Vision and Virtual-based Human Computer Interaction Applications for a New Digital Media Visualization

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ABSTRACT

With the rise of smartphones and tablets interactively, human computer interaction is a very popular topic for engineers, artists, designers and computer scientists around the world in both industry and academia. This topic was studied and researched over many years ago. Nevertheless, most of previous works were studied separately between communication arts (e.g., advertising and marketing communication research) and computer science. Indeed, there has been little work giving an overview of recent integrated research of digital media and some new technologies, such as computer vision, virtual reality, and human computer interaction for visual communication. Therefore, our contribution of this paper is to discuss the recent state-of-the-art development of the digital media research work using and applying these aforementioned multimedia-based technologies. A literature review of the novel digital media and interactive augmented reality researches is also discussed. More importantly, this paper also provides a work-in-progress framework for future digital media research when applying graphical visualization, human computer interaction such as haptic, and sensor technologies into every traditional sense of human interactively, from vision to touch and from smell to taste. In general, this paper will be beneficial for any related field of interactive multimedia, communication arts and human computer interaction both industrial and educational aspects and also for any related researcher such as computer science art communicator.

Keywords
Human Computer Interaction, Robotic, Communication Arts, Taste Communication, Touch Communication, Smell Communication, Multimedia, Digital Media, Graphical Visualization, Advertising, Marketing, Visual Communication

1. INTRODUCTION
With the rise of advanced technologies in computer science such as human computer interaction and graphical visualization, the way people send information and communicate has gradually transformed in this 21st century. Since the emerging of the computer and social media revolution, the lure of the virtual communication has attracted engineers, artists, designers, communicators, computer scientists, and others with the great idea that we might someday accomplish with technologies both physically and virtually [Bai12a]. On one hand, one of the fundamental purposes of communication research is to allow two people to be in two different locations at the same time (or nearly the same time), but can communicate human-to-human smoothly and

robustly in every sense of human as face-to-face interaction. For this reason, digital media expand increasingly and scientifically horizons into new sensory modalities every day. On the other hand, dealing with problems for communication perfectly for human-to-human remotely is not a trivial task. Communications in different senses of human pose different requirements of the communication challenging. The main challenge is how to reproduce the perception realistically and robustly for every five sense: sight, audition, touch, smell and taste. Even though some communication-based systems with different capabilities have been built, most of previous works were developed separately between communication arts and computer science. Over decades, studies of communication media by communication researchers were usually achieved quite separately. At the same time, studies of communication for digital media by computer scientists were studied in some limited dimensions. Rice from Department of Communication in University of California, Santa Barbara, and