

## Seminars at Research Center for Community Centric Systems

Date: May 23, 2015

Location: Tokyo Metropolitan University (Hino Campus)

<http://www.tmu.ac.jp/english/university/access.html#maphino>

Meeting Room 1,2, and 3, Building 1

Participation Fee: Free

Language: English

Web: <http://www.comp.sd.tmu.ac.jp/kubota-lab/hp/lecture/date/20150523.pdf>

Sponsor: Research Center for Community Centric Systems,  
Tokyo Metropolitan University, Japan

A brief introduction to this seminar:

Disaster prevention is one of the challenges for Tokyo Metropolitan Government as the Olympics and Paralympics will be held in Tokyo in 2020. There is a great progress in the community-centric research field, which is applied in robotics and IT industry recently. Community-centric research approach is a new international trend to achieve user log acquisition by social robotics; information media and user model formation by social big data utilization.

It results insupporting the entire community that is formed by multiple users. This research center is focusing on interdisciplinary research and development of community-centric systems based on psychology, social science, health science, informatics, and robotics.

The program of this seminar is as follows:

14:45: Professor Toru Yamaguchi: Opening Address  
Director of Research Center for Community Centric Systems  
Tokyo Metropolitan University, Tokyo, Japan

15:00: Dr. Janos Botzheim  
Graduate School of System Design, Tokyo Metropolitan University, Tokyo, Japan

Title: From Human-Centric Systems to Community-Centric Systems

Abstract:

Recently, the importance of community-centric systems is increasing in the human society. Human-centric systems can enhance the accessibility and usability of systems and devices, and they can improve the quality of life in many areas such as supporting human activities, communication and interactions in healthcare, and welfare. However, there is a need to

shift from human–centric systems to community–centric systems and improve the quality of community in social networks and communities. In this talk, for human–centric systems the acquisition of human data including sensing, monitoring and gathering data for life log are discussed. Constructing user models and applying the models for health care support are also discussed. For community–centric systems, the community detection on the Web is presented. Various visualization systems for community detection on the Web are introduced. Emergency support systems as an important application of community–centric systems are discussed as well.

15:30: Dr. Takenori Obo

Department of Artificial Intelligence, Faculty of Computer Science & Information Technology, University of Malaya, Kuala Lumpur, Malaysia

Title: Hybrid Approach for Human Behavior Recognition

Abstract:

Generally, processing for behavior recognition consists of some components: feature extraction, classification, pattern mapping, and so on. In most of the related works, the components are independently designed and evaluated by their own criteria. However, it is difficult to design the components without considering the relationship between each component. Especially, data of human behavior normally has complex and dynamic underlying features. Therefore, this study aims to develop a method of mutual adaptation between information processing components for human behavior recognition. In this study, we applied a Neuro-Fuzzy System (NFS) to the classification of human posture. The NFS is composed of mainly two parts: feature extraction by fuzzy membership function and pattern classification by feedforward neural network. To implement the mutual adaptation, we propose a learning structure with regularization method based on Drop algorithm and use Natural Evolution Strategy (NES) to tune the membership function during the learning process. From the experimental results, the proposed method realized the overfitting avoidance, generalization improvement and network structure optimization.

Invited talk 1:

16:00: Professor Chu Kiong Loo

Department of Artificial Intelligence, Faculty of Computer Science & Information Technology, University of Malaya, Kuala Lumpur, Malaysia

Title: Emotion Recognition for Empathetic Elderly Companion

Abstract:

The empty nest syndrome has become a significant problem in many countries. Caregivers can help the elderly to cope with some of the issues related to this syndrome, but a tremendous shortage of caregivers is expected due to the low income and high workload. The growing popularity of mobile device use by the elderly has created a great potential for mobile virtual companions. Studies have shown that virtual companions that can show empathy towards its users are perceived as more caring, likeable, trustworthy and supportive. Therefore, we believe that an empathetic companion can help to improve the elderly's emotional wellness and promote an active independent lifestyle. In this work, we propose an empathetic elderly companion based on the psychological theory of empathy in the form of a CareDroid. The empathetic companion recognize the elderly's facial emotion employs a fast online learning algorithm, to recognize emotion. Based on the elderly's current emotion, the companion will provide context-aware empathetic responses.

Invited talk 2:

17:00: Professor Chang-Shing Lee

Department of Computer Science and Information Engineering and Dean of Research and Development Office, National University of Tainan, Taiwan

Title: IRT-based Intelligent Adaptive Assessment Platform (IAAP)

Abstract:

The topic of this talk contains two parts. One is to introduce Item Response Theory with Fuzzy Markup Language for Parameter Estimation and Validation. Another is about FML-based Intelligent Adaptive Assessment Platform for Learning Materials Recommendation. In addition, an intelligent adaptive assessment platform (IAAP) based on item response theory (IRT) is presented in this talk. There are many students learning their academic studies via on-line education platform with many learning materials; however, how to select learning materials that exactly fit to their competence is not easy for them. This talk proposes an intelligent adaptive assessment platform (IAAP) to allow students to do adaptive testing to assess their learning ability. Owing to advanced technical progress in information and communication technology, computerized adaptive assessment becomes more and more important for personalized learning achievement. According to the response data from the conventional test and three-parameter logistic (3PL) model of the item response theory, we combine IRT with fuzzy markup language (FML) for adaptive assessment application. The novel FML-based IRT estimation mechanism includes a Gauss-Seidel (GS) parameter estimation mechanism, a fuzzy knowledge base and a fuzzy rule base, to estimate the item parameters for each item. Meanwhile, it can infer the possibility of correct response to each item for each involved student. Additionally, we also propose a static-IRT test assembly mechanism to assemble a form for the conventional test.

After that, we choose a 5-fold cross validation to validate the research performance. From the experimental results, it shows that the proposed approach performs better than the traditional Bayesian estimation one.

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Technical Co-sponsors:

- Japan Chapter of the IEEE Society on Systems, Man, and Cybernetics
- Intelligent Systems Applications Technical Committee (ISATC) “Robotics” Task Force of the IEEE Computational Intelligence Society
- Technical Committee on Medical Information Technology, the Institute of Systems, Control and Information Engineers
- SICE Technical Committee on Kukanchi