



THE WEIZMANN INSTITUTE OF SCIENCE
FACULTY OF MATHEMATICS AND COMPUTER SCIENCE

Vision and Robotics Seminar

Room 1 ,Ziskind Building
on Monday, Sep 04, 2017
at 14:00

NOTE THE UNUSUAL TIME AND DAY

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Hand-object interaction: a step towards action recognition

Abstract:

When dealing with a highly variable problem such as action recognition, focusing on a small area, such as the hand's region, makes the problem more manageable, and enables us to invest relatively high amount of resources needed for interpretation in a small but highly informative area of the image. In order to detect this region of interest in the image and properly analyze it, I have built a process that includes several steps, starting with a state of the art hand detector, incorporating both detection of the hand by appearance and by estimation of human body pose. The hand detector is built upon a fully convolutional neural network, detecting hands efficiently and accurately. The human body pose estimation starts with a state of the art head detector and continues with a novel approach where each location in the image votes for the position of each body keypoint, utilizing information from the whole image. Using dense, multi-target votes enables us to compute image-dependent joint keypoint probabilities by looking at consensus voting, and accurately estimates the body pose. Once the detection of the hands is complete, an additional step of segmentation of the hand and fingers is made. In this step each hand pixel in the image is labeled using a dense fully convolutional network. Finally, an additional step is made to segment and identify the held object. Understanding the hand-object interaction is an important step toward understanding the action taking place in the image. These steps enable us to perform fine interpretation of hand-object interaction images as an essential step towards understanding the human-object interaction and recognizing human activities.