



UMS
UNIVERSITI MALAYSIA SABAH



FACULTY OF COMPUTING & INFORMATICS
FAKULTI KOMPUTERAN DAN INFORMATIK



IOT BASED WATER LEVEL AND PH MONITORING SYSTEM

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Hardware

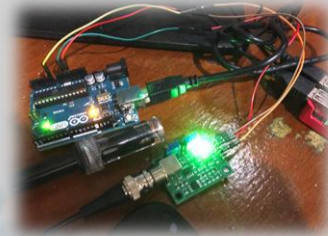


Figure 1

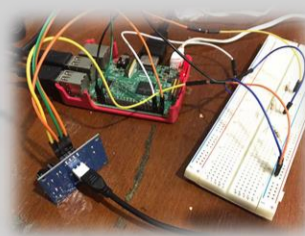


Figure 2



Figure 3



Figure 4

Abstract

Water resources issues within the campus had been mentioned a lot within students group due to relevant cases happened in UMS hostel. The issues had been discussed due to water shortages and low purity water in student's hostel meanwhile the issues had sustained for years with no resolving. So, IoT based water level and pH monitoring system had come to mind and the project, utilization techniques and skills was based on the student's hostel information. Furthermore, this project aimed to design and develop monitoring system by reading the water level and pH value via sensors. Plus, the raspberry pi 3 will be core of this project as to implement the system, power supply and able to show or read data from the sensors. Meanwhile, the method used to access the system is using remot3.it platform as it will provide a connection between the device and system. Thus, VNC (Virtual Network Computing) viewer will do the work to show the system interface. Lastly, there was a research that using regression to implement in this project.

Problem Statements

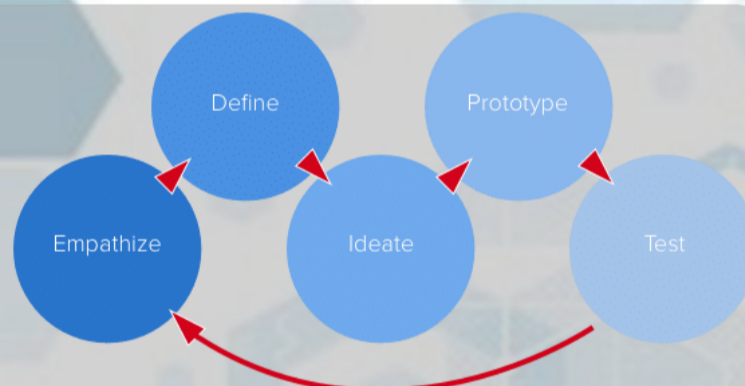
- I. Difficult in monitoring water tank condition
- II. Inconvenient notify system
- III. Difficult to do analyst due to no report for water tank

Objectives

- I. To design an IoT Based Water Level and PH Monitoring for UMS Campus admin.
- II. To develop an IoT Based Water Level and PH Monitoring System by using raspberry pi 3 with water level and pH level sensors.
- III. To testing and verify the IoT Based Water Level and PH Monitoring System functionality with different scenario such as detect pH value and water level with three container that consist acid, neutral and alkaline level of ph.

Methodology

The chosen methodology to implement the project is rapid prototyping model due to it applies instructional design, which is to develop learning experiences through a continuous cycle throughout the project life cycle. This method is built, tested, and reworked as necessary until an acceptable prototype is finally achieved from which the complete system developed.



Design

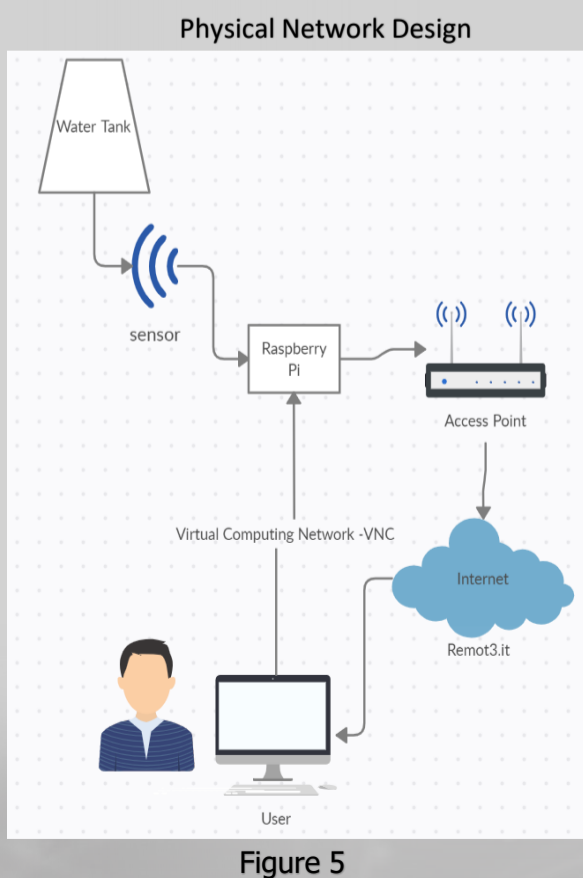


Figure 5

Physical Electronic Design

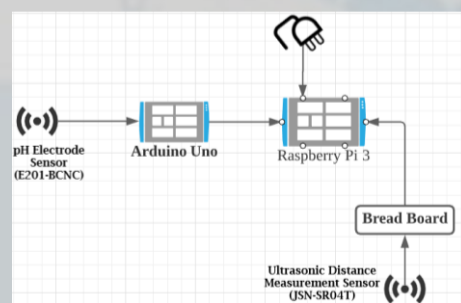


Figure 6

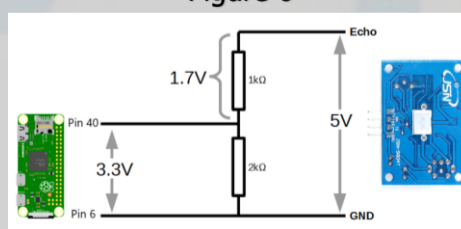


Figure 7

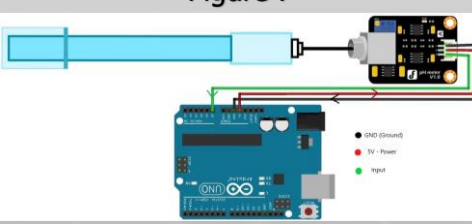


Figure 8

Result

There were two type of result taken, figure 9 was the result based on long term which is the data was taken within some period of time while figure 10 was the result based on short term that data taken in short period.

No	Date Time (H:M:S)	Actual Result	Predicted Result	Differences	Prediction Accuracy	Average
Tap Water						
1	16:18:14	6.75	6.67	0.08	98.81%	97.89%
2	16:25:11	6.81	6.99	0.18	97.35%	
3	16:32:55	6.95	7.11	-0.16	97.70%	
4	16:33:30	6.94	6.78	0.16	97.69%	
Alkaline added						
5	17:16:58	8.1	7.25	0.85	89.51%	94.99%
6	17:17:05	8.15	7.88	0.27	96.69%	
7	17:17:14	8.11	7.96	0.15	98.15%	
8	17:19:18	8.48	8.85	-0.37	95.63%	
Acid Added						
9	17:41:18	3.69	4.76	-1.07	71.00%	90.81%
10	17:41:20	3.83	3.7	0.13	96.61%	
11	17:43:30	3.69	3.58	0.11	97.02%	
12	17:44:02	3.68	3.73	-0.05	98.64%	

Figure 9

Figure 10

Conclusion & Future Work

The project included web-based and hardware-based system which is expected to help the target user in terms of the ease to achieve the information from water tank from distance. A report will be generated and send to admin via email with the information that from the system. Plus, the alert system that running at system background will automatically send the alert message to student when the water level drop to 20% via email. The project objectives are achieved and in future, the IoT based monitoring system will be developed to smart water tank system that can be install a camera for visual detection and also a backup battery.