SUSTAINABLE WATER MANAGEMENT SYSTEM

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Abstract –

With growing scarcity of water and deteriorating quality, water resources management in India is becoming more challenging with the passage of time. WATER is a finite but widely present resource. It is a good solvent, which makes it highly vulnerable to pollution. This paper speaks about the water management system based on the RFID tags and the information to be spread to the water dealer and govt. officer. The water starts flowing at a prescribed quantity after the RFID tag is swiped at the RFID reader and if the quantity of water is zero the message will be sent to the govt. officer and water dealer so that the measures will be taken to fill the water supply tank again and govt. official verifies whether the water is filled by the dealer or not. Database. Beside this there are many methods of wireless communication but we selected in our project because as compared to other techniques, this is an efficient and cheap solution also, we are much familiar with FIREBASE technology and it is easily available.

2. Literature Survey

The researchers gathered information from different sources which give appropriate ideas or what parts to be used in every circuitry involved in this project. Android APP interfacing to NODEMCU using ANDROID STUDIO was the hardest part ever encountered during the development stage. From a step by step process, researchers started from writing simple code to more complex.

*Key Words***:** *RFID reader, Node MCU, Moisture sensor, Suction motor*

1. INTRODUCTION

Water management has been a major issue where water scarcity is increasing and everybody wants to take proper measures to prevent scarcity. In addition, there is need to automate water management so that the people can take the advantage of technological advancement. This project presents a model that will provide water management to a location, like colony , public body Implementation
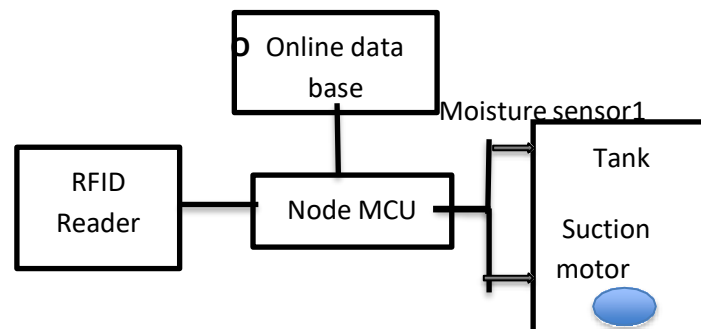
NODE MCU: Moisture sensor 2

etc via message using firebase database technology. behind this project is to meet the upcoming challenges of them Modern practical applications of wireless communication and to facilitate our successors with such splendid ideas that should clear their concept about wireless communication and control system.. There is a huge need in real life situations that require control of water management to adequately use the water. Basic Idea of our project is to provide Water levelling based smart management system even if the human is away from the water supplier. For this we adopted wireless mode of transmission using FIRE BASE Espress Smart Connectivity Platform (ESCP) is a set of

high performance, high integration wireless SOCs, designed for space and power constrained mobile platform designers. It provides unsurpassed ability to embed WiFi capabilities within other systems, or to function as a standalone application, with the lowest cost, and minimal space requirement.
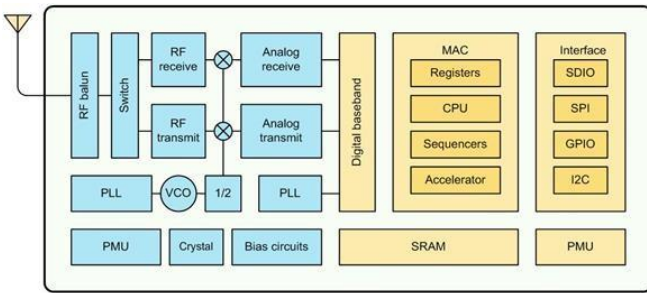
ESP8266EX Block DiagramRFID Reader and Tag

Radio-**F**requency **I**dentification (**RFID**) is the use of radio waves to read and capture information stored on a tag attached to an object. A tag can be read from up to several feet away and does not need to be within direct line-of-sight of the reader to be tracked. This is the advantage over Bar-code.A **RFID reader** is a device used to gather information from an RFID tag, which is used totrack individual objects. Radio waves are used to transferdata from the tag to a reader.

A **passive tag** is an RFID tag that does not contain a battery, the power is supplied by the reader. When radio waves from the reader are encountered by a passive rfid tag, the coiled antenna within the tag forms a magnetic field. The tag draws power from it, energizing the circuits in the tag.
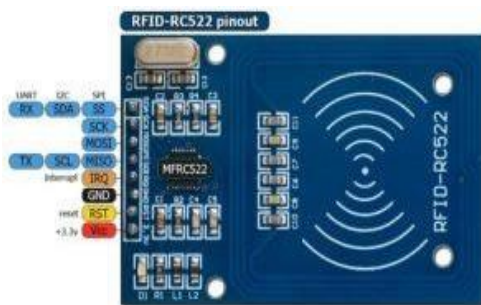

Fig. RFID Reader

Soil Moisture Sensor

This sensor measures the volumetric content of water inside the soil and gives us the moisture level as output. The sensor is equipped with both analog and digitaloutput, so it can be used in both analog and digital mode. In this article, we are going to interface the sensor in both modes. So let's begin our tutorial on interfacing Arduino and Soil moisture sensor.
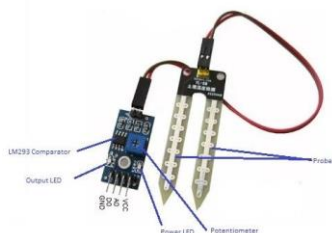
Fig. Moisture sensor

Water Pump

This is a low cost, small size Submersible Pump Motor which can be operated from a 3 ~ 6V power supply. It can take up to 120 liters per hour with very low current consumption of 220mA. Just connect tube pipe to the motor outlet, submerge it in water and power it. Make sure that the water level is always higher than

the motor. Dry run may damage the motor due to heating and it will also produce noise.

Fig. water pump

Table-1:Performance Specifications

Specification	Ranges
Node MCU	Integrated low power 32-bit MCU
RFID reader	Operating Current :13-26mA / DC3.3V

	Operating Frequency: 13.56MHz
Soil moisture	Input Voltage 3.3 − 5V Output Voltage 0 − 4.2V Input Current 35mA Output Signal Analog &digital
Water pump	Operating Voltage : 3 ~ 6V Operating Current : 130 ~ 220mA Driving Mode : DC, Magnetic Driving
Motor Driver	● Motor/logic supply 5 to 36V ● Capable of delivering output current up to 600mA per channel ● Pcb dimensions 36mm x 24mm

3. SOFTWARE DESCRIPTIONSOFTWARE USED

4. Step 5: Setup ESP8266 Support

FIREBASE DATABASE

Firebase is a mobile and web application development platform developed by Firebase, Inc. in 2011, then acquired by Google in 2014. As of October 2018, the Firebase platform has 18 products, which are used by 1.5million apps.

Android Studio

As Android devices become increasingly more common, demand for new apps will only increase. Android Studio is an easy to use (and free) development environment to learn on. It's best if one has a working knowledge of the Java programming language for this tutorial because it is the language used by Android. There won't be much code used in this tutorial, so I will assume that you know enough Java to understand or are willing to look up what you don't know. This will take roughly 30-60 minutes, depending on how quickly you are able to download andinstall Android studio.

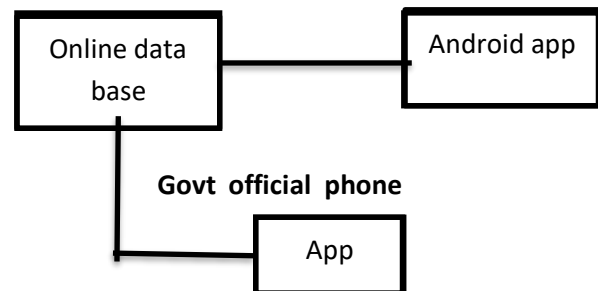Arduino Software SDK for NODE MCUFirebase Database

Android Studio

Arduino Software SDK for NODE MCU

The NodeMCU programming can be as easy as in Arduino, the main difference is the distribution of pins in the node MCU board. Following below operations and
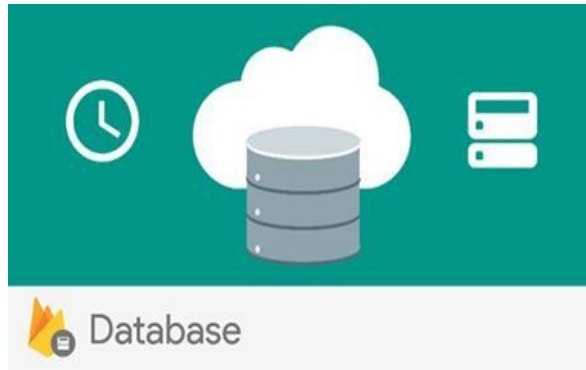
enjoy your first NodeMCU & Arduino IDE travel! Step 1: Connect Your Node MCU to the Computer

Receiver section:

```
┌──────────────┐          ┌──────────────┐
│ Online data  │──────────│  Android app │
│     base     │          │              │
└──────────────┘          └──────────────┘
        │
   **Govt official phone**
        │
   ┌──────────┐
   │   App    │
   └──────────┘
```

5. Power Consumption

The following current

Contractor phone

consumption is based on 3.3V

Step 2: Install the COM/Serial Port Driver

Step 3: Install the Arduino IDE 1.6.4 or GreaterStep 4: Install the ESP8266 Board Package

supply, and 25°C ambient, using internal regulators. Measurements are done at antenna port without SAW filter. All the

transmitter's measurements are based on 90% duty cycle, continuous transmit mode.

6. L298N motor driver moduleDouble H driver module uses ST L298N dual full-bridge driver, an integrated monolithic

circuit in a 15- lead Multi watt and PowerSO20 packages. It is a high voltage, high current dual full-bridge driver designed to accept standard TTL logic levels and drive inductive loads such as relays, solenoids, DC and stepping motors. Two enable inputs are provided to enable or disable the device independently of the input signals. The emitters of the lower transistors of each bridge are connected together and the corresponding external terminal can be used for the connection of an external sensing resistor. An additional supply input is provided so that the logic works at a lower voltage. The Motor Driver is a module for motors that allows you to control the working speed and direction of two motors simultaneously .This Motor Driver is designed and developed based on L298N IC. L298N is a 16 Pin Motor Driver IC. This is designed to provide bidirectional drive currents at voltages from 5 Vto 36 V.
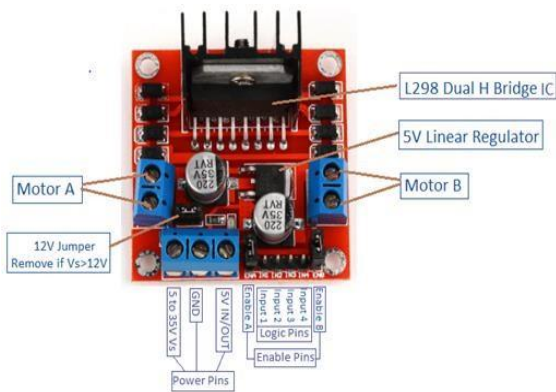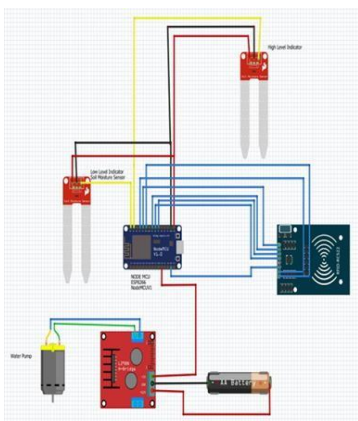

Figure: Connection diagram

The L298N is a 16 pin IC, with eight pins, on each side, to controlling of two DC motor simultaneously. There are 4 INPUT pins, 4 OUTPUT pins and 2 ENABLE pin for each motor.

7. Circuit diagram

Algorithm

Step 1: start the system

Step 2: check whether water is available or not

- If available RFID TAG can be used
- If not message is sent to the supplier and govt.officer

Step 3: Repeated tag checker

- If repeated water will not be sent
- Else the water is sent through pump for aspecified time

- If water completes message will be sentStep 4: Stop the machine after use

8. Applications

Major Fields of ESP8266EX applications to Internet-of-Things include:

- Home Appliances

- Home Automation

- Smart Plug and lights

- Mesh Network

- Industrial Wireless Control

- Baby Monitors

- IP Cameras

- Sensor Networks

- Wearable Electronics

- WiFi Location-aware Devices

- Security ID Tags

- WiFi Position System Beacons

CONCLUSION

Water Management is important since it helps determine future Irrigation expectations. Water management is the management of water resources under set policies and regulations. Water, once an abundant natural resource, is becoming a more valuable commodity due to droughts and overuse. Here are links to articles that address water management subjects such as the optimization of water usage. Water resource

anagement is the activity of planning, developing, distributing and managing the optimum use of water resources. It is a sub-set of water cycle management. Ideally, water resource management planning has regard to all the competing demands for water and seeks to allocate water on an equitable basis to satisfy all uses and demands. As with other resource management, this is rarely possible in practice.

Water is an essential resource for all life on the planet. Of the water resources on Earth only three percent of it is fresh and two-thirds of the freshwater is locked up in ice caps and glaciers. Of the remaining one percent, a fifth is in remote, inaccessible areas and much seasonal rainfall in monsoonal deluges and floods cannot easily be used. At present only about 0.08 percent of all the world's fresh water is exploited by mankind in ever increasing demand for sanitation, drinking, manufacturing, leisure and agriculture.

FUTURE SCOPE

- The NODE MCU based smart water management system has been designed and tested with the Internet Network. The user can be effortless in looking the system after since it is automated by the message sending system through the FIREBASE database.
- During upcoming scenarios the water management must be more flexible so that the scarcity of water has to be

reduced by adequately utilizing the water. One of the implementations to be made is by measuring the level of water and detailing it so that more information is obtained about water quantity.

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