A

Project Report

On

"Automatic Water Supply Distribution and Monitoring in Locality using IoT"

Submitted in partial fulfillment for the award of degree of

Bachelor of Technology

in

Department of Electronics & Communication Engineering

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Project Guide

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CHAPTER 1

INTRODUCTION

1. INTRODUCTION OF PROJECT

1.1 Project title:

Automatic Water supply distribution and monitoring in locality using IOT

Guide Name: Mr. Pallav Rawal

1.2 What will be the end product?

It would have two systems physically independent of each other but communicating through the internet via cloud service.

System 1 - It would be a system packaged in a box having connectors for power supply (battery), providing users to enter the operational time details through a 4x4 keypad with an 16x2 lcd display facilitating interactive behaviour.

System 2 - A system packaged in a box having connectors for power supply(battery), Gears will be attached to the valve which is to be driven, a DC motor to drive gear.

Thus, This project"Automatic Water Supply Distribution and Monitoring in a Locality using IOT", will be used as an exceptional setup that will reduce human efforts and human errors by automation. This automatic water supply system will focus on the scheduled functioning and will minimise water wastage at the time of distribution in colonies.

1.3 Target specifications of the end product:

Mechanical specifications of the end product:

System 1- It is a setup with physical dimensions of 20 cm x 12 cm x 8cm with the microcontroller interfaced and connected with a Keypad, LCD and a Battery

System 2- It is a setup with physical dimensions of 3 ft x 1 ft x 2 ft (including valve dimension) the output received from the gearbox is torque - 30 Nm and the speed of gear at valve spindle is 8 RPM whereas the input to gearbox provided by the dc motor is 4 Nm and 60 RPM, in this setup we have used the Sluice valve (non-rising spindle gate valve) with a valve size of 4 inches.

Electronic specifications of the end product:

System 1- When it comes to electronic specification, we have used Arduino(ATMEGA328p) and NodeMCU(ESP8266), a battery of 9 V and 1 A, the current sensor of 1 A, the whole system is operated on 5 V (system 1) with NodeMCU(ESP8266) for the transfer of data from system 1 to system 2 and also to store the data on the cloud.

System 2- When it comes to electronic specification of system 2, we have used Arduino (ATMEGA328p),a battery of 12 V, DC motor 12 V, 25 W, 60 RPM.The data is uploaded on the server using Wi-Fi.

Table 1. Material Specifications:

S.No	Product	Min. Value	Max. Value
1	Arduino	-	5 V
2	Node MCU(ESP8266)	-	5 V
3	Keypad	-	5 V
4	LCD(16*2)	-	5 V
5	Current Sensor	-	5 V
6	DC Motor	4 Watt	25 Watt
7	Motor Driver	4 Watt	30 Watt

1.4 Objective of the project:

- Encourage the student to understand how to use technical knowledge and methods to provide innovative solutions and hence better services to customers.
- To provide the knowledge of designing the interfacing circuits, integrating sensors, Micro controller, actuators and IOT to successfully establish the tasks.
- To provide the knowledge about operation and principle behind Battery management Systems.
- To provide the knowledge of integration of electronics with mechanical systems.
- To provide knowledge of testing and troubleshooting methodologies for electronics interfacing circuits and physical arrangement.
- To provide the knowledge of software implementation(programming Embedded Systems).
- To learn time and hence project management and scheduling for timely operation and completion.
- Know the importance of simulators and learn various simulation environments.

1.5 What will the student learn from the project?

- Concept of power transmission using different mechanical arrangements like gear, belt-pulley, chain sprocket etc.
- Operating concept of Battery management Systems via battery monitoring using current sensor.
- Concepts of Arduino, NodeMCU - (ESP8266) and IOT, DC Motor, Current Sensor, lcd, keypad interfacing.
- Simulation and designing of embedded system circuits using softwares like Diptrace and Proteus and Circuit testing and debugging.
- The major core values that students will learn will be:
  -Working as a team member.
  -Project Management
  -Team Management.

Table 2. Team details:

S.NO	NAME	Phone Number	E-Mail
1(S1)	Anshul Kothari	9667551414	kotharianshul1998@gmail.com
2(S2)	Aditi Sharma	7340066438	adisha.sharma7@gmail.com
3(S3)	Anmol Bajaj	9929839111	anmolbajaj003@gmailm.com

1.6 Literature and Market Survey:

1.6.1 Market Survey and Site Visit:

- We went for our site visit to New Light Colony, Bajaj Nagar, Jaipur, Rajasthan.
- A water utility company-Overhead water tank.
- We learned the basic structure of an Overhead Water Tank:
- Water Supply Quantity Measurement = Average Per person Demand*Population
- There are many factors affecting the per capita demand like Size of the city, Presence of industries, Climatic Conditions, Pressure in distribution system, Cost of water, etc.
- Capacity of water tank-250000 lts.
- Height of water tank-12 m.

Hence, as a result to avoid these problems we have introduced "Automatic water supply distribution and monitoring in a locality using IOT"

Consumption	Normal Range (lit/capacity/day)	Average (lit/capacity/day)	%
Domestic	65-300	160	35
Industrial	45-450	135	30
Fire Demands	20-90	45	10
Waste	45-150	62	25

Figure 1- Statistics of water supply in various sectors.

CHAPTER 2

PROJECT DESCRIPTION

2.1 Brief description of the project:

2.2 Motivation for taking up this project:–

This project will be a Smart City Initiative as this project will be a step forward towards digital India and making water supply chain automatic. It will be used as an exceptional setup that will reduce human efforts and human errors by automation, this automatic water supply system will focus on the functioning schedule and will minimise water wastage at the time of distribution in colonies. This project will also help in the reduction of panic related to the timings of water and duration of it.

2.3 Industry state of the art and needs: –

As per my knowledge, water supply distribution in locality and farms are manual. In this project we will try to replace manual operation by scheduled operation using Microcontroller and IoT; and store all the data on server cloud.

2.4 Innovative elements of the proposed project :–

We have incorporated IoT in this so as to make it more efficient, fast and so as to save our data on the cloud for referral purposes.

Resources required?

- → Are these available in the college? No
- → If no, then how will the project be completed?
- → The components will be purchased from the market.
- → Various components include
- ➢ Power supply circuit components
- ➢ Arduino Uno
- ➢ Current sensor
- ➢ NodeMCU(ESP8266)
- ➢ Keypad
- ➢ LCD
- ➢ DC Motor
- ➢ Spur Gears
- ➢ Sluice Valve
- ➢ Packaging

2.5 METHODOLOGY:

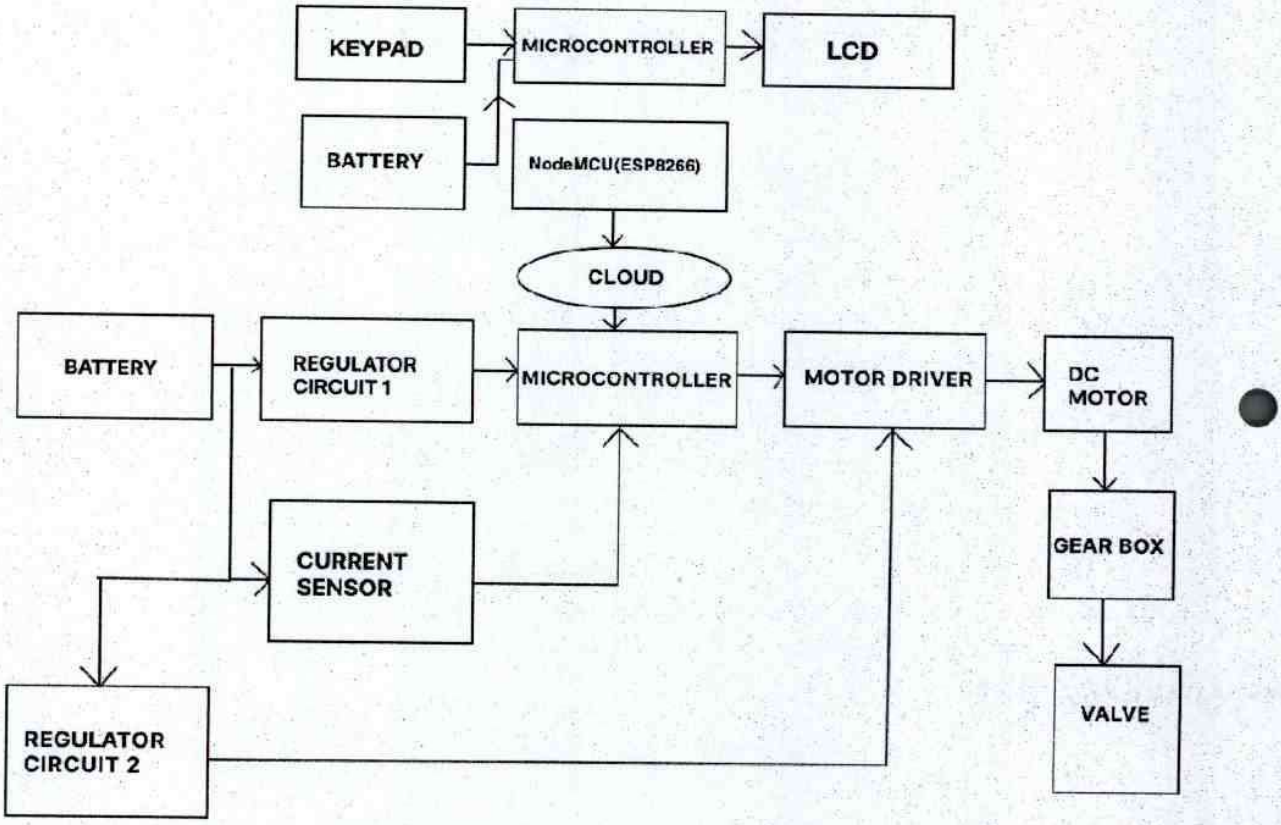

Figure 2: Overall System Block Diagram

To make any project first of all an idea is thought about how to proceed step-by-step in the making of a working system. When the idea has been completely ventured, we begin with the market survey of all the components that are required, hence similarly in this product for mechanical arrangement we calculate the torque that our system requires at the valve end and compared and converter it from the one received by dc motor(one with specifications easily available in market) at input. We assembled other components and designed a gearbox as well so that the required torque for rotating the system was produced. After the sufficient torque was produced using the gearbox, we calculated the actual dimension of the product. On the other hand, for the electronic arrangement we started by interfacing the components with microprocessors like ATMEGA328p and NodeMCU(ESP8266). A proper code was written for interfacing first individually and then the whole system as per the block diagrams. Then, the circuit design and code was simulated on the softwares like Diptrace and Proteus. After the complete testing and simulation of the design all the components were arranged and set up properly so that there is no wear-and-tear of the components and system.

BILL OF MATERIALS

Table 6: Bill of materials

COMPONENTS	QUANTITY	COST
ARDUINO UNO	2	450/-(PER)
LCD	1	90
KEYPAD	1	150
NODEMCU(ESP32 866)	2	600
CURRENT SENSOR	1	145
GEARBOX	1	2200
SLUICE VALVE	1	1000
BATTERY	3	50
MECHANICAL SETUP	-	500