Tiny (Bharathkumar Ramachandra)

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SUMMARY

Scientist in deep learning for computer vision and leader of high-performing machine learning teams. Expertise in the design and development of cutting-edge deep learning systems, and in leading cross-cultural and cross-functional teams with empathy. Lifelong learner with a growth mindset that manifests as an obsession for improvement.

WORK EXPERIENCE

Head of Machine Learning at Geopipe AI
Feb 2023 - present | New Brunswick, NJ, USA

- Supervised and grew a team of machine learning engineers and scientists of different backgrounds and seniority.
- Collaborated with peer engineering, data and product teams to build our AI technology in a robust, ethical and sustainable manner, balancing business risk with innovation pursuit.

Senior Deep Learning Scientist at Geopipe AI
Aug 2022 - Feb 2023 | New Brunswick, NJ, USA

- Technical leader and mentor to a high-performing team of 4 machine learning engineers.
- Directed the development of projects involving 3D building reconstruction, image inpainting, semantic segmentation and object detection from aerial orthophotos and LiDAR data.

Team Lead and Scientist, Machine Learning at Invision AI
Aug 2021 – Aug 2022 (1yr) | Toronto, ON, Canada

- Supervised, grew and retained an excellent team of 4 machine learning scientists and engineers.
- Directed 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 with peer engineering and product development teams to build out new technological capabilities.

Computer Vision Scientist at Wrnch AI (acquisition: 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 to several efforts on generative modeling with GANs, 3D hand pose estimation and 2D pose estimation.

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 authoritative survey on Video Anomaly Detection.
- Reproduced code for papers that proposed convolutional auto-encoders to perform video anomaly detection using TensorFlow. [50+ ★s. 15+ forks on GitHub](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 AND LEADERSHIP PROFICIENCY

Python; PyTorch; TensorFlow; OpenCV; Scikit-learn.
Deep learning; Computer Vision; Machine Learning; Artificial Intelligence.
Transformational and servant leadership; Development and retention focused.

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 ['23, '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. Paper presenting the idea: "End-to-End Multi-Person Pose Estimation With Transformers." Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition. 2022.

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.*
- Barbalau, A., Ionescu, R. T., Georgescu, M. I., Dueholm, J., **Ramachandra, B.**, Nasrollahi, K., ... & Shah, M. (2022). SSMTL++: Revisiting Self-Supervised Multi-Task Learning for Video Anomaly Detection. *arXiv preprint arXiv:2207.08003.*
- 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)**
- 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.*