

Detection and Recognition of Hand Gesture for Wearable Applications in IoMT

Anna YANG*, Sung Moon CHUN**, Jae-Gon KIM*

* School of Electronics and Information Engineering, Korea Aerospace University, Korea

**Insignal, Korea

{nayang, jgkim}@kau.ac.kr, smchum@insignal.co.kr

Abstract— To support an efficient media consumption in wearable and IoT (Internet of Things) environments, the standardization of IoMT (Internet of Media-Things) is in the progress in MPEG (Moving Picture Experts Group). In this paper, we present a method to detect and to recognize hand gestures for generating hand gesture-based commands to control the media consumption in smart glasses. First, we present a detection method that utilizes depth image obtained by incoming stereo image sequences and skin color information in a combined way. Secondly, we are going to present the representation of detected hand contours based on Bézier curve as metadata to provide an interoperable interface between a detection module and a recognition module in an IoMT framework. In addition, the comparison with existing standard tools that can be used for hand gesture representation is given. In the recognition module, the detected hand contour is reconstructed by parsing delivered metadata. A set of hand gestures featured with diverse combination of open fingers and rotational angles is used for the hand gesture recognition in the proposed recognition method. Finally, the recognized hand gesture is mapped into one of the pre-defined set of gesture commands. Experiment results show that the proposed method gives quite stable performance of detection and recognition of hand gesture along with interoperable interface between both processing modules.

Keyword— MPEG Internet of Media-Things (IoMT), Smart Glasses, Hand Gesture Recognition, Hand Gesture Detection, Bézier curve



Anna Yang received the MS. degree from Korea Aerospace University, Korea, in 2017. She is currently working toward the Ph.D degree in the Department of Electronics and Information Engineering, Korea Aerospace University, Goyang-city, Korea. Her current research interests include IoT/wearable media applications, and MPEG standards.



Jae-Gon Kim received the B.S. degree in electronics engineering from Kyungpook National University, Daegu, Korea, in 1990, the M.S. and Ph.D degrees in electrical engineering from the Korea Advanced Institute of Science and Technology (KAIST), Daejeon, Korea, in 1992 and 2005, respectively. From 1992 to 2007, he was with Electronics and Telecommunications Research Institute (ETRI), where he was involved in the development of digital broadcasting media services, MPEG-7/7/21 standards and related applications, and convergence media technologies. From 2001 to 2002, he was a Staff Associate at the Department of Electrical Engineering, Columbia University, New York, USA. Since 2007, he has been with the Korea Aerospace University, Goyang-si, Gyeonggi-do, Korea, where he is currently a professor in the School of Electronics and Information Engineering. His research interests include digital video coding, video signaling processing, digital broadcasting media, and multimedia applications.



Sung Moon Chun received the B. S. degree from Sungkyunkwan University, Korea, in 1990. From 1990 to 2000, he was with Hyundai Electronics, where he was involved in the development of HDTV, MPEG-2/4 standards and related video codec technologies. From 2002 to 2012, he was with ECT Inc, where he was involved in the development of Semiconductor and related stereo video technologies. He is currently CTO in Insignal Inc. His research interests include video compression, virtual reality, and wearable applications.