IOT BASED
REAL TIME
SMART AGRICULTURAL
IRRIGATION SYSTEM
USING ML TECHNIQUES AND IBM WATSON

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Publishing Rights℗ : VSRD Academic Publishing
A Division of Visual Soft India Pvt. Ltd.

ISBN-13: 978-93-91462-67-3
FIRST EDITION, JULY 2023, INDIA

Printed & Published by:
VSRD Academic Publishing
(*A Division of Visual Soft India Pvt. Ltd.*)

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Printed & Bound in India

VSRD ACADEMIC PUBLISHING
A Division of Visual Soft India Pvt. Ltd.

REGISTERED OFFICE
154, Tezab mill Campus, Anwarganj, KANPUR–208003 (UP) (IN)
Mb:9899936803, Web: www.vsrdpublishing.com, Email: vsrdpublishing@gmail.com

MARKETING OFFICE
340, FF, Adarsh Nagar, Oshiwara, Andheri(W), MUMBAI–400053 (MH) (IN)
Mb:9956127040, Web: www.vsrdpublishing.com, Email: vsrdpublishing@gmail.com

PREFACE

Welcome to the world of IoT-based real-time smart agricultural irrigation systems using machine learning techniques and IBM Watson. In this book, we embark on a journey to explore how cutting-edge technology can revolutionize the way we manage irrigation in agriculture.

Agriculture plays a vital role in sustaining our growing global population. However, traditional irrigation practices often suffer from inefficiencies, leading to water wastage, decreased crop yield, and increased costs. It is crucial to develop intelligent solutions that optimize irrigation processes, conserve water resources, and enhance agricultural productivity.

The Internet of Things (IoT) has emerged as a powerful paradigm that connects physical devices and systems, enabling seamless data exchange and intelligent decision-making. By integrating IoT with machine learning techniques and leveraging the capabilities of IBM Watson, we can create a smart agricultural irrigation system that operates in real-time, making precise irrigation decisions based on data-driven insights.

In this book, we delve into the core concepts of IoT and machine learning, providing a foundation for understanding how these technologies can be applied in the agricultural domain. We explore the architecture and components of an IoT-based irrigation system, discussing the integration of sensors, actuators, and communication networks to monitor and control irrigation processes.

Furthermore, we explore the potential of machine learning techniques in analyzing sensor data, predicting crop water requirements, and optimizing irrigation

schedules. By harnessing the power of IBM Watson, we showcase how its cognitive capabilities can enhance decision-making, enabling farmers to make informed choices for efficient irrigation management.

Throughout the book, we present practical implementation examples, code snippets, and case studies to illustrate the concepts and demonstrate their real-world applications. We aim to provide a comprehensive guide that equips readers with the knowledge and tools necessary to build their own IoT-based smart agricultural irrigation systems using machine learning techniques and IBM Watson.

We hope this book serves as a valuable resource for agricultural professionals, researchers, and enthusiasts who are passionate about leveraging technology to transform irrigation practices and contribute to sustainable agriculture. By adopting these advanced techniques, we can optimize resource utilization, conserve water, and enhance agricultural productivity, ultimately working towards a greener and more sustainable future.

Let us embark on this journey together to revolutionize the world of agriculture through IoT, machine learning, and the power of IBM Watson.

The chapter 1 deals with the information gathering about the existing systems and the disadvantages of the existing systems and deals with doing a Comparative study and analysis between the K-NN, SVM, Decision Tree Classifier, Artificial Neural Network and Random Forest Classifier to understand the best suited algorithm for the given system based on the performance matrix on the Kaggle Dataset. The best suited algorithm is then used in the given proposed model to give high accuracy

and efficiency in the given model.

The chapter 2 deals with the block diagram of the proposed system and the functioning of the hardware equipment relevant to the proposed system are discussed. This chapter deals with the integration of the various sensors and microcontrollers in order to develop an automated IOT system that would be able to measure and extract the various irrigational parameters such as pH, Atmospheric Temperature, Humidity, Conductivity of the Soil etc. These values are stored in a .csv file called retrievedIOTSystem.csv. This dataset is used by the proposed model for further process.

The chapter 3 deals with the Live values that are retrieved from the architecture and the working of the proposed system are focused in this chapter. The description of the various technologies used like Internet of Things, IBM Watson and Node-Red are specified and all the UML Diagrams related to the Book are dealt in this chapter.

The chapter 4 explains about the design and the architecture of the IBM Cloud along with This chapter is mainly about the results of the modules implemented and about the collection of screenshots demonstrating the results.

The chapter 5 gives the conclusion and the future enhancements that can be done to this Book and in this area are dealt in this chapter.

✍ *Author*

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