Yash Sanjay Bhalgat

Curriculum Vitae *Primary email: yashbhalgat95@gmail.com*

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EDUCATION

University of Michigan, Ann Arbor, MI **Dec '18 (expected)**
Masters, Computer Science and Engineering
- **GPA**: 3.8/4.0

Indian Institute of Technology, Bombay, **2013-2017**
B.Tech. with Honors in Electrical Engineering and *Minor* in Computer Science
- **GPA**: 9.44/10

Research

PUBLICATIONS

- **CatsEyes: Categorizing seismic structures with scattering wavelet networks**
  Yash Bhalgat, Laurent Duval, Jean Charlety, *ICASSP 2018* [link]
- **A Scattering Wavelet Network based approach to Fingerprint Classification**
  P. Birajadar, *Yash Bhalgat*, Vikram Gadre, *Pattern Recognition Letters* (Under 2nd review)
- **Stamp Processing with Examplar Features**
  Yash Bhalgat, Mandar Kulkarni, Shirish Karande, Sachin Lodha, *DAS 2016* [arxiv]

TECHNICAL SKILLS

- ***Languages:*** (high to low) Python, C++, MATLAB, Java, R, Julia, Bash, Verilog, SQL (basic)
- ***Packages:*** PyTorch, Theano, TensorFlow, OpenCV, CUDA, python-flask

WORK EXPERIENCE

VISION AND LEARNING LAB, Univeristy of Michigan *[Fall '17]*
Human Pose Estimation, *Guide: Prof. Jia Deng*
Developing a PyTorch framework of the Stacked Hourglass network for human pose estimation.

IFPEN, Paris *[Summer '17]*
Categorization of seismic structures with scattering wavelet networks
Proposed a methodology to give deformation invariant features with a tessellation of geophysical images, followed by feature selection. Work accepted as a Poster presentation at ICASSP 2018.

IBM RESEARCH, Bangalore *[Summer '16]*
Joint multi-modal representations for e-commerce catalog search by visual attributes
Used "CorrNets", an autoencoder-based architecture, to learn the joint representation for images and captions. State-of-art results for large fashion catalogues search without manual tagging.

TATA RESEARCH DESIGN AND DEVELOPMENT CENTER, India *[Dec '15]*
Object recognition in document images with semisupervised deep learning [arXiv]
With specific recognition to stamp detection - segmentation, proposed a shape-based ranking algorithm to learn the 1st layer of a CNN. Detection accuracy 94% and segmentation IoU 74.81%.

TI-Digital Signal Processing Lab, IIT Bombay *[Fall '16, Spring '17]*
[THESIS] Scattering Wavelet Network based approach to Fingerprint Classification
Guide: Prof. Vikram Gadre
Developed a block-wise algorithm using Scattering Wavelet Network based feature extraction to obtain better than state-of-art results on fingerprint classification with NIST-SD4 database.

INFURNIA, Mumbai *[Summer '15]*
Software module development using CAD modelling engine
Created a range of constraint-modules and modified functions in FreeCAD for direct use without affecting backward compatibility in Python. Infurnia is a furniture-based startup in Mumbai.

FOCUS ANALYTICS, Mumbai *[Dec '14]*

Indoor Navigation System - Pedometry

Developed a pedometry-based indoor navigation system accurate to 1-1.5 meters. Steps: processing cell-phone sensor-data and using TRIAD algorithm for real-time heading estimation.

MARS SOCEITY OF INDIA, IIT Bombay *[Aug '14-Mar '15]*

Navigation System Design - University Rover Challenge, Utah

Worked in the Navigation & Vision subsystem on Robotic Operating System (ROS), aimed to build a semi-autonomous prototype of a Mars rover. Used A-star algorithm for video-guided nav.

Academic Experience and Achievements

Key Course Projects

- **Convolutional Neural Network from scratch**, Advanced Computer Vision [github]
- **Exploring machine-learning ranking systems through the Yelp dataset**, Information Retrieval
- **Sarcasm detection in sentences**, Machine Learning (CS 725) [github]
- **Segmentation of MRI images using Expectation Maximization**, Estimation and Identification
- **Computer Vision and Image Processing algorithms acceleration with CUDA**, High Performance Scientific Computing [github]
- **Emotion from Speech extraction (CNNs, HMMs)**, DSP Poster presentation [github]
- **Automated Stellarium Laser Pointing device**, Electronic Design Lab [youtube-demo]

Relevant Courses

Advanced Computer Vision, Machine Learning, High Performance Scientific Computing, Digital Image Processing, Matrix Computations, Design and Analysis of Algorithms, Advanced Topics in Signal Processing, Estimation and Identification, Probability and Data Analysis, Network Theory, Control Theory, Complex Analysis, Microprocessors

Scholastic Achievements

- All India Rank **12** in IITJEE-Mains exam among 1.5 mil students
- All India Rank **155** in IITJEE-Advanced exam among 0.15 mil 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

Miscellaneous

Presentations and Talks

- '*Scattering Wavelets Network based Latent Fingerprint Enhancement*', Research Scholars Conclave, College of Engineering, Pune (COEP) (March '17)
- '*Stamp Processing with Examplar Features*', 12th IAPR workshop on Document Analysis Systems (DAS), Santorini, Greece (April '16)
- '*Emotion from Speech*', TeQIP Seminar Poster Presentation, IIT Bombay, India (March '16)
- '*How deep neural networks can be taught to classify images?*', Blog, Electronics Club, IIT Bombay link

Teaching Experience

At University of Michigan - Ann Arbor

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

At Indian Institute of Technology, Bombay

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

Teaching Assistant, Quantum Mechanics and Applications *Winter '15, Fall '15*