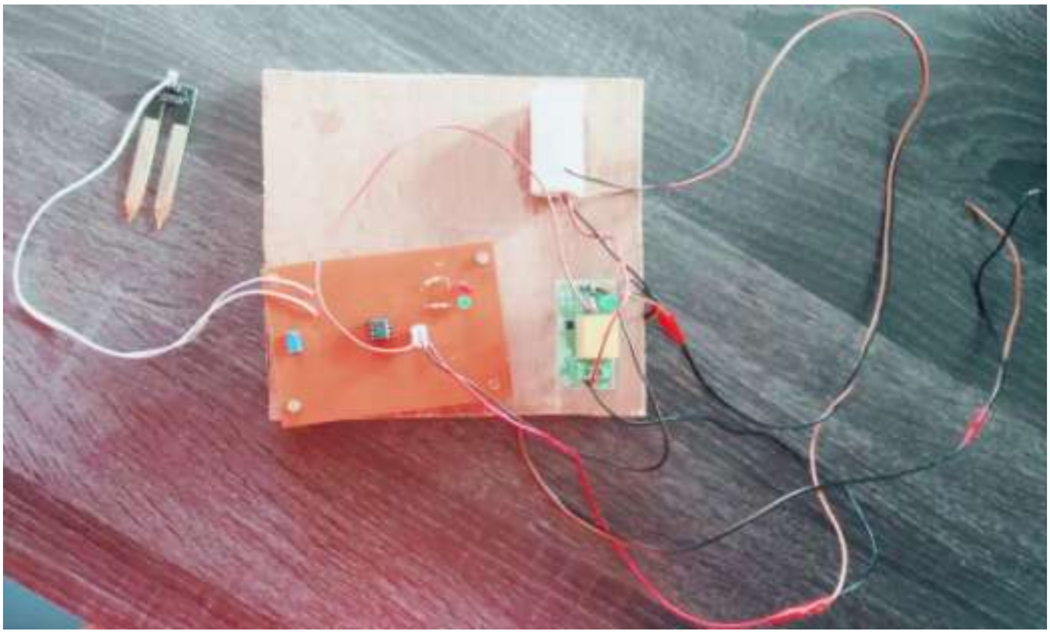
Protective shielding so that no unforeseen variables such as rocks on the ground are damaged.

The soil moisture sensor module features a comparator since the wet soil is more conductive than the dry soil. The tensile voltage is compared with the pre-defined voltage and only when the soil condition is dry is the comparator output high.

If the soil moisture exceeds the threshold, the relay is activated. The relay spiral is activated and activated by the motor.As an indicator, the LED is activated. The earth starts supplying with water, and the soil has an increased water content.

When the soil's moisture content rise to the threshold value, the soil humidity sensor output is low and the motor is shut down. This prevents an overwatering situation.

WORKING MODEL STRUCTURE



IV. CONCLUSION

Irrigation becomes straightforward, precise and practical using the above-mentioned approach and may be applied in future to further support agriculture. The moisture sensor and level system output plays an important part in the output generation.

This was the way in which the "AUTOMATIC IRRIGATION SYSTEM (APIS)"Successfully conceived and tested. It was built with the integration of all the features of the used hardware. The presence of each module is discussed and carefully put to make a contribution to the unit's best functioning. The system was automatically tested to work and to greatest advantage.

The humidity sensors measure the level of humidity (water content) in each plant. The humidity sensor transmits the signal to the operational boost, which prompts the DC Motor pump to turn on and supply the water to its field area, if the humidity level is discovered to be below the desired level. The system stops at its own level and the DC Motor pump turns out when the necessary amount of moisture reaches. This has extensively tested the functionality of the whole system and it is said to work successfully.

In order to optimise the water resources for farming productivity, the smart irrigation system is viable and economical.

In places with water constraint, this irrigation technology provides for improvement of sustainability.

It demonstrates that water use can be reduced.

For organic crops it is vital to use solar power in this method.

FUTURE WORK

The system can be expanded to incorporate several options that can include mobile engine control application and Wi -Fi controlled monitoring. This system can be used as a framework. These will increase this prototype's functional capacity and efficiency. It can be used in every place employing the notion of sprinkler not in agriculture but in gardens. When coupled with IOT, it has a huge range. This will give automation a new level.

We are able to cut or conserve electricity by using solar energy (solar panel). It's also cheap Power in the wild.

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