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ROBOT WITH AUTOMATIC WATER SPRINKLE FOR FIR ACCIDENTS.

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Abstract: Farmers in a bid to irrigate their farm looked for numerous methodologies. Manual irrigation the use of buckets and watering cans, flood irrigation, drip irrigation, sprinkler irrigation have been and are still being used today. The current machine has numerous boundaries; leaching off of soil vitamins, erosion due to flooding, lack of water from plant surfaces via evaporation, water wastage that may result to water scarcity in drought areas and manufacturing of bad plants. This problem can be rectified if we use microcontroller based automatic irrigation device in which the irrigation will take place most effective whilst there could be acute requirement of water. The project is designed to develop an automatic irrigation machine which switches the pump motor ON/OFF on sensing the moisture content material of the soil. In the field of agriculture, use of proper approach of irrigation is essential. The gain of the use of this method is to reduce human intervention and never ensure proper irrigation. The assignment makes use of an 8051 collection microcontroller which is programmed to receive the input signal of varying moisture circumstance of the soil via the sensing association. This is executed through using an op-amp as comparator which acts as interface among the sensing association and the microcontroller. Once the controller gets this signal, it generates an output that drives a relay for working the water pump. An LCD show is likewise interfaced to the microcontroller to show popularity of the soil and water pump. The sensing arrangement is made with the aid of using stiff metal rods inserted into the sector at a distance. Connections from the metal rods are interfaced to the manipulate unit. In the quick paced global humans require the whole lot to be automatic. Our existence style needs everything to be faraway controlled. Apart from few matters man has made his life automatic. In the sector of develop electronics, life of humans have to be simpler. Hence to make life easier and convenient, we have made.

Keywords:- L293D,SUMERGIBLE PUMP,MICROCONTROLLER(8051).

I. INTRODUCTION.

A model of controlling irrigation facilities to assist tens of millions of people. This model makes use of sensing arrangement generation with microcontroller to make a clever switching tool. The non-stop increasing demand of meals requires the fast development in food production generation. In a country like India, in which the financial system is mainly based totally on agriculture and the climatic conditions are isotropic, still we aren't capable of make full use of agricultural resources. The fundamental purpose is the dearth of rains & shortage of land reservoir water. Irrigation has constantly been an historic practice which has advanced through so many stages over the years. Our ancestral farmers in a bid to irrigate their farm looked for numerous methodologies. Manual irrigation the use of buckets and watering cans, flood irrigation, drip irrigation, sprinkler irrigation have been and are nevertheless being

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used today. The current system has numerous boundaries; leaching off of soil nutrients, erosion because of flooding, loss of water from plant surfaces via evaporation, water wastage that may result to water shortage in drought regions and manufacturing of dangerous crops.

II. OVERVIEW OF PROJECT.

This hassle may be rectified if we use microcontroller based automatic irrigation machine wherein the irrigation will take area most effective whilst there might be acute requirement of water. Automation of irrigation gadget refers back to the operation of the machine with out a or minimum guide interventions. Irrigation automation is justified in which a large irrigated area is divided into Small segments known as irrigation blocks and segments are irrigated in collection to fit the release to be had from the water supply. In this regard, the works that we've got surveyed describe the unique forms of computerized irrigation techniques, how they in reality have served the purpose and the primary difference among our venture and those literatures that we've contemplated. On this detail, the prevailing works "Applied engineering in agriculture, "Data acquisition gadget and irrigation controller and "Automation in Micro-Irrigation, employs subsurface drip irrigation the use of drip tapes and are time based structures wherein irrigation time clock controllers, or timers, are an fundamental part of an automated irrigation machine. A timer is an important device to use water inside the necessary quantity at the proper time. Timers can lead to below or over-irrigation if they're not efficaciously programmed or the water quantity is calculated incorrectly. Time of operation is calculated in line with volume of water required and the common waft charge of water a timer starts offevolved and stops the irrigation system. It routinely schedules irrigation at random events via the usage of timers in which within the automation for the device and presentations have been not applied. The papers titled " Feedback Control for Surface Irrigation Management and "Control and Automation in Citrus Micro-irrigation Systems, employs open loop structures in which the operator makes the decision on the quantity of water to be applied and the timing of the irrigation event. The controller is programmed correspondingly and the water is implemented consistent with the favored schedule. Open loop manipulate systems use both the irrigation duration or a particular implemented extent for control purposes. Open loop controllers normally include a clock this is used to begin irrigation. Termination of the irrigation can be primarily based on a pre-set time or can be based on a designated quantity of water passing thru a drift meter. In an open loop system, the operator makes the choice on the amount of water a good way to be applied and while the irrigation occasion will occur. This records is programmed into the controller and the water is applied according to the desired time table. Open loop manipulate systems use either the irrigation length or a special applied volume for control purposes. The disadvantage of open loop structures is their inability to reply routinely to converting situations in the environment. In addition, they will require frequent resetting to obtain high degrees of irrigation performance.

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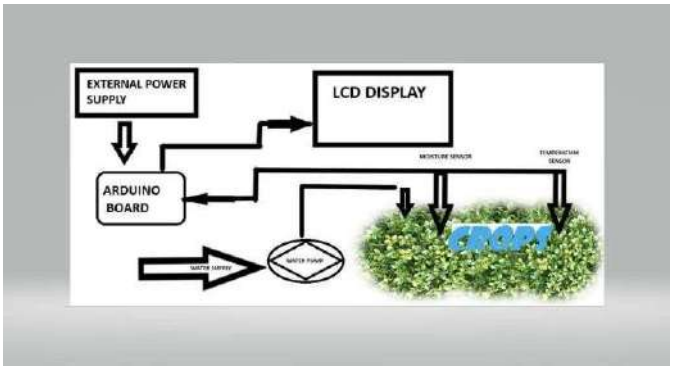

Figure:Automatic irrigation system

Step down transformer converts 230V from AC mains into 12V AC by using a centre tap transformer. Transformer selection is based on the fact that regulator ICs require around 11v as input considering dropout voltage, in order to obtain 12v power supply. Transformer steps down ac voltage from 230v ac to 12v ac. It is then given to bridge rectifier. Bridge rectifier converts ac voltage into pulsating dc. It is then given to regulator ICs which output constant dc voltage

III. Project Methodology and Requirements

This project on "Automatic Irrigation System" is intended to create an automated irrigation mechanism which turns the pumping motor ON and OFF on detecting the dampness content of the earth. In the domain of farming, utilization of appropriate means of irrigation is significant. The continuous extraction of ater from earth is reducing the water level due to which lot of land is coming slowly in the zones of un-irrigated land. The benefit of employing this technique is to decrease human interference and still make certain appropriate irrigation. The circuit comprises of sensing arrangement parts built using op-amp IC LM358. Op-amps are configured here as a comparator. Two stiff copper wires are inserted in the soil to sense whether the soil is wet or dry. The Microcontroller is used to control the whole system by monitoring the sensing arrangement and when sensing arrangement senses the dry condition then the microcontroller will send command to relay driver IC the contacts of which are used to switch on the motor and it will switch off the motor, if the sensing arrangement senses the soil to be wet. The microcontroller does the above job as it receives the signal from the sensing arrangement through the output of the comparator, and these signals operate under the control of software which is stored in the Microcontroller. The condition of the pump i.e., ON/OFF is displayed on a 16X2 LCD. The power supply consists of a step down transformer, which steps down the voltage to 12V AC. This is converted to DC using a Bridge rectifier. The ripples are removed using a capacitive filter and it is then regulated to +5V using a voltage regulator which is required for the operation of the microcontroller and other components. The figure below shows the block diagram of Microcontroller based irrigation system that proves to be a real time feedback control system which monitors and controls all the activities of the irrigation system efficiently

4.Microcontroller(8051).

8051 Microcontroller manufacturers have been competing for a long time for attracting choosy customers and every couple of days a new chip with a higher operating frequency, more memory and upgraded A/D converters appeared

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on the market.However, most of them had the same or at least very similar architecture known in the world of microcontrollers as “8051 compatible”.

What is all this about?

The whole story has its beginnings in the far 80s when Intel launched the first series of microcontrollers called the MCS 051. Even though these microcontrollers had quite modest features in comparison to the new ones, they conquered the world very soon and became a standard for what nowadays is called the microcontroller.

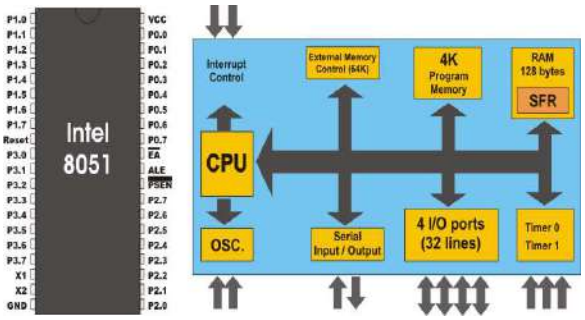

Fig 2.4.1: 8051 Architecture

The main reason for their great success and popularity is a skillfully chosen configuration which satisfies different needs of a large number of users allowing at the same time constant expansions (refers to the new types of microcontrollers). Besides, the software has been developed in great extend in the meantime, and it simply was not profitable to change anything in the

microcontroller’s basic core. This is the reason for having a great number of various microcontrollers which basically are solely upgraded versions of the 8051 family.

As seen in figure above, the 8051 microcontroller hasnothing impressive in appearance:

- 4 Kb of ROM is not much at all.
- 128Kb of RAM (including SFRs) satisfies the user's basic needs.
- 4 ports having in total of 32 input/output lines are in most cases sufficient to make all necessary connections to peripheral environment.

The whole configuration is obviously thought of as to satisfy the needs of most programmers working on development of automation devices. One of its advantages is that nothing is missing and nothing is too much. In other words, it is created

exactly in accordance to the average user‘s taste and needs. Another advantage is RAM organization, the operation of Central Processor Unit (CPU) and ports which completely use all recourses and enable further upgrade.

2.4.1 Pin out Description

Pins 1-8: Port 1 Each of these pins can be configured as an input or an output.

Pin 9: RS a logic one on this pin disables the microcontroller and clears the contents of most registers. In other words, the positive voltage on this pin resets the microcontroller. By applying logic zero to this pin, the program starts execution from the beginning.

Pins10-17: Port 3 Similar to port 1, each of these pins can serve as general input or output. Besides, all of them have alternative functions:

Pin 10: RXD Serial asynchronous communication input or Serial synchronous communication output.

Pin 11: TXD Serial asynchronous communication output or Serial synchronous communication clock output.

Pin 12: INT0 Interrupt 0 input.

Pin 13: INT1 Interrupt 1 input. Pin 14: T0 Counter 0 clock input. Pin 15: T1 Counter 1 clock input.

Pin 16: WR Write to external (additional) RAM. Pin 17: RD Read from external RAM.

Pin 18, 19: X2, X1 Internal oscillator input and output. A quartz crystal which specifies operating frequency is usually connected to these pins. Instead of it, miniature ceramics resonators can also be used for frequency stability. Later versions of microcontrollers operate at a frequency of 0 Hz up to over 50 Hz.

Pin 20: GND Ground.

Pin 21-28: Port 2 If there is no intention to use external memory then these port pins are configured as general inputs/outputs. In case external memory is used, the higher address byte, i.e. addresses A8-A15 will appear on this port. Even though memory with capacity of 64Kb is not used, which means that not all eight port bits are used for its addressing, the rest of them are not available as inputs/outputs.

Pin 29: PSEN if external ROM is used for storing program then a logic zero (0) appears on it every time the microcontroller reads a byte from memory.

Pin 30: ALE Prior to reading from external memory, the

microcontroller puts the lower address byte (A0- A7) on P0 and activates the ALE output. After receiving signal from the ALE pin, the external register (usually 74HCT373 or 74HCT375 add- on chip) memorizes the state of P0 and uses it as a memory chip address. Immediately after that, the ALU pin is returned its previous logic state and P0 is now used as a Data Bus. As seen, port data multiplexing is performed by means of only one additional (and cheap) integrated circuit. In other words, this port is used for both data and address transmission.

Pin 31: EA By applying logic zero to this pin, P2 and P3 are used for data and address transmission with no regard to whether there is internal memory or not. It means that even there is a program written to the microcontroller, it will not be executed. Instead, the program written to external ROM will be executed. By applying logic one to the EA pin, the microcontroller will use both memories, first internal then external (if exists).

Pin 32-39: Port 0 Similar to P2, if external memory is not used, these pins can be used as general inputs/outputs. Otherwise, P0 is configured as address output (A0-A7) when the ALE pin is driven high (1) or as data output (Data Bus) when the ALE pin is driven low (0).

Pin 40: VCC +5V power supply.

Bridge Rectifier.

Bridge Rectifier converts ac voltage into dc voltage. 4 diodes are connected in bridge. Its input is from transformer and output is given to the voltage regulator IC's. 3.4 Comparator Soil sensing arrangement is used to measure the volumetric water content of soil. It consists of two prongs, which must be inserted in the soil, an LM358, which acts as a comparator and a pot to change the sensitivity of the sensing arrangement.

Submersible Pump

A pump is a tool used to move fluids, which include beverages, gases or slurries. A pump displaces a quantity by using physical or mechanical action, this pump requires 12V DC of electricity supply. A submersible pump (or electric submersible pump (ESP)) is a device which has a hermetically sealed motor near- coupled to the pump frame. The entire meeting is submerged within the fluid to be pumped. The primary advantage of this sort of pump is that it prevents pump cavitation's, a trouble related to a high elevation distinction among pump and the fluid surface.

Submersible pumps push fluid to the floor in preference to jet pumps having to tug fluids. Submersibles are extra green than jet pumps.

Voltage Regulator:

situation is dry. This output from the soil sensing arrangement is given to the analogue input pin of the microcontroller.

The LM7805 is a three-terminal positive regulator that is available in the TO-220/D-PAK package and with 5V as fixed output voltage. It employs internal current limiting, thermal shutdown and safe operating area protection, making it essentially indestructible. If adequate heat sinking is provided, it can deliver over 1A output Current. Although designed primarily as fixed voltage regulators, these devices can be used with external components to obtain adjustable voltages and currents.

B. *Working*

The soil moisture sensors that are not anything but copper strands are inserted within the soil. The soil sensing association measures the conductivity of the soil. Wet soil can be extra conductive than dry soil. The soil sensing arrangement module has a comparator in it. The voltage from the prongs and the predefined voltage are compared and the output of the comparator is high only when the soil per channel with peak output current limited to 1.2A (non- repetitive). This means you cannot drive bigger motors with this IC. However, most small motors used in hobby robotics should work. If you are unsure whether the IC can handle a particular motor, connect the IC to its circuit and run the motor with your finger on the IC. If it gets really hot, then beware... Also note the words "non-repetitive"; if the current output repeatedly reaches 1.2A, it might destroy the drive transistors.

Supply voltage can be as large as 36 Volts. This means you do not have to worry much about voltage regulation.

L293D has an enable facility which helps you enable the IC output pins. If an enable pin is set to logic high, then state of the inputs match the state of the outputs. If you pull this low, then the outputs will be turned off regardless of the input states

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The datasheet also mentions an "over temperature protection" built into the IC. This means an internal sensor senses its internal temperature and stops driving the motors if the temperature crosses a set point

Another major feature of L293D is its internal clamp diodes. This flyback diode helps protect the driver IC from voltage spikes that occur when the motor coil is turned

The logical low in the IC is set to 1.5V. This means the pin is set high only if the voltage across the pin crosses 1.5V which makes it suitable for use in high frequency applications like switching applications (upto 5KHz)

Lastly, this integrated circuit not only drives DC motors, but can also be used to drive relay solenoids, stepper motors etc.

1) Description:-

It works on the concept of H-bridge. H-bridge is a circuit which allows the voltage to be flown in either direction. As you know voltage need to change its direction for being able to rotate the motor in clockwise or anticlockwise direction, Hence H-bridge IC are ideal for driving a DC motor.

In a single l293d chip there two h-Bridge circuit inside the IC which can rotate two dc motor independently. Due its size it is very much used in robotic application for controlling DC motors. Given below is the pin diagram of a L293D motor controller.

There are two Enable pins on l293d. Pin 1 and pin 9, for being able to drive the motor, the pin 1 and 9 need to be high. For driving the motor with left H-bridge you need to enable pin 1 to high. And for right H-Bridge you need to make the pin 9 to high. If anyone of the either pin1 or pin9 goes low then the motor in the corresponding section will suspend working. It's like a switch.

2) Pin Diagram:-

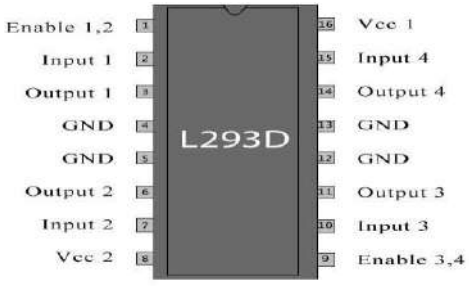

Fig showing pin diagram of L293D

3) ADVANTAGES:-

Stress free, Time saving robot, Automated control of the robot

4) DISADVANTAGES:-

Expensive, Safety and security concerns, Sprinkler irrigation may become problem, It effected by the temperature/humidity

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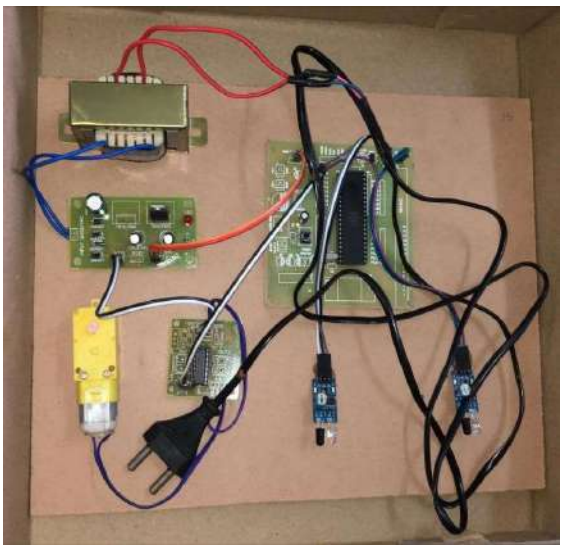
5) APPLICATIONS:-

1. Firefighting task
2. Forest implementation

IV. RESULT:-

Finally, we have successfully implemented the circuit .It canbe easily implemented in elections and remote and local services.



V. CONCLUSION

The project "Development of Fire Fighting Robot" has been successfully designed and tested. It has been developed by integrating features of all the hardware components used. Presence of every module has been reasoned out and placed carefully thus contributing to the best working of the unit. Secondly using highly advanced IC's and with the help of growing technology the project has been successfully implemented.

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