University of Cyprus
Department of Computer Science

You are cordially invited to the PhD Defense on:

Physically-Based Probabilistic Image Segmentation

Mr. Nikolas Ladas
University of Cyprus, Cyprus

Tuesday, January 28, 2020
09.30-10.30 EET

Room 148, Building 12
Faculty of Pure and Applied Sciences, New Campus

Abstract

Image segmentation is a vital component of many Computer Vision algorithms including object identification, tracking, and image manipulation. These algorithms power various high impact applications such as image editing, composition, film post-processing, autonomous driving and virtual/augmented reality. Although image segmentation is a mature field, existing algorithms often fail when the input -images or video- contains strong illumination effects such as shadows and colored lighting. This thesis addresses some of these limitations by incorporating knowledge from the Computer Graphics field where complex illumination effects are well-studied. Our contribution is twofold: Firstly, we introduce a data acquisition process that utilizes high dynamic range imaging to capture the illumination of the scene. Based on this process we have developed an illumination normalization algorithm that improves tracking performance in cases where the scene illumination changes rapidly. The second contribution of this thesis is two algorithms for the segmentation of images into background and foreground regions. The proposed algorithms utilize a physically-based formulation of scene appearance which explicitly models the formation of shadows originating from multiple, possibly colored, light sources. This formulation enables a probabilistic model to distinguish between shadows and foreground objects in challenging images, such as those lit by colored lights. The proposed methods are efficient, general, and robust.

Short Bio:

Nikolas Ladas is a Ph.D. candidate at the Computer Science Department under the supervision of professor Yiorgos Chrysanthou. His research interests lie in the areas of Computer Graphics and Computer Vision and specifically in inverse illumination and scene segmentation. Nikolas is also the co-founder of Ten Ton Train LTD which develops technology for commercial and serious games. He received his BSc and MSc from the University of Cyprus

Host: Prof. Constantinos Pattichis (pattichi-AT-cs.ucy.ac.cy)