PROJECT PROPOSAL ON

"Water level Detector and Automatic Irrigation Tools"

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Course No: CSE 3104

Course Title: Peripherals and Interfacing Laboratory

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Objectives:

- To automatically turn on the motor when tank water is low and turn off the motor when the water level is high.
- To automatically start the irrigation when the moisture level is low and stop at a certain moisture level of the ground.
- To show the current water level in a display
- To help farmers to irrigate their lands automatically
- To reduce waste of water
- To ensure that plants are absorbing proper amount of water necessary for their growth.

Problem Statement:

- When using a standard motor, water may get wasted by unawareness.
- When farmers irrigate plants manually, plants may not be watered properly or get excess amount of water.

Significance of Project:

- To prevent and minimize the wastage of water.
- To improve irrigation of plant.

Scope of Project:

- A farmer who is getting trouble during irrigation.
- People who store water in water tank using motor.

Introduction:

Water is a vital element of our nature. We use it almost everywhere in our life. Unfortunately, a lot of water is wasted while using. For this reason, the surface water level is going down day by day. In the context of Bangladesh, the majority of water is wasted in two fields.

1. In Agricultural Sector
2. While filling up the water reserve tank.

In the agricultural sector in Bangladesh water is vastly misused. Rice is the staple food, and Paddy is our most cultivated crop. Farmers are using 3300 liters of water for cultivating 1kilogram of Paddy whereas only 2500 liters is enough to cultivate the same amount. So **about 800 liters of water is wasted for cultivating just 1kilogram of Paddy!** In Bangladesh, Farmers produce **19.5 million metric tons** of rice a year – which means billions of litres of water are wasted every year. According to a survey conducted by the BADC recently, farmers are using 75% of groundwater while 25% from surface.

Almost every house in Bangladesh has a water tank. We use a motor pump to pump the water from the surface and store them in the tank. In the current context, the process is manual. If the water tank is empty, one person has to switch on the motor and has to wait for the tank to fill up which is a very disturbing process. Not only this, but most often people forget to switch off the motor after the tank is filled up. As a result, the precious groundwater overflows and we lose the water.

In this project, we planned to make this irrigation process and tank filling process automated, which will not only lessen the burden on people but also will save a lot of water from being wasted. Included in this proposal are our methods for making the system automated.

Components:

Serial No	Components	Ratings
	Arduino Uno R3	The operating voltage is 5V The recommended input voltage will range from 7v to 12V The input voltage ranges from 6v to 20V Digital input/output pins are 14 Analog input pins are 6 DC Current for each input/output pin is 40 mA DC Current for 3.3V Pin is 50 mA Flash Memory is 32 KB SRAM is 2 KB EEPROM is 1 KB CLK Speed is 16 MHz
	Soil Moisture Sensor	Model Number: REES52 Output Voltage:5 V Signal Output Temperature :Room Temperature Supply Current:5 V
	HC-SR04 Ultrasonic	Power Supply :+5V DC Quiescent Current : <2mA Working Current: 15mA Effectual Angle: <15° Ranging Distance : 2cm – 400 cm/1″ – 13ft Resolution : 0.3 cm Measuring Angle: 30 degree Trigger Input Pulse width: 10uS Dimension: 45mm x 20mm x 15mm
	Motor Driver	Driver Model :L298N 2A Driver Chip : Double H Bridge L298N Supply Voltage(maximum): 46V Supply Current(maximum): 2A Driver Voltage : 5-35V Driver Current : 2A Logical Current:0-36mA Maximum Power:25W
	LED	1.2 to 3.6 volts with a forward current rating of about 10 to 30 mA

	Battery	Nominal Voltage: 9 Volts Capacity(Lithium Ion): 1200 mAh
	Connecting Wired	
	Breadboard	

Project Description:

In this project, we are going to use Arduino Uno as our microcontroller, a sonar to detect the water level of the tank and a moisture sensor to detect the moisture of the field. Two servo motors would be used in this project. One for the tank and the other for the irrigation.

For the first task of automated irrigation, the moister sensor is inserted into the ground The Arduino reads the readings of the sensor and if the moisture is low, it turns on the motor and irrigation starts. When the field has enough water (detected by sensor again) the motor stops and irrigation ends.

For the second part, we are going to use a sonar sensor, Arduino and a motor. The height of the water is counted through sonar and we calculate the remaining water in the tank. If the water level is low, the motor would start and the water level increases again. After a certain level of water(measured by sonar), the motor stops and there is no waste of water!

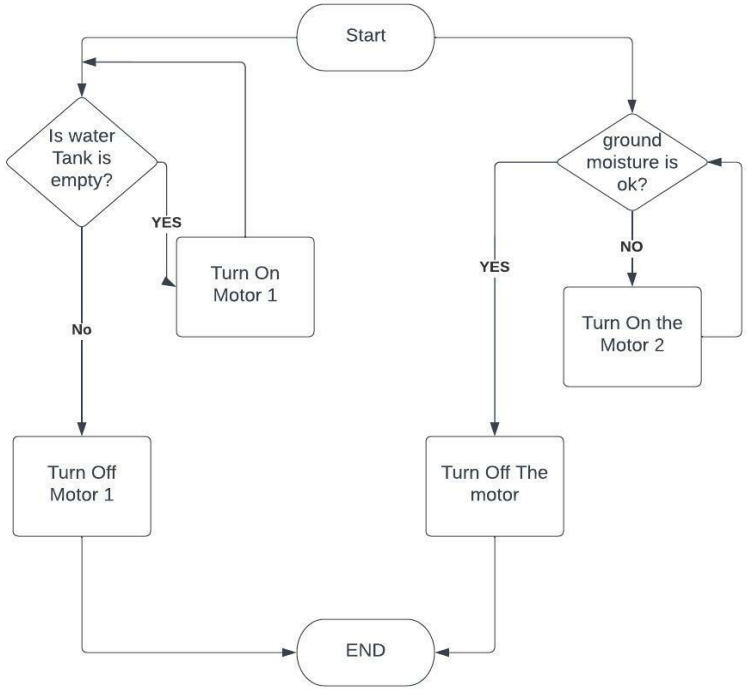

Fig 1.1: Flow chart of Project

Circuit Diagram:

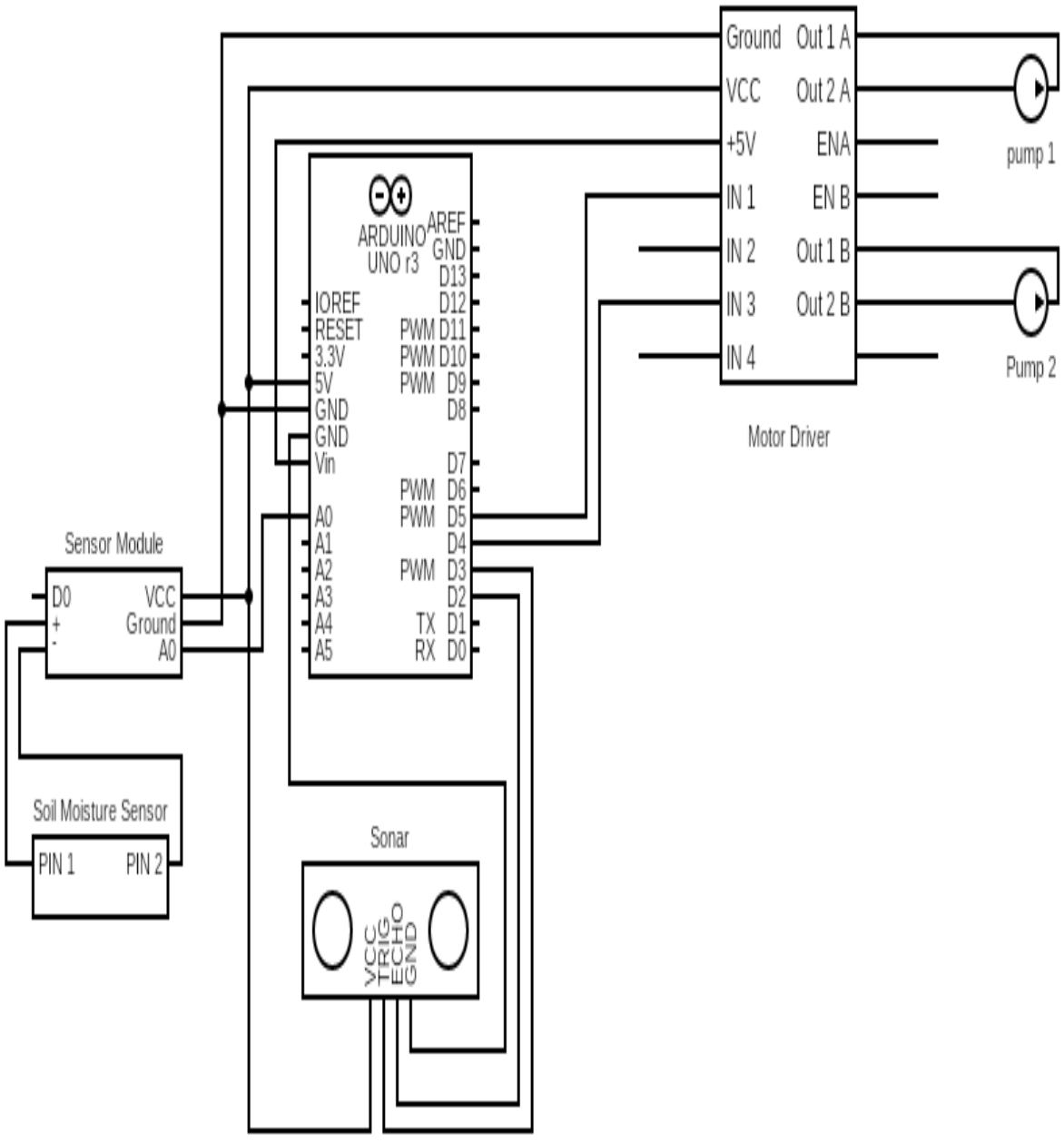

Fig 1.2: Circuit diagram of Project

Source code:

```
#define tp 2
#define ep 3

int duration;
int distance;

void setup() {
  Serial.begin(9600);

  pinMode(2,OUTPUT);
  pinMode(3,INPUT);
  pinMode(4,OUTPUT);
  pinMode(5,OUTPUT);
}

void loop() {
  int sensorValue;
  digitalWrite(tp,LOW);
  delayMicroseconds(5);
  digitalWrite(tp,HIGH);
  delayMicroseconds(10);
  duration = pulseIn(ep,HIGH);
  distance = 0.017*duration;
  Serial.println(distance);
  if(distance>4)
  {
     digitalWrite(4, HIGH);
  }
  else
  {
    digitalWrite(4, LOW);
  }
  sensorValue = analogRead(A0);
  Serial.println("Analog Value : ");
  Serial.println(sensorValue);
  if(sensorValue<123)
  {
    digitalWrite(5,LOW);
  }
  if(sensorValue>170)
  {
    digitalWrite(5,HIGH);
  }
  delay(500);
}
```

Total Cost:

Sl No	Components	Price (Taka)
	Arduino Uno R3	1100
	Soil Moisture Sensor	100
	HC-SR04 Ultrasonic	90
	Motor Driver	170
	Total Cost	1460

Cost Analysis:

If we analyze the cost to make the project it is only 1460 taka which may seem a little high for the people of rural area but it saves a huge energy and water. The more we save electrical energy and water the more it saves our money. So in the long run this project will give the user an immense benefit.

Discussion:

We have created an automated system that can help the framers to irrigate their land properly and reducing waste of water. The water level detector subsystem's function is to detect the level of water and turn on and off pump automatically to fill up the tank. It can prevent the wastage of water. The automatic irrigation subsystem's function is to irrigate the land automatically using the condition of the moisture of soil. It will make sure that plants are getting watered properly. We have kept soil moisture sensor for detection of moisture level of soil and sonar sensor to detect the current level of water.

Conclusion:

Ground water is a very important resource for us. Almost all the fresh water of Bangladesh comes from ground water. We have seen already some cities like Dhaka and its surrounding are facing problem while fetching water from underground. This is high time for us to be cautious about the usage of water. The device made by us is solving a major problem of water waste in irrigation and in household works. It also makes people free from the burden of manual switching of motors. So, people would be flexible to use it.

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