Bharathkumar "Tiny" Ramachandra

bharathkumar@ncsu.edu | +1 (919) 268-3183 | Raleigh, NC, USA | Personal homepage

Summary

Doctoral candidate 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.

Work Experience

Computer Vision Scientist at Wrnch.AI
Jan 2020 - present

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 and perform transfer learning through domain-adversarial training for better generalization.

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. 30+ ★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 image 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 and classification of satellite imagery in the US using deep networks on the latest Intel Xeon CPUs.

TECHNICAL PROFICIENCY

Python; TensorFlow; PyTorch; OpenCV; Scikit-learn; Matlab; R; C++; CUDA C; Apache Spark; QGIS.

SERVICE

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

AWARDS

- Best paper award at ICCS 2016.
- NCSU College of Engineering student travel award 2016.

PUBLICATIONS (GOOGLE SCHOLAR)

- **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)**
- **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.**, & Jones, M. (2019). Street Scene: A new dataset and evaluation protocol for video anomaly detection. *arXiv preprint arXiv:1902.05872*. (to appear in WACV 2020).
- **Ramachandra, B.**, Jones, M. & Vatsavai, R. R. (2019). Learning a distance function with a Siamese network to localize anomalies in videos. (to appear in WACV 2020).
- **Ramachandra, B.***, Dutton, B.*, & Vatsavai, R. R. (2019). Estimating a Manifold from a Tangent Bundle Learner. *arXiv preprint arXiv:1906.07661*.
- 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., Vatsavai, R. R., **Ramachandra, B.**, Zhang, Q., Singh, N., & Sukumar, S. (2016, December). Scalable nearest neighbor based hierarchical change detection framework for crop monitoring. In *2016 IEEE International Conference on Big Data (Big Data)* (pp. 1309-1314). IEEE.
- Chen, Z., **Ramachandra, B.**, & Vatsavai, R. R. (2017, July). Hierarchical change detection framework for biomass monitoring. In *2017 IEEE International Geoscience and Remote Sensing Symposium (IGARSS)* (pp. 620-623). IEEE.
- **Ramachandra, B.**, Nawathe, P., Monroe, J., Han, K., Ham, Y., & Vatsavai, R. R. (2018). Real-Time Energy Audit of Built Environments: Simultaneous Localization and Thermal Mapping. *Journal of Infrastructure Systems*, *24*(3), 04018013.