

Developing Tangible Interaction and Augmented Reality in Director

Ji-Dong Yim

Department of Industrial Design, KAIST
373-1, Gusung-Dong, Yusung-Gu, Daejeon,
305-701, Korea
jidong@kaist.ac.kr

Tek-Jin Nam

Department of Industrial Design, KAIST
373-1, Gusung-Dong, Yusung-Gu, Daejeon,
305-701, Korea
tjnam@kaist.ac.kr

ACM CLASSIFICATION

H.5.2 [User Interfaces]: Prototyping, D.2.2 [Design Tools and Techniques]: Evolutionary prototyping; Software libraries, H.5.1 [Multimedia Information Systems]: Artificial, augmented, and virtual realities

KEYWORDS: Physical Computing, Tangible User Interface, Augmented Reality, Prototyping, Director.

ABSTRACT

This poster presents a tool for designers with non-technical backgrounds to easily implement the design concepts of new interaction design projects, such as physical computing, tangible user interface and interactive media art. We simplified the connection of external input and output hardware and made augmented reality technology easily available within a common designers' prototyping software, Macromedia Director.

Many designers from traditional design disciplines such as industrial and graphical design are contributing to the development of HCI by creating new concepts of products and applications with their own specialties based on the understandings of users, technologies and aesthetics. One of the problems they face in such projects, nevertheless, is the difficulty of transforming their conceptual ideas into initial working prototypes. Multimedia authoring tools, such as Hypercard© or Macromedia Director© have been used but limited in supporting external hardware connection or vision input. Some prototyping tools [1] have been used but are not efficient as designers are unfamiliar to programming environments.

MIDAS stands for Media Interaction Design Authoring System. MIDAS provides easier ways to manage electric input and output of external devices and to support augmented reality with vision processing functionalities.

MIDAS consists of a PC interface board (K8000 [2]) and an ActiveX control in the MS Windows environment [Figure 1]. It is targeted to be used within Macromedia Director©. Director users control external input and output hardware by the LINGO script, an embedded programming language of Director. MIDAS also supports the 3D Augmented Reality feature by overlaying 3D virtual objects on marker images of

a live video from a camera. This feature is based on the popular Mixed-Reality library, ARToolKit [3]. Designers can easily use these features by creating a sprite object and controlling the functions attached to the sprite.

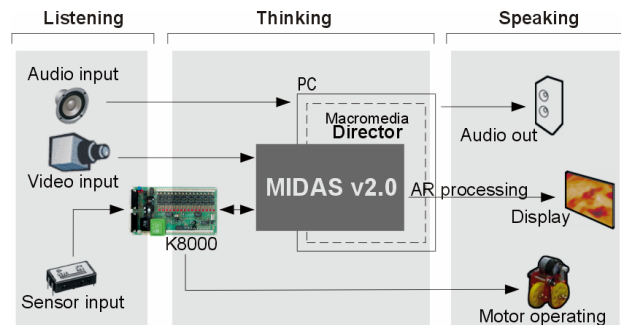


Figure 1 System architecture of MIDAS

We used MIDAS on several design projects including a virtual 3D bubble creation game. It is similar to children's soap bubbles creation game but intended to enhance user experience with tangible user interface and augmented reality. A virtual 3D bubble is created on a marker when the user blows on a sensor attached straw toward the camera. Capturing the input sensor value and the marker tracking was done via MIDAS in the Director environment.

Designers participated in the demo projects reported that MIDAS was very helpful as they could concentrate more on ideation. They could implement the physical interface concepts without advanced engineering skills. The prototyping time was reduced and the process was iterative. There were however still requirements for designers to acquire basic knowledge on electronic circuit, sensors and programming for advanced prototyping. We plan to investigate simpler electronic configurations and grammars for designers. The latest version of MIDAS is available at <http://cidr.kaist.ac.kr/midas/>.

REFERENCES

1. Greenberg, S. and Fitchett, C. Phidgets: Easy Development of Physical Interfaces through Physical Widgets. *Pro. UIST 2001*, ACM Press (2001), 209-218.
2. Velleman Group, K8000, <http://www.velleman.be/>
3. Kato, H., Billingham, M., Poupyrev, I, Imamoto, K. and Tachibana, K. Virtual Object Manipulation on a Table-Top AR Environment. *Proc. ISAR 2000*