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WATER POLLUTION MONITORING BY USING ADVANCED MACHINE LEARNING CONCEPTS

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Abstract:- *Water is the most precious element in the world. All the living things on the earth must need water for their livelihood. So we need to safeguard water. Due to various chemicals, plastic and unwanted elements usage increase water pollution. Once water gets polluted then, it is very hard for living on the earth. To prevent water pollution nowadays it becomes very essential to monitor water pollution. Machine learning is one of the most automated and applicable tools for water pollution monitoring. The system trained with the previous data values and it may be applicable for the current situations. The designed system is much active and capable to apply modifications based on water contaminated. The precautionary measures will be taken derived from the system. The system analyzes the current contamination and makes decisions.*

Key Words: *Pollution, factory waste, groundwater, contamination, large data sets, water storage points.*

INTRODUCTION:

In the entire world, 2/3 of the area is occupied by water. Water is very precious, and the contamination of water arises against unexpected health problems for the human, which may be lead to permanent disability or death. So it is essential to protect water. In Andhra Pradesh most of water storage points are lakes, rivers, oceans, and aquifers [1]. The underground water is the major water resource. Due to heavy pollution and discharge of waste and pollution elements into water became water contaminated. Most of the factory wastage, drainage water is going to a mix-up with water storage points. Due to the human mistakes, water is getting contaminated and causes severe health diseases. There are different types of water pollution, for example Nutrient Pollution, Marine Pollution, sometimes groundwater pollution [2]. The Neural Network is going to be designed through Machine Learning for monitoring water pollution. The self learning algorithm continuous keeps monitoring about water storage and record the data will be analyzed. The analysis report is going to generate with required decisions.

WATER FORMATION:

Water is a combination of one oxygen atom and two hydrogen atoms (H_2O). The molecular formation of water is shown in figure1.0.

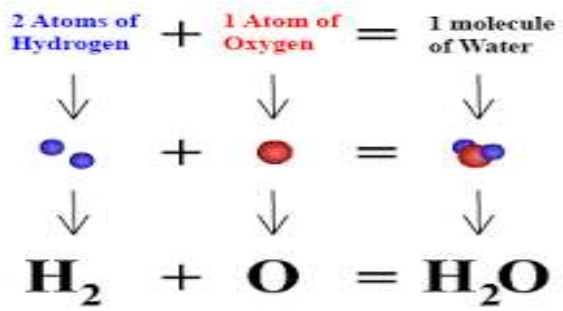

Figure 1.0: Molecular Formula of water.

Types of water pollution:

Due to human mistakes and negligence of releasing the waste and sewage water causes the contamination of water [3]. The factory waste, plastic is also one of the major causes of water pollution. Water pollution majorly divided into 3 types

- Surface Water Pollution
- Marine Water Pollution
- Groundwater Pollution

Surface Water Pollution:

The upper layer of water polluted due to the mixing of drain water, sewage water, and other plastic particles [4]. Due to this the upper layer of water changes its color and not useful for the usage. Most of the rivers, lakes, oceans are polluting due to surface water pollution. The surface water pollution is shown in figure 2.

Figure 2: Surface Water Pollution

Marine Water Pollution:

Marine water pollution commonly faced by the river and ocean water. These were happened because of discharging the heavy polluting chemicals from the industries and plastic. The plastic wastage pollutes water and creates harmful diseases [5]. In the world most of the technologically advanced countries such as China, Indonesia, Thailand, Egypt, etc… are releasing maximum wastage which causes Marine Water Pollution. 90% of plastic waste is going to reach the world's ocean [6]. The marine dumping is shown in figure 3.0.

Figure 3: Marine Dumping

Causes of Water Pollution:

Most of the human made mistakes cause water pollution, few major causes of water pollution are garbage and liquid waste, Sewage, Plastic and other harmful chemicals releasing into the water [7]. The plastic increases the toxic in water which is harmful to drinking and animals. The contaminated water is shown in figure 4.

Figure 4: Contaminated Water

Water Quality Parameters

- Oxygen in water (Dis solved oxygen)
- pH
- Chloride Percentage
- Water Level
- Precipitation

Pollution Measurement Devices

pH meter is used to measure water quality. The figure 5 shows water quality with various pH values.

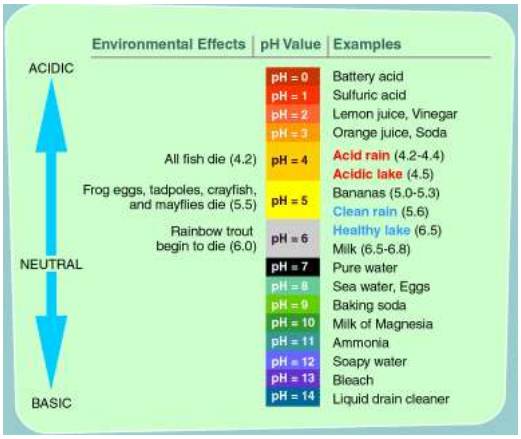

Figure 5: pH table index

ABOUT MACHINE LEARNING

The machine can acquire knowledge on its own. The system need not be explicitly programmed. Machine learning is one of the most precious applications of Artificial Neural Networks. The machine accesses, the data from the existing database and try to learn the contents. The first implementation of Machine Learning was defined by Arthur Samuel in 1959, and defined that "it gives computers the ability to learn without being explicitly programmed [8]. In 1997, Tom Mitchell implemented with

the help of mathematics such as task, performance and, experience.

WATER POLLUTION MONITORING MECHANISM:

Water pollution monitoring device sensors record the data. The recorded data set is collected from water pollution center and divided the data into a structural format so as to read the data by the machine [9]. The Machine learning methodologies such as supervised and unsupervised learning mechanism will be implemented for continuous monitoring of water purity. When water is became contaminated then the system generates precautionary measures and sends the message to the concern authorities [10].

The advanced technology data science was implemented successfully to monitor the water contaminated and the results are defined in table 1.

SNo	Element	Contaminated %
1	pH (0 to 7)	No Contamination (0%)
2	pH (8 to 12)	No Contamination (Suitable for drinking) (1%)
3	pH (12 to 80)	Very little bit contaminated (5%)
4	pH (80 to 120)	7%
5	pH (120 to 200)	15%
6	pH (200 to 400)	28%
7	pH (400>)	50% to 80% (Very Harmfull)

Table 1: Contamination of water with pH

CONCLUSION:

The water is more precious and required for the human beings and other living objectives on earth. Due to much pollution and huge water usage, the water became polluted. So it is essential to monitor the water pollution. The water pollution system provides a mechanism to have continues monitoring and provides the status of contamination. The machine learning algorithms allows the user to implement huge dataset for pollution monitoring.

REFERENCES:

1. Shruti Danve, Mithaila Barabde, Real Time Water Quality Monitoring System, IJIRCCE, vol 3, June 2015.
2. Ulhaskumar Gokhale, Akanksha Purohit, Real Time Water Quality Measurement System based on GSM, IOSR-JECE Volume 9, Issue 3, ver. June 2014.
3. Michael Healy, Sinead O'Keefee, O'Connell ieee journal, Vol. 13,no.7, July 2013.
4. Niel, Andre cloete, Reza Malekian and Lakshmi Nair, Design of Smart Sensors for Real Time Water Quality Monitoring, IEEE Conference, 2016.
5. Azedine C, Antoine G, Patrick B, Michel M (2000) Water quality monitoring using a smart sensing system. Measurement:219–224.
6. Central Ground Water Board (2017) Ministry of Water Resources, River Development and Ganga Rejuvenation, Government of India. http://cgwb.gov.in/. Accessed 24 July 2017.
7. Christie R, Mallory C, Jared L, Alan M (2014) Remote Delay Tolerant Water Quality Monitoring. In: IEEE global humanitarian technology conference, 10–13 Oct 2014.
8. S. Revathi, A. Malathi, "A detailed analysis on NSL-KDD dataset using various machine learning techniques for intrusion detection", *Proc. Int. J. Eng. Res. Technol.*, pp. 1848-1853, 2013.
9. D. Sahoo, C. Liu, S. C. H. Hoi, Malicious URL detection using machine learning: A survey, 2017, [online] Available:
10. M. I. Jordan, T. M. Mitchell, "Machine learning: Trends perspectives and prospects", *Science*, vol. 349, no. 6245, pp. 255-260, 2015.