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AUTOMATED SYSTEM TO CONTROL WATER PUMPS WITH REMOTLY MONITORING WATER LEVEL AND CONSUMPTION FOR WUSL KULIYAPITIYA PREMISES

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ABSTRACT

Nowadays everybody has overhead tank at their homes. Such water tank owners face several problems which can be solved with microcontroller based automation system. The comprehensive automation systems are how to online track the water level and way to switch ON/OFF when the tank is empty or full respectively, the way to stop water pumping just after tank is full etc. In this way wastage of electricity, water and managing other resources can be saved. There is wastage of energy as well as wastage of water. This is also happened in Wayamba University of Sri Lanka Kuliyapitiya premises. In this Electronic research project and user friendly water supply controlling system was designed for Wayamba which can be easily controlled even by a low level minor employee just clicking on informative Graphical User Interface (GUI) on the controlling CPU. This system used Ultrasonic Sensor to measure the water level, Microcontroller to communicate with personal computer and Graphical User Interface (GUI) to monitors whole systems from one controlling center.

Keywords: *Ultrasonic Water Level Sensor, Microcontroller, Graphical User Interface*

1.0 INTRODUCTION

Presently Wayamba University use manual system to control motor system of the water pumps and unknown water level at the moment. But this manual process leads to more disadvantages. Today people have less time to human monitor control process in home application as well as in industry routine jobs. These microcontroller based automation is a major solution for the above problem. This project aim designing automation system to save resources delay with water pumping system at Wayamba University of Sri Lanka Kuliyapitiya Premises.

2.0 METHOLODOGY

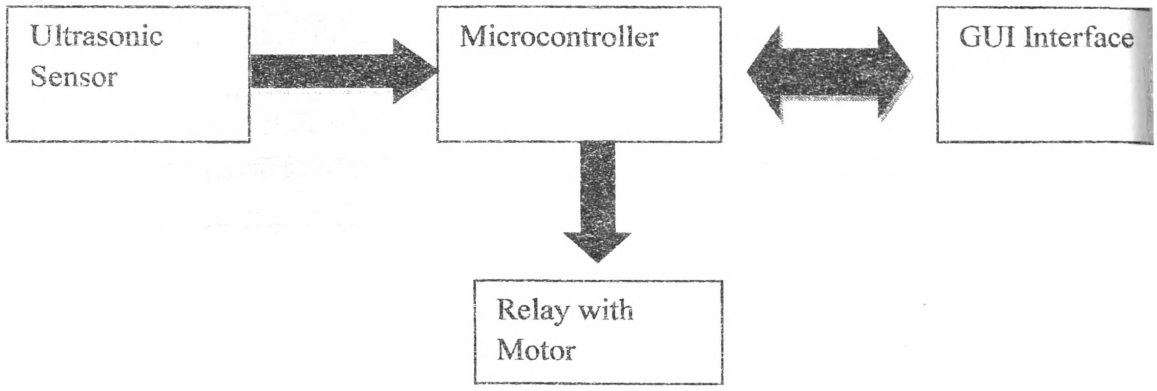


Figure 1: Block Diagram of The water pumps controlling System

The above figure is illustrating the whole project block diagram. The first block is Ultrasonic Sensor module. Ultrasonic waves spread in the air and would return immediately when it encountered obstacles on the way. Then the ultrasonic receiver would stop timing when it received the reflected wave. In this proposed system water act like an obstacle. Ultrasonic spread velocity is 340m/s in the air. The timer is record time (t) to received reflected wave[1]. Then microcontroller is needed to do above calculation according;

$$\text{Distance} = \text{Velocity} \times \text{Time} \quad (1)$$

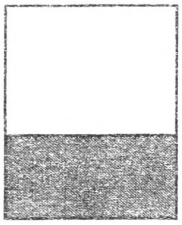
$$S = (340*t)/2,$$

S - Distance between sensors located position and top of water level.

The water level is difference between S and distance of from sensor located point to bottom of tank. Finally water level is send to personal computer through UART (Universal Asynchronous Receiver Transmitter)[2]. GUI is catch the values send from the PIC[3]. Hence the level of water is displayed in GUI. Also water level is checked minimum or maximum[4]. According to above result, Data is automatically sent into the microcontroller. Then related port connected with motor is activated as HIGH OR LOW. Finally relay circuit activated motor.

The water consumption is calculated without any sensor. But mealy with the calculation been done at the GUI application in the microprocessor. Moreover daily consumption also displayed in the text box of GUI[5].

Calculation of the consumption as shown in the following; Let assumed volume of tank is 2000 ltr and the water 30% containing in the tank



Containing Volume of tank = 2000ltr x 0.3
= 600ltr

Figure 2: Water filled Tank

3.0 RESULTS AND DISCUSSION

A person should be with some computer literacy to operate the controlling activity of two water pump at two well. The GUI interface is a unique extra featured to the existing water monitoring systems. If one tank connected with more than one motor can easily control all motors automatically up to 8 motors. As future work development; small data base to be integrated to GUI and daily consumption automatically update into the data base. Then report can be automatically generated weekly or monthly. The quick links related to project attached in GUI Interface so can be easily trouble shoot since the control GUI is linked with the overall system.

3.1 The Advantages of the proposed controlling system

Compare to the other systems this is cost effective and the used equipments are locally available and they are reliable.

Electric energy consumption will be reduced as the result of motor being ON/OFF at the right time. Also the water quantity is not wasting due to above system. Time efficiency of controlling can be achieved with only single computer literacy labor such employed can take care of the system of reliability and smooth functioning. This system can be proposed to Sri Lanka water board to compliment commercially in island wide. This system can be used for the water management and consumption of water level at weekly/monthly basis also can be analyzed.

Diode is used to be protected from the alternative current used. GUI interface shown in following figure 3.

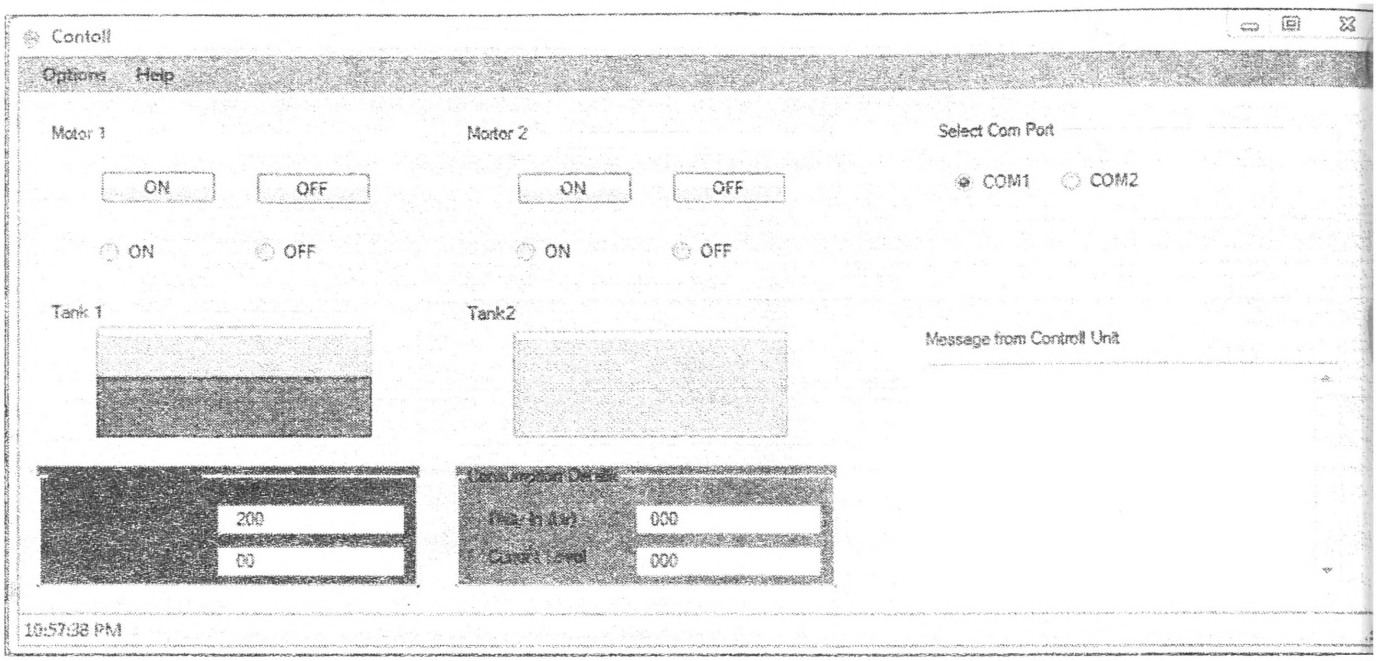


Figure 3: Graphical User Interface

4.0 CONCLUSION

The final outcome of this project is automated water pump controlling and water consumption monitoring system which can also be used to check whether the motor is running or not, current water level etc.

ACKNOWLEDGEMENT

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REFERENCES

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[3]. PIC 16F887A Data sheet

[4]. http://www.codeproject.com/Articles/8422/Vertical-ProgressBar