WATER LEVEL MONITORING SYSTEM

Technology has advanced to the point that it can assist people in their daily lives. Human beings may benefit from this development in a variety of ways. This system is one that monitors the level of water in storage tanks, may monitor progress in levels of river water as well as notify the necessary parties wirelessly on their phones.

GITHUB LINK

The following are the GitHub repositories of both the water level monitoring system and wireless contactless switch:
https://github.com/Ci-Daniels/water-level-monitoring-system

OBJECTIVE

The objective of this project is to develop an automated system for monitoring the level of water in an underground tank with push notification features using the Telegram Bot API. Internet of Things (IoT) will be implemented in this project by using NodeMCU as a microcontroller to connect the level sensor or an ultrasonic sensor to the Internet. An ultrasonic sensor/level sensor is used to read the water level.

- Check the level of water in tanks or rivers.
- Notify and alert the necessary parties in case the water is too low or when there is an overflow.

TESTING

The tests to be done include testing for the accuracy of the ultrasonic sensor and the water level sensor, and the performance of the internet connection using an integrated Wi-Fi module in the NodeMCU microcontroller.

EXPECTATION

The system tests should show that the system performs perfectly with the requirement needed to send the real-time status of the water level, and an alert to the user using the Telegram Bot API.

SCALABILITY

This research can help to:

- Notify us in real-time when the level of water in our underground tanks is very low and needs refilling.
- Notify us in real-time when there is an overflow of water in the tank and the pump needs to be closed.
- In other situations, it can be improved to be a river monitoring system that monitors the river water in real-time status and notifies the necessary authorities in case the river is about to overflow and as such reduce the aftermath of river flooding.

PROJECT PLAN

DATE	ACTIVITY
21/2/2022	Generate code
22/2/2022	Write documentation
23/2/2022	Assemble /Test/Simulate the system
24/2/2022	● Do the schematics and PCB design ● Design the casing
25/2/2022	● Retest the system ● Upload the documents and media to GitHub ● Design the casing

BIL OF MATERIALS

Hardware

-Water level sensor module

-ESP8266 node MCU

-220 ohm and 10Kohm resistors

-5 LED’s

-Buzzer

-Relay

Software

-Arduino IDE

-Telegram Bot

WORKING PRINCIPLE

The working principle of the water level system is as follows:

- ★ The water level sensor will measure the threshold level and the minimum level of water in the tank.
- ★ The level of water is divided into 2 levels that are greater than 500cm when full and less than or equal to 350 cm for minimal water.
- ★ The buzzer will turn on when the water level in the tank is minimal.
- ★ The ESP will send a notification to the telegram bot set up in the phone remotely that the tank is full/almost empty and the pump is to be switched off or on respectively. One can also send a message from the bot to ask the system about the status of the water level in the tank.
- ★ When the water is at LESS THAN 350 cm, to mean the minimum level of water has been reached in the tank, the buzzer will go ON.

ADVANTAGES

1. Money Saver

A water level system helps save money by limiting the waste of water and electricity. These devices accurately regulate how much energy is used to protect against any unnecessary water/electricity usage. Over time, the money saved is quite substantial.

2. Automatic

Another notable advantage of this device is that they regulate on their own. By eliminating manual operations with a timer switch, the frustrations of manual monitoring water tanks are minimized. Water levels are maintained at the appropriate levels thanks to the automatic operations of these devices.

3. Efficient

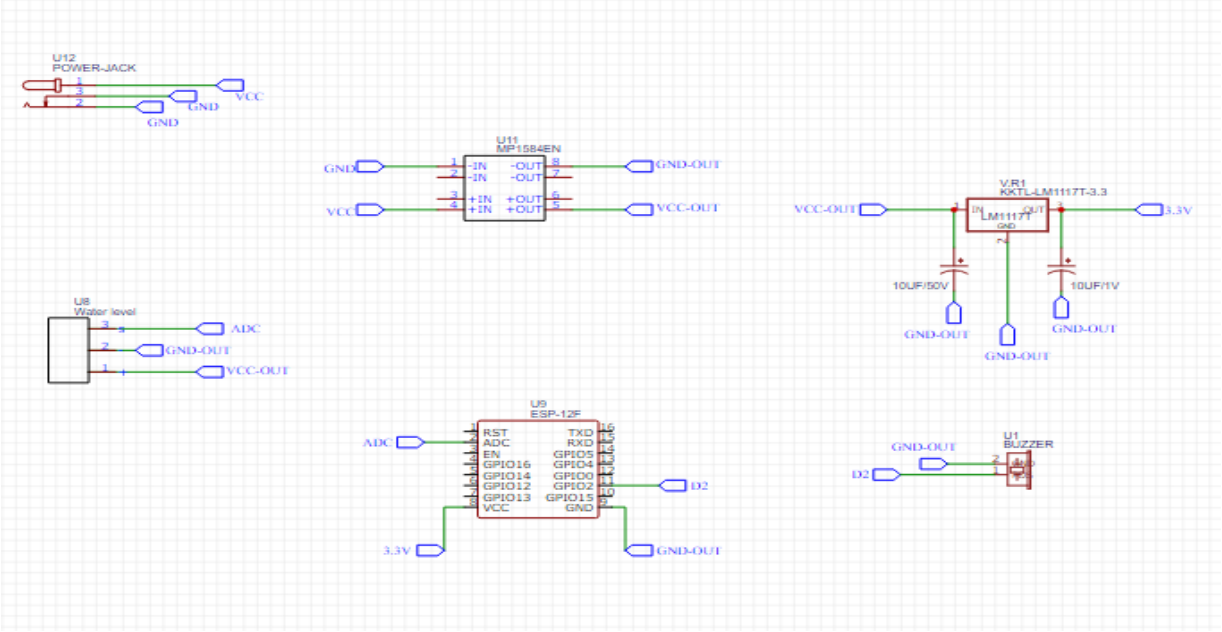
One can monitor the water levels in their tanks remotely without having to go check every single time whether the system is working or not. This is a very efficient way since the system will notify you from wherever how much water is remaining in the tank, if there is an overflow, you will be able to turn off the pump; while in the case of low levels of water, you are notified to turn on the pump or contact your water supplier to come and refill your tanks.

DISADVANTAGES

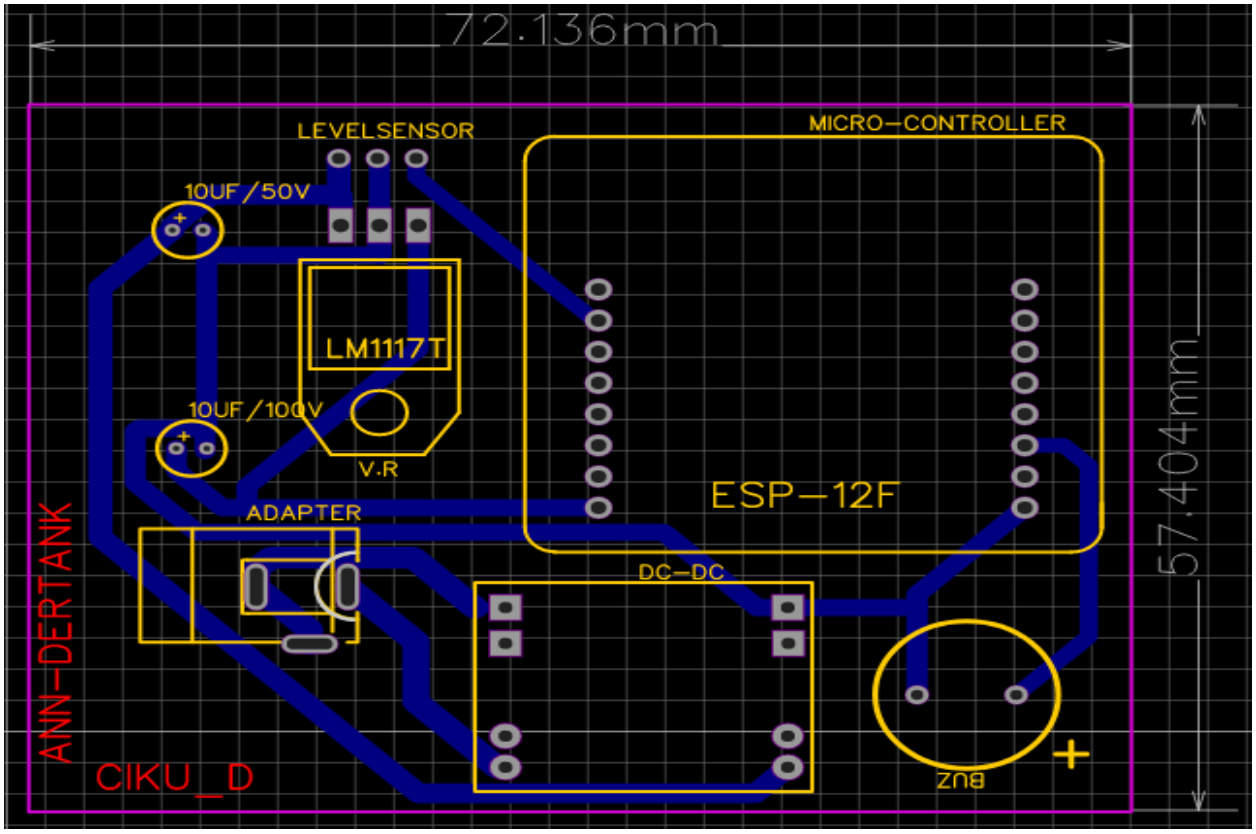
1. Closed-mindedness; People are yet to adapt to the industry 4.0 revolution of home automation and automated system.
2. Maintenance of the system can be quite a task.
3. The security of the system could be at a risk, especially from hackers and/or physical theft.

SCHEMATICS AND PCB DESIGN

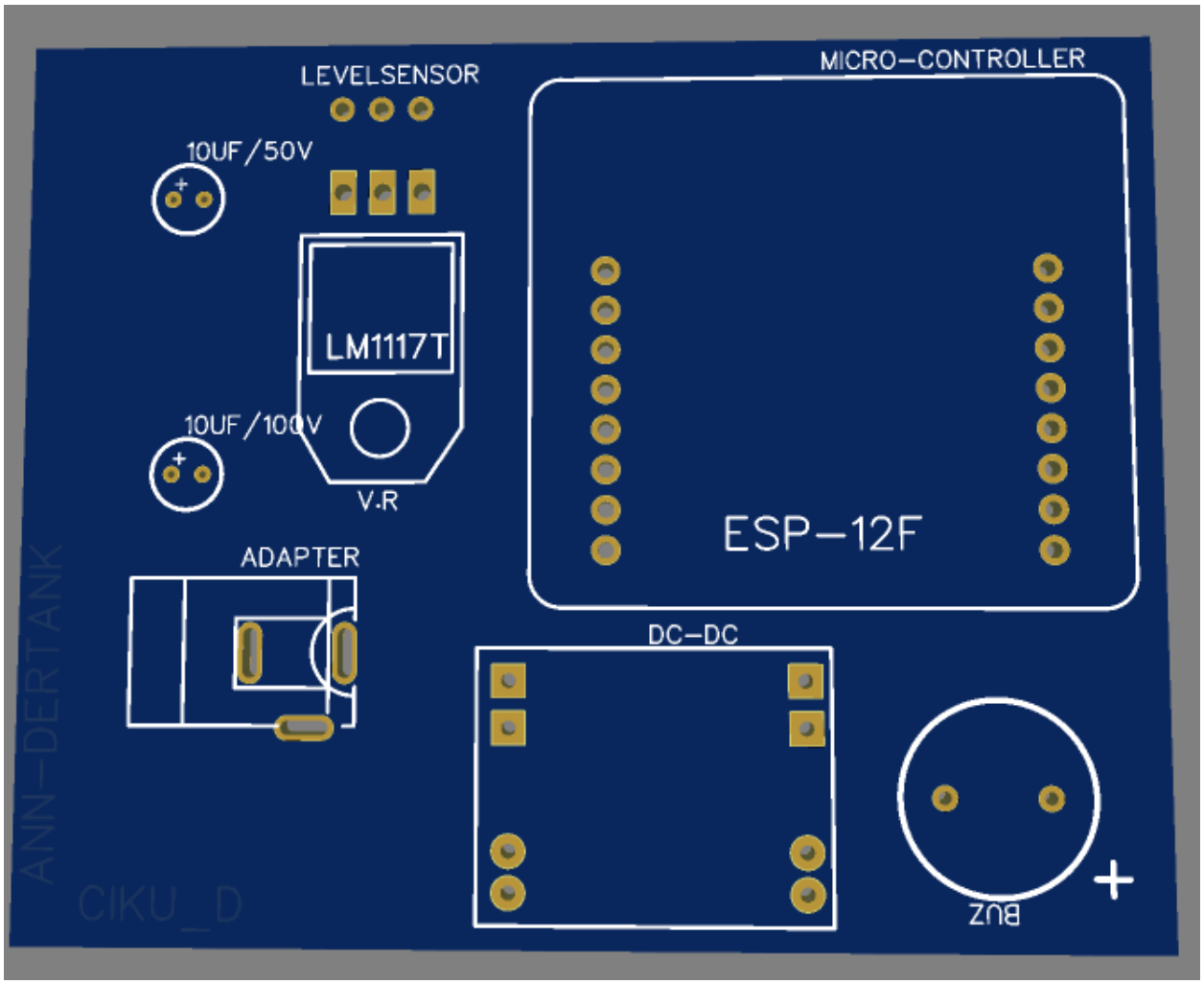
SCHEMATICS DESIGN



PCB DESIGN



3-D PCB DESIGN



CONCLUSION

The water level monitoring system scopes the problem of having to always go to your underground water tank to check whether there is enough water. It could also solve the problem of over flooding of river banks in some areas. It could also address the problem of overflow in tanks. The system checks the level of water and remotely alerts or notifies the owners in real-time. It uses the basics of IoT to do real-time communication remotely.

This system has addressed its main objective,which was to notify the owner when there are minimal levels of water in the tank wirelessly,without the need of going to the tank physically.