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An ALM Matrix Completion Algorithm for Recovering Weather Monitoring Data

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Abstract : The development of matrix completion theory provides new approaches for data gathering in Wireless Sensor Networks (WSN). The existing matrix completion algorithms for WSN mainly consider how to reduce the sampling number without considering the real-time performance when recovering the data matrix. In order to guarantee the recovery accuracy and reduce the recovery time consumed simultaneously, we propose a new ALM algorithm to recover the weather monitoring data. A lot of experiments have been carried out to investigate the performance of the proposed ALM algorithm by using different parameter settings, different sampling rates and sampling models. In addition, we compare the proposed ALM algorithm with some existing algorithms in the literature. Experimental results show that the ALM algorithm can obtain better overall recovery accuracy with less computing time, which demonstrate that the ALM algorithm is an effective and efficient approach for recovering the real world weather monitoring data in WSN.

Keywords : wireless sensor network, matrix completion, singular value thresholding, augmented Lagrange multiplier
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