

Graduate Research Seminar: Parallel Tracking and Verifying: A Framework for Real-Time and High Accuracy Visual Tracking

Speaker: Heng Fan
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Date: May 1st, 2019 (Wednesday)
Time: 11:00am-12:00pm
Venue: Computer Science Room 330A Robinson Hall

Abstract:

Visual object tracking is one of the most fundamental problems in computer vision and has a long list of applications such as video surveillance, human-machine interaction, robotics, etc. Being intensively studied in recent decades, visual tracking has seen great advances in either speed (e.g., with correlation filters) or accuracy (e.g., with deep features). Real-time and high accuracy tracking algorithms, however, remain scarce.

In this presentation, I will talk about our recent work, a novel *parallel tracking and verifying* (PTAV) framework, by taking advantage of the ubiquity of multi-thread techniques and borrowing from the success of *parallel tracking and mapping* in visual SLAM. Specifically, our PTAV framework typically consists of two components, a tracker \mathcal{T} and a verifier \mathcal{V} , working in parallel on two separate threads. The tracker \mathcal{T} aims to provide a super real-time tracking inference and is expected to perform well most of the time; by contrast, the verifier \mathcal{V} checks the tracking results and corrects \mathcal{T} when needed. The key innovation is that, \mathcal{V} does not work on every frame but only upon the requests from \mathcal{T} ; on the other end, \mathcal{T} may adjust the tracking according to the feedback from \mathcal{V} . With such collaboration, PTAV enjoys both the high efficiency provided by \mathcal{T} and the strong discriminative power by \mathcal{V} . In extensive experiments on several benchmarks including OTB2013, OTB2015, TC128 and UAV20L, PTAV demonstrates state-of-the-art performance with real-time speed.

Brief Bio:

Heng Fan is a Ph.D. candidate in the Department of Computer and Information Sciences at Temple University. His research interests include computer vision and machine learning, such as visual object tracking, semantic segmentation and object detection. His work has been published in high-impact conferences (e.g., CVPR, ICCV, AAAI, WACV, etc.) and journals (T-IP, T-CSVT, T-ITS, etc.). He was a receipt of national scholarships in his graduate and undergraduate studies in 2015 and 2011. He won the second prize in nation-level Mathematical Contest in Modeling for graduate in 2013 and the second prize in Hubei College Mathematic Contest in Modeling in 2012.