

# Data Analytics to Provide Solutions for Groundwater Management of India

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**Abstract:** - Groundwater is the major source of drinking water and India's 1.35 billion residents depend on the groundwater. The groundwater resources are under depletion due to the increase in usage not only for daily use but also for industrial purposes. The project uses different techniques and methods using the concepts of machine learning including Exploratory Data Analysis (EDA), and K-nearest neighbour (KNN) regressor it is based on supervised machine learning techniques.

**Keywords:** - Groundwater, Data Analysis, KNN, EDA (Exploratory Data Analysis), etc.

## I. INTRODUCTION

Groundwater is the water that seeps through rocks and soil during rainfall and is stored below the ground. The majority of India's water problems are those relating to groundwater water that is found beneath the surface of the earth. This is because India is the largest user of groundwater in the world, and therefore highly dependent on it. Over 260 cubic km per year, India uses 25 percent of all groundwater extracted globally, ahead of the United States and China. Since 70 percent of the water supply in agriculture today is groundwater, it will remain the lifeline of India's water supplies for years to come. In many areas, groundwater is the major source of drinking water specifically in villages. The groundwater crisis is not only the result of natural factors but also caused by human actions and over-usage. During the past twenty years, the water level in several parts of the country has been falling rapidly due to their high usage and extraction. The rapid increase in population and changing lifestyle has also increased the domestic need for water. Pollution is another reason for the depletion of groundwater resources. Groundwater resources need to be preserved and examined to get a proper report of the overall availability of water. The concept of machine learning plays a vital role in this project. Machine learning is a branch of artificial intelligence and computer science that focuses on the use of data and algorithms to imitate the way that humans learn, in order to improve its accuracy, it is a type of artificial intelligence that allows different software applications to become more accurate and correct at predicting outcomes. Machine learning uses historical stored data as input to predict new results and output values. Supervised learning is when the model will be trained on a labelled dataset. A labelled dataset is a dataset that has both inputs as well as output parameters. In this type of learning both training and validation are done.

## II. OBJECTIVE

1. Visualize the water need / usage of the town.
2. Identify whether the water sources availability is going to be able to meet the need till the next monsoon?
3. How bad is that the current water crisis compared to previous years.

## III. LITERATURE REVIEW

Initially, the topic groundwater, was governed by common law standards connected to land possession and ownership, to a good extent. The Indian Easement Act, 1882 incorporates these principles, which faced serious challenges within the question of large-scale extraction of groundwater by the owners of the land. This provision was misused by the multinational companies for the extraction of groundwater for meeting their commercial motive. The National Water Policy, 1987 (Policy 1987) emphasizes the requirement for the mindful use of groundwater resources.

The Policy 1987 also recommends for a resolving inter-State modality through acceptance of proper modifications within the proposed water plans. This Water Policy was reviewed and updated in 2002 and later in 2012. The National Water Policy, 2012 (Policy 2012) was released with an objective to plan and recycle resources for optimum availability. other than that, the Policy 2012 also suggests that artificial recharging projects should be undertaken so the quantity of extraction of the groundwater is a smaller amount than the recharge which guidelines must be issued for safety of storage dams. Ground Water Management and Regulation Scheme could be a Central Sector Scheme of Ministry of Water Resources, River Development & Ganga Rejuvenation during 12th plan (2012-17) with an estimated cost of Rs 3319 Crore.

#### IV. METHODOLOGY

##### 1. Data Pre-Processing

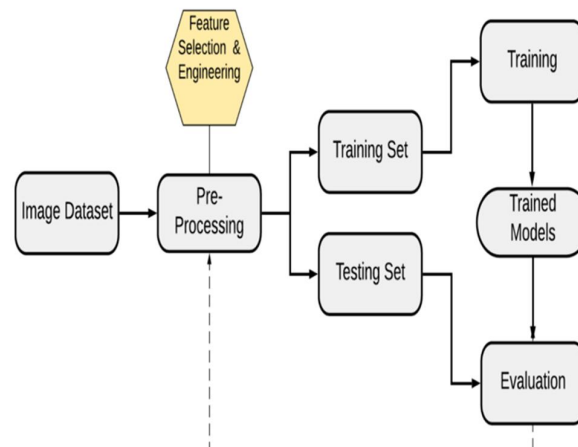
Data pre-processing is a data mining technique that refers to the transformation of raw data into a systematic and useful format. The aim of pre-processing is to change the data into an understandable and readable format. We have used Exploratory Data Analysis (EDA) for this process, EDA performs different operations so as to remove any errors, or repetition of data and gives a proper understanding of data.

Steps in data pre-processing:

- Obtaining a relevant dataset
- Importing all the required dataset
- Importing the dataset
- Identifying the missing and repeating values
- Encoding variables

##### 2. Implementing the Relevant Model

Choosing a model that fits properly and provides us with the desired results is a crucial part of machine learning. The dataset has to be split into two parts according to that the two parts are training set and testing set. We have implemented the KNN regression model.



##### Advantages

1. In the project we use Exploratory data analysis (EDA) It Helps point out errors in data sets provide us a far better and simple understanding of the dataset.
2. It provides the outputs in visual representation which creates strong impressions.
3. It is feasible for user.
4. It provides complete details of ground water management like available quantity water Recharge, extract etc.

### **Application**

1. To get analysis of available water.
2. Helps in water conservation.
3. With the help of this project, we can sort areas with water scarcity.

### **V. FUTURE SCOPE**

Ground water prospects graphs could also be employed by the sphere Officers of the departments of the respective states to pick the sites at appropriate places. These graphs are the great inputs which will be used for aquifer mapping, one in all the input for resource estimation for future ground water development for the given area. The graphs are prepared supported the provision recharge conditions i.e., rainfall, depth to formation, availability of water within the water bodies during time of the mapping. Hence depth and yield will vary. Graphs help in identifying the ground water exploitation areas (through water irrigated patches) for addressing the acceptable recharge structures for improving the ground water levels.

### **VI. CONCLUSION**

From In dynamically changing environments monitoring groundwater levels could be a critical issue. Early prediction of drought or loss of pumpage will depend upon the faster response of the groundwater researchers. Timely data is made available using advancements in wireless networking infrastructure. to make an entire, correct and practical solution to the real-time groundwater monitoring all the components of the system need to be developed and integrated efficiently. the answer outlined during this paper directly addresses one in all the immediate needs of the groundwater research and provides a workplace for future research of environmental monitoring normally.

### **REFERENCE**

- [1] <https://www.omicsonline.org/open-access/groundwater-management-in-india-problems-and-perspectives-116563.html>
- [2] <http://jalshakti-dowr.gov.in/ground-water-management-studies>
- [3] <https://iopscience.iop.org/article/10.1088/17426596/978/1/012047/pdf#:~:text=The%20result%20of%20their%20research,a%20lowest%20accuracy%20of%202.5%25>
- [4] <https://www.groundwater.org/getinformed/basics/whatis.html#:~:text=Groundwater%20can%20also%20be%20extracted,the%20bottom%20of%20the%20well>
- [5] <https://www.ctc-n.org/technologies/groundwater-extraction-and-monitoring>
- [6] <https://www.itl.nist.gov/div898/handbook/eda/section1/eda11.htm>