Session 2.1 Human-Intelligent Systems

Time & Location: 10:20-12:00, Dec. 1, L009

Chair: Yihsin Ho (何宜欣)

(1) Successive human tracking and posture estimation with multiple omnidirectional cameras.

Shunsuke Akama (Tokyo Metropolitan College of Industrial Technology), Akihiro Matsufuji (Tokyo Metropolitan University), Eri Sato-Shimokawara (Tokyo Metropolitan University), Shoji Yamamoto (Tokyo Metropolitan College of Industrial Technology), and Toru Yamaguchi (Tokyo Metropolitan University)

We propose a successive method for human tracking and posture estimation by using multiple omnidirectional cameras appropriate for Machine Learning method. A stable estimation for foot and head position is executed by the combination analysis with particle filter processing. Moreover, a classification method is accomplished by using the constraint of the connected line between head and foot position. The combination both this constraint and relative height from head to foot is possible to distinguish typical four postures for human activities in an indoor scene. We believe that this continuity of each data helps smooth convergence to the time-sequential learning for the discrimination between normal and abnormal behavior.

(2) Development of an Intelligent Dialogue Agent with Smart Devices for Older Adults: A Preliminary Study

Satoshi Yamada (National Institute of Technology, Tokyo College), Daisuke Kitakoshi (National Institute of Technology, Tokyo College), Akihiro Yamashita (National Institute of Technology, Tokyo College), Kentarou Suzuki (Kyorin University), and Masato Suzuki (National Institute of Technology, Tokyo College)

This study aimed to examine the application of an Intelligent Dialogue Agent (IDA) in preventive care frameworks for healthy older adults. Introducing the agent increases familiarity with the frameworks, encourages performance of preventive care exercises, and helps older adults turn using the frameworks into a habit. We used a questionnaire to collect data on older adults' impressions of Information Technology (IT) devices, smart speakers in particular (main components of the IDA), and interviewed the participants after they actually used the smart speaker in order to discuss required functions and expected roles in developing the IDA. Results from the questionnaire and interview revealed promising characteristics of smart speakers and problems concerning Japanese speech recognition.

(3) A Method of Action Recognition in Ego-Centric Videos by using Object-Hand Relations

Akihiro Matsufuji (Tokyo Metropolitan University), Wei-Fen Hsieh (Tokyo Metropolitan University), Hao-Ming Hung (National Chi Nan University), Eri Shimokawara (Tokyo Metropolitan University), Toru Yamaguchi (Tokyo Metropolitan University), and Lieu-Hen Chen (National Chi Nan University)

We present a system for integrating the neural networks' inference by using context and relation for complicating action recognition. In recent years, first person point of view which called as ego-centric video analysis draw a high attention to better understand human activity and for being used to law enforcement, life logging and home automation. However, action recognition of ego-centric video is fundamental problem, and it is need to inference from complicating features. In order to overcome these problems, we propose the context based inference for complicated action recognition. In realistic scene, people manipulate objects as a natural part of performing an activity, and these object manipulations are important part of the visual evidence that should be considered as context. Thus, we take account of such context for action recognition. our system is consist of rule base architecture of bi-directional associative memory to use context of object-hand relationship for inference. We evaluate our method on benchmark first person video dataset, and empirical results illustrate the efficiency of our model.

(4) A research on document summarization and presentation system based on feature word extraction from

stored information

Kei Matsubayashi (National Institute of Technology, Tokyo College), Akihiro Yamashita (National Institute of Technology, Tokyo College), Hidetoshi Nonaka (CHOWA GIKEN Corporation), and Yohko Konno (CHOWA GIKEN Corporation)

This study examines a method of effective utilization as knowledge in organizational stored information of business activities. More specifically, the purpose of this study is developing a system that supports efficient finding of appropriate knowledge from the stored information according to a question sentence input from a user. As an approach, we used automatic documents summarization technology to obtain valuable information from the stored information and we evaluated the effectiveness based on the real bulletin board system data from a certain company.

(5) Machine Learning based Path Prediction System - Adapting One Model for All Intersections

Kai-Qi Huang (National Central University) and Min-Te Sun (National Central University)

Intersections have long been known as the place where major traffic accidents most likely to happen. To reduce the number of accidents, this thesis proposes a vehicle path prediction system to predict the future direction when a vehicle is about to cross an intersection. The GPS sensor is used to collect the dataset of vehicle trajectories at intersections. The trend of vehicle movements are derived from the heading in the trajectories, which is then combined with the vehicle speed to generate training data. In our path prediction algorithm, two ensemble learning algorithms, i.e., Random Forests and AdaBoost, are adopted for model training. The experiment results indicate that the Random Forest algorithm exhibits the best performance, and the Adaboost algorithm performs better than the base learner (i.e., Decision Tree).