KGiSL INSTITUTE OF TECHNOLOGY COIMBATORE

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

PROJECT PHASE REVIEW # 00

AI DRIVEN SENSOR DRIVEN SYSTEM FOR IRRIGATION AND WATER WASTE MINIMIZATION

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Under the guidance of :

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AGENDA

- Abstract of the project work
- Existing System
- Proposed System
- Expected Outcome
- Flowchart
- References
- Timeline

ABSTRACT

AI Driven Sensor based system aims to revolutionize water management in agriculture by integrating artificial intelligence (AI) into piped and micro irrigation systems. By leveraging AI algorithms to predict crop water needs, automate valve controls, and optimize irrigation schedules, we seek to minimize water waste and maximize yield. The proposed system will employ sensors to gather real-time data on soil moisture, weather conditions, and crop health, enabling precise irrigation management tailored to the specific requirements of each field.

EXISTING SYSTEM

Currently, water management in agriculture relies heavily on manual observation and semi-automated irrigation.

Drawbacks / Pitfalls of the Existing system

Farmers often face challenges in accurately assessing crop water needs, resulting in over- or under-irrigation, which can lead to water waste, decreased productivity, and environmental damage.

LITERATURE SURVEY

TITLE	PUBLICATION YEAR	AUTHOR / PUBLISHER	METHODOLOGIES
“Model Predictive Control Structures for Periodic ON–OFF Irrigation”	2023	Gabriela B. Cáceres; Antonio Ferramosca; Pablo Millán Gata; Mario Pereira Martín	**Description:** The main objective of this study is to develop and evaluate periodic model predictive control structures that explicitly account for on-off irrigation, a characteristic of drip irrigation systems . **Drawback:** watering will be turned on and off manually.
“Artificial Neural Networks and Computer Vision's-Based Phytoindication Systems for Variable Rate Irrigation Improving”	2021	Galina Kamyshova , Aleksey Osipov, Sergey Gataullini , Sergey Korchagin, Stefan Ignar, Timur Gataullini, Nadezhda Terekhova, and Stanislav Suvorov	**Description:** Determines the rate of watering of plants in the current sector of the location of the sprinkler with the help of 8 IP cameras. **Drawback:** Lack of efficiency in monitoring.
"AgriSens: IoT-Based Dynamic Irrigation Scheduling System for Water Management of Irrigated Crops”	2021	Sanku Kumar Roy;Sudip Misra; Narendra Singh Raghuwanshi; Sajal K. Das IEEE Internet of Things Journal	**Description:** Dynamic irrigation scheduling system for efficient water management of irrigated crop fields and provides real time, automatic, dynamic as well as remote manual irrigation treatment for different growth phasesof a crop’s life cycle. **Drawback:** Low efficient monitoring.

LITERATURE SURVEY

TITLE	PUBLICATION YEAR	AUTHOR / PUBLISHER	METHODOLOGIES
"Optimal Irrigation Allocation for Large-Scale Arable Farming"	2022	A. T. J. R. Cobbenhagen; L. P. A. Schoonen; M. J. G. van de Molengraft; W. P. M. H. Heemels IEEE Transactions on Control Systems Technology	**Description:** Comprises of optimization frameworkthat computes the allocation of irrigation machinery and water to arable fields by maximization of a profit function in a receding horizon fashion using realistic models for crop growth dynamics. **Drawback:** Suitable only for small scale arable farming.
"Water Management in Agriculture: A Survey on Current Challenges and Technological Solutions"	2020	Abdelmadjid Saad; Abou El Hassan Benyamina; Abdoulaye Gamatié	**Description:** Aiming at optimizing water usage, and improving the quality and quantity of agricultural crops, while minimizing the need for direct human intervention. **Drawback:** Low efficient water management and monitoring.
"An Optimized Water Distribution Model of Irrigation District Based on the Genetic Backtracking Search Algorithm"	2019	Zhipeng Sun; Jian Chen; Yu Han; Rui Huang; Qi Zhang; Shanshan Guo	**Description:** Improving irrigation efciency in order to balance water supply and demand has become an urgent need for social development in the northwest of China. **Drawbacks:** Trained based on a specific location.

PROPOSED SYSTEM

The AI Driven Sensor based System will integrate AI-driven technology with sensor networks to create a smart irrigation system capable of optimizing water management in piped and micro irrigation setups. AI algorithms will analyze data from various sources, including image processing , soil moisture sensors and adjust irrigation schedules and flow rates in real time to ensure optimal moisture levels in the soil while minimizing water waste.

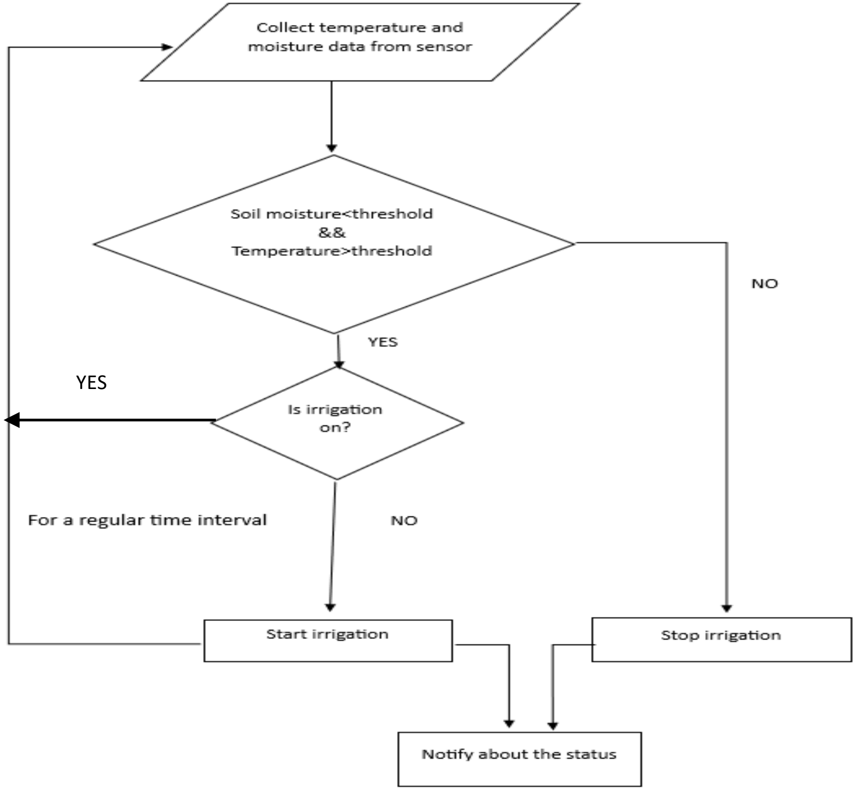
Advantages over existing method

- ➢Improved Water Efficiency
- ➢Retaining soil concentration
- ➢Decision Making

EXPECTED OUTCOME

- Improvements in water efficiency.
- Better crop yields.
- Improved soil moisture management.
- Real-time monitoring and control.

FLOWCHART


Collect temperature and moisture data from sensor
Soil moisture<threshold && Temperature>threshold
NO
YES
YES
Is irrigation on?
For a regular time interval
NO
Start irrigation
Stop irrigation
Notify about the status

REFERENCE

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[7] M. K. van Ittersum, P. A. Leffelaar, H. van Keulen, M. J. Kropff, L. Bastiaans, and J. Goudriaan, “On approaches and applications of the Wageningen crop models,” Eur. J. Agronomy, vol. 18, nos. 3–4,pp. 201–234, Jan. 2003.

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TIMELINE

Particulars	Feburary-24				March-24				April -24			
	Week 1	Week 2	Week 3	Week 4	Week 1	Week 2	Week 3	Week 4	Week 1	Week 2	Week 3	Week 4
Problem Identification												
Literature Survey												
Module 1												
Module 2												
Module 3												
Module 4												
Thesis Draft												
Final Thesis												
Viva												

THANK YOU