

LITERATURE SURVEY

Paper Title	Author, Journal	Inference
IoT Based Real-Time Water Quality Monitoring System	Mohammad Salah Uddin Chowdury, Talha Bin Emran, Subhasish Ghosh Abhijit Pathak, Mohammed Manjur Alam, Nurul Absar, Karl Andersson, Mohammad Shahadat Hossain. Procedia Computer Science, Volume 155, 2019, Pages 161-168, ISSN 1877-0509, https://doi.org/10.1016/j.procs.2019.08.025 .	Method: This paper utilises Wireless Sensor Networks (WSNs) inclusive of microcontrollers for processing the system and for communication between the nodes present inside the system. Visualization of the data was carried out using SparkMLib. Finally, an SMS was sent to the target regarding quality of the river according to certain metrics

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An Energy-Efficient River Water Pollution Monitoring System in Internet of Things	S. Chopade, H. P. Gupta, R. Mishra, P. Kumari and T. Dutta, "An Energy-Efficient River Water Pollution Monitoring System in Internet of Things," in IEEE Transactions on Green Communications and Networking, vol. 5, no. 2, pp. 693-702, June 2021, doi: 10.1109/TGCN.2021.3062470.	Method: This paper makes use of compressed deep neural network to monitor any pollution present within the river water. Following this, the authors have made use of a knowledge distillation technique to train the model. Conclusively, the paper develops on this approach as it goes by throughout the work, as a game-theory approach to establish reduced energy consumption for monitoring through longer ranges

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Smart Sensor Node of WSNs for River Water Pollution Monitoring System	<p>E. A. Kadir, A. Siswanto, S. L. Rosa, A. Syukur, H. Irie and M. Othman</p> <p>"Smart Sensor Node of WSNs for River Water Pollution Monitoring System," 2019 International Conference on Advanced Communication Technologies and Networking (CommNet), 2019, pp. 1-5, doi: 10.1109/COMMNET.2019.8742371.</p>	<p>Method: The authors have utilised Wireless Sensor Networks (WSN) and have exploited the advantage of its interoperability and communication to multiple sensors. With this, they have also monitored the water level and flow rate for the purpose of generating flood alerts.</p>

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River Water Quality Parameters Prediction Method Based on LSTM-RNN Model	<p>Q. Ye, X. Yang, C. Chen and J. Wang,</p> <p>"River Water Quality Parameters Prediction Method Based on LSTM-RNN Model," 2019 Chinese Control And Decision Conference (CCDC), 2019, pp. 3024-3028, doi: 10.1109/CCDC.2019.8832885.</p>	<p>Method: Through the study of the paper, it was inferred that a long short-term memory induced recurrent neural network was utilized for the purpose of drawing conclusions regarding the non-linearity and correlation of the various parameters measured in the Shanghai River using sensors. The conclusions were further compared by the authors against the traditional grey model which was used by the respective authors to construct a predictive model for estimating parameters for future use</p>

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Design of IoT-Based River Water Monitoring Robot Data Transmission Model Using Low Power Wide Area Network (LPWAN) Communication Technology	R. D. Lestari, A. Rusdinar, M. A. Murti, G. Tawaqal and D. Lee, "Design of IoT-Based River Water Monitoring Robot Data Transmission Model Using Low Power Wide Area Network (LPWAN) Communication Technology," 2019 IEEE International Conference on Internet of Things and Intelligence System (IoTaIS), 2019, pp. 201-205, doi: 10.1109/IoTaIS47347.2019.8980377.	Method: This development was slightly different from the other studies carried out on the other papers. The authors exploited the low power wide area network communication topology. With four nodes and one gateway established using long range radio (LoRa) transceiver against Arduino boards, the authors had tried to establish the transmission of the sensor readings to longer range for analysis. With the tests, there was learning regarding the fact that transmission of the sensor analysis results was possible up to 500 m close on the surface of the water.

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A new monitoring system for river discharge with horizontal acoustic Doppler current profiler measurements and river flow simulation	Yasuo Nihei, Akira Kimizu Water Resources Research, Volume 44, Issue 4	Method: This paper utilises horizontal acoustic doppler current profiler (H-ADCP) measurements and river flow simulation to achieve constant and continuous river monitoring at a lower cost Results: This method was observed to be much faster than the methods that existed within the market with an accuracy increase of 4.9% from the existing 89%

TAKEAWAYS FROM THE LITERATURE SURVEY

- In sync with the industrial project allocated, we hope to utilise wireless sensor networks to establish effective communication and better security with the sensor devices that we have planned to use.
- The sensor devices that have a proposition of being used include turbidity sensor, liquid temperature sensor, pH sensor, and hardness sensor which help in evaluation of the essential factors when it comes to river quality monitoring: the alkalinity levels which play a pivotal role in allowing safe and secure water for daily use, the hardness levels which have an extended impact on plant and animal life, and the temperature levels which stay an indicator of the global warming
- There is a proposition to include actuation alerts that include SMS and call alerts to the respective authorities responsible in handling the river water quality to ensure the safe quality of livelihood among people consuming the water.
- If time and/or space permits, we hope to extend the model for analysis using LSTM-RNN and try for possibilities to extend the range of sensor data transmission using LPWPAN

