A
Project Based Seminar Report
On

"Prediction of values using Machine Learning Algorithms "

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By

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CERTIFICATE

This is to certify that the project based seminar report entitled " **"Prediction of values using Machine Learning Algorithms"** "being submitted by **Shubham Derhgawen (T150608505)** is a record of bonafide work carried out by him /her under the supervision and guidance **Prof. Pooja Kadam** in partial fulfillment of the requirement for **TE (Information Technology Engineering) – 2015** course of Savitribai Phule Pune University, Pune in the academic year 2018-2019

Date : .....

Place : .....

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This project-based seminar report has been examined by us as per the Savirtibai Phule Pune University, Pune, requirements at Dhole Patil College of Engineering on . . . . . .

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ABSTRACT

The smart management water for maximum use and minimum wastage is essential for reducing the water crisis that the world faces today, all the while contributing to environmental sustainability. The intense use of technologies offers a means for providing the exact amount of water needed for each purpose and use and not a drop more. The Internet of Things (IoT) is the natural choice for smart water management applications, even though the integration of different technologies required for making it work seamlessly in practice is still not fully accomplished. The SMART2L project develops an IoT-based smart water management platform to curb the problem of water crisis and manage water resources efficiently with a hands-on approach. This paper presents a study about IoT that stands to change dramatically the way it impacts on the water crisis in the world. this paper also presents the perspective on the challenges of SMART2L in delivering its service to provide the assistance in solving water crisis especially in managing water resources.

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Chapter 1

Introduction to Prediction of values using Machine Learning Algorithms

1.1 Introduction

With the ever increasing amounts of data becoming available there is good reason to believe that smart data analysis will become even more pervasive as a necessary ingredient for technological progress. The age of Big Data gives us a lot to learn from. This abundance of data can be used in various fields to make decisions based on predictions. But different characteristics of data present us with challenges of varied difficulties . Each case different from others . To overcome this challenge we study various algorithms and their abilities to solve each problem of prediction. Our project

1.2 Motivation

Access to water is a fundamental human right. The need to take care of global freshwater resources, to achieve universal access to drinking water and sanitation and to prepare for water-related disasters is absolutely the need of the moment. The reason for working on this project is something as basic as the knowledge that there would be no life without water and that at the moment IOT is the best way to manage and conserve our water resources and furthermore it also helps in the most efficient usage and maximum utilization of water.

1.3 Aim and Objective(s) of the work

As sustainable water management is designated integrated covering of all artificial and natural water circulations under consideration of three essential aims:

- Long-term protection of water as the environment or as central element of our environment
- Water provision in its various forms as the resource for present as well as for future generations
- • Accessing preferred rights for sustainable natural, economic and social development.

Now as we know use of technology increases the output and decreases the effort and human error , the maximized use of IOT to manage water can produce the following outcomes that may prove to belief changing for the field of water management :-

1. Internet of Things in water management is the reduction in energy pricing and consumption. Keeping in mind the goal of meeting the water requirements in a city.
2. Predictive analytics can be used to calculate the price of energy during different hours in a day.
3. This information can then be used for scheduling the pumps throughout a day in such a way that there is no loss of unnecessary energy or resources.

1.4 Introduction to IOT to minimize water crisis

Water utilities in world are still marching at a greatly deliberate speed when it comes to deal with smart water management. Not anything like gas and electricity, most are in synchronized with the adopted cutting-edge technology. As an IoT solution, SMART2L can play its part in the current developing industry like the new housing development, in supporting the government's policy on focusing the latest knowledge and technology on water management to ensure sustainable water development resources . Mutual real-time data is a smarter pronouncement . Data collected can be promptly turned into valued data for any reasonable decision making in the entire areas of the company, improving the whole part of the utility's data sharing technique that is normal for daily tasks. Eventually, operators, planners, and managers can obtain continuous, pertinent and precise updates anytime from everywhere despite the need to wait for offline reports or data.

1.4.1 Aim and Objectives of Seminar

- **Preservation and Protection of Our Natural Resources:** Conserving water can help preserve our natural resources. Conserving water means more water is available to serve additional water needs, as well as for wildlife and recreation.
- **Saving Money for Our Citizens and Our Community :**Conserving water can reduce the amount of money spent each month for household water use
- **Insuring the Reliability of Our Water Supply :** Water conservation can positively affect the reliability of our water supply during periods of high demands (such as the summer months) and during droughts.
- **Use of IOT to maximize efficient utilization of water.**

Chapter 2

LITERATURE SURVEY

[1]**Paper Title:** ”IOT based Water Management”.

Publish Year:March,2017

Rescorces/Facilities Used:

- Water resources,
- Cloud computing,
- Internet of Things,
- Mobile applications,
- Magnetic sensors,
- Rotors

[2]**Paper Title:** ”Smart water management using IOT”.

Publish Year:2016

Rescorces/Facilities Used:

- Wireless fidelity
- Cloud computing,
- Internet of Things,
- Mobile applications,
- Magnetic sensors
- Pins

[3]**Paper Title:** ”Self powered IOT-enabled water monitoring system”.

Publish Year:2018

Rescorces/Facilities Used:

- Wireless communication
- Cloud computing,
- Internet of Things,
- Mobile applications,
- Wireless sensor network,
- Temperature measurement

Advance Research:

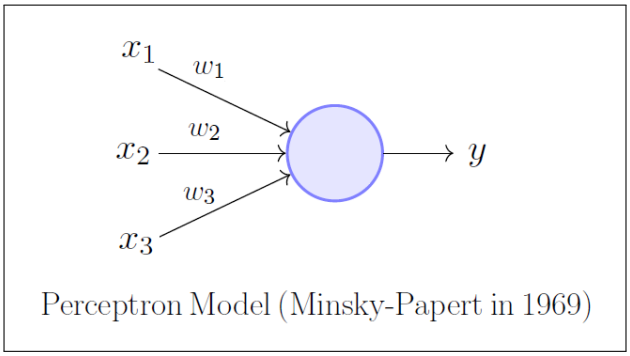
All the above research papers have their pros and cons , on the basis of these this project aims to eliminate the disadvantages and glorify the advantages. The difference being not just in managing the water resources or monitoring them but also in taking instant action, reducing wastage an curbing the water crisis.The modernization of monitoring using apps and instant action options furthermore have a humungous effect on the reduction of water wastage. The use of IOT helps in minimizing the error , efforts and improves accuracy of monitoring and response.

Chapter 3

Perceptron

3.1 Introduction

The most fundamental unit of a deep neural network is called an artificial neuron, which takes an input, processes it, passes it through an activation function like the Sigmoid and returns the activated output.Frank Rosenblatt, an American psychologist, proposed the classical perceptron model in 1958. Further refined and carefully analyzed by Minsky and Papert in 1969 in their model is referred to as the perceptron model.



Perceptron Model (Minsky-Papert in 1969)

3.2 Definition

The perceptron is an algorithm for supervised learning of binary classifiers. the perceptron is an algorithm for learning a binary classifier called a threshold function: a function that maps its input $\mathbf{x}$ (a real-valued vector) to an output value $f(\mathbf{x})$ (a single binary value):

$$f(\mathbf{x}) = \begin{cases} 1 & \text{if } \mathbf{w} \cdot \mathbf{x} + b > 0 \\ 0 & \text{otherwise} \end{cases}$$

where $\mathbf{w}$ is a vector of real-valued weights,$\mathbf{w} \cdot \mathbf{x}$ is the dot product $\sum_{i=1}^{m} w_i x_i$where m is the

number of inputs to the perceptron, and b is the bias. The bias shifts the decision boundary away from the origin and does not depend on any input value.

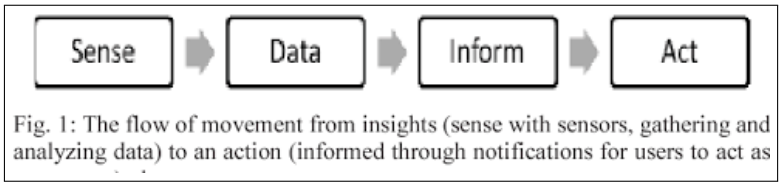


Figure 3.1: Real-time IOT-based water resources Information System

The information gathered from the real-time monitoring will be benefited department of water resources and also the public. The main idea of a real-time IOT-based water resources information system is to convey inclusive and precise figures

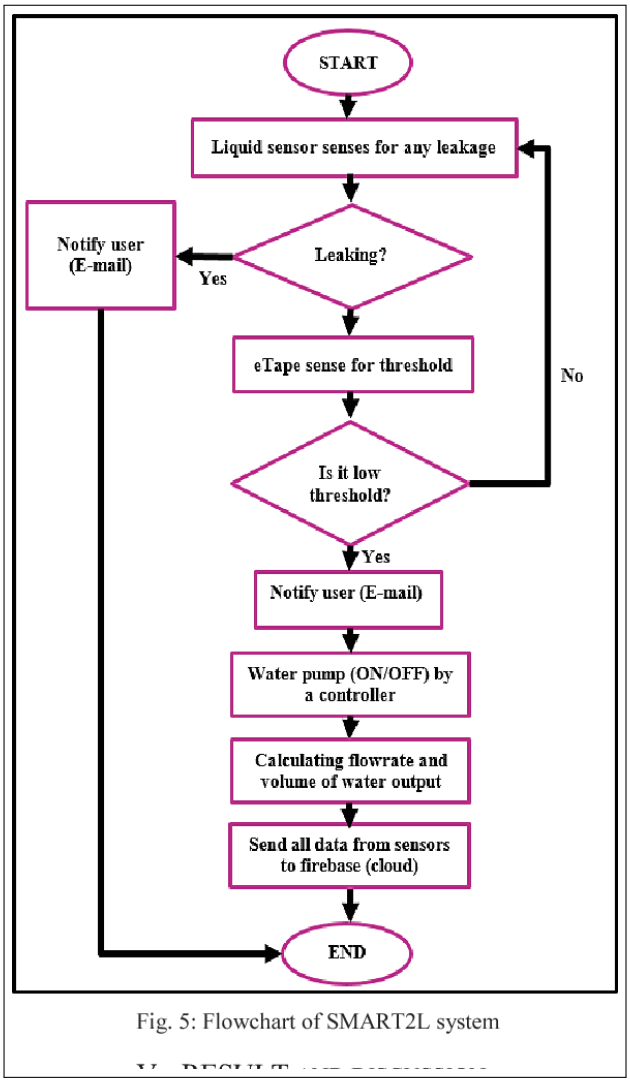


Fig. 5: Flowchart of SMART2L system

Figure 3.2: Flow of Real-time IOT-based water resources Information System

3.3 How it Works?

SMART2L system integrates the usage of Arduino Yun. A reserve tank, batteries (power supply), water tank and water pump are used to set up the water pump system. The reserve tank is connected to the main tank via a water pump. The water pump is used to pump water from reserve to the main tank and is controlled by the main tank's water threshold, which turns on/off the water pump. This is the most common method of threshold level control for the main tank which simply to start the water pump at its low level and permits it to run until the water is filled up.

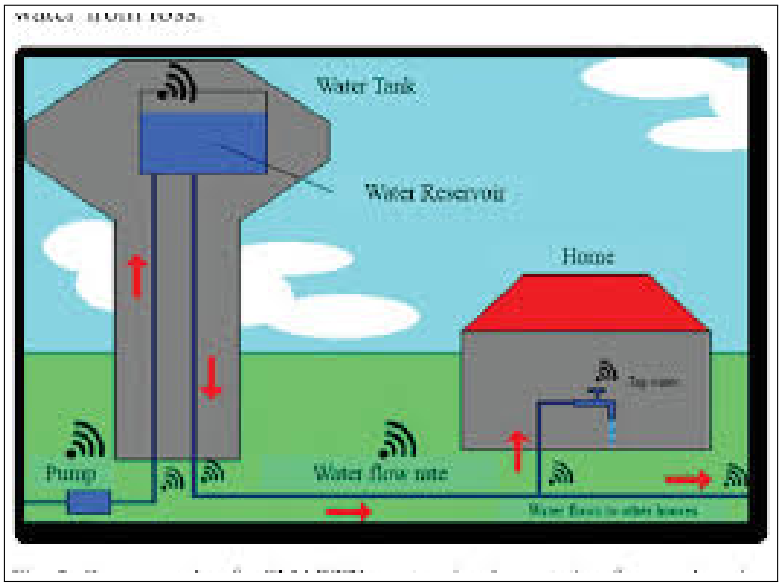


Figure 3.3: Model of Real-time IOT-based water resources Information System

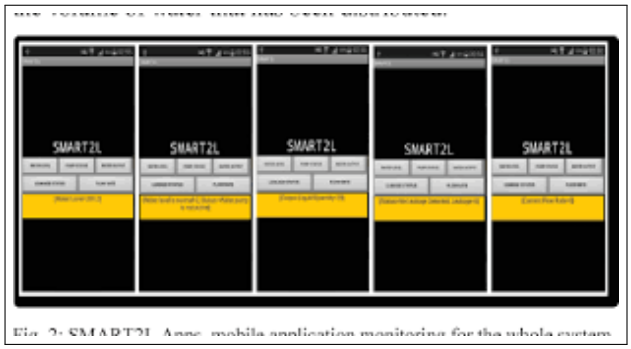


Figure 3.4: Mobile Based Application for IOT-based water resources Information System

A. **Presence of Leaks**

The liquid sensor will first sense any leakage present either at the valve or the distribution of PVC pipes. If there is a presence of leakage, the Arduino Yun will send an e-mail to notify the users. The decrease in the water below the threshold level will cause Arduino Yun to send an e-mail too. This will cause the pump to automatically pump water and liquid will start to flow from the reservoir to the main tank till it is full. Beforehand, users need to install the SMART2L apps on their smartphone to ensure the users able to monitor SMART2L system through mobile apps as Arduino Yun sends the system data to Firebase.

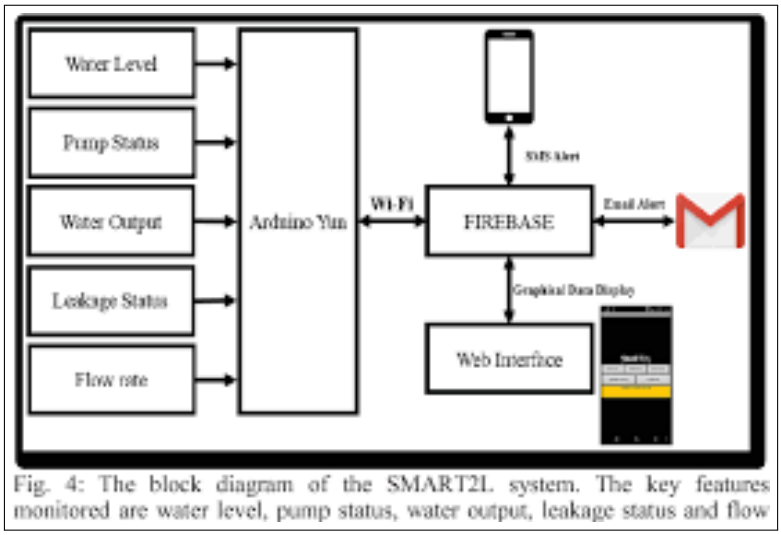


Fig. 4: The block diagram of the SMART2L system. The key features monitored are water level, pump status, water output, leakage status and flow

Figure 3.5: Block Diagram of Smart2L

B. **The absence of Leaks; Low Threshold** On the other hand, in the absence of leakage the SMART2L system continuously still sense the liquid threshold through eTape sensor. Any changes, Arduino Yun will send notification through e-mail. Simultaneously, the shape sensor monitors the threshold level as a step taken to prevent the liquid from overflowing. Real-time data will continuously be updated to Firebase. The information of the SMART2L system that is gathered in Firebase to view overall data. The data will be constantly updated in the real-time following any changes happen within the system. Firebase is used together to store the analytics info gathered from all the available sensors in the SMART2L system. The information in Firebase is stored in JSON format. Every updated, added or deleted information can be observed in real-time and colors flashing in the cloud database based on Fig.3.5 signifying such actions are being done.

Apart from that, the users will also receive an email notification on alerting the users about the water threshold as well as if any leakage present.

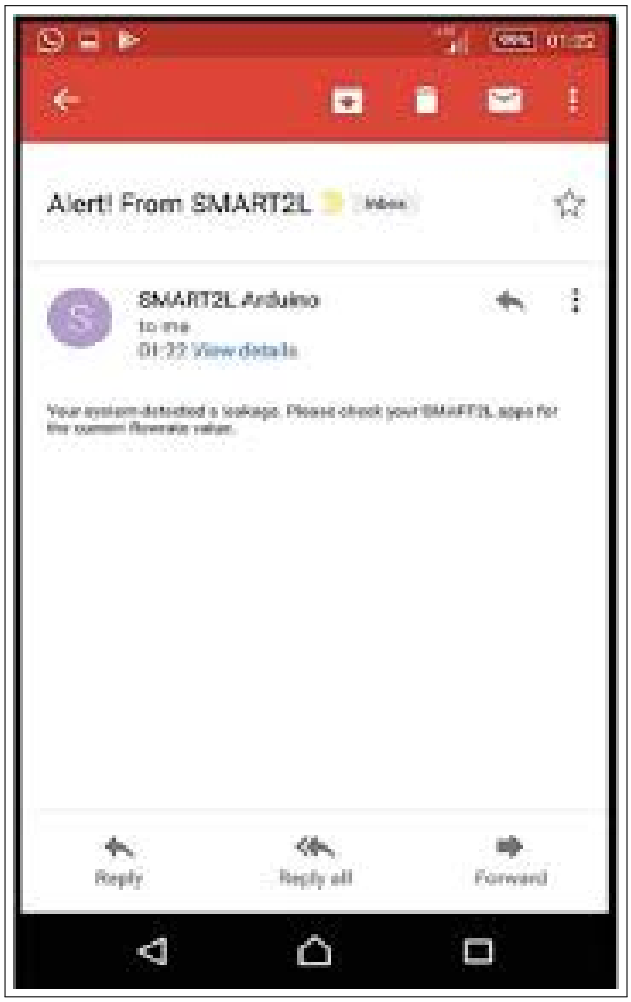


Figure 3.6: Email Alert

Chapter 4

CONCLUSION

Investing in the current cutting-edge technology like the Internet of Things (IoT) really gives great impact in curbing the issues related to the water crisis and water management. The existing systems employ additional period to gather data and focus less on the insights of the data. Most of the existing systems require the manual collection of data.

The SMART2L monitoring system, an IoT-based system able to deliver a better solution in monitoring the water resources which equipped with proper sensors. A faulty pipe can leak anywhere within seconds. Without proper flow sensor monitoring on sites, a basic break like this could be resulted in losing substantial amounts of water and can take weeks to be made conscious of the matter

This real-time visibility and remote access have been so beneficial to the district, that SMART2L system has can now become mandatory especially for all new construction projects..

Beside that this project can be implemented in a real situation and can hold a market value especially in a residential unit or in industries. This is because it is about time for the residential and also the industry to make a change to appreciate the benefits of IoT since they still reliably engaged to the float technology which marginally inefficient and lacking precisions.

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