IMI RESEARCH SEMINAR

DATE: 10 October 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

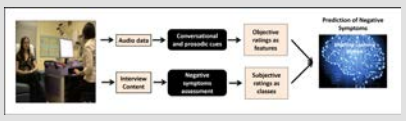
*** Attendance is on first-come first-served basis due to limited seating.**

+ Lunch will be served

11.00am – 11.25am

20 mins presentation, 5 mins Q&A

Non-Verbal Speech Cues as Objective Measures for Negative Symptoms Schizophrenia



Dr Yasir TAHIR – Senior Research Engineer, IMI

Negative symptoms of schizophrenia significantly affect the daily functioning of patients, especially communication, movement and expressive gestures. The diagnosis of such symptoms is often difficult and requires the expertise of a trained clinician. Apart from these subjective methods, there is little research on developing objective methods to quantify the symptoms. Therefore, we explore speech cues and body movement signals as objective measures of negative symptoms. Specifically, we extract the signals from speech and video recordings of patients being interviewed. We analysed the interviews of 69 paid participants (46 patients and 23 healthy controls) in this study. Our results suggest a strong correlation between the audio-visual cues and certain measures of the Negative Symptoms Assessment criteria.

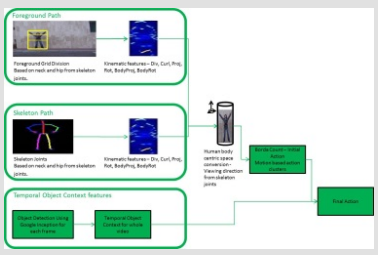
About Dr Yasir TAHIR

Dr Yasir TAHIR received his PhD from Nanyang Technological University (NTU) in 2017. He is currently working as a Senior Research Engineer at the Institute for Media Innovation at NTU. His research interests include social signal processing, human behaviour understanding and human robot interaction.

11.25am – 11.50am

20 mins presentation, 5 mins Q&A

Combining Pose-Invariant Kinematic Features and Object Context Features for RGB-D Action Recognition



Dr Manoj RAMANATHAN – Research Fellow, IMI

Action recognition using RGBD cameras is a popular research topic. Recognizing actions in a pose-invariant manner is very challenging due to view changes, posture changes and huge intra-class variations. Involvement of objects makes recognition more difficult. To tackle this problem, novel pose-invariant action recognition framework based on kinematic features and object context features is proposed. Using RGB, depth and skeletal joints, the proposed framework extracts a novel set of pose-invariant motion kinematic features based on 3D scene flow and captures motion of body parts with respect to the body itself. The obtained features are converted to a human body centric space that allows view-invariant recognition of actions. The proposed pose-invariant kinematic features are extracted for both foreground region (from RGB and Depth) and skeleton joints separately. Separate classifiers are trained for kinematic features from foreground and joints respectively and combined using Borda-count to obtain initial action recognition result. For capturing object context features, a convolutional neural network classifier is proposed to identify the objects involved. The proposed context features also include temporal information on the object interaction. The framework allows simultaneous recognition of actions by multiple people which is a less researched topic. The performance and robustness of the proposed pose-invariant action recognition framework is tested on several benchmark datasets.

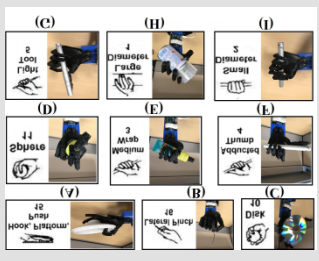
About Dr Manoj RAMANATHAN

Dr Manoj RAMANATHAN is a Research Fellow in the Institute for Media Innovation, Nanyang Technological University (NTU). He received his PhD degree from School of EEE, NTU. His PhD research is titled 'Pose-invariant Action Recognition for Automated Behavioral Analysis'. He received his B.Tech degree in instrumentation and control engineering from the National Institute of Technology, Tiruchirappalli, India, in 2009. He was working as a software engineer in Toshiba Software India Pvt. Ltd till 2012. His research interests include computer vision, action recognition, pattern recognition and robotics.

11.50am – 12.10pm

15 mins presentation, 5 mins Q&A

The Designing and Making of a Humanoid Robotic Hand



TIAN Li – Research Associate, IMI

Dexterity robotic hands can greatly enhance the functionality of humanoid robots, but the making of such hands with not only human-like appearance but also the capability of performing natural movement for social robots is a challenging problem. This presentation discusses the issues and principles of designing and fabricating fully articulated robotic hands for humanoid robots. We start with studying the biomechanical features of a human hand and proposing a simplified mechanical model of robotic hands. Then we use 3D modeling techniques to create a single interlocked hand model that integrates pin linkages to the fingers without additional assembly process and can be fabricated using commonly-accessible 3D printing techniques. Finally the actuation of the hand is realized by cables and motors.

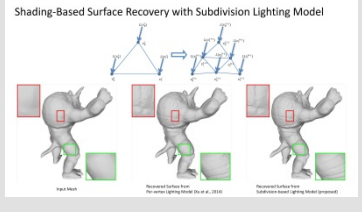
About TIAN Li

TIAN Li is a Research Associate at the Institute for Media Innovation, Nanyang Technological University (NTU). He received his B.Eng. and M.Sc from NTU in 2010 and 2012 respectively. He has 5-year firmware engineer working experience in Toshiba and Fuji Xerox. He is currently working in the area of social robotics under the supervision of Prof Nadia THALMANN. TIAN Li is currently pursuing part-time PhD degree in NTU and his supervisor is Assoc Prof ZHENG Jianmin. His research interests include computer aided geometric design, geometric modeling and robot motion control.

12.10pm – 12.30pm

15 mins presentation, 5 mins Q&A

Subdivision-based Overall Illumination for MVS Surface Reconstruction



DENG Teng – Project Officer, IMI

The reconstruction of 3D real world objects is a fundamental task in computer graphics and vision. The overall illumination plays an essential role in photogrammetry based 3D reconstruction techniques that are based on the relations among 3D shapes, surface reflectance properties and lighting conditions. In this work, we propose a subdivision-based overall illumination model to compactly represent the overall illumination vectors and provide inherent smooth regularization. Furthermore, we propose an adaptive reparameterization scheme to locally model sharp illumination regions. We use this model to solve the problem of shading-based MVS surface detail recovery under general unknown illumination. Compared to the state-of-the-art, our method recovers more surface details but requires much less memory.

About DENG Teng

DENG Teng is a Project Officer at the Institute for Media Innovation, Nanyang Technological University (NTU). He is currently pursuing his PhD degree at NTU. He received his B.Eng degree in School of Computer Engineering from NTU. His research interests include computer vision, machine learning, 3D reconstruction and RGB-D sensor calibration and registration.