Abstract

Object tracking and detection is a classical research area in the field of computer vision from decades. Numerous kinds of applications are dependent on the area of object detection, such as advance driving assistance system, traffic surveillance, scene understanding, autonomous navigation etc. Many challenges still exist while detecting an object such as illusion, low visibility, cast shadows and most importantly occlusions of object. Occlusions occur under two categories, firstly its, self?occlusion which means that, from a certain viewpoint, one part of an object is occluded by another part. Secondly, its inter-object occlusion which means when two objects being tracked occlude each other. We will review various occlusion handling methods that involved single and multiple cameras according to their application. In short, the objective of this paper is to deliberate in detail the problem of occlusion in object tracking and provide a concise review for the problem of occlusion handling under different categories and identify new trends.

References

- Hossein Tehrani Niknejad, Taiki Kawano, Yuki Oishi, Seiichi Mita, "Occlusion
Handling using Discriminative Model of Trained Part Templates and Conditional Random Field," 2013 IEEE Intelligent Vehicles Symposium (IV) June 23-26, 2013, Gold Coast, Australia
- Andrej Karpathy Li Fei-Fei, "Andrej Karpathy Li Fei-Fei," 2014
- Jiyan Pan, Bo Hu, "Robust Occlusion handling in object tracking," IOP Sciences, Computer Vision and Pattern Recognition, 2007
- Min Hu, Weiming Hu, Tieniu Tan, "Tracking People through Occlusion," International Conference on Pattern Recognition, 2004
- Xiaoyu Wang, Tony X. Han and Shuicheng Yan, "An HOG-LBP Human Detector with Partial Occlusion Handling," IEEE 12th International Conference on Computer Vision (ICCV), 2009
- Rashid Mehmood, Rab Nawaz, Naveed Iqbal Rao, "Occlusion Handling in Meanshift Tracking using Adaptive Window Normalized Cross Correlation," 11th International Bhurban Conference on Applied Sciences and Technology (IBCAST), 2014
- Yaowen Guan, Xiaou Chen, Deshun Yang, Yuqian Wu, "Multiperson tracking by detection with local particle filtering and global occlusion handling," IEEE International Conference on Multimedia and Expo (ICME), 2014
- Tao Yang, Stan Z. Li, Quan Pan, Jing Li, &quot;Real-time Multiple Objects Tracking with Occlusion Handling in Dynamic Scenes,&quot; IEEE Computer Society Conference on Computer Vision and Pattern Recognition, 2005
- Dongbo Min and Kwanghoon Sohn, &quot;Cost Aggregation and Occlusion Handling With WLS in Stereo Matching,&quot; IEEE Transactions on Image Processing, vol. 17, no. 8, 2008
- Bing-Fei Wu et al., &quot;A Relative-Discriminative-Histogram-of-Oriented-Gradients-Based Particle Filter Approach to Vehicle Occlusion Handling and Tracking,&quot; IEEE Transactions on Industrial Electronics, vol. 61, no. 8, 2014
- Markus Enzweiler, Angela Eigenstetter, Bernt Schiele, Dariu M. Gavrila, &quot;Multi-Cue Pedestrian Classification With Partial Occlusion Handling,&quot; IEEE Conference on Computer Vision and Pattern Recognition, 2010
- Woo-Seok Jang, Yo-Sung Ho, &quot;Efficient depth map generation with occlusion handling for various camera arrays,&quot; Signal, Image and Video Processing, Volume 8, Issue 2, pp 287-297, 2014
- Christian Wojek, Stefan Walk, Stefan Roth and Bernt Schiele, &quot;Monocular 3D Scene Understanding with Explicit Occlusion Reasoning,&quot; IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2011
- Christian Wojek, Stefan Walk, Stefan Roth and Bernt Schiele, &quot;Monocular 3D Scene Understanding with Explicit Occlusion Reasoning,&quot; IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2011
- Fabienne LathuiIiere and Jean-Yves Herve, &quot;Visual Tracking of Hand Posture with Occlusion Handling,&quot; 15th International Conference on Pattern Recognition, 2000
- Ting - Hsun Chang, Shaogang Gong and Eng Jon Ong, &quot;Tracking multiple people under occlusion using multiple cameras,&quot; BMVC, 2000
- Ro´mer Rosales and Stan Sclaroff, &quot;Improved Tracking of Multiple Humans with Trajectory Prediction and Occlusion Modeling,&quot; IEEE Conf. on Computer Vision and Pattern Recognition, 1998
- Andrew Senior et al., &quot;Appearance models for occlusion handling,&quot; Image and Vision Computing, vol. 24, 2006
- Yasuyuki Sugayama and Yuichi Ohta, &quot;Stereo by the integration of two algorithms with/without occlusion handling,&quot; 15th International Conference on Pattern Recognition, 2000
- Chenyuan Zhang, Jiu Xu, Axel Beaugendre and Satoshi Goto, "A KLT-Based Approach for Occlusion Handling in Human Tracking," Picture Coding Symposium, 2012
- James J. Little and Walter E. Gillet, "Direct Evidence for Occlusion in Stereo and Motion," Computer Vision — ECCV, 1990
- Juyang Weng, Narendra Ahuja, Thomas S. Huang, "Two view matching," IEEE, 1988
- Ming Qing, Van-Dung Hoang and Kang-Hyun Jo Yung, "Localization and Tracking of Same Color Vehicle under Occlusion Problem," Mechatronics-REM, 2012
- Xiaowu Chen, Qing li, Dongyue Zhao, Qinping Zhao, "Occlusion cues for image scene layering," Computer Vision and Image Understanding Volume 117, Issue 1, Pages 42–55, 2013

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