

## Accepted Manuscript

A Bayesian Network Model for Data Losses and Faults in Medical Body Sensor Networks

Haibin Zhang, Jiajia Liu, Ai-Chun Pang

PII: S1389-1286(18)30493-6  
DOI: [10.1016/j.comnet.2018.07.009](https://doi.org/10.1016/j.comnet.2018.07.009)  
Reference: COMPNW 6539



To appear in: *Computer Networks*

Received date: 6 September 2017  
Revised date: 20 May 2018  
Accepted date: 2 July 2018

Please cite this article as: Haibin Zhang, Jiajia Liu, Ai-Chun Pang, A Bayesian Network Model for Data Losses and Faults in Medical Body Sensor Networks, *Computer Networks* (2018), doi: [10.1016/j.comnet.2018.07.009](https://doi.org/10.1016/j.comnet.2018.07.009)

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

# A Bayesian Network Model for Data Losses and Faults in Medical Body Sensor Networks

Haibin Zhang, Jiajia Liu<sup>1</sup>

*School of Cyber Engineering, Xidian University, No.2 South Taibai Road, Xi'an, Shaanxi,  
710071, China.*

Ai-Chun Pang

*Department of Computer Science and Information Engineering, National Taiwan  
University, Taipei, Taiwan, R.O.C.*

---

## Abstract

Medical body sensor network (BSN) is a promising and flexible platform for person monitoring under natural physiological status. Due to limited resources, noise and unreliable links, sensor faults and data losses are common in BSNs. Most available works adopted schemes originated from traditional wireless sensor networks (WSNs) to detect faults and reconstruct data. However, these works either focused only on fault detection or failed to achieve a satisfactory reconstruction accuracy due to the lack of information redundancy in BSNs. In light of this, a Bayesian network based data reconstruction scheme is proposed in this paper, which rebuilds data using conditional probabilities of body sensor readings to recover missing data and sensor faults, rather than the redundant information collected from a large number of sensors. Note that the limited number of sensors in BSNs significantly reduces the complexity of Bayesian learning and thus enables efficient structure and parameter estimation of Bayesian network. Experiments on extensive online data sets have been conducted and our results show that the performance of our scheme outperforms all available data reconstruction schemes.

**Keywords:** Reliability, Bayesian methods, fault detection, body sensor

---

<sup>1</sup> *Email addresses:* hbzhang@mail.xidian.edu.cn, liujiajia@xidian.edu.cn.

Download English Version:

<https://daneshyari.com/en/article/6882591>

Download Persian Version:

<https://daneshyari.com/article/6882591>

[Daneshyari.com](https://daneshyari.com)