# A New Autonomous Data Transmission Reduction Method For Wireless Sensors Networks

### Abstract

- The inherent limitation in energy resources and computational power for sensor nodes in a Wireless Sensor Network, poses the challenge of extending the lifetime of these networks. Since radio communication is the dominant energy consuming activity, most presented approaches focused on reducing the number of data transmitted to the central workstation.
- This can be achieved by deploying both on the workstation and the sensor node a synchronized prediction model capable of forecasting future values.

## Existing system

- These devices are powered by irreplaceable batteries since they are typically deployed in harsh or hostile environments. Thus, developing a mechanism that allows such networks to work for a prolonged period of time while operating solely on limited amount of energy is a crucial need for sensor network applications to succeed
- radio communication is the dominant energy consuming activity, most presented approaches focused on reducing the number of data transmitted to the central workstation.

### Hardware requirement

UP.

- Processor
- Speed
- RAM
- Hard Disk
- Floppy Drive
- Key Board
- Mouse
- Monitor

- Pentium –III
- 1.1 Ghz
- 256 MB(min)
- 20 GB
- 1.44 MB

SVGA

- Standard Windows Keyboard
  - Two or Three Button Mouse

## Software requirement

- Operating System
- Application Server
- Front End
- IDE
- Back-End

- Windows 7/8
- Tomcat 5.0
- JAVA
- NETBEANS 7.1
- HEIDISQL 3.5

#### Server page





#### Router page



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#### Ip verification





#### **Destination path**





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### Proposed system

- A Wireless Sensor Network (WSN) consists of small and simple computing devices that are usually in the form of a micro-controller, and have limited computational and energy resources. This mechanism offers a decrease in the cost of transmission energy for a price of an increase in the cost of computational energy. Therefore, finding the right tradeoff between complexity and efficiency is very important to achieve optimal results.
- In this paper, we present a novel data reduction method that outperforms other state of the art data reduction approaches. We demonstrated the efficiency of our algorithmusting simulation on real-world data sets collected at our laboratory.

### Conclusion

- In this paper, we have proposed a new data reduction method that is fully autonomous and requires no calibration or intervention from the user, only the tolerated error threshold is specified and the rest is automatically adapted according to the collected data. Moreover, despite being very light in term of complexity and memory space, it is proven to be robust and extremely efficient in term of transmission reduction.
- Furthermore, it has been demonstrated that our method outperforms other state of the art data reduction approaches. This has been proven through an appropriate simulation on real collected measurements of different environmental features. For future work we aim to implement ADRM on real sensor nodes in order to verify the efficiency of our proposal in a real world deployment.

## Reference

- [1] J. M. Bahi, A. Makhoul, and M. Medlej, "A two tiers data aggregation scheme for periodic sensor networks," Ad Hoc & Sensor Wireless Networks, vol. 21, no. 1-2, pp. 77–100, 2014.
- [2] T. Du, Z. Qu, Q. Guo, and S. Qu, "A high efficient and real time data aggregation scheme for wsns," International Journal of Distributed Sensor Networks, vol. 11, no. 6, p. 261381, 2015.
- [3] H. Harb, A. Makhoul, D. Laiymani, and A. Jaber, "A distancebased data aggregation technique for periodic sensor networks," ACM Trans. Sen. Netw., vol. 13, no. 4, pp. 32:1–32:40, Sep. 2017.