Irrigation methods with new technology: A Reviewer

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Abstract
The primary idea is that we use cutting-edge systems, such as IOT (the internet of things), to regulate water flow, with the degree of our attention dependent on how easily accessible the water is. This review is an effort to exhibit some memory of the past in a world where Iraq is now responsible for regulating water flow and conserving the amount. The essential idea is that, depending on the arability of the land, the reviewer chooses the optimal irrigation method among numerous possible options that vary from one location to the next.
There were a number of techniques employed at that time, including sprinkler watering and drip watering.
There are advantages and disadvantages to each, as well as factors that limit the usage of some types and favor others, as well as considerations for setting and crop type that apply to both indoor and outdoor settings.

Keywords: Irrigation, new technology, IOT

1. Introduction
Her we review some article that focusing to the irrigation system type in many place
The

1.1 "Irrigation Techniques and Evaluations"
- **What happened**

Irrigation systems for farms are often developed for monetary reasons. Like seed, fertilizer, manpower, machinery, etc., water is an essential component of a successful farming operation. Irrigation water helps sustain productivity in humid locations during dry years. Irrigation increases harvests annually in somewhat drier places. Crop production is wholly reliant on irrigation water in severely dry places. The second scenario involves an economic choice to augment rainfall with irrigation water. It is reasonable to invest in an irrigation system if the anticipated gain from higher yields covers the outlay for the system and the cost of water. This is an investment with a possible short-term payoff.
In the third scenario, the financial viability of the overall agricultural operation determines whether or not an irrigation system is developed for the farm. This is a choice that investors make with the long term in mind [1].

1.2 Performance evaluation of irrigation projects: Theories, methods, and techniques
- **The historical context**

This document summarizes irrigation system performance assessment information. This article draws on literature on irrigation project assessment, evaluation, and performance. Irrigation performance assessment approaches and frameworks were shown. Several irrigation performance evaluation methodologies were developed. Fuzzy set theory, direct indicator measures, the analysis hierarchy process (AHP), and remote sensing (RS) are the principal irrigation system performance evaluation approaches. We discussed all these ways. Although the literature offers a broad variety of possibilities for describing all areas of performance assessment, there is no approved technique to measure irrigation system performance. The irrigation system and evaluation purpose determine the assessment framework and approach [2].

1.3“An overview of smart irrigation systems using IoT”

- **The historical context**

Agriculture in developing nations is becoming more sustainable with the aid of technology. Improvements to irrigation systems help achieve UN Sustainable Development Goal 6 and its associated Target 6.4 by increasing the efficiency with which water is used. The benefits of Internet of Things (IoT) and sensor-based smart irrigation systems to the Sustainable Development Goals are discussed. Secondary sources of information are utilized in the qualitative study. This innovation could aid in lowering water use because of how efficient automated irrigation systems are. Automation and the Internet of Things (IoT) help farmers succeed. Farmers may learn more about their crops, reduce waste, and protect the environment with the use of sensory systems. These high-tech gadgets keep an eye on the ground, the air, and the water. Constant innovation towards environmentally responsible operations and cost reductions could be aided by optimized irrigation systems. Finally, the benefits and drawbacks of using a sensory-based irrigation system are discussed. Researchers and farmers can use the information in this analysis to better comprehend irrigation practices and plan for future irrigation-related endeavors [3].

1.4. “Comparison of Different Irrigation Methods Based on the Parametric Evaluation Approach”

- **What happened**

The primary objective of this research is to compare and contrast two potential irrigation systems utilizing a parametric assessment methodology in the soils of the Field Plants Central Research Institute-Ikizce Research Farm in southern Ankara. A detailed 1/5000 scale soil map was utilized to determine the soil type, depth, EC, drainage, carbonate content, and slope in the study area. Following GIS-based analysis and evaluation of soil properties, maps depicting areas amenable to gravity and drop irrigation were created. While only 13.1% of the study area was found to be suitable for surface and gravity irrigation, 51.2% was found to be suitable for drop irrigation. However, it was found that some 3, 16, 18, and 19-coded mapping units are not suitable for either form of irrigation. Because of these soil and topographic factors, drop type irrigation was suggested as the best method for more than half of the soils in the study area.
This study demonstrates the value of using GIS to evaluate soils' potential for success with gravity and drop irrigation systems [4].

1.5. “Agricultural Water Monitoring for Water management Under Pivot Irrigation Systems Using Spatial Techniques”

- **The historical context**

In arid and semi-arid regions, WUE is an absolute must for effective water management. Water losses are exacerbated by inefficient uses of water. It is possible that water losses might rise if irrigation failed to account for soil variations and consistently applied water. More resources are needed, including water, electricity, and money. The water efficiency and yield of pivot irrigation are assessed using satellite imagery and geographic information system methods in this study. El-Salhia owns a sizable farm in the south of the Nile Delta. The central field was irrigated by sprinklers, and wheat was planted there. NDVI and LST were calculated using Landsat data. By contrasting the LST of objectives with the ambient temperature (Tair), the crop water stress index (CWSI) calculates an overall relative moisture reading. Throughout the 2012–2013 wheat growing season, 47 representative samples were collected at regular intervals to measure soil texture, organic matter, TDR, thermal infrared, leaf area index, and yield. The accuracy of available water (AW) was lower than that of the other considerations. Statistics show that canopy temperature (Tc), CWSI, field capacity (Fc), and leaf area index (LAI) can all be used to predict wheat yield. According to the WUE, the gradient in density was 1.07 kg/m3 close to the southeast border and 2.2 kg/m3 close to the northwest border. Distribution of WUE is consistent with soil features and yield circulation, which is indicative of high application and enhanced yield responsiveness [5].

1.6. Systems engineering for irrigation systems: successes and challenges

- **The historical context**

Australia's thriving agricultural sector and exports are dependent on the country's extensive system of gravity-fed irrigation canals. By integrating large-scale civil engineering systems with proper data infrastructure, sensors, actuators, and a communication network, systems engineering ideas can be applied to improve irrigation system utilization. Using traditional concepts of system identification and control, this research explains how automated irrigation systems can improve the efficacy of water distribution and deliver an almost on-demand water supply [6].

1.7. “Smart Irrigation Techniques for Water Resource Management”

- **The previous**

Extreme weather is predicted to increase in frequency and intensity, which will have a direct and negative impact on natural resources. Earth's water supply is limited, so controlling its use is crucial. Upgrading to a wireless network is the best approach to reduce water waste and increase the effectiveness of your irrigation system. The ability of agricultural systems to provide access to healthy food is enhanced by the use of smart farming practices. In this way, policies for the growth of sustainable agriculture might incorporate both the requirement for adaptation and the possibility of mitigation. Several techniques for reducing water use in farming are incorporated into the smart farming system. Solar-powered irrigation controls are a part of the smart irrigation system. A full-fledged smart irrigation system includes temperature, moisture, and humidity sensors. In this section, we'll examine the wide variety of modern irrigation techniques in use around the world [7].

1.8. Smart Irrigation Systems: Overview

- **The previous**

In an effort to boost agricultural output, several nations are embracing and integrating new technologies and practices. Therefore, improving irrigation efficiency is crucial to preserving agriculture as a sustainable economic sector. Smart irrigation technologies have the potential to greatly increase irrigation efficiency with the advent of wireless communication networks, monitoring devices, and improved control mechanisms for efficient irrigation scheduling. The research combed through a mountain of material to determine the scientific underpinnings of smart irrigation. Among the many topics investigated were irrigation methods, managerial leeway, and technical applications. All sorts of academic publications provided the information. Because of this, we decided to read widely, focusing on works created within the last four years by authors from all over the world. A number of irrigation initiatives were also accelerated during this time. The next section of this analysis focuses on some of the most crucial aspects of smart irrigation, including real-time irrigation scheduling, the Internet of Things, internet connection requirements, smart sensing, and energy harvesting [8].

1.9. "Irrigation scheduling controls and techniques

- **The historical context**

Scheduling irrigation runs is an essential part of managing an irrigation system. To achieve water management goals, it is necessary to administer water at just the appropriate time. It's possible to cut down on water waste, increase crop yields, increase profits, or reduce irrigation costs. Water availability cycles and trickle irrigation systems, which provide water on demand, are two examples of possible irrigation schedules. Irrigation schedules may be determined by field monitoring of soil water condition, plant water status, water budgeting, or some combination thereof. The water budget can make use of either historical climate data or current weather conditions. Modern computers and instruments are used by the irrigation industry. Irrigation strategies can be optimized, scheduled, and planned in real time by computers. Due to water shortages, advances in remote sensing are being made to rapidly monitor agricultural conditions for irrigation schedules. Energy, labor, and cultural resources management must be integrated into irrigation schedule [9].

1.10. Irrigation System Selection for Maximum Crop Profit

- **The background**

Profits from crop production can only be maximized by careful optimization of irrigation system selection and irrigation water management. Irrigation system optimization is a difficult undertaking, therefore most people just go with their gut while doing it. Factors such as climate, soil, water, fertilizer, and farmers' methods utilized in the field are just a few of the many that go into making a successful harvest. In this research, we present a framework for maximizing profit during the process of selecting irrigation system design parameters. The yields of crops and, by extension, the market value of agricultural goods are greatly influenced by the consistency of irrigation practices and the timing of water applications. System homogeneity, scheduling methods, and crop growth and harvest are all linked via computational methods. One can calculate the annual water application rate that maximizes net profit for a given crop, irrigation system type (furrow, sprinkle, or trickle), and scheduling mechanism. The production costs, crop-water production functions (either field data or crop growth models), and system capital costs are the inputs for the computerized mathematical model. Using this methodical strategy, the designer may quickly weigh the benefits and drawbacks of various water, system, and crop production options. Inadequate flexibility in many irrigation systems prevents them from meeting the unique needs of the fields in which they are installed. To better understand how irrigation systems affect agricultural yields, planners should give due consideration to key variables throughout the practical design phase. Our goal is not to provide a comprehensive catalog of all possible layouts. However, data on sugar cane fields' production and economic impact are used as examples [10].

1.11. Solar Based Smart Irrigation System Using PID Controller

- **The previous**

In this research, we propose an approach to automate irrigation that minimizes the need for manual labor, hence improving the standard of living for farmers worldwide. The system includes an Arduino microcontroller, four real-time sensors for gathering input data in the field, and the software for controlling the DC motor pump. The PID controller used by Arduino is already embedded in the board. Four sensors (wind speed, ambient temperature, humidity, and radiation) are used as inputs to calculate soil moisture levels. The PID and Penman evapotranspiration models inform the ratios at which these four sensors function. The power for the system comes from a solar-charged lead-acid battery. The four chosen sensors provide field conditions in real time to the remote monitoring equipment, which features a liquid crystal display (LCD). In this analysis, we simulate not only the software but also the hardware [11].

1.12. Automatic irrigation system using Arduino UNO

- **The historical context**

It's challenging to maximize plant development without increasing costs in the modern era; consequently, a novel idea is to implement an automated irrigation system to more efficiently manage water and human resources. An automated irrigation system with the help of sensors and Arduino allows for more efficient use of water. The plants' soil is equipped with a soil moisture sensor, and the water container, from which the plants will receive their water, is equipped with a water level sensor. An algorithm, including threshold values for a soil moisture sensor and a water level sensor, has been developed to regulate soil water amounts. For this task, you'll need Arduino boards that use the ATMega328 microprocessor. With the help of a soil moisture sensor, this project will make manual watering much more efficient. This technology conserves water and decreases the need for human labor by efficiently watering plants. The layout minimizes energy waste and maximizes efficiency in the use of available resources. For this project, soil moisture levels are determined after input data from sensors is processed using a programmable 8051 microprocessor. The water pumping motor is driven by an output from the microcontroller after it has processed the inputs. The microcontroller monitors soil and pump moisture and relays that information to an LCD screen. The water level sensor monitors storage tank levels to provide enough water delivery to crops [12].

1.13A Review on the Smart Irrigation System

- **The historical context**

Many Americans make their living in agriculture because the sector is vital to the health of our economy. There are a great deal of wireless communication modules being used to transmit data from the field. We employ a number of sensors, such as a smart irrigator system and a smart sensing system, to efficiently apply smart irrigation techniques. The utilization of a network of sensors dispersed around the field to determine its true state. This lets us automate the crop irrigation process, turning on various motors without lifting a finger. The notion rests on the use of sensors and the generation of useful results [13].

1.14. Smart automated irrigation system with disease prediction

- **Abstract**

The field has recently risen to prominence thanks to its applications in precision agriculture, which include remote environment monitoring, disease diagnosis, insect and pest control, etc. Additionally, developments in IoT have made it possible to network real-world objects and collect data, such as that of physical phenomena, via sensors deployed in the agriculture industry. This research paper explores the process of creating a smart autonomous irrigation system capable of recognizing the presence of disease. Placement of soil moisture, temperature, and leaf-wetness sensors in agricultural areas will allow comparison of collected data to standards set for various soil types and specific crops. Using a GSM module and a wireless connection, an Arduino Uno processor collects data from the fielded sensors and sends it to a remote server. The data center saves data for later analysis using data mining techniques like the Markov model to detect illness. The research results and the measured attributes are finally reflected in the Android smartphone's user interface. Through the Android smartphone's user interface, a faraway user can control the irrigation system by activating or deactivating the Arduino's motor pump [14].

1.15. "Sensor based Irrigation System: A Review"

- **The previous**

Under many parts of the country, the future of irrigated agriculture is under question because of the increasing demand for water. Therefore, it is critical to understand the water requirements of various crops so that appropriate irrigation strategies can be implemented. The typical techniques of watering fields result in localized flooding and drought. Due to water scarcity and the prevalence of droughts, a centralized irrigation management system is now required. The focus of this research is on soil moisture sensors and their place in the irrigation process, as well as the present status of sensor technology and its varied applications in agriculture and water management. [15].

1.16. "IoT Based Low Cost Smart Irrigation System"

- **Abstract**

Water is one of the most essential things needed to keep life going on Earth. The rapid increase in population over the past few decades has exacerbated the problem of a global water crisis. Therefore, this is rapidly becoming a global issue. The antiquated irrigation system consumes a lot of water, so it might use some new tricks to reduce wastage. The demand for Internet of Things (IoT) solutions has skyrocketed for both simple and complex applications. Connecting smart irrigation to the Internet of Things via wireless sensors simplifies maintenance, despite the complexity of the original concept. The Humidity and Temperature Sensor takes readings from the environment to determine the relative humidity and temperature. If the soil around the plant becomes too dry, the ultrasonic sensor will detect this and send water from the reservoir to the plant. The data will be processed by the ESP8266 Node MCU. Data from Wi-Fi-enabled sensors is gathered by the ESP8266 Node MCU microcontroller, processed, and sent through the MQTT protocol [16].

1.17. "IoT based smart crop-field monitoring and automation irrigation system"

- **The previous**

The growth of agricultural nations like India depends critically on agriculture. The nation's development has been permanently hindered by agricultural issues. Smart agriculture is the only solution because it improves and modernizes traditional farming methods. The proposed method aims to "smarten" farming through the use of automation and the Internet of Things. Internet of Things (IoT) applications include crop monitoring and selection, irrigation decision aid, and more. A Raspberry Pi-based autonomous irrigation IoT system is proposed as a means to modernize and increase agricultural output. Most farmers spend too much time in the fields taking care of irrigation systems, rather than cultivating drought-resistant crops. Streamlining the system's wiring and providing efficient water management are also crucial. Using information gathered from sensors, the proposed system can estimate how much water will be required. Two sensors collect and transmit data on the soil's moisture and temperature, as well as the surrounding air's temperature and the quantity of sunlight received each day. You can plug these figures into the suggested irrigation systems to get an idea of how much water would be required. To assist farmers improve crop yields while limiting water and fertilizer consumption, the technology integrates precision agriculture (PA) with cloud computing [17].

1.18 "Design and Management of Irrigation Systems"

- **Background**

Irrigation systems must play a significant role in the agricultural sector's development, sustainability, and productivity if it is to provide enough food to meet the growing demand. For efficient use of water resources and profitable crop and orchard production, an irrigation system that has been carefully planned, controlled, and operated is crucial. This research is motivated by the belief that better irrigation systems would lead to more productive and environmentally friendly farming practices, and therefore it will analyze data and studies that highlight the most important factors and methods for enhancing irrigation system design and management. The design and management of irrigation systems necessitates attention to a wide range of factors, including those related to agronomy, soil, hydrology, economy, energy, and the environment. Farm-level irrigation system planning and management is crucial for achieving water efficiency, fostering agricultural economic growth, and ensuring environmental sustainability [18].

1.19. Irrigation System Automation Using Finite State Machine Model and Machine Learning Techniques

- **The previous**

Finite-state machines and machine learning improve irrigation. Existing irrigation systems all have poor water usage efficiency (WUE). The finite automata model efficiently irrigates using soil parameters, crop coefficients, and meteorological data. K-Nearest Neighbor (KNN) forecasts agricultural water needs based on crop development stage with 97.35% accuracy and soil texture classification with 93.65% accuracy. Irrigation automation boosts water production [19].

1.20. Modern Irrigation System using Convolutional Neural Network

- **The background**

Agriculture's significance in people's daily lives has grown over the past two decades as the world's population has grown without corresponding gains in food production. In addition, recent years have seen advancements in agricultural technology. Most people today depend on farming and related industries for their livelihood. The technological divide between farmers and consumers can finally be bridged because to developments in machine learning (ML) and the Internet of Things (IoT). Convolutional neural networks (CNN) are an algorithm we developed that pave the road to the most accurate result. Our design allows for a more scientific approach to irrigation and farming, which boosts yields and increases food safety. Because this data-driven method only needs to be set up once, it can boost agricultural output while lowering costs. We conclude that the CNN algorithm functions competently within the IOT framework based on the outcomes of our experiments. The following concepts are included in this technical answer: A mobile app that displays the farm's current condition to the farmer and a database of recognizable plant species. (c) a water pump, a moisture sensor, and a Node MCU that all work together to make an Internet of Things device (d) A server mediating communication between the foregoing elements (e) a plant identification machine learning model and a wilt detection machine learning model [20].

2. Conclusion

Previous article study suggests that the urgency of the project's completion is the most critical factor. Many different methods are demonstrated, as well as technologically advanced options. When it comes to establishing maximum command over an irrigation system, for instance, the Internet of Things (IoT) has more benefits than drawbacks. However, this choice is not feasible in many parts of the world, and it may necessitate more management than is now available. Furthermore, the type of agriculture being worked on makes it extremely important to do the required repairs.

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