

IMI RESEARCH SEMINAR

DATE: 23 January 2018, Tuesday

TIME: *11:00 am – 12:30 pm+

VENUE: IMI Seminar Room, Research Techno Plaza, XFrontiers, Level 03-01,
50 Nanyang Drive, Singapore 637553

* Attendance is on first-come first-served basis due to limited seating.

+ Lunch will be served

11.00am – 11.25am

20 mins presentation, 5 mins Q&A

A Comprehensive Framework for Multi-party VR



Dr Nisha JAIN – Research Fellow, IMI

Most of the Virtual Reality (VR) developments aim at achieving realistic immersive experience. We define a multi-party virtual world as an environment which includes multiple animated computer agents and graphical representation of real users (avatars), who communicate with each other using objects. Incorporating multiple avatars enhances the user experience in the virtual environment. We develop a comprehensive multi-party virtual reality platform which captures the users by integrating data from a head mounted device and kinect. We adopt a client-server architecture for building our multi-user VR platform which induces flexibility of adding multiple avatars to the application. The modular nature of our proposed system enables editing and adding extra features to the framework according to the requirements of the VR application. We exemplify our framework by developing a multi-player VR Volleyball game which employs the features of our proposed scheme.

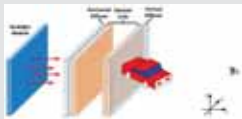
About Dr Nisha JAIN

Dr Jain is a Research Fellow at the Institute of Media Innovation (IMI), Nanyang Technological University (NTU). She received her PhD from Indian Institute of Technology (IIT), Delhi, India. Her research interests include Virtual Reality, Computer Graphics and Physically based Modelling.

11.25am – 11.50am

20 mins presentation, 5 mins Q&A

Compressed Light Field 3D Display Based on Multiple LCDs



Dr XIA Xinxing – Research Fellow, IMI

The horizontal-parallax-only (HPO) compressed light field 3D display based on stacked LCDs and the special backlight module is presented. The backlight of this 3D display is steered to diffuse only in horizontal direction to make the rays transmit in horizontal plane between multiple LCDs. It significantly reduces the computation complexity of the optimization in the generation of the display images. The architecture of the special backlight module is analyzed. The simulation and experimental results are given to verify this novel method of light field display. And the observed images for the viewers are also shown with good 3D visual effects.

About Dr XIA Xinxing

Dr Xia is a Research Fellow at the Institute for Media Innovation (IMI), Nanyang Technological University (NTU). He received his PhD on optical engineering at the State Key Laboratory of Modern Optical Instrumentation, Zhejiang University, China. His dissertation research focused on the principle and establishment of horizontal-parallax-only (HPO) light field 3D displays. His research interests include 3D display and acquisition, computational imaging and some related applications on 3D Telepresence, VR/AR.

11.50am – 12.15pm

20 mins presentation, 5 mins Q&A

Perception-Link Behavior Model – Supporting A Novel Operator Interface For A Customizable Anthropomorphic Telepresence Robot



Dr William GU – Research Fellow, IMI

The face-to-face (FTF) communication is still the best communication tool because it encompasses more social cues as compared to the computer-mediated communication (CMC). However, the existing CMC mediums still have their advantages over the FTF communication. To merge both their benefits, a customizable anthropomorphic telepresence robot (CATR) with realistic behavior is viewed as a potential candidate. However, there are issues in teleoperation that might degrade the performance of the CATR. The proposed framework with perception-link behavior model (PLBM) adopts the spatiotemporal distributed representation for all the nonverbal signals, and it increases the functionalities of a CATR during teleoperation. For example, the PLBM can tune the gesture styles so that the CATR can deliberately avoid a collision. In summary, this novel framework consists of the PLBM can enhance the user's presence on a CATR by synthesizing expressive user gestures.

About Dr William GU

Dr Gu received his B. Eng. in Mechanical Engineering (Mechatronics) from Nanyang Technological University (NTU) in Aug 2008. He received his PhD from the School of Mechanical and Aerospace Engineering (MAE), NTU in 2017 under the supervision of A/P Gerald Seet Gim Lee, MAE and Prof Nadia Magnenat-Thalmann, IMI. He is currently a Research Fellow at the Institute for Media Innovation (IMI), NTU designing the robotic software architecture and developing fundamental behavior for a child-sized humanoid robot. His research interests include robotic application, machine learning application, and multimodal analysis.

12.15pm – 12.30pm

10 mins presentation, 5 mins Q&A

3D Morphable Model for Real- Time face Reconstruction



SONG Guoxian – Project Officer, IMI

We introduce a **robust** and **real-time** framework is for **photo-realistic** 3D face reconstruction and reenactment. It fills the demand gap between 2D images and 3D face shape using 3D morphable model (3DMM) and convolution neural network(CNN). Traditional method for this 3DMM parameters extraction process is using optimization, which is time consuming. In order to achieve real-time speed, we introduce a network to disentangle identity, expression, and albedo information from a single face image. Using this method, we can use our own face to drive the avatar by changing its expression parameters.

About SONG Guoxian

Guoxian is a Project Officer at the Institute for Media Innovation (IMI), Nanyang Technological (NTU). He received his B. Sci. degree in 2016 in the School of Mathematics in University of Science and Technology of China. His research interests include computer vision and graphics, machine learning, and 3D teleconferencing using VR and AR devices.