



## IOT PHASE 2 PROJECT



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# *Smart water management*

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## **Phase 2 : INOVATION**

### **SMART WATER METER**

#### **Introduction**

Smart water management refers to the use of technology and data-driven strategies to optimize the utilization, distribution, and conservation of water resources. This approach aims to address the growing challenges associated with water scarcity, population growth, and climate change.

A smart water meter is an advanced and technologically enhanced version of a traditional water meter used to measure water consumption in residential, commercial, and industrial settings. Smart water meters are designed to provide more accurate, real-time, and detailed information about water usage.

Increasing water consumption and wastage is leading to water scarcity. While a large population has no safe drinking water, some people use a lot of water on daily basis and waste it.

This project is of a smart water meter that measures our daily water usage and feeds live data on our phone that is connected to a database, which can be accessed by the concerned authorities through a web browser.

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## Components Required:

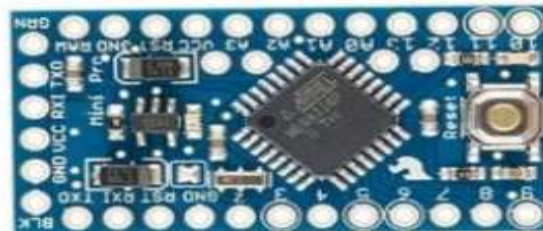
- Water flow sensor (FS400A is recommended):

The FS400A is a commonly used water flow sensor that can be integrated into various applications to measure the flow rate of water.



- Arduino Pro Mini:

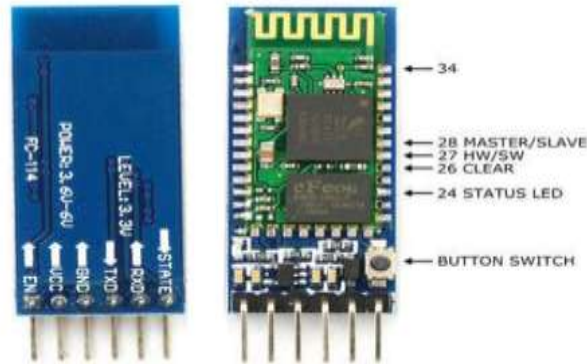
The Arduino Pro Mini is a compact and versatile microcontroller board based on the ATmega328P or ATmega168P microcontroller, which is the same microcontroller used in the popular Arduino Uno board. The Pro Mini is designed for embedded systems and projects where space and power consumption are critical considerations.



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- Bluetooth HC-05:

The HC-05 is a popular and affordable Bluetooth module used for wireless communication between electronic devices. It is commonly used in various DIY projects, robotics, and electronics applications to enable Bluetooth connectivity.

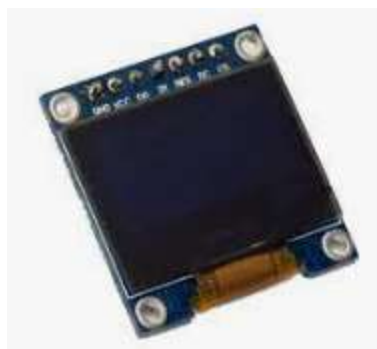


- Programmer (Arduino Uno/FTDI USB-UART adaptor):

If you want to program an Arduino Pro Mini, which doesn't have a built-in USB interface, you'll need an external USB-to-UART adapter, such as an FTDI USB-UART adaptor, to upload your Arduino sketches to the Pro Mini.

- OLED SSD1306:

The SSD1306 is a popular controller chip used in OLED (Organic Light-Emitting Diode) displays. These displays are known for their high contrast, wide viewing angles, and low power consumption. The SSD1306 controller is commonly used with small OLED screens in various electronic projects



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- Water pipe (size as per flow meter inlet diameter):

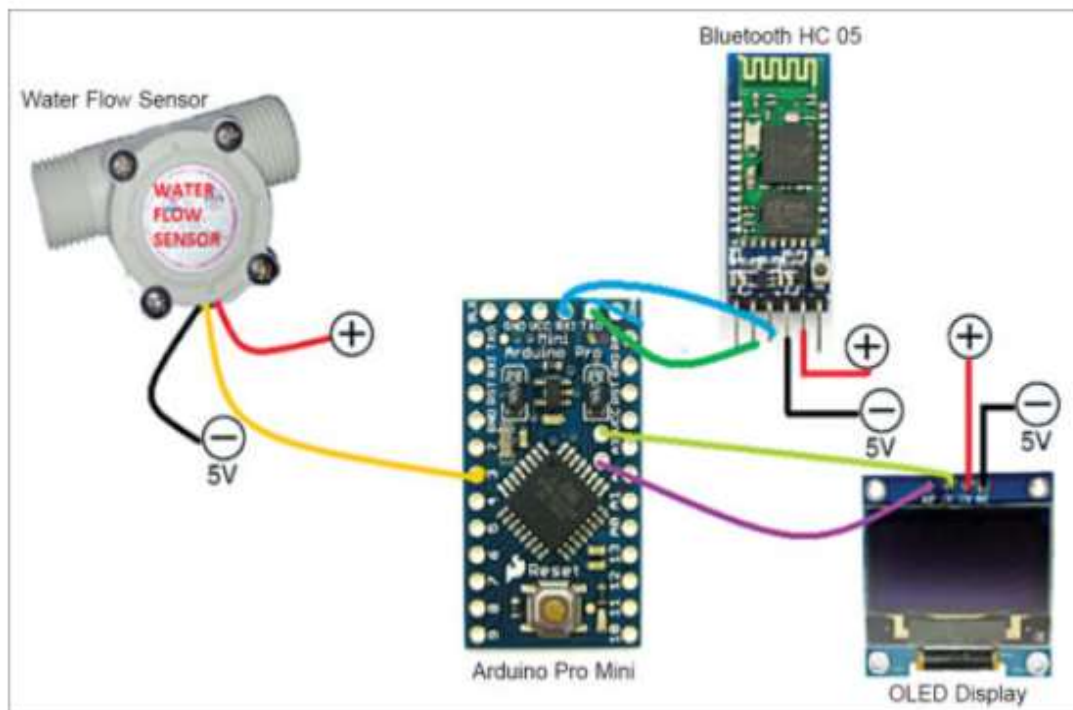
When selecting the size of a water pipe for a flow\_meter, it's important to choose a pipe size that is compatible with the flow meter's inlet diameter and the anticipated flow rates



## **STEPS:**

- **Step 1:** Download the flow meter library Unzip the Flow Meter-master folder and paste it in the libraries folder of Arduino IDE. After that, open multi in o file from the Flow Meter-master folder and save it as water meter. in.
- **Step 2: Coding :** create the interrupt handler for the sensor . set up the Bluetooth with baud rate at 9600. If this baud rate does not work, try default baud rate at 4800 Set the data output that will be sent to Bluetooth with Serial. print (data to send) function last, set OLED display with oled (data to send) function.
- **Step 3:Android app development:** Open MIT App Inventor, make a layout and add the components. go to MIT Code block and set the code. Save this code as smart meter. aia and generate its .apk file. This .apk file needs to be installed on your Android smartphone

## Connections:



**Connections Between  
Arduino Uno and Pro Mini Boards**

**Table 1**

Arduino Uno	Arduino Pro Mini
Rx	Rx1
Tx	Tx0
Gnd	Gnd
5V	Vcc
Reset	Reset

**Arduino Pro Mini Pins  
Connections With Components**

**Table 2**

Arduino Pro Mini pins	Components pins
5V	Vcc of Bluetooth
GND	GND of Bluetooth
RX1	TX of Bluetooth
TX0	RX of Bluetooth
Vcc	OLED Vcc
GND	OLED Vcc
A4(SDA)	OLED SDA
A5(SCL)	OLED SCL
Pin 3	Output pin of water flow sensor

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- Cross-check all the connections. If all the connections are correct, then power the Arduino with a 5V DC power supply.
  - Connect the water sensor pipe to the water tap or water inlet of your water tank. You can see the total volume of water and water flow rate on the OLED display. Next, install the smart meter.apk file on your Android device. Then, open smart \_meter app and press on the Bluetooth icon.
  - You will get a list of Bluetooth devices available near your Android phone. Select HC-05 from the list to pair it. The default code for pairing is 1234 (or could be 0000 or 1111).
  - After connecting/pairing it, you will get the water flow rate and water volume consumed in the app on your phone as shown in Fig. 13. If there is a display problem or the data is incorrect, disconnect Bluetooth and connect it again.
  - You can tap on the DB icon to upload your water usage data to the Web server so that it can be seen from anywhere through the Internet.
  - Note. Internet Wi-Fi connection needs to be turned on in order to upload the data to the server.
  - Now, to fetch the data; Then type your house tag name as home 1, which is already mentioned in the app. Click on Get Value button to get the details of water usage

We have made the wonderful solution that can help us control water wastage. You can add an extra flow sensor to pin 2 of Arduino for water wastage data from the sewer pipe outlet. It will work with the same code and app. So, use two sensors (one for water usage and another for waste water)

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## USES:

- Enhanced water consumption monitoring

Smart water meters provide users with not only detailed, but also highly accurate information regarding their daily water usage, consumption, as well as associated costs. What's more, users can also compare their stats across annual, monthly, or weekly periods and decide how they can make their properties more efficient.

- Higher water and energy savings

Knowing the details of your water consumption allows you to detect areas of improvement and actively work on reducing your daily water usage. Closely monitoring and investigating the main statistic of your water consumption helps clearly identify the vital areas where you need to cut back on use in order to reap the biggest savings.

- Lowered environmental impact

Finally, the reduction of daily water usage and the lowered time spent heating water for your property means you'll significantly reduce the carbon footprint of your home or business. This way, you'll ensure your property is a lot more environmentally friendly, causing less harm to our planet.



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THANK YOU

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