Yash Sanjay 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**: 9.35/10.0

SKILLS

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

PUBLICATIONS

- **Annotation-cost Minimization for Medical Image Segmentation using Suggestive Mixed Supervision Fully Convolutional Networks**, *Yash Bhalgat*, Meet Shah, et. al., *Medical Imaging meets NeurIPS 2018* (accepted) [Paper]
- **Teacher-Student Learning Paradigm for Tri-training: An Efficient Method for Unlabeled Data Exploitation**, *Yash Bhalgat*, Zhe Liu, Pritam Gundecha, et. al., *NAACL-HLT 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* [Paper] [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]
- Proposed teacher-student learning paradigm for task-agnostic classification in presence of label noise in training data
- Built deep learning and ensemble frameworks to integrate weakly-labeled and high-quality training samples

IFP Energies nouvelles, Paris, *Mentor - Laurent Duval* [Summer '17]
- Proposed a method for extraction of deformation invariant features of geophysical images, followed by feature selection
- Exploited the sparse structure of data to process gigabyte-sized images in real time (ICASSP 2018)

IBM Research, Bangalore, *Mentor - Vikas Raykar* [Summer '16]
- Joint multi-modal representations for e-commerce catalog search by visual attributes without manual tagging
- Implemented autoencoder-based CorrNet in Theano achieving a query-search over 4 million images in 2-3 ms

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

Infurnia, Mumbai [Summer '15]
- Software module development in Python and C++ for an 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 a team aimed at building a prorotype Mars Rover
- Implemented a video-guided navigation system in ROS (Robotic Operating System) using the A-star algorithm

KEY PROJECTS

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

- Implemented Triplet Net in PyTorch combining *video-level* and *frame-level* features with a BiLSTM + 3D CNN model
- Video-embeddings obtained from a dense layer were used to make relevance predictions on unseen videos

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

Undergraduate Thesis, *Guide: Prof. Vikram Gadre*

- Used ScatNets and Local Non-linear Total Variation model to enhance texture components in fingerprints
- Extended version of this work on Iris classification/recognition submitted to the International Journal of Biometrics

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

- Parallelized image filtering, edge detection, k-means segmentation and few other algorithms using CUDA
- Compared with serial implementation using OpenCV and MATLAB. *Guided by Prof. S. Gopalakrishnan*

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

- Built features based on n-grams, sentence polarity (incongruity), punctuation and emojis with feature selection
- Comparared several classifiers and developed meaningful insights on feature relevance to sarcasm detection

Other Projects

- **Emotion from Speech (CNNs, HMMs)**, DSP Poster presentation [github]
- **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]

RELEVANT COURSES

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

TEACHING EXPERIENCE

University of Michigan

Graduate Student Instructor, Computational Data Science, *Prof. Raj Nadakuditi* [Fall '18]

Graduate Student Instructor, Introduction to Logic Design, *Prof. Matthew Smith* [Winter '18]

IIT Bombay

Teaching Assistant, Wavelets, *Prof. Vikram Gadre* [Fall '16, Winter '17]

Teaching Assistant, Quatntum Mechanics and Applications, *Prof. Siva Prasad* [Fall '14, Winter '15]

SCHOLASTIC ACHIEVEMENTS

- Awarded the Undergraduate Research Award (URA 02) for exceptional work in my Undergraduate Thesis.
- 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 **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 2015-16 for excellence in leadership and academic skills
- Winner of IMATATHON - Image Processing Hackathon held by Electronics Club, IIT Bombay

REFERENCES

Available on request.