Ragav Venkatesan

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Profile

Applied Scientist II at AWS AI Labs focused on emerging machine learning technologies. Areas of recent research interests include:

- Neural Network Compression.
- Domain Adaptation.
- Multiple-instance learning.

Professional Experience

(P1) Amazon

(A1) *Applied Scientist II - Amazon Web Services* May 2019 – Present

(A2) *Research Scientist - Amazon Web Services* November 2017 – May 2019

Statistics of Tenure:

- Patents filed: 3.
- Peer-reviewed publications : 1.

External Artifacts:

- Developed the following artifacts with the Amazon SageMaker Team:
  - Amazon SageMaker Reinforcement Learning.
  - Amazon SageMaker Object Detection Algorithms.
  - Amazon SageMaker Semantic Segmentation Algorithms.
  - Bring your own Tensorflow and MXNet models to Amazon SageMaker.
  - Neural Network Compression using AWS SageMaker Reinforcement Learning.

Teaching:

- Amazon A9 CVC workshop on AWS Sagemaker. February 2019
- Convolutional Neural Networks at Machine Learning University. 2019 – 2018
- Deep Neural Network Bootcamp. 2018

(P2) *Research Assistant - Arizona State University.* August 2011 – October 2017

(P3) *Computer Vision Research Intern - Intel Corp.* December 2013 – August 2014

- Built vehicle and lane detection for automated driver assistance systems applications.

Education

Doctor of Philosophy - Computer Science October 2017
Advisor: Professor Baoxin Li
Arizona State University, Tempe, Arizona, USA

- The Diabetic Retinopathy project Funding Agency: National Institutes of Health.
- The MIDAS project Funding Agency: National Science Foundation.

Master of Science - Electrical Engineering August 2012
Advisor: Professor David Frakes
Arizona State University, Tempe, Arizona, USA

Bachelor of Engineering - Electronics and Communication Engineering June 2010
Anna University, Chennai, Tamil Nadu, India

Books

(B1) **Ragav Venkatesan**, Baoxin Li, " Convolutional Neural Networks in Visual Computing: A Concise Guide ", CRC Press, a Tyler & Francis company, 2017.

Ragav Venkatesan, Baoxin Li, " 卷积神经网络与视觉计算 ", 机械工业出版社, 2019.

Book Chapters

(Bc1) Parag Chandakkar, **Ragav Venkatesan**, Baoxin Li, "Feature Extraction and Learning for Visual Data" in " Feature Engineering for Machine Learning and Data Analytics ", CRC Press, a Tyler & Francis company, 2017.

Thesis

(R1) **Doctoral dissertation** *Novel image features and learning techniques.* October 2017

(R2) **Masters thesis** *Video Deinterlacing using Control Grid Interpolation Frameworks.* August 2012

(R3) **Undergraduate thesis** *A comparative study of detection of faults and estimation of distance to faults on wired communication channels, using TDR and FDR techniques.* May 2010

Peer-Reviewed Journal Publications

Multiple-Instance Learning

(J1) Parag Shridhar Chandakkar, **Ragav Venkatesan**, Baoxin Li, " MIRank-KNN: Multiple Instance Retrieval of Clinically-Relevant Diabetic Retinopathy Image ", *in SPIE Journal of Medical Imaging*, 2017.

Image Interpolation

(J2) **Ragav Venkatesan**, Christine Zwart, David Frakes, Baoxin Li" Spatio-temporal Video Deinterlacing using Control Grid Interpolation ", *in SPIE Journal of Electronic Imaging*, 24(2), 023022. 2015.

(J3) Christine Zwart, **Ragav Venkatesan**, David Frakes, " Decomposed Multidimensional Control Grid Interpolation for Common Interpolation-Based Image Processing Applications in Consumer Electronics ", *in SPIE Journal of Electronic Imaging*, vol. 24, no.4, pp.43012-1 to 43012-12. 2012.

Peer-Reviewed Conference Publications

Deep Learning

(C1) Xiang Xu, Xiong Zhou, **Ragav Venkatesan**, Gurumurthy Swaminathan, Orchid Majumdar " *d*-SNE: Domain Adaptation using Stochastic Neighborhood Embedding. ", *in IEEE International Conference on Computer Vision and Pattern Recognition (CVPR)*, Long Beach, California, USA, 2019. [ORAL] ($< 5.5\%$ Acceptance Rate).

(C2) **Ragav Venkatesan**, Jaya Vijetha Gattupalli, Baoxin Li, " On the generality of neural image features. ", *in IEEE International Conference on Image Processing (ICIP)*, Phoenix, Arizona, USA, 2016. [ORAL]

Multiple-Instance Learning

(C3) **Ragav Venkatesan**, Parag Shridhar Chandakkar, Baoxin Li, " Simpler non-parametric methods provide as good or better results to multiple-instance learning. ", *in IEEE International Conference on Computer Vision (ICCV)*, Santiago, Chile 2015. [Spotlight]

(C4) Parag Shridhar Chandakkar*, **Ragav Venkatesan***, Baoxin Li, Helen Li, " Retrieving clinically relevant diabetic retinopathy images using a multi-class multiple-instance framework ", *in proceedings of SPIE conference on Medical Imaging, International Society of Opticals and Photonics*, Orlando, Florida, USA, 2013. [ORAL]

(C5) **Ragav Venkatesan***, Parag Shridhar Chandakkar*, Baoxin Li, Helen Li, " Classification of Diabetic Retinopathy Images Using Multi-Class Multiple-Instance Learning Based on Color Correlogram Features ", *in Proceedings of International Conference of the IEEE Engineering in Medicine and Biology Society 2012 (EMBC'12)*, San Diego, California, USA, 2012. [Poster]

(C6) **Ragav Venkatesan***, Parag Shridhar Chandakkar*, Baoxin Li, Helen Li, " Clinically Relevant Diabetic Retinopathy Image Retrieval Using a Multi-Class Multiple Instance Framework ", *in proceedings of ACM conference on Bio-informatics, Computational Biology and Biomedicine (ACM-BCB'12)*. Orlando, Florida 2012. [ORAL]

ADAS: Bayesian Modelling

(C7) **Ragav Venkatesan**, Parag Shridhar Chandakkar, Baoxin Li, " Video-Based Self-Positioning for Intelligent Transport Systems Applications ", *in the Tenth International Symposium on Visual Computing (ISVC)*, Las Vegas, Nevada, USA, 2015. [ORAL]

Image Interpolation

(C8) **Ragav Venkatesan**, Christine Zwart, David Frakes, Baoxin Li, " Perception-Inspired Spatio-Temporal Video Deinterlacing ", *in the Eighth International Workshop on Video Processing and Quality Metrics for Consumer Electronics (VPQM)*, Tempe, Arizona, USA, 2014. [ORAL]

(C9) **Ragav Venkatesan**, Christine Zwart, David Frakes," Video Deinterlacing with Control Grid Interpolation Frameworks ", *in Proceedings of the IEEE International Conference on Image Processing (ICIP)*, Orlando, Florida, USA, 2012. [Poster]

* - Equal contribution from authors.

arXiv Papers and Longforms

Deep Learning

(A1) **Ragav Venkatesan**, Hemanth Venkateshwara, Sethuraman Panchanathan, Baoxin Li., "A strategy for an uncompromising incremental learner.", arXiv: 1705.00744 2017.

(A2) **Ragav Venkatesan**, Vijetha Gattupalli, Baoxin Li., "Neural Dataset Generality.", arXiv: 1605.04369 2016.

(A3) **Ragav Venkatesan**, Baoxin Li., "Diving deeper into mentee networks.", arXiv: 1604.08220 2016.

Social Media Mining

(A4) Lydia Manikonda, **Ragav Venkatesan**, Subbarao Kambhampati, and Baoxin Li., "Evolution of fashion brands on Twitter and Instagram.", arXiv: 1512.01174 2015.

Teaching Experience

(T1) *Instructor - Arizona State University.*
CSE 591: Introduction to deep learning for visual computing (January - May 2017)

(T2) *Co-instructor - Arizona State University.*
CSE 509: Digital Video Processing (August 2015 - December 2015)

(T3) *Teaching Assistant - Arizona State University.*

- CSE 575: Statistical Machine Learning
  - Dr. Jingrui He (January 2015 - May 2015)
- CSE 569: Fundamentals of Statistical Learning
  - Dr. Baoxin Li (August 2014 - December 2014 and August 2016 - December 2016)
- CSE 509: Digital Video Processing
  - Dr. David Claveau (August 2012 - December 2012)
  - Dr. Hari Sundaram (August 2013 - December 2013)
- CSE 424, 485 and 486: Capstone Projects (January 2013 - May 2013)

(T4) *Guest Lectures - Arizona State University.*
Duties in this position involve providing specific lectures in courses on invitation.

- CSE 569: Hidden Markov Models (September 2017)
- CSE 569: Neural Networks (October - November 2017)

Selected Talks and Lectures

(L1) **IEEE Conference on Computer Vision and Pattern Recognition**, - 2019.
Domain Adaptation using Stochastic Neighborhood Embedding.

(L2) **Microsoft Research, Redmond, Washington**, - 2019.
Common Dataset Issues and Solutions.

(L3) **Amazon A9 Computer Vision Conference**, - 2019.
Workshop on Amazon SageMaker.

(L4) **Seattle Machine Learning Meetup**, - 2019.
Amazon SageMaker Semantic Segmentation.

(L5) **ASU International Students Graduate Orientation**, - 2017.
Professional Networking for Graduate Students.

(L6) **Qualcomm**, San Diego, California, - 2017.
Tools for Measuring Images.

(L7) **Siemens**, Princeton, New Jersey, - 2017.
Measuring Images.

(L8) **International Conference on Image Processing**, Phoenix, Arizona - 2016.
Neural Dataset Generality.

(L9) **International Workshop on Video Processing and Quality Metrics for Consumer Electronics**, Chandler, Arizona, USA - 2014.
Perception-Inspired Spatio-Temporal Video Deinterlacing.

(L10) **SPIE conference on Medical Imaging**, Orlando, Florida, USA - 2013.
Retrieving clinically relevant diabetic retinopathy images using a multi-class multiple instance framework.

Software

(S1) Tf-Lenet : Using LeNet as a case-study, this repository provides an in-depth migration guide from theano to tensorflow.

(S2) Yann : Yet another neural network toolbox. A versatile toolbox for building various types of state-of-the-art Convolutional Neural Networks, with many options. This toolbox was written on top of theano and provides plug-and-play and modular capabilities of generating performance and research oriented deep convolutional neural networks.

(S3) InstaCrawl : Toolkit for crawling down Instagram.

(S4) Search Engine : Toolkit written in PyLucene for implementing vector-space similarities with additional options for Authorities and Hubs, Page Rank and other tools needed to construct a search engine.

(S5) Open Source Contributions: Contributed to various open source repositories including SageMaker Examples , SageMaker Python SDK and Gluon-CV .

References

Will be provided on request.