Sajal Maheshwari

CONTACT INFORMATION

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EDUCATION

Masters in Computer Vision, Carnegie Mellon University,
School of Computer Science, Pittsburgh, PA, USA **Dec 2020**

G.P.A.: 4.14/4.00

Relevant courses: Geometry in computer vision, Computational photography, Visual learning and recognition, Maths fundamentals, Computer vision, Introduction to machine learning, Localization and Mapping

B.Tech., Electronics and Communiation Engineering, IIIT - Hyderabad,
Hyderabad, India **Jun 2017**

G.P.A.: 8.21/10.0

Relevant courses: Computer Programming, Data structures, Algorithms and Operating Systems, Digital Signal Processing, Digital Image Processing, Statistical Methods in AI, Computer Vision

PATENTS (FILED)

Message Passing Network Based Object Signature for Object tracking

- Using representation learning methods and message passing networks, developed a novel method for using learned embeddings in combination with traditional features for efficient vehicle tracking in self-driving systems

Label efficient detection of camera movement in videos

- Using pre-trained labels and handcrafted features, proposed a novel method to detect camera movement in cinematic videos by comparing relevant spatial regions in the video frames. Improved the performance from the current SOTA by 15% along with 10X speed improvement

PUBLICATIONS

Murtuza Bohra, **Sajal Maheshwari** and Vineet Gandhi. "TextureToMTF: predicting spatial frequency response in the wild".Signal, Image and Video Processing (**SIVP**) 2020. [Link]

Pranjal Kumar Rai, **Sajal Maheshwari**, and Vineet Gandhi. "Document quality estimation using spatial frequency response". International Conference on Acoustics, Speech and Signal Processing (**ICASSP**) 2018 (**Oral**). [Link]

Pranjal Kumar Rai*, **Sajal Maheshwari***, Ishit Mehta, Parikshit Sakurikar and Vineet Gandhi."Beyond ocrs for document blur estimation". International Conference on Document Analysis and Recognition(**ICDAR**) 2017 [Link]

Sajal Maheshwari, Pranjal Kumar Rai, Gopal Sharma and Vineet Gandhi. "Document blur detection using edge profile mining". Indian Conference on Computer Vision, Graphics and Image Processing(**ICVGIP**) 2016 [Link]

EXPERIENCE

Amazon May 2022-Present | Seattle,WA
Applied Scientist | Virtual Product Placement(VPP) in Prime video

- Developed computer vision models for classification of shot as moving or stationary in terms of camera movement, decreasing shot selection process for VPP by 20%
- Developed temporally consistent occlusion handling models for realistic two-dimensional virtual product placement deployed for real-time throughput. Improved accuracies over baseline models by greater than 30%

Qualcomm Inc. Feb 2021-May2022 | San Diego,CA
ML Research Engineer | Autonomous driving Sensor Fusion R&D Systems

- Developed vehicle tracking from a fusion of multiple input sensor modalities (camera and radar)
- Developed vehicle re-identification as a metric-learning problem using message-passing networks and integrated these models into existing vehicle tracking framework

Qualcomm Inc. May 2020-August 2020 | San Diego,CA
Research internship | Sensor Fusion R&D Systems

- Developed end-to-end pipeline to generate and evaluate appearance based feature using deep CNNs for tracking vehicles across multiple cameras mounted on an autonomous vehicle
- Improved Top-1accuracy by 15% and reduced the training time by 10x

Amazon Lab126/Carnegie Mellon University January 2020-December 2020 | Pittsburgh,PA
Graduate Student Researcher

- Explored various works and baselines for SLAM in indoor environments to handle presence of dynamic objects in the scene
- Incorporated semantic information using object level pose estimation during tracking and filtering out keypoints belonging to dynamic objects for robust map estimation, improving baseline results by approximately 5%.
- Improved the temporal performance of the entire framework by exploring state-of-the-art segmentation architectures(YOLACT and BlendMask) for faster object detection.

IIIT-Hyderabad October 2018-April 2019 | Hyderabad, India
Research Assistant

- Designed a encoder-decoder CNN architecture to refocus narrow aperture image to generate a focal stack of multiple wide aperture outputs using light field data, increasing the PSNR performance by 10 points
- Developed a deep CNN framework to accurately assess quality of natural images using Spatial Frequency Response

Qualcomm India Pvt. Ltd. July 2017 - October 2018 | Hyderabad, India
Associate Software Engineer

- Explored deep CNN models to calculate temporally smooth exposure value of scenes using RAW sensor image and previous exposure values as inputs
- Developed feature for 360 and dual smartphone cameras to sync the exposure values as a function of scene differences, especially in HDR scenes

Skills

Programming Languages: Python, Matlab, C, C++
Libraries: PyTorch, TensorFlow, OpenCV, scikit-learn, etc

Miscellaneous

Reviewer - ICRA 2022, ICVGIP 2018, CVPR 2022(OmniCV workshop)

Teaching Assistant

Digital Image Processing - IIIT-H July 2016-December 2016

Digital Signal Processing - IIIT-H January 2017-April 2017

Awards

Dean's Academic Merit List, IIIT-H: November 2014 - November 2017

Dean's Research Merit List, IIIT-H: November 2017