Bharathkumar "Tiny" Ramachandra

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SUMMARY

Researcher in computer vision and machine learning, mathematically inclined and interested in applied computer vision research. Ability to explain complex concepts in a precise and concise manner. Thrives in a collaborative small-lab environment that actively supports self-education. Technical proficiency aside, a leader who motivates people and makes everyone else better.

WORK EXPERIENCE

Computer Vision Scientist at Wrnch Inc.

Mar 2020 – present
- Developed a novel system for 3D human pose estimation from a single RGB image.

Computer Vision Research Intern at Mitsubishi Electric Research Labs

Summers 2018, 2019 | with Michael Jones
- Developed a new benchmark dataset, new evaluation protocol and baseline algorithms for video anomaly detection hoping to nudge 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.
- Generalized the Siamese CNN approach to process data across multiple scales using region proposals, Spatial Pyramid Pooling and a "margin" metric loss.

Data Science Intern at Samsung Research America

Summer 2017 | with Rui Chen
- Built a logistic regression pipeline on Spark to predict attributes of users based on historical Samsung Mobile Pay transaction information, to be used to provide personalized user experiences.
- Debugged an issue with AI assistant Bixby's Deep Natural Language Processing unit.

EDUCATION

Ph.D. in Computer Science | *Aug 2014 – Dec 2019* | GPA 4.0

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. 40+ ★s, 10+ forks on GitHub
- Collaborated in projects on video action recognition, semi-supervised image classification, remote sensing change detection, multi-modal image classification and manifold estimation.
- Relevant coursework: Visual Sensing, Advanced Machine Learning, Spatial and Temporal Data Mining, Artificial Intelligence, Data Science, Advanced Spatial Statistics, Design and Analysis of Algorithms.

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

Birla Institute of Technology and Science - Pilani, Dubai

PROJECTS (GITHUB)

- Implemented manifold-aware density estimator using Python, Manifold Parzen Windows, which outperforms the naïve Parzen Windows estimator.
- Implemented the G-means clustering algorithm using R, that can automatically pick an optimal number of clusters in a domain independent fashion.
- Parallelized Gaussian process regression on GPUs using CUDA dynamic parallelism.
- Augmented a sparse point-cloud mapping library, ORB-SLAM2, to perform real-time SLAM using thermal sensors for energy audits of buildings.
- Performed highly optimized large-scale distributed training of deep neural networks and classification of satellite imagery on the latest Intel Xeon CPUs.

TECHNICAL PROFICIENCY

Python; TensorFlow; OpenCV; Scikit-learn; Apache Spark.

SERVICE

- Reviewer: TPAMI ['20], WACV ['21, '20], ICDM ['19], KDD['18], PKDD ['19], AAAI ['19], SDM ['20, '19, '18], PAKDD ['18], SSTD ['17], SSTDM ['16, '17].
- Program Committee: SSTDM '19 (at ICDM '19).

TALKS

- "Understanding Human Pose" at McGill AI Society's Hackathon 2020.

AWARDS

- WACV 2020 PhD consortium participant + travel award.
- Best paper award at ICCS 2016.

SELECT PUBLICATIONS (GOOGLE SCHOLAR)

- **Ramachandra, B.**, Jones, M. J., & Vatsavai, R. R. (2020). A Survey of Single-Scene Video Anomaly Detection. *To appear in 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).
- 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. *To appear in 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.*