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.

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.

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
25/2/2022	Make the PCB
26/2/2022	- Retest the system - Upload the documents and media to github - Design the casing - Present

DOCUMENTATION

INTRODUCTION

 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.

OBJECTIVE

- 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.

BILL OF MATERIALS

-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 5 levels that is greater than 500cm when full and 0 cm for no water.

★ The led's will turn on when each level is reached.

- ★ When the water is at greater than 500, to mean the threshold capacity has been reached in the tank, all the LED will turn off and the buzzer will go ON.
- ★ The ESP will send a notification to the telegram bot set up in the phone remotely that the tank is full and the pump is to be switched off. 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 LED's will turn on and the buzzer will go OFF.
- ★ The ESP will send a notification to the telegram bot set up in the phone remotely that the tank is almost empty and the pump is to be switched on. One can also send a notification message from the bot to check the status of the water level in the tank remotely..

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.
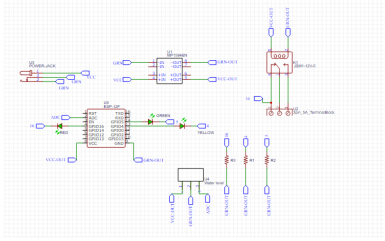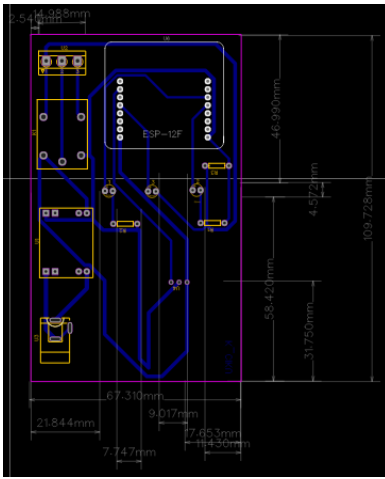
SUMMARY

ACTIVITY	DETAILED REVIEW	COMMENTS
Wireless Lighting system	-I familiarised myself with the ESP8266 node MCU module. With this, I used it to create a wirelessly controlled lighting system. I interfaced my system with the Telegram bot as the communication channel between the system and the lights. -I also updated my portfolio using HTML and CSS.	-No problems were encountered in this system.

Contactless wirelessly controlled switch	-Using the basic idea and knowledge of Telegram bot and node MCU, I transformed my first system to be fully IoT.	-The wireless system was an improvement of the first prototype.
	-The idea was to make the system fully IOT and with the telegram bot and esp in place, it was easy to control the lights in the house automatically just by the touch of a button.	
	The bot allowed you to send the command to the esp and through it allow you to turn the lights ON and OFF. Or even just light a specific build on while the rest remained off.	
	-In it, I integrated an IR sensor that allowed you, in case of power loss, to still operate the lights contactless through proximity.	
	-An LDR that adjusted the brightness of the lights based	

	on how the room was lit.	
Fusion 360	-I engaged with Fusion 360 and did a few designs on the same. -Uploaded the schematics and documentation of the systems I had been working on in GITHUB.	-It was quite tasking but with the help of a few tutorials online I got the gist.
Presentations	I did a presentation on the fully scaled-up IOT contactless switch.	
Water Level Monitoring Sensor.	I started working on the water 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.	- I however encountered a problem with sending and receiving notifications on my telegram bot. - The bot and the esp communicated with each other okay. - However, the updates were too often and flooded my phone with the status of the system after just seconds despite specifying in my code

	OBJECTIVE	to receive
	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.	notifications after only 2 minutes:(
	BILL OF MATERIALS	
	-Water level sensor module	
	-ESP8266 node MCU	
	-220 ohm and 10Kohm resistors	
	-5 LED's	
	-Buzzer	
	-Relay	
	Software	
	-Arduino IDE	
	-Telegram Bot	
	-I designed the code of the system.	

Research	- I researched how to program the esp8266 module using the FTDI module. - This was because, when creating the PCB I would want it scaled-down and compact such that the entire node MCU would not be used but only the esp wifi chip. - I finally did resolve the notification problem.	-The solution was to make my actual code be dependent on the getupdates() function.

Schematics and pcb designs	I designed the schematics and PCB designs of the water level system. They are as follows: a)SCHEMATICS b) 	-I encountered a situation while connecting the relay to my circuit. -From the research it was clear and I finished up my schematics.
	I was taken through the 3D printing process after designing a simple 3D design. -I researched the differences between relay modules and the relay. -The relay works on the principle of magnetic	

	induction to turn on and off.	
Fusion 360	-I designed the casing of the water level sensor using Autodesk fusion 360. -Finished up the schematics of the system. -Printed my first PCB designs.	
Documentation	-I did the documentation of the systems. -I pushed the documentation and schematics to the Github repository. -I practiced more on Fusion 360.	