Sai Srivatsa Ravindranath

CONTACT INFORMATION

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RESEARCH INTERESTS

Computer Vision, Machine Learning

EMPLOYMENT

Havard University **Oct, 2017 - Present**
Visual Computing Group
Advisor: Prof. Hanspeter Pfister

Microsoft Research - India **Aug, 2016 - Aug, 2017**
Machine Learning and Optimization Group
Advisor: Dr. Prateek Jain

EDUCATION

Indian Institute of Technology, Kharagpur **2012 - 2016**
B.Tech (Hons) in Electrical Engineering
Minor in Computer Science and Engineering
- GPA (EE) : 8.82/10.00
- Minor GPA (CS) : 9.40/10.00

PUBLICATIONS

Learning Objective functions for Improved Image retrieval.
Sai Srivatsa Ravindranath, Michael Gygli, Luc Van Gool.
MediaEval 2015 Workshops.

Salient Object Detection via Objectness Measure.
Sai Srivatsa Ravindranath, R Venkatesh Babu.
IEEE International Conference on Image Processing (ICIP), 2015.

Under Submission:
A Smart Wearable System for Classification of Alertness States.
Punyashlok Dash, Anirban Dasgupta, Suvodip Chakroborty,
Sai Srivatsa Ravindranath, Aurobinda Routray, Debasis Samanta.
IEEE Transactions on Mobile Computing

RESEARCH EXPERIENCE

Visual Computing Group, Harvard University
Advisor: Hanspeter Pfister **Oct, 2017 - Present**

Computer Vision and Deep Learning for Connectomics

We are working on a pipeline to create comprehensive neural wiring diagrams of the brain from electron microscopy images. I'm currently working on two problems:
- 3D-alignment and stitching of electron microscope scans
- Detection and Segmentation of Synapses in 3D volumes.

Microsoft Research, India
Advisor: Prateek Jain **Aug, 2016 - Aug, 2017**

Multi-label Learning

- Investigated the use of ProtoNN (a KNN based algorithm) for extreme classification (multi-label learning with a large label set).
- Implemented it on GPUs and achieved a 5x speedup over the existing C++ codebase. I also proposed changes that further improved the training time and accuracy.

Research Experience (Contd.)

- Achieved results on par with existing methods like SLEEC and FastXML. On Related Search dataset, we performed 2.9% better than one-vs-all classifier and 6.5% better than FastreXML in terms of Precison@1.
- 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 inductive setting (where labels in the test set are not observed in training set).

Computer Vision Lab, ETH Zurich
Advisor : Prof. Luc Van Gool, Dr. Michael Gygli **Summer - 2015**

Learning Submodular Objectives for Improved Image Retrieval

- We formulated improving image retrieval as a subset selection problem.
- We 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). Using a large-margin formulation, we learnt the weights for such a mixture.
- We implemented lazy-greedy algorithm to select a nearly-optimal subset.
- We showed that our approach achieves state-of-the-art results on MediaEval-2013, 2014 Diverse Images dataset.

Visual Interestingness of Images

- Analyzed how image content and emotions are linked to interest
- Built a predictive model using deep convolutional neural networks, which predicts interest more accurately that the previous state-of-the-art.

Video Analytics Lab, IISc Bangalore
Advisor : Prof. R Venkatesh Babu **Summer, 2014**

Salient Object Detection via Objectness Measure

- We proposed a method to estimate the foreground regions in an image using objectness proposals.
- We proposed and implemented a novel saliency measure which determines how tightly a pixel or a region is connected to the estimated foreground. We use this to refine our foreground estimate.
- We integrated our approach with a saliency optimization framework to obtain smooth and accurate saliency maps.
- We evaluated our approach on two benchmark datasets and obtained results that were better than the existing state of the art approaches.

We published our work at IEEE International Conference on Image Processing - 2015

Indian Institute of Technology, Kharagpur
Advisor : Prof. Aurobinda Routray **Spring 2016**

Alertness Prediction Using Mobile Devices (Bachelor's Thesis Project)

- We developed a prototype of a wearable system that detects the state of alertness of an individual using psychological and physiological features.
- I was involved with the design and implementation of several psycho-motor vigilance tasks on portable devices that test the visual and auditory response of individuals. We computed psychological features based on these responses.
- We trained an SVM using these features to predict the state of alertness.

Our work was featured in major Indian press (Hindustan Times, Times of India). Our work is currently under review at IEEE Transactions on Mobile Computing.

Skills

Programming Languages: C, C++, MATLAB, Python
Libraries: Tensorflow, Pytorch, Keras, OpenCV

Press	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
Awards and Scholarships	**Inspire Fellowship for Higher Education** Program by Dept. of Science and Technology, Govt. of India	2012
	Kishore Vaigyanik Protsahan Yojna Fellowship (KVPY) Awarded to top 250 students in India by Dept. of Science and Technology, Govt. of India	2011
	National Talent Search Scholarship (NTSE) Awarded to top 1000 high school students in India by NCERT	2009
Scholastic Achievements	**99 percentile** in IIT-JEE (amongst 0.5 million candidates) **99.93 percentile** in AIEEE (amongst 1.1 million candidates) **All India Rank 7** in National Cyber Olympiad **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)