Bharathkumar “Tiny” Ramachandra

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Summary

Scientist in computer vision and deep learning and leader of high-performing ML teams. Expertise in directing the design and development of cutting-edge deep learning systems, and in growing and leading cross-cultural and cross-functional teams with empathy. A lifelong learner with an obsession for improvement.

Work Experience

Senior Deep Learning Engineer at Geopipe Inc.

Aug 2022 - present | New Brunswick, NJ, USA

- Led and mentored a team of 4 deep learning engineers through the process of scaling the team.
- Directed the development of deep learning models that prompt procedural 3D reconstruction of cities.
- Contributed to projects involving 3D building reconstruction, image inpainting, semantic segmentation, object detection and facade parsing from aerial orthophotos and LiDAR data.

Team Lead and Scientist, Machine Learning at Invision AI

Aug 2021 – Aug 2022 (1yr) | Toronto, ON, Canada

- Grew, supervised and retained a team of 4 machine learning scientists and engineers.
- Managed initiatives such as 3D object detection, federated learning on the edge, knowledge distillation with object detection and multitask loss balancing for neural networks from surveillance video.
- Identified key strategic opportunities for the use of machine learning in our products and collaborated actively with peer engineering and product development teams to build out new technological capabilities.

Computer Vision Scientist at Wrnch Inc. (acq. Hinge Health)

Mar 2020 – Aug 2021 (1yr 6mos) | Montreal, QC, Canada

- Developed and patented a novel system to solve a problem that the team had been grappling with for the previous 5 years - an fully trainable joint-to-person association method for multi-person pose estimation with a Transformer network.
- Spearheaded the development of a novel system for 3D human pose estimation from a single RGB image based on a new representation of poor quality 3D pose annotation data.
- Contributed towards critical strategy to several projects on deep generative modeling of images with GANs, 3D hand pose estimation, 2D human pose estimation and inverse kinematics.

Computer Vision Research Intern at Mitsubishi Electric Research Labs

Summers 2018, 2019 | with Michael Jones | Cambridge, MA, USA

- Developed a new benchmark dataset, evaluation protocol and baseline algorithms for video anomaly detection that has nudged research in a more meaningful direction.
- Developed a novel video anomaly detection algorithm that learns a metric with a Siamese CNN from source datasets and uses it to subsequently score video patches in a target dataset.

Data Science Intern at Samsung Research America

Summer 2017 | San Jose, CA, USA

Education

Ph.D. in Computer Science | *2014 – 2019* | GPA 4.0 | *Raleigh, NC, USA*

North Carolina State University | *with Ranga Raju Vatsavai*

- Dissertation on ‘Anomaly Detection in Videos’; wrote the most comprehensive survey on Video Anomaly Detection to-date.
- Reproduced code for papers that proposed convolutional auto-encoders to perform video anomaly detection using TensorFlow. 50+ ★s, 15+ forks on GitHub.
- Collaborated on research on video action recognition, semi-supervised image classification, remote sensing change detection, multi-modal image classification and manifold estimation.
- Directed thesis research for and supervised several masters and junior PhD students.

B.E. (Hons.) in Computer Science | *2010 – 2014* | GPA: 3.51 | *Dubai, UAE*

Birla Institute of Technology and Science - Pilani, Dubai

Technical Proficiency

Python; PyTorch; TensorFlow; OpenCV; Scikit-learn.

Deep learning; Computer Vision; Machine Learning; Artificial Intelligence.

AWARDS

- **The Peak's 2022 Emerging Leaders in Artificial Intelligence**
- WACV 2020 PhD consortium + travel award.
- Best paper award at ICCS 2016.

SERVICE

- Program Chair: SSTDM workshop at ICDM '21.
- Program Committee: WAIN '22 (at ICDM), BigSpatial '22 (at ACM SigSpatial), SSTDM '22, '19 (at ICDM).
- Reviewer: SIGSPATIAL ['22], CIKM ['21, '20], TPAMI ['20], WACV ['23, '22, '21, '20], ICDM ['22, '19], KDD['18], PKDD ['19], AAAI ['20, '19], SDM ['20, '19, '18], PAKDD ['18], SSTD ['17], SSTDM ['16, '17].

TALKS

- "Innovation to Implementation: Building Deep Tech Powered Systems" at McGill AI Society's Learnathon Feb 2021.
- "Understanding Human Pose" at McGill AI Society's Hackathon Sep 2020.

PATENTS

- "Pose Parsing using a Transformer Network" - provisional patent 2021.

SELECT PUBLICATIONS (GOOGLE SCHOLAR)

- **Ramachandra, B.,** Jones, M., & Vatsavai, R. R. (2020). A Survey of Single-Scene Video Anomaly Detection. *IEEE Transactions on Pattern Analysis and Machine Intelligence*.
- **Ramachandra, B.**, & Jones, M. (2020). Street Scene: A new dataset and evaluation protocol for video anomaly detection. In *The IEEE Winter Conference on Applications of Computer Vision* (pp. 2569-2578).
- **Ramachandra, B.**, Jones, M., & Vatsavai, R. (2020). Learning a distance function with a Siamese network to localize anomalies in videos. In *The IEEE Winter Conference on Applications of Computer Vision* (pp. 2598-2607).
- **Ramachandra, B.**, Jones, M., & Vatsavai, R. R. (2021). Perceptual metric learning for video anomaly detection. *Machine Vision and Applications, 32(3), 1-17.*
- Gadiraju, K. K., **Ramachandra, B.**, Chen, Z., & Vatsavai, R. R. (2020, August). Multimodal Deep Learning Based Crop Classification Using Multispectral and Multitemporal Satellite Imagery. In *Proceedings of the 26th ACM SIGKDD International Conference on Knowledge Discovery & Data Mining* (pp. 3234-3242).
- Chen, Z., Dutton, B., **Ramachandra, B.**, Wu, T., & Vatsavai, R. R. (2020). Local Clustering with Mean Teacher for Semi-supervised Learning. *IEEE International Conference on Pattern Recognition 2020.*
- **Ramachandra, B.**, Dutton, B., & Vatsavai, R. R. (2019). Anomalous cluster detection in spatiotemporal meteorological fields. *Statistical Analysis and Data Mining: The ASA Data Science Journal*, *12*(2), 88-100.
- **Ramachandra, B.**, Gadiraju, K. K., Vatsavai, R. R., Kaiser, D. P., & Karnowski, T. P. (2016). Detecting extreme events in gridded climate data. *Procedia Computer Science*, *80*, 2397-2401. **(Best Paper Award)**
- Gadiraju, K. K., **Ramachandra, B.**, Shashidharan, A., Dutton, B., & Vatsavai, R. R. (2019, December). Scalable Data Parallel Approaches to Anomaly Detection in Climate Data using Gaussian Processes. In *2019 18th IEEE International Conference On Machine Learning And Applications (ICMLA)* (pp. 485-488). IEEE.
- Chen, Z., **Ramachandra, B.**, Wu, T., & Vatsavai, R. R. (2018). Relational Long Short-Term Memory for Video Action Recognition. *arXiv preprint arXiv:1811.07059*.
- Chen, Z., **Ramachandra, B.**, & Vatsavai, R. R. (2020). Consistency Regularization with Generative Adversarial Networks for Semi-Supervised Image Classification. *arXiv preprint arXiv:2007.03844*.
- **Ramachandra, B.**, Dutton, B., & Vatsavai, R. R. (2019). Estimating a Manifold from a Tangent Bundle Learner. *arXiv preprint arXiv:1906.07661*.