IMI RESEARCH SEMINAR

DATE: 22 March 2017, Wednesday

TIME: *11:00 am – 12:05 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

Hardware Implementation of Several Ideas for Multimodal Human-Robot Dialogue and Stereoscopic Tele-presence

Dr Viatcheslav V IASTREBOV – Research Fellow, IMI

This presentation describes the tangible hardware, prototyped for implementation of the following tasks:
Replacement of the traditional use of keyboard, mouse and touchscreen monitor on the future industrial shop floor. Instead, programming by demonstration (PBD), augmented reality (AR) & outer projection of intentions have been implemented for a dialogue (!) between the human and the robot. Hardware complex for multimodal human-robot interactions and framework are presented.

Constancy and flexibility of the remote 3D visual object examination. Remote stereoscopic camera has been modified as follows: (a) Continuous measurement of the object distance + live regulation of the cameras zoom and convergence to maintain the 3D object's position; (b) Manual fine adjustment of converging angles to move the image to a comfortable position.

About Dr Viatcheslav V IASTREBOV (Dr Slava)

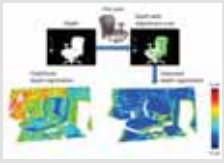
Dr Slava received his M.Eng in Electrical Engineering on Automation & Tele-mechanics from the Moscow Institute of Electronic Machine Building (MIEM) and Ph.D. in Control in Technical Systems from the Institute of Data Transfer Problems (Moscow, USSR) in 1981 and 1991 respectively.

His research interests are concentrated around the secured multimodal human-robotic interaction (SMMI), Programming by demonstration (PBD), augmented reality (AR), Tele-presence, Laser graphics projection, Underwater ROVs & sonar imaging, mechatronic systems.

11.25am – 11.45am

15 mins presentation, 5 mins Q&A

Multiple Consumer-grade Depth Camera Registration Using Everyday Objects



DENG Teng – Project Officer, IMI

The registration of multiple consumer-grade depth sensors is a challenging task due to noisy and systematic distortions in depth measurements. Most of the existing works heavily rely on large number of checkerboard observations for calibration and registration of multiple depth cameras, which is tedious and not flexible. In this work, we propose a more practical method for conducting and maintaining registration of multi-depth sensors, via replacing checkerboards with everyday objects found in the scene, such as regular furniture.

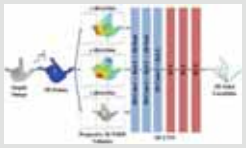
About DENG Teng

Deng Teng is currently pursuing his PhD degree at Nanyang Technological University. He received his B. Eng degree in School of Computer Engineering from Nanyang Technological University. His research interests include computer vision, machine learning, 3D reconstruction and RGB-D sensor calibration and registration.

11.45am – 12.05pm

15 mins presentation, 5 mins Q&A

3D Convolutional Neural Networks for Efficient and Robust Hand Pose Estimation from Single Depth Images



We propose a simple, yet effective approach for real-time hand pose estimation from single depth images using three-dimensional Convolutional Neural Networks. Image based features extracted by 2D CNNs are not directly suitable for 3D hand pose estimation due to the lack of 3D spatial information. Our proposed 3D CNN taking a 3D volumetric representation of the hand depth image as input can capture the 3D spatial structure of the input and accurately regress full 3D hand pose in a single pass. In order to make the 3D CNN robust to variations in hand sizes and global orientations, we perform 3D data augmentation on the training data. Experiments show that our proposed approach outperforms state-of-the-art methods and is very efficient.

About GE Liuhao, PhD Student, IMI & IGS (August 2015 Intake)

Liuhao is currently pursuing the PhD degree at Nanyang Technological University. He received his M.E. degree in 2014 in School of Automation from Southeast University, Nanjing, China; and his B.E. degree in 2011 in College of Automation Engineering from Nanjing University of Aeronautics and Astronautics, Nanjing, China. His research interests include computer vision, machine learning, virtual and augmented reality, and hand/human pose estimation.

His Supervisor is Assoc Prof Junsong YUAN, EEE and Co-Supervisor is Prof Daniel THALMANN, IMI.