



Real Time Water Level Detection Systems for Water Treatment Plant

Muhamad Burhanuddin Hamzah, Nor Azhar Ahmad

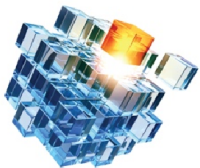
Fakulti Sistem Komputer & Kejuruteraan Perisian, Universiti Malaysia
Pahang, Lebuhraya Tun Razak, 26300 Gambang, Pahang, MALAYSIA
muhamadburhan93@gmail.com, nazhar@ump.edu.my

Highlights: "Water Level System" is a system which functioned to detect the water level in a water tank and analyze the data collected. The primary purpose of this software is to improvised current system used by Perbadanan Air Pahang (PAIP). Currently, the method adopts by PAIP required users, to check the system manually. Development of a new system could reduce the management cost with the alert mechanism. This system sends the first SMS when the water tank is nearly full and then the second SMS when the tank is full. It can send least two SMS to the user. The user also can view the record of the reading if they want to analyze the water level pattern. The system also can display the data in graph form to make the data more informative.

Key words: *Water Detection Systems, Raspberry Pi, SMS, Alert System*

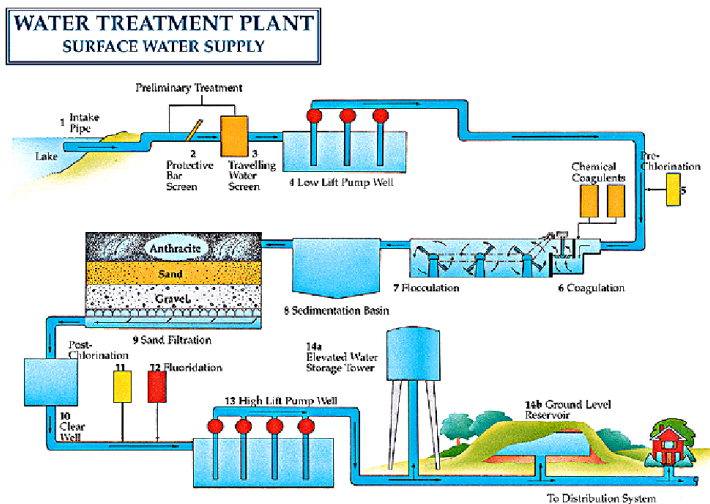
Introduction

A crucial problem occurs especially in a rural area is the malfunction of domestic water supply. This event occurs when the quantity of water in water treatment plant cannot supply enough to the residential area. Sometimes even the water reservoir is enough, maintenance of treatment plant also contribute to this problem. The workers hardly to maintain the water distribution volume manually. It is hard, to ensure this event to be prevented completely.



Water Detection Systems

Several systems already implemented to prevent previously discussed the event. Namely, water level detection system which could give a recent reading of water treatment plant capacity. However, this system is a disaster when it can't alert the workers when they should close the water supply gate. Please refer Figure 1. The system implemented in the fourth section: low lift pump well.



**Figure 1 : Water Treatment Plant – Surface Water Supply
(Canadians Opposed to Fluoridation ~ Canadiens
Opposés à la Fluoration (COF-COF), 2016)**

Therefore, a system with an alert system is needed. The proposed system could send an SMS to the workers, which took a crucial part in water supply systems. Furthermore, this system extends its functionality by triggering an SMS (by request) to the nearby resident.

Through this way, it could alert them about chances of a shortage of water supply.

Flow of Systems

The systems flow shows in *Figure 2*.

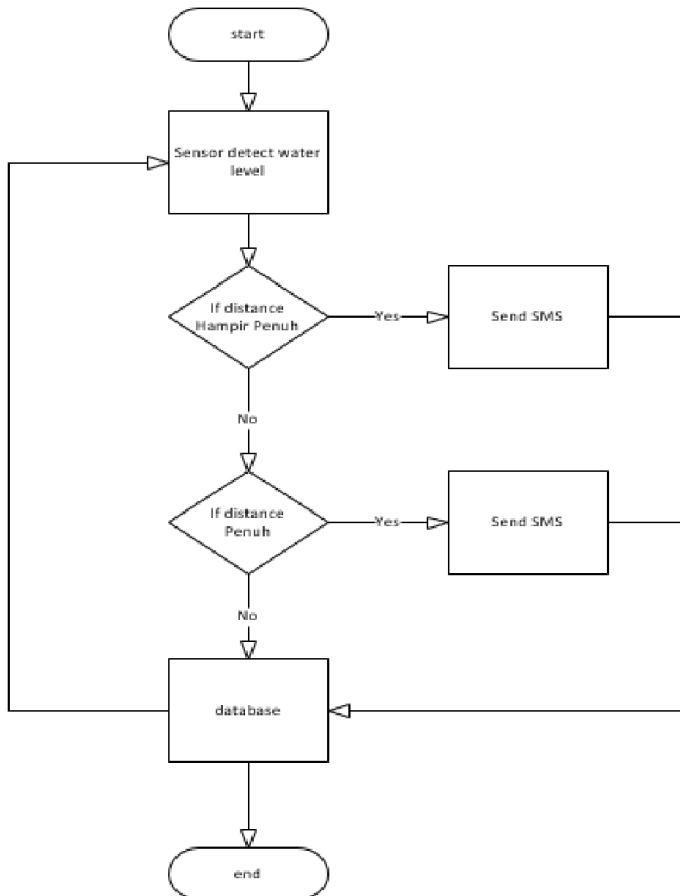
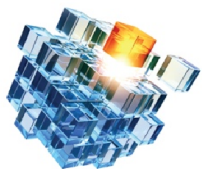


Figure 2 : System Flowchart



Result and Discussion

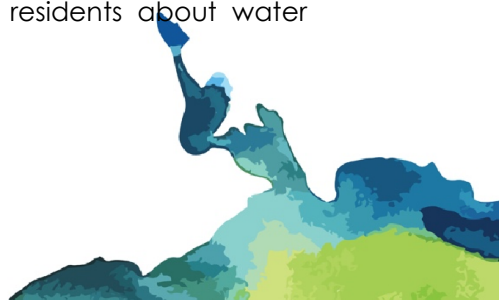
The prototype testing is the process of analyzing the systems to detect bugs in the prototype and also evaluate the characteristics of the proposed system. The main objective is to generate efficient, effective and useful pre-usage. Black-box testing used to test Water Level System prototype based on Raspberry Pi platform. Black-box testing is ignoring the inner code of system or component and focuses solely on the output generate in response to a specific input. The test cases are shown in Table 1.

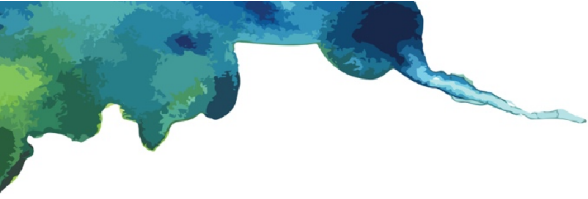
Test cases	Condition	Expected result	Actual result	Status
1	Check water level	Display water level	Display water level	Pass
2	Send SMS when the water level in the tank nearly full	SMS send	SMS send	Pass
3	Send SMS when the water level in the tank full	SMS send	SMS send	Pass

Table 1: Testing Result

Advantages

- i. To avoid water wastage if the water were overflow from the tank
- ii. Reduce time to manage water treatment plant
- iii. Could inform earlier the residents about water shortage



- 
- iv. Cheaper ways to cater a big problem (water wastage)

Commercial Values

This system already presented to Loji Pengunmpulan Air, Perbadanan Air Pahang, Cawangan Chini, and in the early negotiation of implementation in all Pahang Treatment Plant.

Also, but not lease, this system could be applied in any non-vaporable liquid plant to detect its capacity and alert the technical team on time.

Acknowledgement

The authors would like to acknowledge Management Board, Faculty of Computer Systems & Software Engineering who supports the registration fees for this competition.

References

Canadians Opposed to Fluoridation ~ Canadiens Opposés à la Fluoration (COF-COF). (2016). Surface Water Treatment Plant – Flow Diagram. Retrieved from <http://cof-cof.ca/surface-water-treatment-plant-flow-diagram/>

Hamzah, M. B.. (2016). Water Detection Systems (Undergraduate's Final year Project thesis, Universiti Malaysia Pahang, Kuantan, Malaysia).

