

IMI RESEARCH SEMINAR

DATE: 12 January 2016, Tuesday

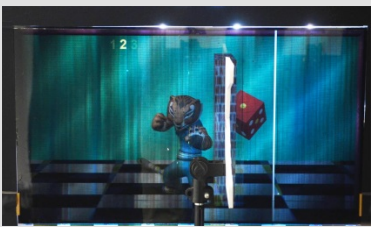
TIME: 11:00 am – 12:30 pm

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

*Lunch will be served

11.00am – 11.25am

Glass-free 3D Multiscopic Display Based on Dynamic Backlight



Dr XIA Xinxing – BTC Key Researcher, UNC, USA

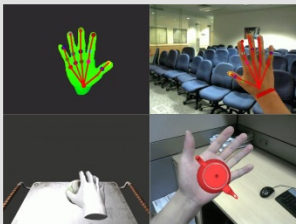
To create a convincing illusion of remote presence, the dynamic data of remote environments must be displayed in 3D and with viewpoint-dependent perspective. To make multiple users observe 3D scenes in their own positions without wearing glasses, we are developing the multi-user glass-free 3D display system based on dynamic backlight. The proposed 3D display system is mainly composed of a projector, field lens, lens array, LCD and eye-tracking module. The rear projector is utilized to generate the directional backlight. The field lens, slanted cylindrical lens array and vertical diffusers constitute the optical steering module to generate the uniform illumination for any specific viewpoint. And the illuminated LCD is used for the actual display screen. So one or two viewers could observe the 3D scenes at any location in the viewing zone.

About Dr XIA Xinxing

Xinxing Xia is a postdoctoral researcher at UNC (USA), and is currently visiting the BeingThere Centre at NTU in Singapore. He did his PhD on optical engineering at 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 interest focuses on 3D display and acquisition, computational imaging and some related applications on VR/AR.

11.25am – 11.50am

Hough Forest and its Application for Hand Motion Analysis



LIANG Hui – Research Associate, IMI

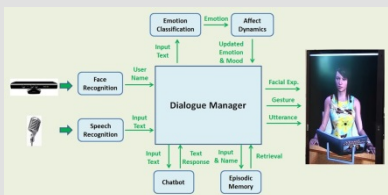
Hough forest and its variants have proven very effective for pose and motion analysis of body and hand. The success of these methods can be largely attributed to their good generalization power and robustness to noisy inputs. In order to further improve hand pose prediction accuracy, the Hough forest needs to incorporate hand motion constraints and determine the significance of difference voting elements properly. This presentation will discuss our solutions in these two aspects, including a post-fusion strategy with pre-learned hand motion constraints and a spatial-optimization scheme for Hough voting.

About LIANG Hui

Hui Liang is a PhD candidate at the School of Electrical and Electronic Engineering and the Institute for Media Innovation at Nanyang Technological University. He received the B.S. and M.S. degrees in Electronics and Information Engineering from Huazhong University of Science & Technology (HUST), Wuhan, China, in 2008 and 2011, respectively. His research interests include computer vision and machine learning, specifically in vision-based hand pose estimation and gesture recognition.

11.50am – 12.10pm

Episodic Memory for Long- term Companion Free Dialogue in Natural Language



ZHANG Juzheng – Project Officer, IMI

Long-term companion-user free dialogue in natural language is a very challenging problem. This paper proposes to use episodic memory to enhance artificial human companions' ability in long-term free dialogue. Our model provides supplemental memory functionalities such as retrieval of similar utterances, contextual features or meta-information. Compared to previous knowledge extraction based methods, our work has several advantages: (1) it can retrieve episodes by semantic meanings of utterances in natural language, which allows users to organize their utterances freely; (2) it has low requirements on the completeness and formats of user utterances, which is extremely important in practice since incomplete or informal sentences frequently occur in free dialogues; and (3) it is domain-independent, which enables easy integration with general dialogue systems.

About ZHANG Juzheng

Juzheng Zhang is a PhD candidate at the School of Computer Science and the Institute for Media Innovation at Nanyang Technological University. He received a Bachelor degree on Mathematics from Zhejiang University. His research topics concern affective system and episodic memory for virtual human and social robots.

12.10pm – 12.30pm

Feature Fusion for RGB-D Scene Classification



While convolutional neural networks (CNN) have been excellent for object recognition, the greater spatial variability in scene images typically meant that the standard full-image CNN features are suboptimal for scene classification. In this paper, we investigate a framework allowing greater spatial flexibility, in which the Fisher vector (FV) encoded distribution of local CNN features, obtained from a multitude of region proposals per image, is considered instead. The CNN features are computed from an augmented pixel-wise representation comprising multiple modalities of RGB, HHA and surface normals, as extracted from RGB-D data. More significantly, we make two postulates: component sparsity and modal non-sparsity.

About WANG Anran (SCE)

Anran is currently pursuing her PhD degree at Nanyang Technological University. She received the B. Eng degree in 2012 in Computer Science from Tianjin University, China. Her research interests: computer vision, machine learning.

Her Supervisor is Assoc Prof CAI Jianfei, SCE.