Vijay Kumar

Website: https://vijaykumar01.github.io | **LinkedIn:** https://in.linkedin.com/in/vijay01 | **Github:** https://github.com/vijaykumar01
Google Scholar: http://goo.gl/uzbemZ | **Email:** vij4321r@gmail.com | **Phone:** +91 9160569293

PROFESSIONAL SUMMARY

Experienced professional with a Ph.D in computer vision (CV) and machine learning (ML) with 8+ years of hands-on experience in designing and building CV/ML systems. Area of expertise include image classification, object detection and recognition, segmentation, stereo-depth estimation and problems in human understanding including person (re)identification / recognition, pose estimation and action recognition. Work published at major CV conferences and journals (CVPR, ICCV, CVIU, etc). Active community participation as a conference reviewer, organizing reading groups and tutorials, and providing mentorship for up skilling in CV/ML.

SKILLS

Programming languages: Python (proficient, 8+ years of experience), Matlab (proficient, 6+ years), C/C++ (basic), PySpark (basic).
Libraries: Pytorch (proficient, 8+ years of experience), TensorFlow (basic), Caffe (basic), OpenCV (proficient).
Big data tools: Hadoop (basic), Spark (basic), SQL (basic).

WORK EXPERIENCE

Senior Data Scientist, Walmart Labs, Bangalore
April 2020 - present

- **Search and Personalization.** Building large-scale grocery recommendation system for Walmart.
- Responsible for complete revamp of heuristic based system with a state-of-the-art computer vision and machine learning approach. Lead a small focused team of data scientists and interns. Acceptance rates increased by 30bps, coverage (recall) by 4%.
- Close collaboration with product and engineering teams to enable real-time inferencing capabilities for ML systems across the org.
- Fashion compatibility recommendation system published at RecSy21, and one under submission.
- Recognition with an Excellence award for the contribution.

Postdoctoral Researcher, Willow, INRIA, Paris
July 2018 - Dec 2019

Advisor: Dr. Ivan Laptev

- **Spatio-temporal human action localization in movies.** Proposed a graph neural network to model long-term person interactions in movie shots. Our model that considers multiple contextual cues produces 10% relative improvement over several state-of-the-art video features (e.g. I3D, slowfast)
- **Weakly supervised action localization.** Model based on discriminative clustering that integrates different types of supervision as constraints on the optimization.
- Worked closely with the funding agency and a French startup to develop computer vision system for abnormal (violent) human action detection in surveillance videos.

Advisor, Kukun Inc
Jan 2015 - Dec 2019

Provided mentorship on multiple ML projects for house renovation.

Research Assistant, Center for Visual Information Technology (CVIT)
March 2012 - May 2018

Advisor: Prof. C V Jawahar and Prof. Anoop Namboodiri

- **Pose-aware Person Recognition** with multiple body cues (head, upper body, *etc*.) published at (*CVPR17, WACV20*). We perform pose estimation and then train an ensemble of convolutional neural network models for each pose. At inference time, fusion of these models is performed with attention weights according to the subject's pose.
- **Face Detection** with a bag-of-words retrieval (dense SIFT + TF/IDF + Hough voting) framework (*ICCV15*).
- **Person Identification in image collections** (e.g. photo-albums) with self training technique that selects confident seed images from the target domain with off-the-shelf algorithms. We then apply transductive label propagation to transfer their labels to remaining images (ACPR13, ICPR14, SIVP17).
- **Large Scale Face Database:** Built a large face database for Indian subjects collected primarily from Indian movies. Managed the entire process working with a large team of annotators (NCVPRIPG13).

Software Engineer, Motorola Solutions, Bangalore
April 2010 - Feb 2012

Automation for LTE KPI measurement and release build sanity checks.

Software Internship, Motorola Solutions, Bangalore
Nov 2009 - Apr 2010

Automation to capture Wimax network events into detailed reports.

EDUCATION

Doctor of Philosophy, Computer Science   July 2012 - May 2018
Advisors: Prof. C V Jawahar and Dr. Anoop Namboodiri
PhD thesis: **Person identification in Images and Videos**
International Institute of Information Technology, Hyderabad, India

Bachelor of Engineering   Aug 2005 – July 2009
Electronics and Communication Engineering
R. V. College of Engineering, Bangalore, India.

SELECTED PUBLICATIONS

(For a complete list, please refer to **Google scholar: http://goo.gl/uzbemZ** page.)

- Ambareesh R, Vijay Kumar, Deepthi Sharma, **Semi-supervised Learning for Fashion Compatability**, ACM RecSys, 2021.

- Vijay Kumar, Makarand Tapaswi, Ivan Laptev, **Spatio-Temporal Modeling with Graph Neural Networks for Action Detection**, Computer Vision and Image Understanding Journal (CVIU), 2021.

- Vijay Kumar, Anoop Namboodiri, C. V. Jawahar, **Region Pooling and Adaptive Feature Aggregation for End-to-End Person Recognition**, Winter Conference on Applications of Computer Vision (WACV), 2020.

- Vijay Kumar, Anoop Namboodiri, Manohar Paluri, C. V. Jawahar, **Pose-Aware Person Recognition**, International Conference on Computer Vision and Pattern Recognition (CVPR), 2017.

- Vijay Kumar, Anoop Namboodiri, C. V. Jawahar, **Visual Phrases for Exemplar Face Detection**, International Conference on Computer Vision (ICCV), 2015.

- Vijay Kumar, Anoop Namboodiri, C. V. Jawahar, **Semi-supervised Annotation of Faces in Image Collection**, Signal, Image and Video Processing, Springer, 2018.

TALKS AND TUTORIALS

- Computer Vision in Retail, Workshop, Walmart, Bangalore.
- Pose-Aware Person Recognition, Amazon India AI Summit, Bangalore.
- People Recognition in Images and Videos, TCS Research, Pune.
- Tutorials on semi-supervised learning, sparse coding and its applications, CVIT, IIIT Hyderabad.

PROFESSIONAL SERVICE

- Conferences: Reviewer. WACV 2021, ACCV 2020, ECCV 2020, CVPR 2020, AAAI (2020-21), ICCV 2019, MIPR (2017-18), ICVGIP 2018.
- Journals: Reviewer. IEEE PAMI (2018, 2020), Springer IJCV (2018), IEEE Trans. Information Forensics and Security (2018).

MENTORSHIP

- Additya Poli at Walmart **Fashion compatibility from in-the-wild images**, 2021 **(AAAI submission).**
- Ambarish Revannur **Fashion compatibility with limited data**, 2021 **(RecSys 21).**
- Himangi Saraogi, **Action Recognition in Soccer Videos**, 2016 (with Prof. C V Jawahar) **(ICVGIP 2016).**
- Hiba Ahsan, **Multi-label Annotation of Music**, 2014 (with Prof. C V Jawahar) **(ICAPR 2015).**
- Amit Bansal, Gautam Tulsiyan, **Document Image Restoration**, 2013 (with Prof. C V Jawahar) **(ICDAR 2013).**.
- Shankar Shetty, Parisa Beham, Moula Husain, **Indian Movie Face Database**, 2013 (with Prof. C V Jawahar) **(NCVPRIPG 2013).**

GRANTS AND AWARDS

- TCS PhD Research Fellowship $(2012 - 2017)$, TCS Travel Grant (ICCV 2015, Chile).
- Karnataka engineering entrance exam: Rank 114, Maths and Physics: $100/100$.
- Best Outgoing student, High School, BBV Pragathinagar, 2005.

REFERENCES

available upon request