

UNIVERSITY OF MACAU  
FACULTY OF SCIENCE AND TECHNOLOGY  
DEPARTMENT of  
COMPUTER AND INFORMATION SCIENCE

Ref: FST/SEM/00042/2014

*"Robust Object Tracking via Locality  
Sensitive Histograms"*

by

*Mr. Shengfeng HE*

*Department of Computer Science, City University of Hong Kong*

**Date: 24/04/2014 (THURSDAY)**

**Time: 3:30PM – 4:30PM**

**Venue: ILG129 (University of Macau)**

**Abstract**

This paper presents a novel locality sensitive histogram (LSH) algorithm for visual tracking. Unlike the conventional image histogram that counts the frequency of occurrence of each intensity value by adding ones to the corresponding bin, a locality sensitive histogram is computed at each pixel location and a floating-point value is added to the corresponding bin for each occurrence of an intensity value. The floating-point value reduces exponentially with respect to the distance to the pixel location where the histogram is computed. An efficient algorithm is proposed that enables the locality sensitive histograms to

be computed in time linear in the image size and the number of bins. In addition, this efficient algorithm can be extended to exploit color images. A robust tracking framework based on the locality sensitive histograms is proposed, which consists of two main components: a new feature for tracking that is robust to illumination change and a novel multi-region tracking algorithm that runs in real-time even with hundreds of regions. Extensive experiments demonstrate that the proposed tracking framework outperforms the state-of-the-art methods in challenging scenarios, especially when the illumination changes dramatically. Evaluation using the latest benchmark shows that our algorithm is the top performer.

### **Biography**

Mr. Shengfeng He is a Doctoral Candidate in the Department of Computer Science at City University of Hong Kong. He obtained the B.Sc. degree and the M.Sc. degree from Macau University of Science and Technology. During his study in MUST, he received Postgraduate Science and Technology Research and Development Award from Macau SAR. His research interests span computer vision, image processing, computer graphics, and machine learning.

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