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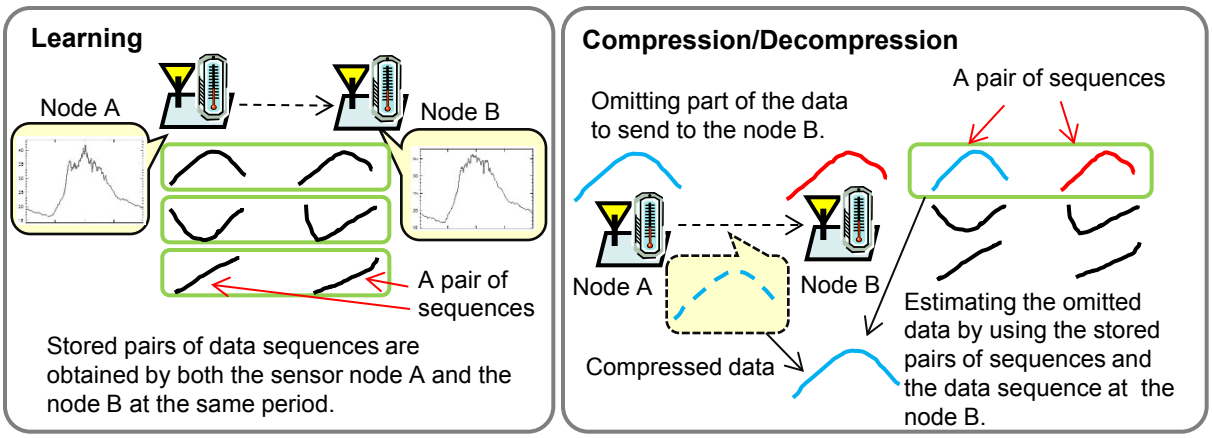
Efficient environmental monitoring

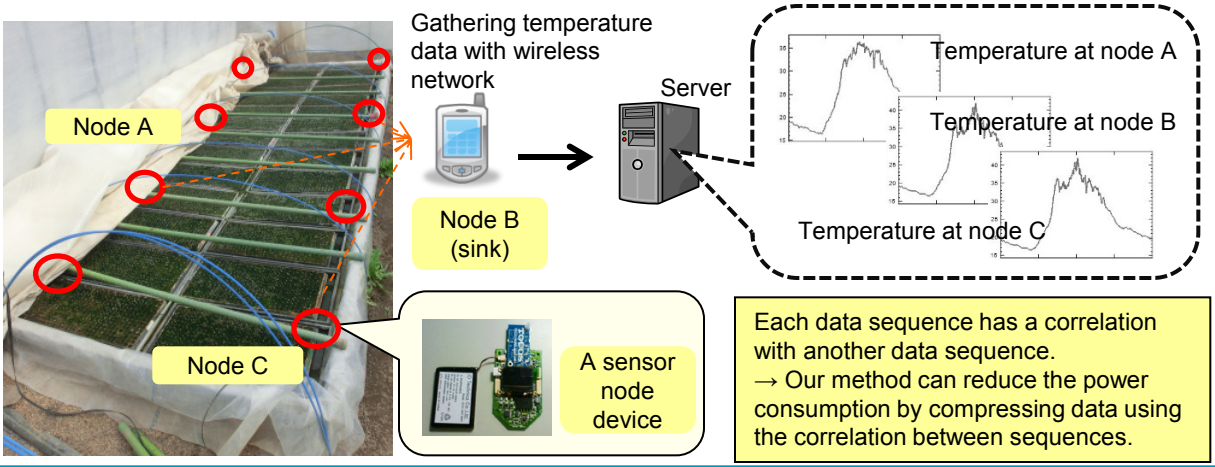
Correlated data gathering for sensor network

***Abstract*— We developed a new data compression technique for large-scale wireless sensor networks, which are used in field monitoring, disaster prediction, heating, ventilation and air conditioning (HVAC) control systems and so on. The technique achieves a high compression ratio by using information correlating each sensor data sequence. It can help reduce the power consumption of limited capacity batteries in small wireless sensor devices. We have improved distributed source coding (DSC) to apply practical data sequences to it. As a result, we can show for the first time anywhere in the world that DSC with a low density parity check (LDPC) code can be applied to practical sensor data sequences.**

Compression Technique We achieve a high compression ratio of sensory data by using correlation information between sensor data sequences.



Application (ICT in Agriculture)Monitoring temperature in the field to increase the amount of crop harvest



Each data sequence has a correlation with another data sequence.
→ Our method can reduce the power consumption by compressing data using the correlation between sequences.

Related works

[1] J. Muramatsu, T. Uyematsu, T. Wadayama, "Low density parity check matrices for coding of correlated sources," *IEEE Transactions on Information Theory*, Vol. IT-51, No. 10, pp. 3645-3653, 2005.
[2] Y. Yanagisawa, T. Maekawa, Y. Kishino, T. Suyama, "Data Gathering in Wireless Sensor Networks using Correlation of Sensor Data," *The Special Interest Group Technical Reports of IPSJ* , 2011-UBI-32(4), pp.1-8, 2011 (in Japanese).

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