University-Business Innovation Center

Shiro Ishibashi
Professor

Wang Junbo
Associate Professor

Refereed Journal Papers

[j-wang-01:2014] et. al. J. Wang. A Situation-Aware Abnormality Detection System for Elderly Care Using SVDD. *International Journal of Innovative Computing, Information and Control*, pages –, 2015.

Elderly care is a very serious social problem in many countries, especially in advanced countries, such as Japan, Korea, USA, and Singapore. To take care of elderly people, first we should clearly understand their situations and support them based on each situation. Abnormal activity detection is a particularly important task, especially in specific situations, e.g., sleeping or going to the bathroom. Based on some abnormal activities, some kinds of diseases may be predicted. However, detecting abnormal activities in a real-time situation is a critical research problem. To solve this problem, we propose a situation-aware abnormality detection system based on support vector data description (SVDD) for elderly people. First, a sensing system is proposed to detect the details of a person's situation. Then, we discuss various features that are analyzed and designed for each situation. Then, a method to detect abnormal activities in a situation based on SVDD is presented. To show the performance of the method, an evaluation is performed.

[j-wang-02:2014] J. Wang and Z. Cheng. Optimal Deployment and Traffic Flows in Mobile Mesh Network after a Disaster. *International Journal of Ad Hoc and Ubiquitous Computing*, pages –, -.

It is a critical research problem to quickly reconstruct a communication system for safety confirmation and information transfer after a disaster. One resolution is to deploy mobile mesh routers (MMR) or mobile base stations in the disaster area to guarantee the connection of users. However, it is still a challenge to find an optimal deployment of MMRs to maximally satisfy users while ensuring a fluent and reliable communication network. In this paper, we focus on the above problems and propose a communication-demand-oriented deployment method (CDODM) and a global-data-traffic routing optimization method (GTFROM) for a disaster. Our main contributions are (1) formalization and optimization of computation transmission cost in a Voronoi area in CDODM, (2) formalization and optimization traffic flows in GTFROM, and (3) implementation and evaluation in Matlab and NS3. Through the evaluation, we have shown the feasibility, performance and scalability of the proposed methods. More specifically, user satisfaction calculated based on recorded throughput in NS3 can be enhanced clearly in the proposed

solutions. In scalability study, the proposed methods works well, with changing range of disaster areas, number of MMRs and user communication demands.