

***Interactive comment on* “Towards Cyber Physical Era: Soft Computing framework based Multi-Sensor Array for Water Quality Monitoring” by Jyotirmoy Bhardwaj et al.**

Anonymous Referee #1

Received and published: 25 August 2017

The manuscript introduces a water quality monitoring system with which data of pH, DO, EC, ORP, and temperature are measured by a sensor array and analyzed by a Python program using fuzzy set theory. The authors are invited to consider the following comments:

GENERAL COMMENTS:

1. Section 2.3.1 proposed a fuzzy approach for the water quality decision support system. However, in Section 3 there is little result analysis or discussion about the results of applying fuzzy logic to the collected live data. The code included in the supplemental materials does not show the application of fuzzy logic, either.

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Readers would benefit from descriptive text and/or figures showing how the fuzzy approach classifies water quality data at the 5 sites into the 3 proposed categories of NA, ADE, and HACC, and what advantages the fuzzy approach has over other algorithmic classifiers or empirical methods.

2. The Conclusion section reads "The proposed system can be implemented in remote locations and unlike commercially available analyzers, the developed system is low cost, low power, lightweight and capable to process, log, and remotely present data." However, the article does not compare the (estimated) costs, power consumption, or weights, of the proposed system and commercial systems.

Other Comments:

1. Page 1, Line 17. "socially acceptable means to detect... contamination". Suggest clarifying the meaning of "social acceptance" in the context of water quality monitoring systems.
2. Page 1, Line 24-25. "Statistics show that 20-60% of water contamination incidents are related to events in the water distribution network". References are needed here.
3. Table 1 shows that for DO values, range for portable water is " $>3\text{mg/L}$ ". However, if groundwater is used as water source, regular DO values are usually lower than 3 mg/L . See, e.g., Sarin, P., et al (2004). Same comments for the DO ranges in Table 3.
4. Page 2, Line 19. "Aurdino mega 2560 microcontroller...". is this "Arduino"?
5. Table 2. suggest removing the column of "manufacturer". It has been mentioned in the main text.
6. Page 3, Line 45. Suggest numbering the supplemental materials and refer to them in the text by numbers.
7. Page 4. Line 10-14. Are there only two rules? if not, suggest listing all rules.
8. Page 4. Table 4. suggest adding a column showing the Mean Average Percentage

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Error (MAPE) of measurements for the proposed system versus lab results.

9. Page 6, Line 18. What does PLS stands for? Abbreviations should be spelled out on first occurrence.

10. How long did the system run at the 5 sites? how many measurements are taken in total? How was the system powered on site? It may also be beneficial to include raw data in the supplemental materials.

Comments on the figures:

Figure 1. The text size is too small to read. Suggest increasing the size and removing the grey background.

Figure 2. X-axis is not shown.

Figure 3. Radar chart usually shows different types (rather than sites) of measurements on the axes (See Figure 5, Lambrou et. al. 2014). Suggest re-plotting to have 5 charts for 5 sites.

Reference:

Sarin, P., et al. "Iron release from corroded iron pipes in drinking water distribution systems: effect of dissolved oxygen." *Water Research* 38.5 (2004): 1259-1269.

Interactive comment on Drink. *Water Eng. Sci. Discuss.*, <https://doi.org/10.5194/dwes-2017-25>, 2017.

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