IMI RESEARCH SEMINAR

DATE: 29 April 2014, 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

Noisy images? We still recognize you!

REN Jianfeng
Research Associate, IMI

Noise-Resistant Local Binary Pattern With an Embedded Error-Correction Mechanism

Local binary pattern (LBP) is sensitive to noise. Local ternary pattern (LTP) partially solves this problem. Both LBP and LTP, however, treat the corrupted image patterns as they are. Thus, we propose a noise-resistant LBP (NRLBP) to preserve the image local structures in presence of noise. The small pixel difference is vulnerable to noise. We encode it as an uncertain state, and determine its value based on other bits of the LBP code. More specifically, we assign the value of an uncertain bit hence as to form possible uniform codes. We develop such an error-correction mechanism to recover the distorted image patterns. The proposed NRLBP are more resistant to noise. On various applications, the proposed NRLBP demonstrates superior performance.

Neetha DAS
Project Officer, IMI

Perception of Audio Environment by Virtual Human Nadine

Sound classification holds significant applications in the scenario where no direct interaction between a human and the virtual human occurs, and the robot must be able to perceive other active sound sources in its proximity. In a meeting room environment, where the humanoid robot is expected to interact well with the other members present in the room, as well as be aware of the acoustic environment, sound classification plays a crucial role in supporting the ability of the robot to perceive the type of sound, and respond accordingly. We discuss existing algorithms and challenges. Also, we propose machine learning techniques to empower Nadine with a better and more robust sound classification ability.


ZHU Hongyuan
PhD Student, IMI/SCE

Multiple Foreground Cosegmentation and Recognition

Localizing, recognizing, and segmenting multiple foreground objects jointly from a general user's photo stream that records a specific event is an important task with many useful applications. Multiple Foreground Cosegmentation (MFC) task is very challenging in that it contrasts substantially from the classical cosegmentation problem, and aims toparse a set of realistic event photos but each containing irregularly occurring multiple foregrounds with high appearance and scene configuration variations.
We propose a method With a minimal amount of user annotations on just a few example photos, the proposed approach produces spatially coherent, boundary-aligned segmentation results with correct and consistent object labeling. Experiments on the FlickrMFC dataset justify that our method achieves state-of-the-art performance.
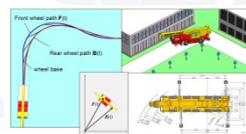
CHEN Yong
PhD Student, IMI/MAE

Trajectory Planning & Simulation for Long Vehicle Driving

Safety and efficiency are two major issues when it comes to large vehicle driving and operating especially in narrow spaces. Compared with small agile robots, it is hard to control and plan the motion of a long vehicle practically. Problems such as Off-tracking and swept volume are need to be considered. To address these issues, a trajectory pre-planning system is developed which can calculate corresponding optimized paths according to different input parameters. Meanwhile, for evaluation and training purpose, an interactive large vehicle driving simulation system is created with the collision detection considered. In both systems, the trajectories and behaviors of the mobile cranes or trailers are calculated based on the database of each model.

Please click here to register