IMI RESEARCH SEMINAR

DATE: **14 February 2017, 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

RGB+D Systematic Error Analysis and Correction for Biometric Applications and Object Detection using Deep Learning

Jaroslaw KOCHANOWICZ – Senior Research Engineer, IMI

As any other measurement, RGB+D skeletal tracking is a subject to two basic types of errors, i.e. random and systematic error. Random errors are caused by the unpredictable changes in the experiment, manifesting as different measurement results for (practically) identical setups. Systematic measurement errors, on the other hand, are persistent features of the measurement setup and may include: constant environmental interference, faulty or improperly used instrument or inherent features of data handling. This research presents a novel method of improving RGB+D measurement accuracy by analyzing and eliminating systematic error.

About Jaroslaw KOCHANOWICZ

Jaroslaw is a Senior Research Engineer at the Institute of Media Innovation, Nanyang Technological University, Singapore. He has submitted a PhD thesis in A.I. at NTU and has previously studied Computer Science and Mathematics at the Jagiellonian University (Poland), and A.I. at the Vrije University (Netherlands) and Katholieke Universiteit (Belgium). He holds an MS in Computer Science (2008). His PhD is focused on cognitive modelling and simulation of human-like irrationality. Subsequently, He has been programming virtual humans and human-like robots with the focus on software engineering and deep learning in computer vision. One of his long-lasting interest and hobbies is object oriented game programming.

11.25am – 11.45am

15 mins presentation, 5 mins Q&A

Episodic Memory Model with Dense Vector Encoding and Continuous Similarity Measure
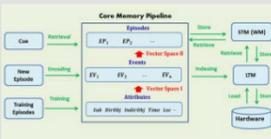
ZHANG Juzheng – Project Officer, IMI

Episodic memory enables agents to remember past experience and learn useful knowledge. The memory retrieval highly depends on the accuracy of the similarity measure for memory elements. Many prior works adopt the discrete similarity measures that have drawbacks in overlooking the attribute relations. To achieve better retrieval, we propose a general episodic memory framework built on raw memory data. We improve prior works by integrating the dense vector encoding and the continuous similarity measure. The core pipeline of our framework encodes all memory elements into two hierarchical spaces by embedding and clustering. The similarities of memory elements are continuous and can be computed by vector operations.

About ZHANG Juzheng

Juzheng is a researcher at the Institute of Media Innovation, Nanyang Technological University, Singapore. He is currently pursuing his PhD degree at Nanyang Technological University. He received his Bachelor in Mathematics and Applied Mathematics from Zhejiang University, Hangzhou, China in 2011. He is focusing on designing some cognitive capabilities, including the affective system and the episodic memory, for social companions to improve user experience in human-robot interactions.

11.45am – 12.05pm

15 mins presentation, 5 mins Q&A

A Novel Interface for Human-Robot Interaction in Industrial Working Environment: Framework and Applications
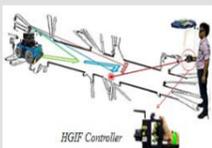
As robots are becoming more popular in industrial contexts, the requirement of designing a user-friendly interface is always very essential. As a result, the ultimate goal of our project is to create an interface that supports a partnership interaction between human and robot which leads to the facilitation of many industrial processes for both new and expert users. In this talk, I will highlight the application of laser-generated outline-graphics in combination with standard Augmented-Reality technology and a handheld device in designing an interface. I will propose a novel framework and share some of its industrial application as well.

About DINH Quang Huy   – PhD Student, IMI & IGS (August 2013 Intake)

Huy is currently pursuing his PhD degree at Nanyang Technological University. He received his B. Eng degree in Electrical Engineering from Da Nang University of Technology, Vietnam. His research interests are robotics, computer vision, augmented reality and related applications in industrial engineering.

His Supervisor is Assoc Prof SEET Gim Lee, Gerald, MAE and Co-Supervisor is Prof Nadia THALMANN, IMI.

12.05pm – 12.30pm

15 mins presentation, 5 mins Q&A

Human Pose Estimation and Tracking from Silhouette Images
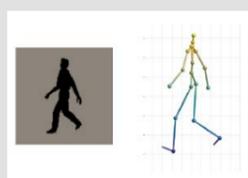
3D pose estimation can be implemented using model-based or example-based approach depending on whether an underlying articulated model is used. This study focused on the example-based method that estimates 3D poses by interpolating the nearest neighbours retrieved in the training dataset. The performances of various silhouette features are compared in terms of retrieval accuracy, robustness to noise and computational efficiency. 3D human motion recovered using the example-based method caused motion jitter and wrongly estimated pose. Tracking of body joints is implemented using annealed particle filter method, and is embedded in the reconstruction process to reduce motion jitter.

About LEONG Mei Chee – PhD Student, IMI & IGS (August 2015 Intake)

Mei Chee is currently pursuing her PhD degree at Nanyang Technological University. She received the B. Eng degree in Manufacturing Engineering from National University of Malaysia and M. Sc in Digital Media Technology from Nanyang Technological University. Her research interests are computer vision, 3D reconstruction, and machine learning.

Her Supervisor is Assoc Prof LEE Yong Tsui, MAE and Co-Supervisor is Assoc Prof LIN Feng, SCE.