Bhavesh Garg

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EDUCATION

Indian Institute of Technology Bombay
Dual Degree (B.Tech., M.Tech.) in Electrical Engineering, Cum. GPA: 8.66 / 10 *July'17 - July'22*

PUBLICATIONS

1. *Deep Generative Model Based Rate-Distortion For Image Downscaling Assessment* [Paper]
   Yuanbang Liang, **Bhavesh Garg**, Paul Rosin, Yipeng Qin
   Oral presentation *(0.8%)* at Conference on Computer Vision and Pattern Recognition (CVPR 2024)
2. *Perceptual CGAN for MRI Super-Resolution* [Paper]
   Sahar Almahfouz Nasser, Saqib Shamsi, Valay Bundele, **Bhavesh Garg**, Amit Sethi
   Paper accepted at IEEE Engineering in Medicine and Biology Conference (EMBC 2022)

RESEARCH PROJECTS

Super Resolution with Modular Adapters | **[Report]** IIT Bombay, India
Master's Thesis, Advisor: Prof. Amit Sethi *2021-22*

- Proposed **ModSR**, a modular CNN framework that integrates large-scale pretraining, meta-learning, and lightweight residual adapters to achieve fast and adaptive super-resolution under real-world settings

Image Downscaling Assessment | **[Paper]** Cardiff University, UK
Advisors: Profs. Paul Rosin, Yipeng Qin *2021-22*

- Formulated a rate–distortion based image downscaling metric that employs generative SR models to stochastically super-resolve images and measure information preservation in downscaling

MRI Super Resolution | **[Paper]** IIT Bombay, India
Advisor: Prof. Amit Sethi *2021*

- Trained a conditional GAN model with Competitive Gradient Descent to super-resolve brain MRI volumes

HDR Imaging with Deep Learning Qualcomm, India
Summer Internship *2020*

- Designed supervised and self-supervised CNN models for HDR imaging with Multi-Exposure Fusion

WORK EXPERIENCE

QureAI | **AI Scientist** Bangalore, India
Lung Cancer Detection *Mar '25 – Present*

- Integrated Test-time Augmentation methods in pulmonary nodule detection pipeline, boosting recall by **14%**
- Led development of CT scan orientation classifier using ResNet model, achieving **97% accuracy** over 3-axis alignment and reduced manual processing
- Conducted **continual pre-training** and **supervised fine-tuning** of Qwen3-4B on domain-specific medical data

Robot Learning Lab | **Research Associate** Freiburg, Germany
Perception for self-driving *May '24 – Nov '24*

- Leveraged 2D optical flow and 3D scene flow to enhance dynamic scene understanding for Bird's Eye View (BEV) semantic segmentation; utilized RAFT for dense flow estimation
- Designed a novel loss function incorporating temporal motion cues from scene flow to improve BEV consistency

WadhwaniAI | **Associate ML Scientist** New Delhi, India
Clinical Decision Support System *Mar '23 – Feb '24*

- Developed an XGBoost-based diagnostic model achieving **80%+ top-3 accuracy** across 30+ classes; enhanced reliability with calibration techniques and conformal prediction for uncertainty-aware decision making

FiveAI | **Research Engineer (intern)** Cambridge, UK
Perception for self-driving *Aug '22 – Dec '22*

- Investigated the role of **depth estimation** for LIDAR-camera based 3D object detection in self driving systems
- Improved the performance of the in-house camera-only detection model by 20% in the mAP metric

ACADEMIC PROJECTS

Sparse Signal Reconstruction | *Advisor: Prof. Ajit Rajwade* | [Code] *Feb '21 – May '21*

- Leveraged the **Gradient Projection** algorithm to solve the convex unconstrained optimisation problem
- Modeled the algorithm in MATLAB and demonstrated **40%** lower **computation time** than competing methods such as ISTA and L1-LS for reconstructing sparse signals and solving image deblurring problems

Fetal QRS-Complex Detection | *Advisor: Prof. Vikram Gadre* *Feb '21 – May '21*

- Designed a wavelet-based **CNN-LSTM** model for the detection of fetal QRS-Complexes from ECG signals
- Proposed a novel algorithm combining the wavelet-based CNN-LSTM model and K-Means clustering

Facial Recognition | *Advisor: Prof. Ajit Rajwade* | [Code] *Sep '19 – Nov '19*

- Investigated the classical subspace based facial recognition algorithms of **Eigenfaces** and **Fisherfaces**
- Established the superior performance of LDA-based Fisherfaces algorithm over PCA-based Eigenfaces algorithm under variable lighting conditions and facial expressions in **Harvard** and **Yale** facial databases

HONORS & SCHOLARSHIPS

- Recipient of the prestigious **NTSE** and **KVPY** scholarships by the Government of India *(2015, 2016)*
- Secured All India Rank of **104** in JEE Mains, **389** in JEE Advanced exam out of 1.2 million candidates *(2017)*

TECHNICAL SKILLS

Languages/Libraries	Python, Pytorch, Keras, OpenCV, Numpy, Pandas, Scikit-learn, C++
Software Tools	Git, VS Code, PyCharm, MATLAB

RELATED COURSEWORK

Signal Processing	Advanced Image Processing, Fundamentals of Image Processing, Speech Processing, Signals and Systems, Wavelets and Multi-Resolution Analysis, DSP Lab
Machine Learning	Theoretical Machine Learning, Introduction to Machine Learning, Advanced ML
Maths & Statistics	Linear Algebra, Calculus, Differential Equations, Data Analysis and Interpretation, Probability and Random Processes, Optimisation, Complex Analysis

EXTRA-CURRICULARS

Sports	Finished the year-long NSO Hockey program organised for freshmen at IIT Bombay Achieved the rank of Yellow Belt in the martial art of Karate-do
Culturals	Achieved 2^{nd} position in the General dance championship of IIT Bombay Represented IIT Bombay at the Kalaghoda Arts Festival in front of an audience of 1000+