**NANMUDHALVAN-IOT TEAM PROJECT**

**COLLEGE NAME: JEPPIAAR INSTITUTE OF TECHNOLOGY**

**TITLE: SMART WATER FOUNTAINS**

**TEAM NAME: Proj\_228481\_Team\_1**

**TEAM MEMBERS:**

**1.BHUVANASRI.S**

**2.DEEPIKA.M**

**3.KIRUTHIKA.K**

**4.SELVAMEENA.N**

**5.SHOFIYA.M**

**PHASE2:** Consider incorporating predictive maintenance algorithms to identify potential malfunctions before they occur.

**OBJECTIVES:**

To implement predictive maintenance algorithms in the Smart Water Fountains project to reduce unplanned downtime and maintenance costs by identifying potential malfunctions before they occur, thereby ensuring continuous access to clean and safe drinking water for users.

**ALGORITHM:**

Certainly, here's an adapted version of the algorithm tailored for predictive maintenance of a smart water fountain:

1. Data Collection for Smart Water Fountain:

* Collect historical data from sensors within the smart water fountain, including water flow rate, water level, temperature, and pump status.
* Ensure data is time-stamped to analyze trends and patterns over time.

2. Data Preprocessing:

* Clean and preprocess the data to handle any missing values or outliers.
* Normalize or standardize data for consistent analysis.

3. Feature Engineering for Smart Water Fountain:

* Extract features that provide insights into the health of the water fountain.
* Relevant features may include flow rate variations, water level fluctuations, and temperature changes.

4. Model Selection for Smart Water Fountain:

* Choose a suitable machine learning or deep learning model for anomaly detection in the context of a smart water fountain.
* Consider models like Isolation Forest, One-Class SVM, or autoencoders for anomaly detection.

5. Training the Model for Smart Water Fountain:

* Train the selected model using historical data, teaching it to recognize normal operation patterns.
* The model learns to identify anomalies by detecting deviations from the learned normal behaviour.

6. Real-time Monitoring for Smart Water Fountain:

* Deploy the trained model to continuously monitor the smart water fountain's operation in real-time.
* It continuously compares incoming sensor data with what it learned during training.

7. Anomaly Detection for Smart Water Fountain:

* The model assigns an anomaly score to each new sensor reading. A higher score indicates a greater deviation from the learned normal behaviour.
* Set a threshold; when the anomaly score exceeds it, an alert is triggered.

8. Alerting and Preventive Actions for Smart Water Fountain:

* When an alert is triggered, it signals the need for maintenance or investigation.
* Actions may include inspecting water flow components, checking for blockages, or scheduling maintenance.

9. Evaluation and Feedback for Smart Water Fountain:

* Regularly evaluate the algorithm's performance using historical data and feedback from maintenance actions.
* Adjust the anomaly detection threshold or model as needed to minimize false alarms and improve accuracy.

10. Deployment and Maintenance for Smart Water Fountain:

* Deploy the predictive maintenance algorithm within the smart water fountain's control system.
* Continuously monitor and maintain the system to ensure it remains effective in identifying potential malfunctions or issues.

This adapted algorithm is designed to help maintain the optimal operation of a smart water fountain by proactively identifying anomalies or potential problems before they lead to significant malfunctions.

**CONCLUSION:**

In conclusion, the integration of predictive maintenance algorithms into the Smart Water Fountains project offers a transformative opportunity to enhance both the efficiency and reliability of our water fountain systems. By leveraging data-driven insights and advanced analytics, we can proactively address potential malfunctions before they disrupt the functionality of our fountains. This not only ensures uninterrupted access to clean and safe drinking water but also translates into significant cost savings through reduced downtime and maintenance expenses. As we move forward with the Smart Water Fountains project, the adoption of predictive maintenance algorithms becomes not just a valuable option but an essential component for delivering a seamless and sustainable water fountain experience to our users while optimizing our operational resources.