

Solar Tracking and Automatic Irrigation

Rida Arshad Khan, R.Sangeetha, Madeeha Qamar, G.Navya Sri

Under the esteemed guidance of

MS. R.Sravani

Assistant Professor



Bachelor of Technology

Department of Information Technology

BVRIT HYDERABAD College of Engineering for Women

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Introduction

- Automatic irrigation system that conserves water and reduces costs while improving soil health and plant growth.
- The easy of access through a basic mobile phone concept of SMS acknowledgment is proposed to be used in this system. This process is achieved by using a GSM module which helps in sending SMS to a target user.
- The system also incorporates a pump to deliver water efficiently.



Problem statement

- Design and implement a solar tracking and automatic irrigation system for optimizing the efficiency of solar panels and ensuring efficient water management in agricultural or horticultural applications.

Literature Survey

S. No	Title of the paper	Author(s) & Journal Details	Description
1	Fuzzy Logic based Smart Irrigation System using Internet of Things	R. Santhana Krishnan a, E. Golden Julie b, Y. Harold Robinson, S. Raja, Raghvendra Kumar, Pham Huy Thong , Le Hoang Son volume 252 - 2023	This paper proposes a smart irrigation system that helps farmers water their agricultural fields using Global System for Mobile Communication (GSM). Fuzzy logic controller is used to compute input parameters (e.g. soil moisture, temperature and humidity) and to produce outputs of motor status. In addition, the system also switches off the motor to save the power when there is an availability of rain and also prevents the crop using panels from unconditional rain.

Literature Survey

S. No	Title of the paper	Author(s) & Journal Details	Description
2	Smart irrigation monitoring and control strategies for improving water use efficiency in precision agriculture	Erion Bwambale , Felix K. Abagale , Geophrey K. Anornu volume 260 - 2022	This paper introduces Smart irrigation systems, leveraging wireless communication technologies, monitoring systems, and advanced control strategies. The paper reviews state-of-the-art monitoring and control strategies, favoring closed-loop systems over open-loop ones due to their ability to address uncertainties. The paper suggests that combining soil-based, plant-based, and weather-based approaches, within a modeling framework with model predictive control

Literature Survey

S. No	Title of the paper	Author(s) & Journal Details	Description
3	A Smart Plant Watering System for Indoor Plants with Optimum Time Prediction for Watering	Vejay Karthy, K. Vishal Vinod, S. K. Mona Sweata, M. Karthika Gurubarani, K. Abiram, volume 204 - 2021	This paper introduces a system where it predicts time, when a plant has to be watered in future. It uses Deep Learning (DL) Algorithms to analyze which would give better performance. It uses Cloud Technologies and Deep Learning techniques to store, process data. Since the data received is time-series data we use LSTM(Long Short-Term Memory) and GRU(Gated Recurrent Unit) models to predict the optimum time to water the plant.

Proposed System

- Solar tracking and automatic irrigation system is designed using photovoltaic panels and a combination of control devices. Here we are building an IOT based irrigation system using NodeMCU Module and DHT11 sensor. It can control the drip irrigation system in automated fashion. The proposed system for automatic irrigation using IoT not only overcomes the drawbacks of traditional irrigation systems, but it also incorporates additional features to improve water usage efficiency.



Tools and Technology

- **DHT 11 Sensor** : The DHT11 is a basic, ultra low-cost digital temperature and humidity sensor.
- **ARDUINO UNO** : Arduino UNO is a microcontroller board.
- **NODE MCU ESP8266** : NodeMCU is an open-source Lua based firmware and development board specially targeted for IoT based Applications. It includes firmware that runs on the ESP8266 Wi-Fi SoC.
- **GSM Module** : GSM (Global System for Mobile Communication) is used to inform the user about the exact field condition through SMS.
- **DC WATER PUMP** : Micro DC 3-6V Micro Submersible Pump Mini water pump is a low cost, small size Submersible Pump Motor.
- **Moister Sensor** : used to sense moister level in soil.
- **LCD** : Liquid Crystal Display is used to display temperature and humidity values.

Feasibility Study

- Technical Feasibility:

Technology Assessment: Evaluate the available technologies for smart and automatic irrigation, including sensors, control systems, and communication methods.

- Market Feasibility:

Market Research: Investigate the demand for smart irrigation and automatic irrigation systems in the target area, including agricultural, commercial, and residential sectors.

- Economic Feasibility:

Cost Estimation: Calculate the initial setup costs, including hardware, software, installation, and infrastructure modifications.

Societal impact

- **Water Conservation:** Assess the potential of smart irrigation to reduce water consumption, especially in regions with water scarcity. Measure the societal benefits of conserving this vital resource.
- **Reduction of Water Pollution:** Evaluate the potential for smart irrigation to reduce water runoff and pollution by minimizing excessive use of fertilizers and pesticides.
- **Crop Yields:** Increased productivity can lead to greater food supply and potentially lower food prices.



Project timeline

S.no	Project timeline	Duration
1	Problem identification	1st August - 31st August
2	Literature Survey	1st September - 15th October
3	Module Identification	16th October - 20th October
4	Module Implementation	21th October - 15th November
5	Report	16th November - 30th November

References

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Thank you