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Envision, Enable, and Empower  
Smarter and Resilient Societies

*co-located with*

# 11<sup>th</sup> **ERDT Conference** on Semiconductor and Electronics, Information and Communications Technology and Energy

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## MICROCONTROLLER-BASED MONITORING SYSTEM FOR WATER FILTRATION (MMSWF)

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### ABSTRACT

Water is a main necessity to people. It is a must for us to have a reliable drinking water source. Good quality of water is needed for human consumption and it should be drinkable inside or even outside of the locality. After natural disasters, communities can be devastated from a lack of clean water. This can lead to death through dehydration, malnutrition, lack of sanitation, and disease propagation.

When tropical storm Sendong (international name Washi) hit Iligan City, Philippines, the city's water shortage continues to hounds the residents of Iligan City and water sources became contaminated and not good for drinking anymore according to the National Disaster Risk Reduction and Management Council (NDRRMC). The water pipes connecting the dam and the reservoirs were damaged resulting to water shortages in the locality even up to the present time. As a result, waterborne diseases such as diarrhea, cholera and amoebiasis were acquired by some residents especially children due to drinking water from NAWASA (National Water and Sanitation Association).

This research study designed and developed a prototype of a portable microcontrollerbased monitoring system for water filtration, which aimed to filter local water sources at disaster sites. It also focuses on evaluating the water quality by indicating the pH level of the water before and after the process of water filtration. This paper also outlines the approach and describes the physical design of the system, decision algorithm, user interfaces and the integration of parts into a portable, remote and microcontroller-based monitoring system for water filtration.

Fig. 1 shows the significant graphical comparison with set of trials to determine the changes in the pH values and to differentiate the result of the pH value of the MMSWF compared to the standard pH meter.



Figure 1. Comparison of pH meter: Commercial VS MMSWF.

**Keywords:** Contaminated, Filtration, Microcontroller, pH, Portable, Water

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### **References**

- [1] S. Barham, S. Kazlauskas, *et al.*, “Rapid Adaptive Needs Assessment (RANA) water quality kit”, *Proc. in IEEE Systems and Information Engineering Design Symposium (SIEDS)*, p. 46, 2011.
- [2] X. Kun, L. Xin-shen, *et al.*, “Design of a drinking water filtration system with intelligent and security management”, *Proc. in 15th International Conference on Electrical Machines and Systems (ICEMS)*, pp. 1-4, 2012.
- [3] R. C. Ball, W. A. Eldredge, “Field Portable Water Purification System”, Patent: US5399260A, 1995.
- [4] M. Nonphayom and D. Hormdee, “Microcontroller-based Automatic Oil Purifier Control System”, *Proc. in International Conference on Embedded Systems and Intelligent Technology (ICESIT)*. 2012.