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Smart Irrigation System with Solar Power

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Retraction

Retraction: Smart Irrigation System with Solar Power (*IOP Conf. Ser.: Mater. Sci. Eng.* **1145** 012058)

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This article (and all articles in the proceedings volume relating to the same conference) has been retracted by IOP Publishing following an extensive investigation in line with the COPE guidelines. This investigation has uncovered evidence of systematic manipulation of the publication process and considerable citation manipulation.

IOP Publishing respectfully requests that readers consider all work within this volume potentially unreliable, as the volume has not been through a credible peer review process.

IOP Publishing regrets that our usual quality checks did not identify these issues before publication, and have since put additional measures in place to try to prevent these issues from reoccurring. IOP Publishing wishes to credit anonymous whistleblowers and the Problematic Paper Screener [1] for bringing some of the above issues to our attention, prompting us to investigate further.

[1] Cabanac G, Labbé C and Magazinov A 2021 arXiv:2107.06751v1

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Smart Irrigation System with Solar Power

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Abstract. As of late everything relies upon brilliant innovation. Water system framework is likewise getting brilliant by utilizing present day advances, which is more profitable instead of the conventional strategies. In this undertaking, a shrewd water system framework is built up that robotizes the water system measure with the assistance of sun based and wind energy. This proposed framework can upgrade the utilization of water dependent on various information, for example, soil dampness, climate expectation, and so forth It will likewise inform its proprietor about the current state of the dirt and engine through IOT innovation. This proposed model can naturally kill ON and the engine siphon by detecting the dampness substance of the dirt relying upon the interest of water in the field. A dampness sensor is utilized to gather information (soil moister level) of a specific territory. The engine will consequently kill subsequent to satisfying the interest of water and get turns ON again when the field gets dry. IOT innovation is utilized to send the report (ON/OFF) of an engine to the ranchers. The entire proposed framework is constrained by an Arduino. Here, DC power is produced from the sun oriented board and wind engine. Every one of these highlights will make water system framework a lot more brilliant and practical. This Project manages the age of power by utilizing two sources join which prompts create power with reasonable expense without harming the nature balance.

Keywords: Arduino, charge control circuit, GSM technology, irrigation system, moisture sensor, relay, solar panel, water pump.

1. Introduction

Energy utilization everywhere on the world is expanding quickly with the development of total populace. To adapt up to the expanding request, energy age should be expanded. Customary fuel sources for example non-renewable energy source which isn't harmless to the ecosystem [1] and will complete in not so distant future [2]. Environmentally friendly power sources can be the best substitute path for energy age. These days, sunlight based energy is quite possibly the most mainstream and solid fuel sources. It is considered as a green innovation since it doesn't radiate ozone harming substances. This sort of energy is equipped for working dc load inside its reach, for example, battery charger [3], grass shaper [4], savvy water system framework, and so forth

Water system framework is the procedure which controls the stockpile of water misleadingly through lines, channels, and so forth The fundamental goals of water system frameworks are to help the development of a plant, scene upkeep, decrease the impact of insufficient precipitation, and so forth Dhekli and Rahat are two conventional water system techniques though, sprinklers and flood type framework are known as present day strategies [5]. Horticultural creation exceptionally relies upon the accessibility of water. Savvy water framework structures guarantee adequate water supply in the field in legitimate time. Water is an indispensable component for every living animal. Just the

agrarian area represents practically 70% of all out water utilization which makes this area the biggest water customer [6]. Wastage of water can be seen while watering the field. To guarantee legitimate utilization of water in horticultural field, brilliant water system framework is required.

Various investigates are continuing with respect to the improvement of water system framework. By utilizing current advances, the water system framework is getting more intelligent step by step, which is more worthwhile as opposed to the conventional techniques. As of late, a dirt dampness observing framework was created in [7] where low force utilization MSP430F149 microcontroller is utilized to understand the elements of the plantation soil information for far off transmission and programmed water system. With the assistance of structure, a venture is done in [8] that gives a savvy water system framework by identifying the clamminess content as it turns the motor ON/OFF consequently. An inserted framework gadget (ESD) is planned in [9] which deals with the water system measure. The PIC18F4550 microcontroller interfaced with GSM module fills in as a sensor. Another examination has been done on legitimate water system of a field by checking the water level of the rice field, giving criticism to ranchers and giving ranchers alternative to control the water [10]. A web of things (IoT) based computerized water system framework is proposed in [6] which can convey ideal water to the plants dependent on dampness.

A shrewd water system framework is the mix of IoT and fluffy rationale regulator [11]. This framework can handle the water move through fluffy principles by detecting the temperature and soil dampness. Another IoT based keen water system framework is developed,[12] which has the capacity of checking the water system measure. Proprietor can handle the cycle by a ThingSpeak channel which is associated with an Arduino. Photovoltaic energy based effectively open and energy saving water system framework is appeared, [13] which wanted measure of water supply to the plants. A fluffy based computerized water system framework is planned [14-19] to appropriate the essential measure of water and power for the water system framework and the siphon, individually.

As of late, ranchers are dealing for certain serious issues in watering their agribusiness fields. Remote sensor and incitation organization (WSAN) based choice emotionally supportive networks (DSS) is developed,[20] which can help the ranchers in the administration of the water system measure. A Raspberry Pi based programmed water system IOT framework is proposed in [21] for the execution of Precision Agriculture (PA) with distributed computing. A rural force the board framework is proposed, [22] which depends on charge control terminal. The expense control terminal capacities are the blend of correspondence, information the executives and capacity, occasion record, boundary setting, card handling capacity. This framework lessens the multifaceted nature of the horticultural force utilization and makes the relationship stable between the purchaser and the providers of the power.In this paper, an automatic smart irrigation system is proposed which is based on solar power and GSM technology.

Here, a moisture sensor is used which will continuously send data about the soil conditions to the Arduino and based on the
Solar energy is used here to run the system. As solar energy is one of the cheapest energy sources, farmers would be able to irrigate their fields economically. This system also ensures the perfect use of water and reduces water wastage.

2. Methodology and Designing of Smart Irrigation System

The proposed solution
Solar cell will generate energy from solar panel and wind mill will generate energy from wind turbine. These solar panel and wind turbine convert energy into electricity. These energies will get combine and pass to charge controller. It will control the amount of charge generated by solar panel and wind turbine and the energy is then stored in battery which is of 12V . Battery Level, water pump and soil moisture sensors which are connected to arduino uno.
Wastage of water must be monitored in agricultural field by using automatic plant irrigation system.

Photo voltaic cell generates power from solar energy. Hence alternative form of electricity is introduced in irrigation. Wind turbines capture kinetic energy from wind and generate electricity. Small belt can be connected to DC motor and fan that fixed in the outlet of pump and to rotate fan through flow of water and generate electricity. Figure 1 shows the block and circuit diagram.
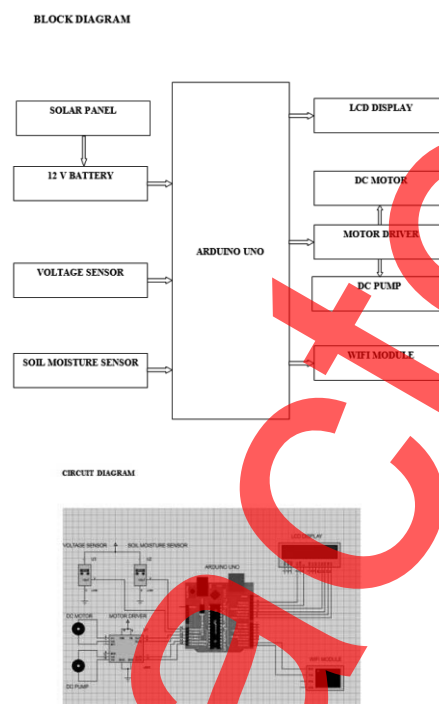

Figure 1. Block diagram and circuit diagram of a Smart Irrigation System with Solar and GSM Technology.

The whole system is controlled by microcontroller which monitors the sensors. The soil state will be identified by the sensors which in return microcontroller passes the command to relay driver IC. If the soil is in wet state the motor is turned off and vice versa. The microcontroller receives the signal from the sensors through the output of the op-amp, the software controls the signal which is stored in ROM of the microcontroller. The condition of the pump i.e., ON/OFF is displayed on a 16X2 LCD which is connected with the microcontroller.

COMPONENTS REQUIRED
HARDWARE REQUIREMENTS
   [1] Arduino uno
   [2] Battery
   [3] Soil moisture sensor
   [4] Voltage sensor
   [5] Solar panel
   [6] Dc motor
   [7] Dc pump
   [8] Motor driver
   [9] Lcd display
   [10] Wifi module

SOFTWARE REQUIREMENTS
   • Arduino IDE

ARDUINO IDE

The Integrated Development Environment (IDE)is a mix of proofreader, linker and a compiler which causes the engineer to make their Firmware for their Innovative Projects. Arduino IDE assume a significant part in open source stage for quick prototyping and simple to access of library. It is easy to use instrument for amateurs and it underpins programming language like inserted C, Luna and so forth Throughout the long term Arduino has been the cerebrum of thousands of ventures, from ordinary items to complex logical instruments. Its backings all the variation of Arduino sheets like Arduino Uno, Nano and Mega and so on When it arrives at a more extensive local area, the Arduino board began changing to adjust to new requirements and difficulties, separating its proposal from straightforward 8-bit sheets to items for IoT applications, wearable, 3D printing, and installed conditions

ARDUINO IDE SOFTWARE

With this Arduino Integrated Development Environment you can alter, order and transfer Arduino portrayals to the Arduino sheets. Figure 2 shows the Arduino IDE software
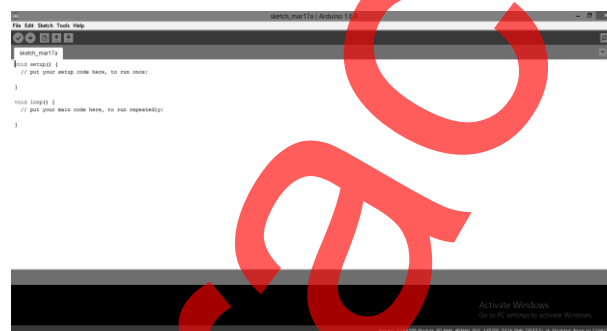

Figure 2. Arduino IDE software

This proposed shrewd water system framework has a few points of interest over the conventional strategies. At times, this proposed framework is more ideal than the other existing keen framework. Table I shows the correlation between the proposed and existing water system framework. This proposed water system framework can be considered as a novel one as a result of the referenced attributes in the table

Table 1. Comparisons Between Proposed And Existing Irrigation System

Proposed irrigation system	Existing irrigation system
This framework utilizes sun based energy as fuel source. Along these lines, this proposed model would be viable in distant regions where there is no electricity.	The vast majority of the current brilliant water system frameworks [6], [9] and [12] rely upon conventional energy sources.
It can work the water system process automatically as per the dirt dampness level. Subsequently, wastage of water is reduced.	Wastage of water is found in the ordinary water system. techniques like, sprinklers and flood type framework [5]

This proposed framework is programmed. Thus, no labor is needed	A large portion of the conventional strategies require labor for the water system. For instance, Dhekli and Rahat, two notable conventional techniques use man and creature power, separately [5].

3. Advantages Over Other Traditional Methods

- This framework can run the water siphon for a couple of hours without the sun.
- The put away energy can be utilized for different purposes.
- Soil dampness sensor assists with controlling the water siphon so the wastage of water can be diminished.
- Sensors utilized have high affectability and are not difficult to deal with.
- Low support and low force utilization.
- Can be utilized for various plant species by rolling out minor improvements in the encompassing ecological boundaries.
- Can be effortlessly changed for improving the arrangement and adding new highlights.
- A low- cost system, providing maximum mechanization.

4. Limitations and Future Scope of Smart Irrigation System

In spite of the fact that the framework runs effectively, a couple of issues are stood up to due to low light and stormy environment. Another constraint of this framework is that the dampness sensor can't recognize the clamminess level for the entire day in a convenient water framework field. This system is outstandingly effective, as these days advancement is running with time and it is absolutely useful with the lifestyle of the way of life of the individual.

The goal of this task is satisfied however there is some update that should be possible to make this water system framework more viable.

• GSM can be added for sending SMS to the versatile if happens any issue.
• Ambient temperature, light power, and dampness can be estimated.
• Weather update can be sent through SMS
• A sun oriented board can be utilized as a programmed sun beam global positioning framework.
• As the proposed framework is programmed, a ultrasonic sensor can be utilized to maintain a strategic distance from an impediments for wonderful activity.

5. Result
While using DC motor we can achieve electricity with the wind and flow of water. And also solar panel used for the primary source of electricity. And soil moister level is updated in cloud. It can be enhance the electricity to make use in future purpose. Figures 3, 4 and 5 shows the result.
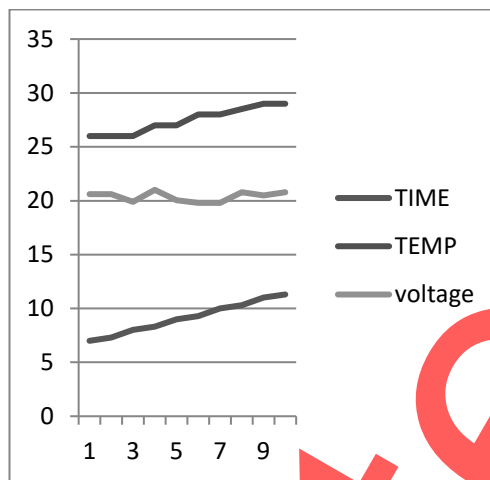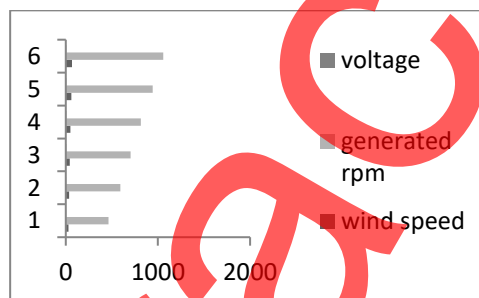
Figure 3. From solar panel
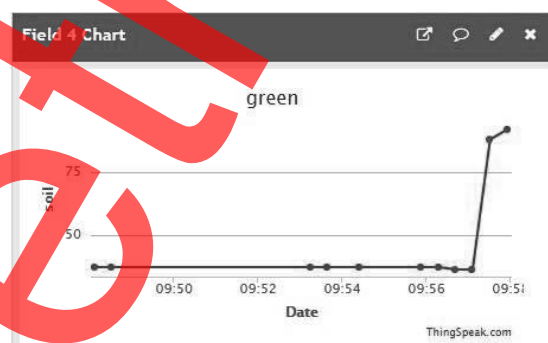

Figure 4. From DC motor

Figure 5. Soil moister updated in cloud

6. Conclusion

The framework will moniter the mechanization in rural field with better proficiency and controls the cycle of water system. In these days cell phone use are exceptionally high. They functioned according to the qualities sent by the sensors and it is likewise controlled through a created site if there is any consumption of cell phone.

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