Chairs' Summary/Proposal for International Workshop on Human Activity Sensing Corpus and Its Application (HASCA2013)

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Abstract

Recent advancement of technology enables installations of small sized accelerometers or gyroscopes on various kinds of wearable/portable information devices. By using such wearable sensors, these devices can estimate its posture or status. However, most of current devices only utilize these sensors for simple orientation and gesture recognition. More deep understandings and recognition of human activity through these sensors will enable the next-generation human-oriented computing. To enable the real-world application by these kinds of wearable sensors, a large scale human activity sensing corpus might play an important role. Additionally, we have now a lot of high-performance mobile devices in real-world such as smart-phones. It is a great challenge to utilize such an enormous number of wearable sensors to collect a large-scale activity corpus. In recent years, there are several ongoing projects which are collecting human activities. In this workshop, we are planning to share these experiences of current research on the human activity corpus and its applications among the researchers and the practitioners and to have a deep discussion for future of activity sensing.

Author Keywords
Large Scale Human Activity Sensing Corpus; Activity Recognition; Wearable Computing; Context Awareness; Mobile Sensor; Participatory Sensing

ACM Classification Keywords
H.5.2. Information interfaces and presentation (e.g., HCI): User Interfaces.

Rationale and Objective of the Workshop

The objective of the workshop is to bring together researchers and practitioners both from academia and industries with the goal to discuss, identify and share experiences surrounding construction of human activity sensing corpus and its applications. Like the other human related information processing areas, such as speech recognition and image recognition, to enable real-world activity recognition in a practical manner, human activity sensing corpus plays a really important role. There were several activities such as OPPORTUNITY[1] and HASC[2], but its influences are limited. Besides from its wide possibility of the application of human activity recognition, there is no well-known international activity related to gathering human activity sensing corpus and development of related algorithms and tools. In this workshop, we are willing to share experiences among the current research and the data collection activities. Additionally, if it is possible, we are willing to form an international research community for the future activity of collecting human activity sensing corpora and development of related tools.

Topics of the Workshop

The workshop is intended to be a forum to share the experiences about human activity sensing corpus and its applications. The main topics of the workshop can be categorized as:

1. *Data collection / Corpus construction*
Experiences or reports from the data collection and/or corpus construction projects. Also includes the papers which describing the formats, styles or methodologies for data collection. Cloud-sourcing data collection or participatory sensing also could be included in this topic.

2. *Effectiveness of Data / Data Centric Research:*
There is a field of research based on the collected corpus, which is called "Data Centric Research". Also, we solicit of the experience of using large-scale human activity sensing corpus. Using large-scape corpus with machine learning technology, there will be a large space for improving the performance of recognition results.

3. *Tools and Algorithms for Activity Recognition:*
If we have appropriate and suitable tools for management of sensor data, activity recognition researchers could be more focused on their research theme. However, development of tools or algorithms for sharing among the research community is not much appreciated. In this workshop, we solicit development reports of tools and algorithms for forwarding the community.

4. *Real World Application and Experiences:*
Activity recognition "in the Lab" usually works well. However, it is not true in the real world. In this workshop, we also solicit the experiences from real world applications. There is a huge gap/valley between "Lab Environment" and "Real World Environment".

Large scale human activity sensing corpus will help to overcome this gap/valley.

5. Sensing Devices and Systems:
Data collection is not only performed by the "off the shelf" sensors. There is a requirement to develop some special devices to obtain some sort of information. There is also a research area about the development or evaluate the system or technologies for data collection.

These topics can be described with the following Keywords.

- Human Activity Sensing Corpus
- Large Scale Data Collection
- Data Validation
- Data Tagging / Labeling
- Efficient Data Collection
- Data Mining from Corpus
- Automatic Segmentation
- Performance Evaluation
- Man-machine Interaction
- Noise Robustness
- Non Supervised Machine Learning
- Sensor Data Fusion
- Tools for Human Activity Corpus/Sensing
- Participatory Sensing
- Feature Extraction and Selection
- Context Awareness
- Pedestrian Navigation
- Social Activities Analysis/Detection
- Compressive Sensing
- Sensing Devices
- Lifelog Systems
- Route Recognition/Detection
- Wearable Application
- Gait Analysis
- Healthcare Monitoring/Recommendation
- Daily-life Worker Support

Estimate of expected participants

We expect to bring together 30-40 participants from academia and industries who are working on or having an interest with human activity sensing corpus and its applications. We will not the limit the participants because it is very important to share the experience and the information of the corpus in this field for the real-world practical applications.

Publication

All contributions will be included in the ACM Digital Library and supplemental proceedings of the conference. A website at http://hasca2013.hasc.jp/ is a permanent record of the workshop.

Estimated outcomes

We hope, the workshop will contribute in establishing a research community in the human activity sensing corpus area. The expected outcomes are:

1. A survey of the state of the art of "Human Activity Sensing Corpus." This includes the overview of the data collection methods, tools and algorithms.

2. Practical knowledge of the data collection methodologies for human activity sensing.

3. Recognition of the potential and the importance of the large-scale corpus for human activity recognition.

These outcomes also will be shown on the workshop websites.

Pre-Workshop activities

Most of organizers / TPC members are from OPPORTUNITY[1] and HASC[2] group. We already have some sort of community about human activity sensing corpus. Additionally, HASC is an on-going project and HASC Challenge 2013 (http://hasc.jp/hc2013/index-en.html) was held just before the workshop. HASC Challenge is a data-collection challenge and it has about 20 team participants. Through the HASC Challenge, we have already collected more than 400 subjects' activities through various types of smartphones. By registering to the HASC Challenge 2013 through the data distribution site (http://hub.hasc.jp), one can download all of the current HASC corpora. We already have more than 150 registered users.

Post-Workshop activities

On the workshop website, the list of the current data collection activities and the information of the public corpora will be presented. If we can successfully form a new research community for the human activity recognition, we will provide a mailing-list for the community.

Organizers

The most of the organizers are from OPPORTUNITY and HASC group. We already have experience of collecting human activity sensing corpus. And deeply understand the importance and difficulty of them. So we would like to form a research community to share the experiences and discuss about the future direction.

Nobuo Kawaguchi is a Professor of Department of Computational Science and Engineering, Graduate School of Engineering, Nagoya University since 2009. He received Ph.D. in Computer Science from Nagoya University, Japan, in 1997. During 1999-2004, he was working with CIAIR (Center for Integrated Acoustic Information Research), and made a major contribution to its large scale in-car speech database which includes speech dialog with car-driving information for more than 500 subjects in the real-world driving environment. His research interest is in the areas of Human Activity Recognition and Ubiquitous Communication Systems. He is now serving a chairperson of the Human Activity Sensing Consortium (HASC), Japan.

Nobuhiko Nishio is a professor of the College of Information Science and Engineering, Ritsumeikan University. He got his PhD at Keio University in 2000. From 1993 till 2003, he had worked at Keio University SFC. His current research interests are ubiquitous computing and long term human activity recognition. He is now serving a general chair of HASC Challenge 2013.

Daniel Roggen is a principal research associate at University Newcastle. He received his M.S. in microengineering in 2000 from the EPFL (Swiss Federal Institute of Technology) in Lausanne, Switzerland. He

carried out his PhD at the Laboratory of Intelligent Systems of EPFL, from which he received his PhD degree in 2005. His activities include context recognition algorithms, embedded wearable systems, sensor fusion, and learning and adaptivity in wearable systems.

Kaori Fujinami is an associate professor in the department of computer and information sciences at Tokyo University of Agriculture and Technology. He received a MS in Electrical Engineering and a Ph.D. in Computer Science from Waseda University in 1995 and 2005, respectively. His research interests include activity sensing, human-sensor interaction and smart object systems.

Susanna Pirttikangas finished her doctoral studies on embedded systems at 2004 and works as a researcher at the Department of Computer Science and Engineering, University of Oulu. Her expertise is on data mining and pattern recognition research enabling situation awareness. Her research interests include context-aware systems, namely machine learning and data mining for context recognition and routine learning.

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