Ph.D. Defense

Detecting, Tracking, and Recognizing Activities of Targets of Interest in Aerial Video

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In this dissertation we address the problem of detecting humans and vehicles, tracking their identities in crowded scenes, and finally determining human activities. First we tackle the problem of detecting moving as well as stationary objects in scenes that contain parallax and shadows. We constrain the search of pedestrians and vehicles by representing them as shadow casting out of plane or (SCOOP) objects.

Next we propose a novel method for tracking a large number of densely moving objects in aerial video. We divide the scene into grid cells to define a set of local scene constraints which we use as part of the matching cost function to solve the tracking problem which allows us to track fast-moving objects in low framerate videos.

Finally we propose a method for recognizing human actions from few examples. We use the bag of words action representation, assume that most of the classes have many examples, and construct Support Vector Machine models for each class. We then use Support Vector Machines for classes with many examples to improve the decision function of the Support Vector Machine that was trained using few examples via late fusion of weighted decision values.

Computer VISION @ Lab

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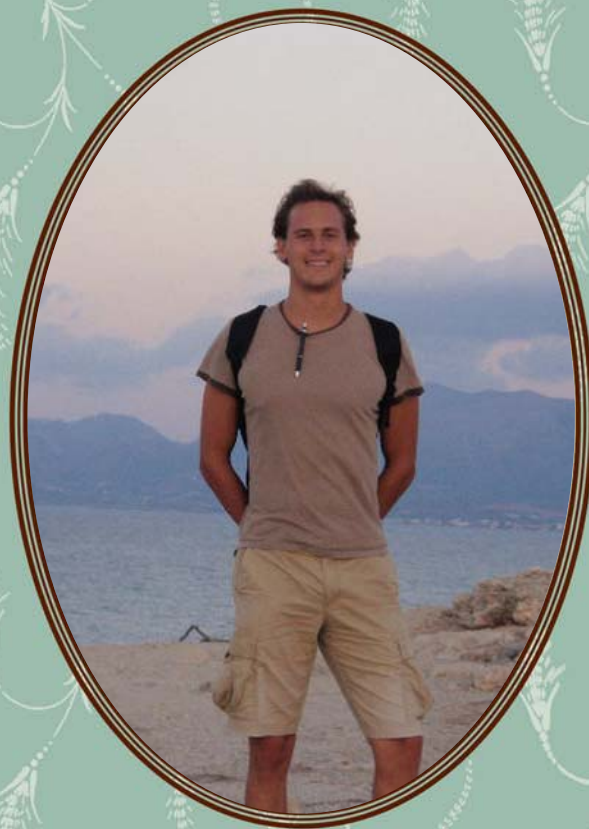
Mr. Vladimir Reilly

Biography

Vladimir Reilly is a Ph.D candidate in the computer vision laboratory of Professor Mubarak Shah. His research interests include object detection, motion detection, geo-registration, and aerial video processing. He received B.S. and M.S. degrees in Computer Science from University of Central Florida in 2006, and 2008 respectively. He published the following papers: "Motion and Appearance Contexts for Tracking and Reacquiring Targets in Aerial Video" CVPR 2007, "Geometric Constraints for Human Detection in Aerial Imagery" ECCV 2010, and "Detection and Tracking of Large Number of Targets In Wide Area Surveillance" ECCV 2010.