Sai Srivatsa Ravindranath

Fellow of CS, Harvard University

Contact Information

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Employment

Harvard University (Oct 2017 -)
Fellow of Computer Science
Advisor: Prof. David Parkes

Microsoft Research, India (Aug 2016 - Aug 2017)
Research Fellow
Advisor: Dr. Prateek Jain

Education

Indian Institute of Technology, Kharagpur (July 2012 - April 2016)
B. Tech with Honors in Electrical Engineering
Minor in Computer Science

Publications

Optimal Auctions through Deep Learning*
P. Dutting, Z. Feng, H. Narasimhan, DC. Parkes, SS. Ravindranath.
Thirty-Sixth International Conference on Machine Learning (ICML 2019)
Authors ordered alphabetically, Accepted as **Long Oral*
ArXiv Version: https://arxiv.org/pdf/1706.03459.pdf

Learning Objective functions for Improved Image retrieval
SS. Ravindranath, M. Gygli, LV. Gool
MediaEval Workshops, 2015.

Salient Object Detection via Objectness Measure
SS. Ravindranath, RV. Babu
Twenty-Second International Conference on Image Processing (ICIP 2015)
ArXiv Version: https://arxiv.org/pdf/1506.07363.pdf

Book Chapters

Machine Learning for Optimal Economic Design
P. Dutting, Z. Feng, N. Golowich, H. Narasimhan, DC. Parkes, SS. Ravindranath. In JF Laslier, H. Moulin, MR. Sanver, WS. Zwicker, editors, *The Future of Economic Design*. Springer, 2019

Press Coverage

IIT Kharagpur innovation to monitor fatigue level in pilots. Hindustan Times, 2016

Stressed? Now, wear a pair of glasses and find out how much. Times of India, 2016

Research Experience

Machine Learning for Mechanism Design Harvard University
Advisor: Prof. David Parkes April 2018 -

- We formulated incentive compatible auction design as a non-standard, constrained learning problem, and showed how it can be solved using multi-layer neural networks. We replaced sampling-based approach with a gradient-based approach to compute constraint violations more accurately.
- We scaled our approach to larger settings with more agents and items where optimal auctions are unknown. We achieved results better than Myersons item-wise auction and other well known baselines. We published our work at ICML - 2019.
- We're currently exploring the use of our framework to obtain new economic insights, validate conjectures and reveal gaps in our current understanding of auctions.

Deep Learning and Computer Vision for Connectomics Harvard University
Advisor: Prof. Hanspeter Pfister Oct 2017 - April 2018

- Worked on improving the alignment and stitching of electron microscopy images, a key step in the pipeline to create comprehensive neural wiring diagrams of the brain.
- Extended Mask-RCNN to 3D setting to perform synapse segmentation and classification. Modified the segmentation head of the network to produce a regression map which can be used to determine the polarity of the synapse.
- Investigated a two-network model to improve guided proof-reading for image segmentation.

Large-Scale Multilabel Learning Microsoft Research, India
Advisor: Dr. Prateek Jain Aug 2016 - Aug 2017

- Investigated the use of ProtoNN (a KNN based algorithm) for extreme classification (multi-label learning with a large label set). Attained 5x speedup over the existing C++ codebase. Proposed changes that further improved the training time and accuracy. On related search dataset with dense features, we out-performed the one-vs-all classifier by 2.9% and FastXML by 6.5%.
- Explored extending the ProtoNN algorithm for efficient semi-supervised classification for multi-class and multi-label problems.
- Investigated the use of side-information such as label features to extend existing multi-label algorithms to an inductive setting (where labels in the test set are not observed in training set).

Learning Submodular Objectives for Improved Image Retrieval: ETH Zurich
Advisor: Prof. Luc Van Gool, Dr. Michael Gygli Summer 2015

- Formulated improving image retrieval as a subset selection problem. Proposed an objective function which is a mixture of several monotone submodular functions that score different aspects of a potential set (such as relevance and diversity). Learnt the weights for the mixture with a large-margin formulation.
- Analyzed how image content and emotions are linked to interest. Built a predictive model using deep convolutional neural networks, which predicts interest more accurately than the previous state-of-the-art. We used this interstingness predictor to further improve our image retrieval results.
- Showed that our approach achieves state-of-the-art results on MediaEval Diverse Images dataset. Achieved 16% improvement (in terms of F1-measure) over Flickr results.

Salient Object Detection via Objectness Measure Indian Institute of Science, Bangalore
Advisor: Prof. Venkatesh Babu Summer 2014

- Proposed a method to estimate the foreground regions in an image using objectness proposals. Implemented a novel saliency measure to refine our foreground estimate and integrated it with a saliency optimization framework to obtain smooth and accurate saliency maps.
- Obtained results that were better than the existing state of the art approaches on two benchmark datasets(MSRA and CSSD).
- We published our work at IEEE International Conference on Image Processing (ICIP), 2015.

Bachelors Thesis Project Indian Institute of Technology, Kharagpur
Advisor: Prof. Aurobinda Routray Spring 2016

- Developed a prototype of a wearable system that detects the state of alertness of an individual using psychological and physiological features.
- Designed and implemented several psycho-motor vigilance tasks on mobile devices that test the visual and auditory response of individuals. Used these responses as features to predict the state of alertness.
- Our work was featured in major Indian press (Hindustan Times, Times of India).

Scholarships

Inspire Fellowship for Higher Education 2012
Program by Dept. of Science and Technology, Govt. of India

Kishore Vaigyanik Protsahan Yojna Fellowship (KVPY) 2011
Awarded to top 250 students in India by Dept. of Science and Technology, Govt. of India

National Talent Search Scholarship (NTSE) 2009
Awarded to top 1000 high school students in India by NCERT

Achievements

99 percentile in IIT-JEE Amongst 0.5 million candidates

99.93 percentile in AIEEE Amongst 1.1 million candidates

Certificate of Merit in:

Indian National Mathematics Olympiad (INMO)	Top 75 (National)
National Standard Examinations in Chemistry (NSEC).	Top 300 (National)
National Standard Examinations in Physics (NSEP).	Top 1% (Regional)

All India Rank 7 in National Cyber Olympiad