Yash Bhalgat

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EDUCATION

University of Michigan, Ann Arbor, MI — **Dec '18 (expected)**
Masters, Computer Science and Engineering, **GPA**: 3.89/4.0

Indian Institute of Technology, Bombay, — **2013-2017**
B.Tech. with *Honors* in EE and *Minor* in Computer Science, **GPA**: 9.44/10.0

SKILLS

Languages Python, C/C++, Bash, MATLAB, Java, Verilog, R, Julia, LaTeX
Packages PyTorch, OpenAI gym, Keras, TensorFlow, OpenCV, CUDA, python-flask, git

PUBLICATIONS

- **Teacher-Student Learning Paradigm for Tri-training: An Efficient Method for Unlabeled Data Exploitation**
  Yash Bhalgat, Zhe Liu, Pritam Gundecha, et. al., *AAAI 2019* (submitted)
- **Iris Classification Using Scattering Wavelet Network: An application to De-duplication**
  P. Birajadar, *Yash Bhalgat*, Vikram Gadre, *International Journal of Biometrics* (submitted)
- **CatsEyes: Categorizing seismic structures with scattering wavelet networks**
  Yash Bhalgat, Laurent Duval, Jean Charlety, *ICASSP 2018* [link] [Poster]
- **A Scattering Wavelet Network based approach to Fingerprint Classification**
  P. Birajadar, *Yash Bhalgat*, Vikram Gadre, *Pattern Recognition Letters* (attempting rebuttal)
- **Stamp Processing with Examplar Features**
  Yash Bhalgat, Mandar Kulkarni, Shirish Karande, Sachin Lodha, *DAS 2016* [arxiv]

WORK EXPERIENCE

IBM Almaden Research Center, *Mentor - Zhe Liu* — *[Summer '18]*
- Paper submitted to AAAI - Task agnostic classification in presence of label noise (specifically, sentiment classification)
- Built deep learning and ensemble frameworks to integrate weakly-labelled and high-quality training samples.

Vision and Learning Lab, Univeristy of Michigan, *Guide: Prof. Jia Deng* — *[Fall '17]*
- Implemented a Stacked Hourglass network + BiLSTM model in PyTorch with improvements and modifications for human pose estimation and tracking on videos. Achieved total AP of 58.2% and MOTA of 43.6%.

IFP Energies nouvelles, Paris, *Mentor - Laurent Duval* — *[Summer '17]*
- Paper accepted in ICASSP - Categorization of seismic structures with scattering wavelet networks
- Proposed a method for extraction of deformation invariant features of geophysical images, followed by feature selection.

IBM Research, Bangalore, *Mentor - Vikas Raykar* — *[Summer '16]*
- Joint multi-modal representations for e-commerce catalog search by visual attributes
- Implemented autoencoder-based CorrNet in Tensorflow for fast search on large fashion catalogs without manual tagging.

Tata Research Design and Development Center, Pune — *[Dec '15]*
- Object recognition in document images with semisupervised deep learning [arXiv]
- Work accepted in DAS conference. Stamp detection accuracy 94% and segmentation IoU 74.81%.

Infurnia, Mumbai — *[Summer '15]*
- Software module development for augmented reality based furniture startup
- Created a range of linear programming solvers by modifying functions in the open-source software FreeCAD

Mars Society of India, IIT Bombay — *[Aug '14 - Mar '15]*
- Worked in the Navigation and Vision subsystem of developing a prorotype for a Mars Rover
- Implemented a video-guided navigation system in ROS (Robotic Operating System) building upon the A-star algorithm

RELEVANT COURSES

Machine Learning, Advanced Computer Vision, Reinforcement Learning, Information Retrieval, Digital & Medical Image Processing, Parallel Computing, Probability & Random Processes, Advanced Topics in Signal Processing, Computational Data Science, Design & Analysis of Algorithms, Data Structures, Matrix Computations, Complex Analysis, Calculus

KEY PROJECTS

Content based Video Relevance Prediction - ACMMM Challenge *[May '18 - Jun '18]*

- Built a Triplet Network to combine the *video-level* and *frame-level* features using a BiLSTM and a dense layer
- Outpt of the dense layer used as video-embeddings trained with the objective to minimize the triplet loss function

Scattering Wavelet Network based approach to Fingerprint Classification *[Jul '16 - Apr '17]*

Undergraduate Thesis, *Guide: Prof. Vikram Gadre*

- Developed better than state-of-art algorithms for Fingerprint classification and Iris recognition.
- Papers submitted to Pattern Recognition Journal and International Journal of Biometrics respectively.

Convolutional Neural Network from scratch, Advanced Computer Vision [github-link] *[Fall '16]*

- Built modules for every layer from scratch with back-propagation, batch normalization and dropout features.
- Obtained state-of-art results by training and testing on MNIST and CIFAR-10 datasets.

Digital Image Processing algorithms acceleration with CUDA [github-link] *[Fall '16]*

- Implemented image filtering, edge detection, k-means segmentation and many others using CUDA
- Compared with serial implementation using OpenCV and MATLAB. *Guide - Prof. S. Gopalakrishnan*

Sarcasm detection in sentences, Machine Learning (CS 725) [github-link] *[Fall '16]*

- Built features based on n-grams, sentence polarity (incongruity), punctuation and emojis followed by feature selection
- Built several classifiers and developed meaningful insights on what/how the features are essential to sarcasm detection.

Other Projects

- **Emotion from Speech extraction (CNNs, HMMs)**, DSP Poster presentation [github-link]
- **Segmentation of MRI images using Expectation Maximization**, Estimation and Identification
- **Automated Stellarium Laser Pointing device**, Electronic Design Lab [youtube-demo]
- **Multicycle RISC15** - Verilog implementation of 16-bit multi-cycle RISC15 processor [github-link]

TEACHING EXPERIENCE

University of Michigan

Graduate Student Instructor, Computational Data Science *Fall '18*

Graduate Student Instructor, Introduction to Logic Design *Winter '18*

IIT Bombay

Teaching Assistant, Wavelets *Fall '16, Winter '17*

Teaching Assistant, Quatntum Mechanics and Applications *Fall '14, Winter '15*

SCHOLASTIC ACHIEVEMENTS

- All India Rank **12** in IITJEE-Mains exam among 1.5 million students
- All India Rank **155** in IITJEE-Advanced exam among 0.15 million students
- All India Rank (AIR) **60** in KVPY Scholarship by Govt. of India among 0.2 million candidates
- Featured in National Top 30 for the International Astronomy Olympiad, 2013
- Among top 300 in India to compete in the Physics, Chemistry and Mathematics olympiads.
- Awarded Cargill Global Scholarship 2014-15 and selected in the 10-member Indian cohort to represent at the global seminar in Minneapolis, USA in 2016
- Winner of IMATATHON - Image Processing Hackathon held by Electronics Club, IIT Bombay