Tarasha Khurana

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Google Scholar, LinkedIn

Education

- **The Robotics Institute, Carnegie Mellon University** **4.11/4.33**
  Master of Science in Robotics; Thesis Committee: Deva Ramanan, Simon Lucey, Achal Dave *2019 – 2021*

- **Netaji Subhas Institute of Technology, University of Delhi** **75.83%**
  Bachelor of Engineering in Computer Engineering; ***First Class with Distinction*** *2014 – 2018*

Experience

- **The Robotics Institute, Carnegie Mellon University** PA, USA
  Graduate Research Assistant, ***Advisor: Deva Ramanan*** *Jan 2020 - Present*

  Detection in Extreme Occlusions [1]: Proposed to detect people during heavy and full occlusions in 3D using freespace supervision from depth maps while tracking. Increased detection by upto 11% F1 over baselines.

  Open-world Tracking [2]: Proposed TAO, a large-scale benchmark for tracking any open-world object to promote generic multi-object tracking in a long-tail large-vocabulary setting.

- **Argo AI** PA, USA
  Research Intern in Autonomy *May 2020 - Aug 2020*

  Proposed to formulate depth completion as a local alignment of dense depth maps by solving a globally-consistent weighted least squares optimization using a sparse LiDAR input for application in far-field tracking.

- **Staqu Technologies Pvt. Ltd.** Gurgaon, India
  Research Associate *Jun 2018 - May 2019*

  Earth Observation: Project for the Govt. of India that aids detection and tracking of objects from low-resolution satellite images by training multi-task networks such that auxiliary tasks assist each other and are interdependent.

  Surveillance: Building lip-reading, gait analysis, automatic speech recognition and multi-object tracking modules for scene monitoring and deployment of these surveillance modules on servers in an adversarially-safe fashion.

- **Indraprastha Institute of Information Technology, Delhi (IIIT-D)** Delhi, India
  Research Assistant at CVML Lab, ***Advisor: Chetan Arora*** *(now at IIT, Delhi)* *Jun 2016 - May 2018*

  Texture-assisted Parsing [3]: Commercial project that used texture cues from texture descriptors like Gabor and LBP in early-fusion and late-fusion style to improve clothing parsing by 1.2% segmentation accuracy.

  Fine Grained Visual Classification [4]: Commercial project that improved fine-grained classification by creating an ensemble of pose experts and a meta-network for pose identification by 6.4% classification accuracy.

- **Netaji Subhas Institute of Technology (NSIT), University of Delhi** Delhi, India
  Advisor: Anand Gupta *Apr 2017 - May 2018*

  Medical Imaging [5]: Bachelor's Thesis on the prediction of lung cancer which localized pulmonary nodules in super-resolved 3D CT-scan images and predicted a feature-dependent malignancy score for each detection.

  Document Analysis [6]: Research project that aimed at detecting and extracting various layouts of tables in document images by exploiting the horizontal and vertical inter-word gaps independent of table rule lines.

Publications

[1] (Submitted) **T. Khurana**, A. Dave, D. Ramanan. "Detecting Invisible People." *37^{th} Conference on Computer Vision and Pattern Recognition (CVPR), 2021.*

[2] A. Dave, **T. Khurana**, P. Tokmakov, C. Schmid, D. Ramanan. "TAO: A Large-scale Benchmark for Tracking Any Object." *16^{th} European Conference on Computer Vision (ECCV), 2020. Spotlight.* [**PDF**]

[3] **T. Khurana***, K. Mahajan*, C. Arora, A. Rai. "Exploiting Texture Cues for Clothing Parsing in Fashion Images." *25th International Conference on Image Processing (ICIP), 2018. IEEE. pp. 2102-2106.* [**PDF**]

[4] K. Mahajan*, **T. Khurana***, A. Chopra*, I. Gupta, C. Arora, A. Rai. "Pose Aware Fine Grained Visual Classification Using Pose Experts." *25th International Conference on Image Processing (ICIP), 2018. IEEE. pp. 2381-2385.* [**PDF**]

[5] A. Gupta, S. Das, **T. Khurana**, K. Suri. "Prediction of Lung Cancer from Low Resolution Nodules in CT-Scan Images by using Deep Features." *7th International Conference on Advances in Computing, Communications and Informatics, 2018. IEEE. pp. 531-537.* [**PAPER**]

[6] A. Gupta, D. Tiwari, **T. Khurana**, S. Das. "Table Detection and Metadata Extraction in Document Images." *2nd International Conference on Smart Innovations in Communications and Computational Sciences, 2018. Springer. pp. 361-372.* [**PAPER**]

Programming Skills

Languages: Python, C++, MATLAB **Technologies**: PyTorch, Caffe, Tensorflow

Relevant Projects

- **Using Depth as a Cue for Tracking in the Wild**: Project aimed to successfully reduce the number of identity switches in object tracking in the wild by 2.2% using cue from depth-based layered representations of objects to modify the similarity metric of SORT tracker. [**VIDEO**]
- **Ego-speed Estimation Using Flow and Depth**: Project aimed to estimate the speed of an ego-vehicle from a video by fusing multi-modal inputs of optical flow and monocular depth with a low mean squared error of 1.1.

Technical Service

- **Co-Organizer:** Robust Video Scene Understanding: Tracking and Video Segmentation Workshop, CVPR 2021.
- **Co-Organizer:** Object Tracking & its Many Guises Workshop, ECCV 2020.
- **Co-Host:** TAO Multi-object Tracking Challenge, ECCV 2020.
- **Reviewer:** CVPR 2021, NeurIPS 2020, ICML 2020-21.
- **Mentor:** CMU AI Mentoring Program 2020, RI Peer Mentor Program 2020.