

# A Survey Paper on Digital Water Management using Machine Learning Technique

Shiwani Salve<sup>1</sup> Suyash Gore<sup>2</sup> Saiprasad Kale<sup>3</sup> Priti Kothavale<sup>4</sup> Dr. Sunil D Rathod<sup>5</sup>

<sup>1,2,3,4,5</sup>Department of Computer Engineering

<sup>1,2,3,4,5</sup>Dr. D. Y . Patil School of Engineering Pune, India

**Abstract**— IT and Mobile phones have enabled easier access to various services. How to use these technologies to solve day-to-day managerial issues like daily water usage and management is challenging job. The water being an essential entity of everyone’s life right from house hold usage to industrial use, its management is a challenge as we cannot anticipate the amount of rainfall and availability of other sources of water. For this we need a smart software based system which will; 1) Assist to make district water budgets and District/Block level water managers to know on day-to-day basis, the habitation wise quantity and quality water supplied and 2) Make every household a water smart household by informing them about the quantity and quality of water available from their nearest source to plan their daily family water budget. Ideas can be mix of technologies like machine learning techniques, management solutions, awareness games etc. The key challenge is accurate availability of quality and quantity of water at the source so that an appropriate prediction algorithm can be designed.

**Key words:** Water Resources, Technologies, Android, FCM (Firebase Cloud Messaging), Control Server, Mobile Phone

## I. INTRODUCTION

Water is one of the important substances used in our day-to-day life. It must be saved and managed to avoid water shortage in future. The best way to save the water is to monitor and study its usage and accordingly its utilization must be managed. Monitoring the water level of water resources plays an important key role in water management. The water resource can be used to preserve the water level and to study the water usage. Water resource management is the activity of planning, developing, distributing and managing the minimum use of water resources.

Water is essential resource for all life on the earth. The management of water resources is directed at minimizing the use of water and optimizing the environmental impact of water use on the natural environment.

Basically, the integral part of ecosystem is based on water resource management where the quantity and quality of water help to determine the nature of the natural resources.

Water conservation and management encompasses the policies, strategies and activities made to manage water as a sustainable resource, to protect the water environment, and to meet current and future human demand. One of the biggest concerns for our water-based resources in the future is the sustainability of the current and future water resource allocation.

Water management is dealing with water in the best possible way. This can be done by local authorities or it can be done by individuals at home. Good water management will involve organizing water so that everyone

has enough, and controlling water supplies and water treatment centres so that they work in the best possible way. It thus often involves some knowledge of the chemical properties.

## II. MOTIVATION

The motivation behind taking up this project was to design a model which would help to people to manage the water resources in an efficient and economic way. This model will help to every smart household by pre-plan and use of water according to the prediction made by different machine learning techniques and will avoid the wastage of water.

The application of this model is that to inform household about the quantity and quality of water available from their nearest source.

## III. LITERATURE REVIEW

Paper No.	Paper Name	Advantages	Limitations
1.	Water Quality Monitoring for Rural Areas-A Sensor Cloud Based Economical Project.	Get the real time notifications related to water level and quality.	No Controller present. High Resource consumption. No idea of work performance.
2.	Real Time Water Quality Monitoring System	Get information related pH value and temperature of water.	Administrator is required always to monitor.
3.	Adaptive Edge Analytic for Distributed Networked Control of Water Systems	Get the notifications related real time water management.	Authority has to login to access the log information. Manual intervention needed.

## IV. PROPOSED SYSTEM

We are going to develop a smart software -based system to analyse water quality and quantity.

- 1) Real time notifications suggest how to use of water as per the need.
- 2) In different environment use of water is different in different area therefore to predict the correct quality and quantity of water machine learning algorithms are used in server.
- 3) Wireless communication between mobile phone and server is very secure because with the help of FCM which allows software developers to send push

notifications for their applications to end users through an application programming interface (API).

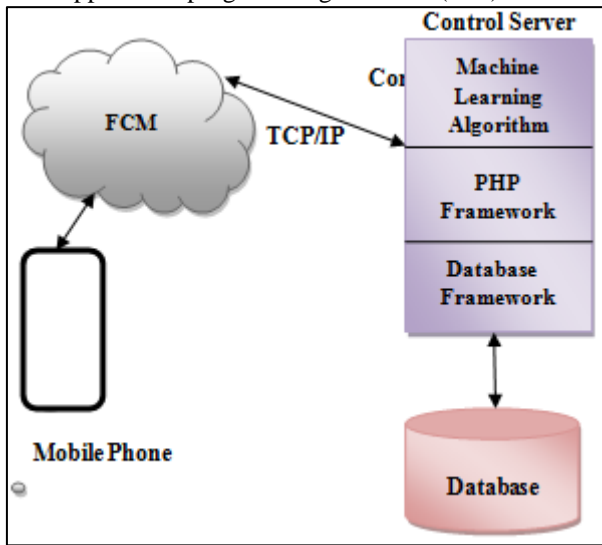


Fig. 1: System Architecture

The system architecture contains three modules mobile phone user interface, control server and database which uses machine learning algorithms for internal processing of database and user interface.

User interface of control server is in the form of PHP User Interface which consists of different types of options such as dashboard contains water consumption pattern in graphical format such as pie charts or graphs. It will also show the tabular format of water consumption according to different types of areas. Other option of PHP UI is the matrix it includes the detail information of water consumption according to hour or in month wise consumption of water supply in different area in different sectors. The last analytic phase contains overall water consumption. Through the control server the real time notifications related to the water supply is sent to the mobile phone with the help of FCM communication network contains quantity and quality of water in different phases of areas.

The main objective of this study is to develop system to keep track of water level of a water resource from a distant location. The actual implementation of the system will require changes in sensor and few other technologies and source code although the methodology and principle remain the same.

- Improving the water consumption
- FCM Communication Network is more secure and helps to show real time notifications learning to the water resources.
- Machine Learning helps to predict database and send accurate notifications related to the water resources.

## V. CONCLUSION

Monitoring of water makes use of machine learning algorithm, PHP interface and database software with existing FCM network. The system can monitor water quality and quantity automatically and it is low in cost and does not require people on duty.

So, the water quality testing becomes more economical, convenient and fast. The system has good flexibility.

The operation is simple. The system can be expanded to monitor hydrologic, air pollution, industrial and agricultural production etc. It has widespread application and extension value.

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