iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 11 **Issue:** V **Month of publication:** May 2023

DOI: https://doi.org/10.22214/ijraset.2023.50948

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 11 Issue V May 2023- Available at www.ijraset.com

Study and Development of IOT based Smart IrrigationSystem using Soil Moisture and Weather Prediction

Dr. Vivek Vaidya[1], Mr. Somesh Nandeshwar[2], Mr. Utkarsh Meshram[3], Mr. Yash Chavan[4], Miss. Dineshwari Madavi[5]
[1]*Assistant Professor,* [2, 3, 4, 5]*Student, Dept of Mech Engg., K.D.K. College of Engineering, Nagpur*

Abstract: ***The smart irrigation system was developed to optimize water use of crops. The system has a distributed wireless network of soil-moisture temperature sensors placed in the root zone of the plants. Also, a gateway unit handles sensor information, triggers, actuators, and transmits data to the web application. The intelligence of The proposed system is based on a smart algorithm, which considers sensed data along with the weather forecast parameters like precipitation, air temperature, humidity, and UV for the near future. The complete system has been developed and deployed on a pilot scale, where the sensor node data is wirelessly collected over the cloud using web- services and a web-based information visualization and decision support system provides real-time information insights based on the analysis of sensor data and weather forecast data. The paper describes the system and discusses in detail the information processing results of three weeks data based on the proposed algorithm. The system is fully functional and the prediction results are very encouraging.***
Keywords: Internet of Things (IoT), sensors, prediction algorithm, Irrigation Management, Precision agriculture.

I. INTRODUCTION

Smart irrigation technology uses weather data or soil moisture data to determine the irrigation needs of the landscape. Smart irrigation technology includes: These products maximize irrigation efficiency by reducing water waste, while maintaining plant health and quality. The objective of the system includes conserving energy and water resources, handles the system manually and automatically, and detects the level of water. Due to the climatic changes and lack of precision; agriculture has resulted in poor yield as compared to population growth. Irrigation is mostly done using canal systems in which water is pumped into fields after regular intervals of time without any feedback of water level in the field. This type of irrigation affects crop health and produces a poor yield because some crops are too sensitive to water content in soil. The server-side software has been developed with node side connectivity along with information visualization and decision support features. A novel algorithm has been developed for soil-moisture prediction, which is based on Machine Learning techniques applied on the sensor node data and the weather forecast data. The algorithm shows improved accuracy and less error. The proposed approach could help in making effective irrigation decisions with optimum water usage.The setup uses soil moisture sensors which measure the exact moisture level in soil & also it contains Humidity and Temperature Sensor DHT11 for Online monitoring of the system. This value enables the system to use appropriate quantities of water which avoids over/under irrigation.

II. LITERATURE REVIEW

An intelligent irrigation system is a way to deal with all of the issues in a conventional approach. This method regulates the water by sensingthe soil quality and moisture and providing adequate moisture needed using motor pumps. The IoT technique here transfers the data to a network with little human communication. It uses statistical data acquired from sensors (like temperature, humidity, moisture and light intensity sensors) compared with the weather forecast for decision making. A filter is used to eliminate noise from the sensors. Agriculture System (AgriSys) uses temperature, pH, humidity sensors and the hybrid inference to input the data from sensors the system monitors the sensors information on LCD and PC.for Agriculture Land Purpose was developed and successfully implemented along with flow sensor. Salient features of the system are: Closed loop automatic irrigation system, temperature and water usage monitoring. Users can easily preset the levels of the Moisture and are regularly updated about the current value of all Parameters on LCD display. In future, other important soil parameters namely soil pH, soil electrical conductivity will also be incorporated in the system. The proposed Smart Irrigation System Based on Soil Moisture Using Iot Agriculture remains the sector which contributes the highest to India's GDP. But, when considering technology that is deployed in this field, we find that the development is not tremendous.

©IJRASET: All Rights are Reserved

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 11 Issue V May 2023- Available at www.ijraset.com

Nowadays there is huge enhancement in technologies which have a significant impact on various fields like agriculture, healthcare etc. Agriculture is the primary occupation in our country. India's major income source is dependent on agriculture therefore the development of agriculture is important. Today also most of the irrigation systems are operated manually. The system guides to maintain the predicted pattern of soil moisture and precipitation information.

III. OBJECTIVES

It is important to detect the soil moisture content for proper development of plants. This IoT project uses soil moisture sensors to notify theuser when the soil gets too dry or too wet.

It helps to grow agricultural crops, maintain landscapes, soil, consolidation and revegetate disturbed soils in dry areas and during periods ofless than average rainfall. The objective of our project is to design an automated irrigation system which is cost effective and time saving using Node microcontroller.

The Automatic Irrigation System designed with the Wireless Sensor Network and Mobile communication. The WSN consists of sensors which are employed in the agricultural field for sensing the moisture and temperature of the soil. The sensed data are brought under the microcontroller for regulating the valve of the pump.

IV. METHODOLOGY

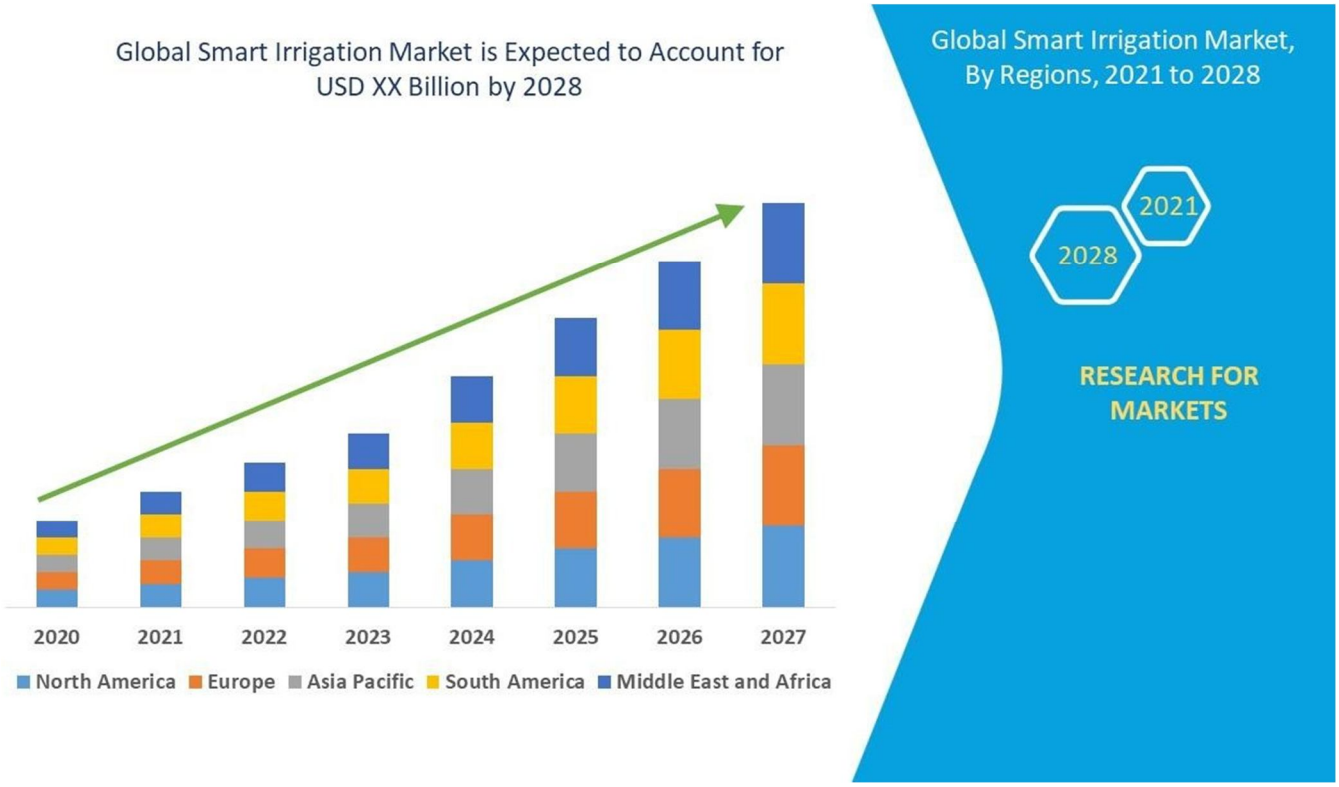


Fig. 1 A sample line graph using colors which contrast well both on screen and on a black-and-white hardcopy

V. CONCLUSIONS

We have successfully designed and implemented a smart irrigation system using the concept of Internet of Things. This automated irrigation system is easily controlled using a computer. It behaves as an intelligent switching system that detects the soil moisture level and irrigates the plant if necessary. Therefore, it is important to detect the soil moisture content for proper development of plants. This IoT project uses soil moisture sensor to notify the user when the soil gets too dry or too wet

VI. FUTURE SCOPE

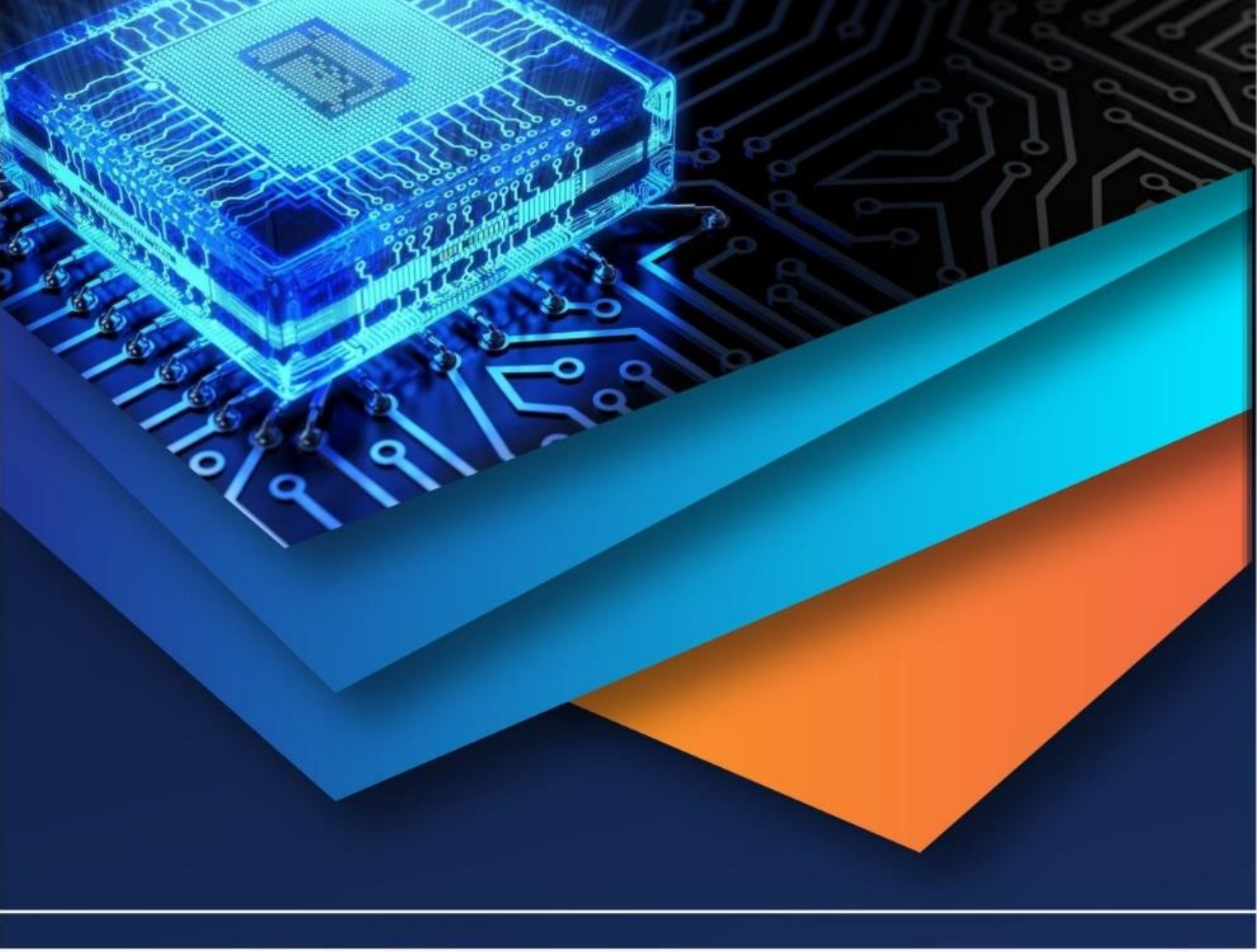
This IOT based Smart Irrigation System using Soil Moisture and Weather Prediction extends watering time for plants, and provides ideal growth conditions. It saves time and timer delay as per the environmental condition can be added for automatic watering.

©IJRASET: All Rights are Reserved | SJ Impact Factor 7.538 | ISRA Journal Impact Factor 7.894 |

REFERENCES

[1] S. M. Metev and V. P. Veiko, Laser Assisted Microtechnology, 2nd ed., R. M. Osgood, Jr., Ed. Berlin, Germany: Springer-Verlag, 1998.
[2] J. Breckling, Ed., The Analysis of Directional Time Series: Applications to Wind Speed and Direction, ser. Lecture Notes in Statistics. Berlin, Germany: Springer, 1989, vol. 61.
[3] S. Zhang, C. Zhu, J. K. O. Sin, and P. K. T. Mok, "A novel ultrathin elevated channel low-temperature poly-Si TFT," IEEE Electron Device Lett., vol. 20, pp. 569–571, Nov. 1999.
[4] M. Wegmuller, J. P. von der Weid, P. Oberson, and N. Gisin, "High resolution fiber distributed measurements with coherent OFDR," in Proc. ECOC 00, 2000, paper 11.3.4, p. 109.
[5] R. E. Sorace, V. S. Reinhardt, and S. A. Vaughn, "High-speed digital-to-RF converter," U.S. Patent 5 668 842, Sept. 16, 1997.
[6] (2002) The IEEE website. [Online]. Available: http://www.ieee.org/
[7] M. Shell. (2002) IEEEtran homepage on CTAN. [Online]. Available: http://www.ctan.org/tex-archive/macros/latex/contrib/supported/IEEEtran/
[8] FLEXChip Signal Processor (MC68175/D), Motorola, 1996.
[9] "PDCA 12-70 data sheet," Opto Speed SA, Mezzovico, Switzerland.
[10] A. Karnik, "Performance of TCP congestion control with rate feedback: TCP/ABR and rate adaptive TCP/IP," M. Eng. thesis, Indian Institute of Science, Bangalore, India, Jan. 1999.
[11] J. Padhye, V. Firoiu, and D. Towsley, "A stochastic model of TCP Reno congestion avoidance and control," Univ. of Massachusetts, Amherst, MA, CMPSCI Tech. Rep. 99-02, 1999.
[12] Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specification, IEEE Std. 802.11, 1997.

©IJRASET: All Rights are Reserved | SJ Impact Factor 7.538 | ISRA Journal Impact Factor 7.894 |



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)