

**SOLAR BASED SMART IRRIGATION**

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**Abstract:**

The practice of irrigation involves administering water to vegetation and areas to encourage growth and improve the crops such as fruits and grains. As opposed to the conventional electricity (supply)/method, which employs an enormous amount of personnel, hours, and unregulated water amount, automated irrigation systems are a new technique of irrigating the vegetable, fruit fields, farms, landscaping, and land scraped regions. By accurately delivering water for irrigation in both location and point, this contemporary drip irrigation technique with solenoid valves offers the benefit of potentially increasing profit while using less water. The whole system, even the water pumps motor, is built to run entirely on solar power and does not require a traditional power source. Farmers who work in agricultural fields are now having a lot of difficulty watering their crops in order in order to keep their harvests green during the summer. It's since they are misinformed regarding the power's supply. They must wait till the pitch is thoroughly irrigated even if the electricity is on. As a result, this procedure forces them to quit doing other acts. However, there is an answer, namely an irrigation system with an autonomous solar submersible pump control panel. PV cells are employed in the submerged pump test to create power, which is then stored in rechargeable batteries. Batteries like this generate electricity needed for system functioning. Water is pumped from a bore well to a storage tank using an underwater pump regulator.

**1. Introduction:**

The development of civilization created the basis for a constantly increasing demand for housing. Accurately predicting property prices has always fascinated Bankers, purchasers, and sellers. The real estate price prediction conundrum has already been attempted by numerous scholars. As a result of the research activities of various scientists around the world, many theories have appeared. Several of these ideas suggest that a region's topography and culture influence whether housing prices rise or fall, while others emphasize the socioeconomic conditions behind the rise in housing prices. We all know that house prices are within a certain range, so predicting house prices is clearly a regression problem. Generally, to predict home prices, people try to find similar properties in the neighborhood and use the information gathered to predict home prices. All of this suggests that predicting home prices is a new area of regression research that calls for knowledge of machine learning. This inspires me to pursue a career in this area. A real estate appraisal is an important part of the real estate buying process. Traditionally, appraisals are done by appraisers with special training in real estate appraisal. Automated price estimation systems help real estate buyers approximate the prices of real estate present on the market. Such systems are especially useful for first-time home buyers with little or no experience.

**A Literature Review**

**Nor AdniMatLeh, Zuraida Muhammad, Muhammad Azri Asyri Mohamad Hafez, Zakiah Mohamad Yusoff, and Shabinar Abdul Hamid[1]** The "Internet of Things" (IoT) is the networked connectivity of physical items like machinery, automobiles, and other electrical gadgets for the transfer of data. The Internet of Things (IoT) is being used more often to link things and gather data. Therefore, the usage of the Internet of Things in agriculture is essential. The objective of the project is to build an intelligent agriculture network that is integrated with the internet of things. To deal with Malaysia's changing weather, technologies are coupled with a system for watering.

**Janani V., Divya J., and DivyaM.[2]** Both the economy and the existence of the Indian people depend on farming. The goal of this project is to develop an embedded-based watering & soil tracking system that will lessen the need for human field surveillance and deliver data via an application for mobile devices. The technique is designed to assist farmers in boosting agricultural productivity. The equipment utilised to inspect the soil includes a pH sensor, a temperature sensor, and a humidity sensor. Producers may choose to grow the best crop for the land according to the results. Wi-Fi is used to transmit sensors data to a field supervisor, and a mobile app is used to generate crop recommendations. Use of an automated irrigation system is necessary when the soil heat is high.

**ShuchiUpadhye, Rajeev Tiwari, Arzeena Khan, and Dweepayan Mishra [3]** Indians rely heavily on farming as a means of income, which has a significant effect on the country's economy. In order to increase output and produce products of greater quality, the growth of crops is crucial. Therefore, crop beds with ideal circumstances and the right amount of moisture can significantly affect productivity. Streams that run from one conclusion to the other of an area are common examples of conventional systems for irrigation. The distribution of this material has the potential to change the fields' water content. The handling of the water supply may be improved with the use of a tailored irrigation device. This study suggests a terrain-specific programmed water distribution system that will preserve human labour while boosting crop production and water utilisation.

### **B. Limitations of existing systems**

Although sunlight-based panels are widely used today, their steady conditions prevent humans from obtaining the full power of the sun. A board driven by the sun is utilised. It was made reality by using many additional techniques. The majority of Indians depend on farming for their livelihood, and it also has an influence on the country's economy. Our project aims to reduce the rancher's laborious involvement by using a computerised water supply framework whose objective is to increase water utilisation for agricultural output. The countries whose economies are based on agriculture and whose climates are conducive to a lack of rainfall and a scarcity of water served as the inspiration for this undertaking. The only things that ranchers operating on homesteading properties have control over constitute the land's bore wells and rainfall. Irrespective of whether the homestead land has a water siphon, landowners must manually operate the syphon in order to switch it on or off as needed. The project is designed to create a programmed water system framework that turns on and off the syphon generator based on the quantity of moisture in the soil.

Utilising the fluid mechanism's fitting mechanism is essential in the farming sector. The benefit of using this technology is that it reduces human intervention while maintaining a proper water supply. By foreordaining the outermost estimates of the soil's moisture, temperature, and water content that were converted in a wrist the controller a product application was established.

### **C. Proposed System**

Throughout this study, a sun-oriented force-based planned daylight-altering structure for sun-powered panel management is provided. Once in position, the board will move to the next sector in order to adhere to the light and obtain the most extreme force. The light-oriented board will return to its preset orientation once the sun goes down. If the power source sun-based power is insufficient to support the structure, the force may be quickly converted to a DC source by using the DPDT exchange system.

The cleaning procedure is empowered by programming. The voltage values are also shown using LCD, and the information are also sent to the online via the Web of Things. Solar monitoring devices boost the energy growth of photovoltaic power plants. The system that yields the greatest energy gain in any region is often one that is designed to align with the sun. This makes it the ideal structure since it can be implemented anywhere and yet guarantee a significant energy benefit. From a passionate standpoint, sun-based monitors are recommended everywhere because they typically increase the amount of acquired energy. It is also effectively utilised to regulate the water supply for agriculture.

#### D. Need and motivation

The demand for agricultural products rises in tandem with the expansion of the world's people. Given the growing shortage of sources of freshwater, efficient water usage in agriculture has taken on critical emphasis. In this situation, solar-powered smart irrigation systems have become a viable and creative answer to the problems growers face. The necessity and driving factors for the implementation of solar-powered intelligent irrigation systems are examined in this article.

Water is frequently wasted when using conventional irrigation techniques like flooding and pumps because of excessive watering, evaporated water, and ineffective dispersion. In addition, reliance on irrigation systems that are driven by fossil fuels increases greenhouse gas emissions and the effects of global warming. These elements emphasize the requirement for a more effective and environmentally friendly irrigation strategy that preserves water supplies and lessens the negative environmental effects. A trustworthy and environmentally friendly substitute for traditional power sources is solar energy. The use of solar energy has advanced and the cost of installing solar panels has decreased, making it more affordable for growers all over the world. By lessening farmers' reliance on pricey traditional sources of energy, this renewable energy source not only solves environmental issues but also provides long-term economic benefits for agriculture.

#### 2.BLOCK DIAGRAMS:

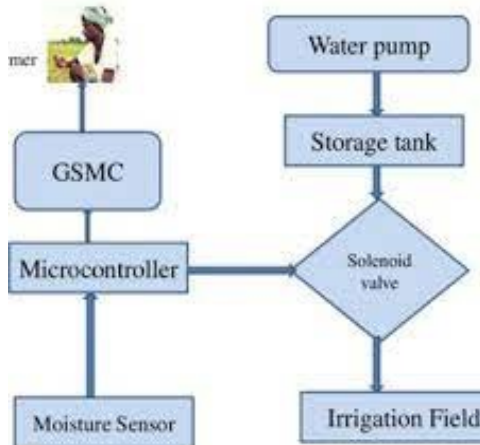


Figure 2.1 Block diagram of proposed system

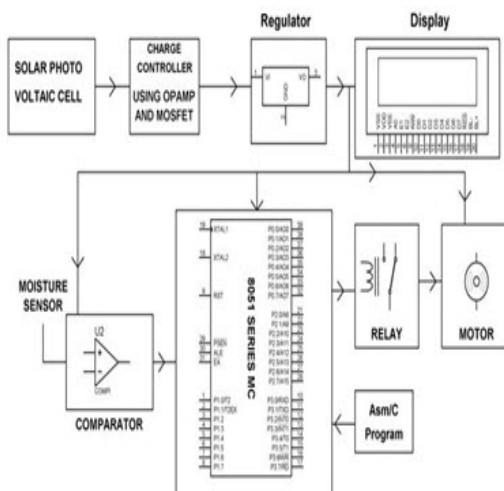


Fig 2. Circuit Diagram

### **3.FUNCTIONAL DESCRIPTION:**

The hands-on explanation of the undertaking's work is explained in this section. For simplicity of understanding, the entire module has been split into several of separate parts. Following is a description of each component. The block schematics and schematics for this initiative's functioning are shown in the next chapter. The sections which follow outline the undertaking's overall goal or method of functioning.

SENSITIVITY OF THE SOIL  
LCD FOR DISPLAY  
MICRO-CONTROLLER  
MEMORY UNIT  
CENTRAL PROCESSING UNIT  
BUS  
INPUT - OUTPUT UNIT  
RELAY SECTION

### **4.IMPLEMENTATION**

A 2 HP water pump is being used for the planned system's deployment, along with a number of modules that were first designed and manufactured independently before being ultimately put collectively. Utilising solar power is 55W are produced by the PVL-68 photovoltaic cells at the nominal operating cell temperature. A crystalline silicon solar cell of 30V type, details of the solar panel that was chosen:

Array power -- 220Wp  
520 W/m<sup>2</sup> of irradiance  
15 V is the open circuit voltage.  
Current in a short circuit: 3.8 A

#### **4.1 Battery specifications and inverter design**

A converter for boost voltage is used for producing 220V DC from 12V DC for an inverter's designer DC input. To produce 220V AC, the Sine PWM method is used.

The constructed comparator circuit is depicted in Fig. 4. With regard to the power source, we utilised a 12V, 120Ah battery to power a 2HP pump.

#### **4.2 Device for moisture metres**

The amount of humidity in the watering field is detected using a humidity monitor. It contains a level detection module where an equivalent value may be entered. This circuit may be utilised with analogue probes like the VG400 probe in Figure 3.1 that generate a voltage proportional to soil wetness. Utilising a moisture sensor for the soil, including the VG400, that generates an identical voltage as the output proportionate to the conductivity between the two probes, one may determine the amount of water of the soil.



**Fig. 3.1:** Soil Moisture Sensor probe.



**Fig. 3.2:** Inverter circuit.

#### **4.3 Autonomous valve control**

We are employing a stepper motor as an actuator control of the valve that is linked to the tank's output valve in order to automate valve controls. The driver circuit that excite the stepper motor's charge receives control impulses from the controller's signals or the humidity signal. According to the quantity of humidity in the discipline's soil, the output valve is thus gradually cracked or closed. After the appropriate level of soil humidity is reached, the actuator fully closes, the driving circuit loses strength, and the computer enters an inexpensively sleep mode. Whenever soil dries up and reaches a certain minimal cut-off significance, The device in question awakens from state of sleep and controls the quantity of fluid after the dirt's moisture has dried to a minimal cut-off level. In this case, the entire system operates independently.

#### **5.OPERATION:**

An electromagnetic relay is used in this effort. The electromechanical relay functions basically as a toggle switch (or a set of buttons) that are triggered by the magnetic pull created by an electric current flowing across a coil. It consists of a movable armature, an array of acquaintances, an electromagnetic field with a wire spiral and electromagnetic circuit, and a mounting frame for everything. An extremely broad spectrum of relays have been developed to meet the demands of the industry. Simply put, this relay is an electrical switch. Once flow through the coil is started or stopped, the circuit is opened or closed. An electromagnet pulls an armature and closes the links once the coil's action is triggered. The messages (indicators) get their power n this way. A symbol that is frequently seen in relay setup is encircled by a coil of copper wire. The centre is fastened to a titanium frame. The moving part in the relay is referred to as the armature. Once an electrical charge is applied to the coiled's ends, the current flowing through the coil produces a magnetic field in the core. In other terms, the metal framework serves as a magnetic to pull people towards the centre. When an armature is drawn to the centering, the magnetic path passes through the heart of the member of the frame, and then returns to the core. The armature's springy return it to its initial location when the electricity is switched off. The attraction magnet must therefore be pulled in with a greater pull than it must be kept in the captivated position.

#### **6.CONCLUSION:**

The "Solar Powered Irrigation System" project has been effectively planned, examined, and a demonstration unit has been built. Just two electrodes are supported because it is a display unit, however according to the size of the field of vision, hundreds of electrodes may be employed in actual applications.

Because it may be hard to get normal electricity in industries, the undertaking's whole circuitry's electricity supply must be sourced from the solar panels. As a result, this supply may be produced utilising the sunlight. The battery may be charged using an appropriate solar panel for immediate form use, and the cell's energy reserve can be used to provide the circuitry's required power supply.

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