**SMART WATER FOUNTAIN**

**1. PROJECT DEFINITION**

**1.1 Objective**

The objective of the Smart Water Fountain project is to design a sophisticated water fountain system that caters to the needs of pet owners, specifically those with cats and dogs. The primary goals are:

* Water Quality Monitoring: Develop a system that continuously monitors the water quality within the fountain. This includes measuring temperature, pH value, and conductance. The system categorizes water quality as "Good," "Average," or "Bad."
* Automatic Water Replacement: Implement an intelligent mechanism to replace water when it becomes polluted or runs out, ensuring pets have access to clean and fresh water at all times.
* Integration with User Devices: Enable connectivity to users' devices through Wi-Fi, providing real-time feedback on the water fountain's status, including water quality and remaining water quantity.
* Long-term Water Supply: Create a system that can be linked to external water sources, such as universal water bottles, to ensure an uninterrupted water supply, even if pet owners are away for several days.

**1.2 Background**

* With a growing number of pet owners worldwide, the need for reliable pet care solutions has increased. The popularity of cats and dogs as pets, which prefer flowing water, necessitates a water fountain. However, ensuring water quality and a consistent supply can be challenging when pet owners are away.
* To address this, the Smart Water Fountain not only provides running water but also offers water quality monitoring and automated water replacement. It can connect to various water sources, making it suitable for long-term use.

**2. DESIGN THINKING**

**2.1 Sensor Unit**

The sensor unit is crucial for monitoring and assessing water quality. It consists of four sensors:

* Temperature Sensor: A waterproof DS18B20 sensor is used to measure water temperature with high accuracy.
* PH Sensor: This sensor measures pH values in the range of 0 to 14 with precision, indicating water acidity or alkalinity.
* Conductivity Sensor: This sensor monitors water conductivity, an important factor in water quality.
* Liquid Level Sensor: This sensor detects the water level in the fountain to ensure an adequate supply.

**2.2 Display Unit**

The display unit utilizes a 20x4 LCD screen to show real-time readings from the sensors, water quality assessments, and remaining water quantity. The information is user-friendly and easy to interpret.

**2.3 Power Supply Unit**

The power supply is primarily based on Zn-Mn batteries, ensuring continuous operation for at least 24 hours. A voltage regulator maintains stability while avoiding exceeding module limits.

**2.4 Mechanical Unit**

The mechanical unit includes several components:

* Fountain Pump: It maintains a continuous water supply through the fountain mechanism, capable of lifting water streams of specific dimensions.
* Supply Pump: Ensures water flow when the water level is low and prevents water transfer when not needed.
* Filter: Maintains water quality by controlling pH value and conductivity.
* Drain: Drains water from the fountain when required, and it's equipped with motor-controlled valves.

**2.5 Control Unit**

The control unit plays a pivotal role in processing data from sensors, determining water quality, and controlling various system components. It is responsible for sending alerts and controlling water supply, filtration, and drainage.

**2.6 Risk Analysis**

Challenges and risks associated with the control unit and mechanical unit were identified. Precise control and water-tightness are critical to the system's functionality and safety.

**3. CONCLUSION**

* The Smart Water Fountain is a comprehensive solution for pet owners seeking a reliable and intelligent water supply system. By focusing on water quality monitoring, automatic water replacement, and user-friendly features, this project addresses the needs of an ever-growing pet owner population.
* The integration of sensors, a display unit, power supply, mechanical components, and a sophisticated control unit ensures that pets have access to clean, fresh water, even when their owners are away. Additionally, the project adheres to ethical principles, prioritizing safety, fairness, and technical competence.
* The Smart Water Fountain not only caters to pets' health and well-being but also contributes to the sustainability of resources through its reusable water bottle connection, aligning with ethical standards and modern environmental consciousness. This project is a testament to the advancement of technology for the betterment of our daily lives and the welfare of our pets.