Tianyu Yang

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Education

City University of Hong Kong
PhD in Computer Science — *Sep, 2015 – Present*

University of Chinese Academy of Sciences
Master in Electronic & Communications Engineering — *Sep, 2010 – Jul, 2013*

Liaocheng University
Bachelor in Communications Engineering — *Sep, 2006 – Jul, 2010*

Publications

- **Tianyu Yang**, Antoni B. Chan, "Learning Dynamic Memory Networks for Object Tracking", *arXiv Preprint*, 2018
- **Tianyu Yang**, Antoni B. Chan, "Recurrent Filter Learning for Visual Tracking", *Workshop on Visual Object Tracking (VOT) Chanllenge, ICCV 2017*
- Lei Yu, **Tianyu Yang**, Antoni B. Chan, "Approximate Inference for Generic Likelihoods via Density-Preserving GMM Simplification", *Workshop on Advances in Approximate Bayesian Inference, NIPS 2016*
- **Tianyu Yang**, Baopu Li, Max Q.-H. Meng, "Robust Object Tracking with Reacquisition Ability using Online Learned Detector", *IEEE Transactions on Cybernetics*, 2014
- **Tianyu Yang**, Baopu Li, Chao Hu, Max Q.-H. Meng, "Adaptive Visual Tracking with Reacquisition Ability for Arbitrary Objects", *IEEE International Conference on Robotics and Automation (ICRA)*, 2013

Patents

- Jingwen Li, **Tianyu Yang**, Yaojie Lu, Zhongchao Shi, Dianchao Liu, "Method, apparatus and system for motion estimation", CN106504265A, patent pending, China.
- **Tianyu Yang**, Yaojie Lu, Zhongchao Shi "Method and system for object tracking based on multiple classifier fusing", CN106204632A, patent pending, China.
- **Tianyu Yang**, Dianchao Liu, Yaojie Lu, Zhongchao Shi, Gang Wang, "Method and apparatus for object tracking", CN104915964B, China.
- **Tianyu Yang**, Baopu Li, Chao Hu, Max Q.-H. Meng, "An online learned object tracking method", CN103150572B, China.

Research Experiences

City University of Hong Kong — *Sep, 2015 – Present*

Worked on visual tracking with deep learning

- Devised a dynamic memroy networks where the target information is stored and recalled from external addressable memory to maintain the variations of object appearance for template-matching. Designed a channel-wise gated residual template learning mechanism to control the amount of retrieved memory for updating. The tracker performs favorably against state-of-the-art tracking methods while retaining real-time speed of 50 fps.
- Proposed an end-to-end recurrent filter learning network where CNNs are used to exact features and a convolutional LSTM is applied to maintain the varaition of target's appearance when tracking. Object appearance is updated by controlling different gates(input gate, forget gate and output gate) automatically without the need of fine-tuning network parameters using time-consuming SGD process.

- Applied recursive Bayesian filtering where the posterior is represented as a Gaussian mixture model (GMM), and the likelihood function as a sum of scaled Gaussians (SSG) for object tracking. Proposed a simplifying algorithm for GMMs to keep the number of components at a tractable level, while also preserving density structure.

Ricoh Software Research Center(Beijing) Co., Ltd. *Jul, 2013 – Aug, 2015*

Worked on visual odometry for Unmanned Aerial Vehicle (UAV) navigation and object tracking for Advanced Driver Assistance System (ADAS).

- Applied techniques including Harris/ORB/KAZE/SURF/SIFT keypoints detection, essential matrix estimation through RANSAC and bundle adjustment, to estimate the pose and translation of agent (UAV)
- Used Connected-Component Labeling(CCL) technique to detect potential obstacles or moving objects from disparity image and adopted Kanade-Lucas-Tomasi (KLT) method to form a sparse optical flow based tracker for object tracking.

Shenzhen Institutes of Advanced Technology, CAS *July, 2011 – June, 2013*

Worked on visual tracking algorithms for intelligent household robots and optical measurement systems for navigating the surgical procedures.

- Applied online SVM to maintain the object's appearance information and Random Ferns as the conservative detector to redetect the target after drifting.
- Used techniques of pinhole camera model with a calibrated four-cameras system to track the reflective passive marker spheres on the scalpel, thus leading to a robust estimation of scalpel's position.

Skills

- **Programming** Python, C/C++, Matlab
- **Toolbox** Tensorflow, Pytorch

Selected Honors and Scholarships

- University Scholarship in 2006-2010;
- National Encouragement Scholarship(two students/one semester) in 2009;
- University-level Outstanding students in 2007.