

# A Location Inference Algorithm Based-on Smart Phone User Data Modelling

Sang-il Kim, Wan Jung, Hwa-Sung Kim

\*Department of Electronics and Communications Engineering, Kwangwoon University

rlatkd234@kw.ac.kr, jun-wan@kw.ac.kr, hwkim@kw.ac.kr

**Abstract**—Human life is rapidly changing around the world in terms of smart phones as the number of users is increasing in a surprising rate and the recent development of remarkable performances. And, there is wide range of smart phone services available based on the location information. However, levels of location based services currently provided are not satisfactory due to the GPS error rate. Though there have been many studies offering measurement technologies based on a variety of network infrastructure or technologies to compensate GPS errors, there still exist disadvantages such as large error rates indoors, energy consumption and need of additional infrastructure. Nowadays, location inference study using available user log data on smart phones, not the measurement technology based on a network, is being made to improve these shortcomings. Smart phone has a variety of user log data. Also, it can obtain variety of information about the surrounding environment around the user using the embedded hardware sensors. These user log and collected sensor data can be modelled as an ontology model then meanings of the information can be apprehended to infer the user location. This paper presents an algorithm to infer user location through an ontology modelling of the collected sensor data and the logged user information such as time, day of the week, location, and kind of applications used by user.

**Keyword**—location based service, location inference, context awareness, ontology, smart phone



**Sang-il Kim** is currently enrolled in Ph.D. program at the Dept. of Electronics and communications Engineering, Kwangwoon University, Seoul, Korea. His research interests Semantic web, context reasoning .



**Wan Jung** is currently enrolled in M.Sc. program at the Dept. of Electronics and communications Engineering, Kwangwoon University, Seoul, Korea. His research interests include semantic web service, context reasoning, augmented reality.



**Hwa-sung Kim** received Ph.D degree at the Dept. of Computer Science, Lehigh University, Bethlehem, PA 18015 USA. He is now a professor at the Dept. of Electronics and communications Engineering, Kwangwoon University, Seoul, Korea. His research interests include mobile network protocol, mobile web computing, embedded software