PROJECT 8 : SMART WATER FOUNTAINS
PHASE 1 : PROBLEM DEFINITION AND DESIGN THINKING

COURSE NAME: INTERNET OF THINGS

GROUP:5

PROJECT NUMBER : 08

TITLE:SMART WATER FOUNTAIN

PHASE 1:PROBLEM DEFINITION AND DESIGN THINKING

YEAR : lll

DEPARTMENT : ELECTRONICS AND COMMUNICATIONS ENGINEERING

PROJECT SUBMITTED TO : SkillUp Online

NO OF STUDENTS : 06

NAME OF STUDENTS : 810021106050-MUHAMMED DAYYAN AL SALAAM S

:810021106052-NAVEEN RAJ S

:810021106062-RAVIVARMAN R

:810021106069-SARAVANAN K

:810021106304-YUVURAJ M

:810021106311-PREMKUMAR M

SMART WATER FOUNTAINS

Smart water fountains are a new type of water fountain that uses technology to make it easier for you to keep your pet hydrated. They are typically connected to a smartphone app, which allows you to monitor the water level, change the flow rate, and receive alerts when it's time to refill the fountain.

Some smart water fountains even have additional features, such as UV-C sterilization to kill bacteria in the water, and water temperature control.

Here are some of the benefits of using a smart water fountain:

Convenience: You can monitor and control the fountain from anywhere in the world, using your smartphone app. This is especially helpful if you have a busy lifestyle or travel frequently.

Peace of mind: You can receive alerts when the water level is low or when it's time to change the filter. This way, you can be sure that your pet always has fresh, clean water available.

Health benefits: Staying hydrated is important for all animals, but it's especially important for cats. Cats are notoriously picky drinkers, so a smart water fountain can help to encourage them to drink more water. This can help to prevent kidney stones and other health problems.

If you are considering getting a smart water fountain, here are a few things to keep in mind:

Price: Smart water fountains can range in price from around $50 to $200. The price will vary depending on the features and size of the fountain.

Size: Choose a fountain that is the right size for your pet and your home. If you have a large dog, you will need a fountain with a large water capacity.

Features: Consider the features that are important to you. Some smart water fountains have more features than others, such as UV-C sterilization, water temperature control, and multiple flow rate settings.

Here are a few of the most popular smart water fountains on the market:

Catit PIXI Smart Water Fountain: This fountain has a variety of features, including multiple flow rate settings, a UV-C clarifier, and a smartphone app. It is also relatively affordable.

PetSafe Drinkwell Platinum Pet Water Fountain: This fountain is made from durable

stainless steel and has a large water capacity. It also has a built-in filter to remove impurities from the water.

Home Zone Smart Automatic Pet Fountain: This fountain is easy to use and has a sleek design. It also has a smartphone app that allows you to monitor the water level and receive alerts when it's time to refill the fountain.

If you are looking for a way to make it easier to keep your pet hydrated, a smart water fountain is a great option. With their convenience, peace of mind benefits, and health benefits, smart water fountains are a worthwhile investment for any pet owner.

PROJECT DEFINITION:

A smart water fountain is a water fountain that uses sensors and technology to monitor and manage its own performance. This can include features such as:

Water quality monitoring: Smart water fountains can use sensors to monitor the quality of the water, such as its turbidity, pH, and conductivity. This data can be used to alert users to any potential problems with the water quality.

Water usage monitoring: Smart water fountains can also track how much water is being used. This data can be used to identify areas where water conservation efforts can be implemented.

Leak detection: Smart water fountains can use sensors to detect leaks. This can help to prevent water waste and damage to property.

Automatic refill: Smart water fountains can be programmed to automatically refill when the water level drops below a certain threshold. This can help to ensure that there is always a fresh supply of water available.

In addition to these basic features, some smart water fountains also offer more advanced features such as:

Remote monitoring and control: Smart water fountains can be connected to the internet, which allows users to monitor and control the fountain remotely. This can be done through a web browser or a mobile app.

Data analytics: Some smart water fountains collect data on water usage and quality over time. This data can be analyzed to identify trends and patterns. This information can then be used to improve the efficiency and effectiveness of the water fountain.

Smart water fountains can be used in a variety of settings, such as schools, offices, hospitals, and public spaces. They can help to improve water quality, reduce water waste, and save money on water bills.

Project definition:

A project to develop a smart water fountain could involve the following tasks:

Define the requirements: What features should the smart water fountain have? Who will be the users of the fountain? What are their needs?

Design the system: How will the smart water fountain work? What sensors and other components will be needed?

Develop the software: The smart water fountain will need software to control its operation and collect and analyze data.

Build a prototype: Once the design and software are complete, a prototype of the smart water fountain can be built. This will allow for testing and debugging.

Test and refine: The prototype should be tested in a variety of conditions to ensure that it meets the requirements and is reliable. Any necessary refinements can be made.

Deploy the smart water fountain: Once the prototype has been tested and refined, it can be deployed in the real world.

This is just a basic overview of a project to develop a smart water fountain. The specific tasks involved will vary depending on the specific features of the fountain and the needs of the users.

DESIGN THINKING:

1.PROJECT OBJECTIVES:

The project objectives of smart water fountains vary depending on the specific needs of the community or organization implementing them. However, some common objectives include:

Reduce water consumption: Smart water fountains can be equipped with sensors that track water usage and can be programmed to dispense water in shorter bursts or to turn off when not in use. This can help to reduce overall water consumption, especially in areas where water resources are scarce.

Improve water quality: Smart water fountains can be equipped with UV filtration systems or other water treatment technologies to improve the quality of drinking water. This can help to reduce the risk of waterborne diseases and improve public health.

Provide real-time data: Smart water fountains can be equipped with sensors that collect data on water usage, water quality, and other factors. This data can be used to monitor the performance of the water fountain and to identify areas where improvements can be made.

Increase convenience and accessibility: Smart water fountains can be equipped with features such as touch-free sensors, contactless payment systems, and wheelchair accessibility. This can make it easier and more convenient for people to use water fountains, especially those with disabilities.

In addition to these general objectives, smart water fountains can also be used to achieve specific goals such as:

Promote sustainability: Smart water fountains can help to promote sustainability by reducing water consumption and improving water quality. This can help to conserve natural resources and reduce the environmental impact of the community or organization.

Improve public health: Smart water fountains can help to improve public health by providing access to clean, safe drinking water. This can help to reduce the risk of waterborne diseases and improve overall health outcomes.

Increase social cohesion: Smart water fountains can be used to create public spaces where people can gather and socialize. This can help to build stronger communities and improve the quality of life for residents.

Overall, the project objectives of smart water fountains are to improve the efficiency, sustainability, and

accessibility of public drinking water. By achieving these objectives, smart water fountains can help to create healthier, more sustainable, and more livable communities.

2.IoT SENSOR DESIGN :

IoT sensors play a critical role in smart water fountains projects. By collecting real-time data on water quality, quantity, and pressure, IoT sensors can help to identify and address water challenges more effectively.

When designing IoT sensors for smart water foundations, it is important to consider the following factors:

* Accuracy and reliability: The sensors must be able to collect accurate and reliable data in real time. This is essential for ensuring that the data can be used to make informed decisions about water management.

* Durability: The sensors must be durable enough to withstand the harsh conditions of the water environment. This includes factors such as temperature, humidity, and water pressure.
* Power efficiency: The sensors should be energy efficient so that they can operate for extended periods of time without requiring batteries or other power sources.
* Cost: The sensors should be cost-effective to deploy and maintain. This is important for making smart water technology accessible to a wide range of communities and organizations.

Here are some specific examples of IoT sensors that can be used in smart water fountains projects:

* Water quality sensors: These sensors can be used to monitor water quality parameters such as pH, turbidity, and dissolved oxygen levels.
* Water level sensors: These sensors can be used to track water levels in tanks and reservoirs.
* Water pressure sensors: These sensors can be used to measure water pressure in pipes and other infrastructure.
* Flow meters: These sensors can be used to measure the flow rate of water through pipes and other infrastructure.
* Leak detection sensors: These sensors can be used to detect leaks in pipes and other infrastructure.

IoT sensors can be used to collect data from a variety of locations, including water treatment plants, pumping stations, distribution networks, and customer taps. This data can be transmitted to a central cloud-based platform for analysis and visualization. This allows water managers to gain real-time insights into the water system and identify and address potential problems quickly and efficiently.
Smart water fountains projects that leverage IoT sensors can help to improve water quality, reduce water consumption, and extend the lifespan of water infrastructure. These projects can also play a vital role in helping communities and organizations to adapt to climate change and other challenges.
Here are some examples of how IoT sensors can be used in smart water fountains projects:
* To monitor water quality in real time and identify any potential problems early on. This can help to prevent waterborne illnesses and protect public health.
* To track water consumption patterns and identify areas where water can be conserved. This can help to reduce water costs and extend the lifespan of water resources.
* To detect leaks in water pipes and other infrastructure quickly and efficiently. This can help to minimize water loss and reduce repair costs.
* To monitor the condition of water infrastructure and identify any potential problems before they cause major outages. This can help to improve the reliability of the water system and reduce the risk of disruptions.
IoT sensors are a key component of smart water fountains projects. By collecting real-time data on water quality, quantity, and pressure, IoT sensors can help to improve water management and build a more sustainable water future.

3.REAL-TIME TRANSIT INFORMATION PLATFORM :

A real-time transit information platform of smart water fountains is a system that uses sensors and data analytics to track the status of water fountains in real time and provide this information to users via a mobile app or website. This system can be used to:
* Locate nearby water fountains: Users can see a map of all nearby water fountains, along with their distance and estimated time of arrival.
* Check the status of water fountains: Users can see whether a water fountain is working properly, if it is

clean, and if it has water.

* Report problems: Users can report problems with water fountains, such as a leak or a broken spigot.

This system can be beneficial for both users and water fountain operators. For users, it can help them to find water fountains quickly and easily, and to avoid water fountains that are not working or are not clean. For water fountain operators, it can help them to identify and fix problems quickly, and to ensure that their water fountains are always in good condition.

Here is an example of how a real-time transit information platform of smart water fountains could be used:

* A user is walking down the street and feels thirsty. They open their mobile app and see a map of all the water fountains nearby. They choose the water fountain that is closest to them and start walking towards it.

* As the user gets closer to the water fountain, the app updates them with the estimated time of arrival. The app also shows them that the water fountain is working properly and that it has water.

* When the user arrives at the water fountain, they find that it is clean and well-maintained. They fill up their water bottle and continue on their way.

If the water fountain were not working or was not clean, the user could report the problem using the app. This would allow the water fountain operator to fix the problem quickly and ensure that the water fountain is always in good condition.

Real-time transit information platforms of smart water fountains are still relatively new, but they have the potential to make a significant impact on the way that we use and maintain water fountains. By providing users with real-time information about the status of water fountains, these systems can help to ensure that everyone has access to clean and safe drinking water.

4.INTEGRATION APPROACH :

The integration approach of smart water fountains can be divided into three main components:

1. Data collection: Smart water fountains are equipped with sensors that collect data on the fountain's

status, such as water quality, temperature, and flow rate. This data is then transmitted to a central cloud

platform for analysis.

2. Data analysis: The cloud platform uses data analytics to identify patterns and trends in the water fountain data. This information can be used to monitor the performance of the water fountains, identify potential problems, and optimize their operation.

3. Real-time communication: The cloud platform can communicate with smart water fountains in real time to send commands and receive updates. This allows for remote monitoring and control of the water fountains, as well as the ability to provide real-time information to users.

The integration of smart water fountains can be achieved using a variety of different technologies. One common approach is to use IoT (Internet of Things) devices to collect data from the water fountains and transmit it to the cloud platform. IoT devices are small, low-power devices that can be connected to the internet and used to collect data from a variety of sensors.

Another approach to integrating smart water fountains is to use a SCADA (Supervisory Control and Data Acquisition) system. SCADA systems are typically used to monitor and control industrial processes, but they can also be used to monitor and control smart water fountains. SCADA systems provide a centralized platform for monitoring and controlling all of the water fountains in a network.

Once the smart water fountains are integrated, the data that they collect can be used to improve the operation and management of the water fountain network in a variety of ways. For example, the data can be used to:

* Monitor the water quality in real time and identify any potential problems early on.
* Identify water fountains that are underutilized or overutilized and adjust their operation accordingly.
* Schedule maintenance tasks for water fountains based on their usage and condition.
* Provide real-time information to users about the status of water fountains, such as whether they are working properly and if they have water.

The integration of smart water fountains is a relatively new technology, but it has the potential to make a significant impact on the way that we manage and use water fountains. By integrating smart water fountains, we can improve the efficiency and effectiveness of water fountain management, reduce costs, and provide users with better access to clean and safe drinking water.

Here are some specific examples of how smart water fountains can be integrated with other systems:

* Smart water fountains can be integrated with smart city platforms to provide real-time information

about the status of water fountains to residents and tourists.

* Smart water fountains can be integrated with building management systems to monitor and control water consumption in buildings.

* Smart water fountains can be integrated with public transportation systems to provide passengers with access to drinking water while they are traveling.

Overall, the integration of smart water fountains has the potential to make our cities and communities more sustainable and livable.