Shashank Gupta

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Education

University of Michigan, Ann Arbor ***CGPA: 4.00/4.00***

Master of Science (MS) in Computer Vision, Electrical and Computer Engineering *Sept 2021 - April 2023*

- **Courses:** Advanced Computer Vision, Deep learning for CV, Reinforcement Learning, IR, NLP & LLMs, Neural Network Optimization / Pruning

Indian Institute of Technology Hyderabad, India ***CGPA: 8.82/10.0***

BTech in Electrical Engineering *July 2015 - May 2019*

- **Courses:** Pattern recognition & Statistical learning, Speech System (MFCC, HMM), Convex Optimization, Adaptive Signal Processing, Graph NN.

Work Experience

Rockwell Automation *Austin, TX, USA*

Research Scientist - I | Generative Model, SSL, Industry Automation, Condition Monitoring *July 2023 - Current*

- Lead development of core algorithms for real-time visual inspection and anomaly detection in manufacturing operations.
- Implements advanced self-supervised learning models (DINOv2, SAM) for improved data efficiency and automated workflow.
- Integrates multi-modal data (motion, frequency, vision, Language) for comprehensive automated monitoring systems. Use of foundation model like 4M.

KLA Tencor *Ann Arbor, MI, USA*

AI Modelling Internship | Domain Adaptation Network, Diffusion Models, GAN, Image Correction, IQA *May 2022 - Sept 2022*

- Implemented generative AI models (diffusion models, VAEs, GANs) for image correction, Improved the existing algorithm by reducing FP by 5%
- Image quality assessment is done to further investigate the quality of results and choose the best qualitative image.

MathWorks Inc *Hyderabad, India*

Software development Engineer | Object detection, RADAR, LIDAR, Sensor Fusion, Signal Processing *May 2019 - Aug 2021*

- Led development for Image Processing & Computer Vision and Deep Learning toolboxes, supporting over 100,000 MATLAB users worldwide
- Optimized object detection workflows (YOLOv3, SSD), achieving an 8% performance improvement and reducing inference time by 12%
- Authored and published industry-standard examples for RADAR and LIDAR-based multi-sensor fusion object detection.

Uber Lab *Bangalore, India*

Computer Vision Internship | 3D Object detection, Style transfer, Vanishing direction, AV *March 2019 - May 2019*

- Developed a Domain Adaptation Network using Style Transfer algorithms, generating synthetic data, improving AV perception accuracy by 18%
- Implemented a 3D object detection system for vehicles, integrating 2D object detectors, camera properties, and vanishing point detection.

Research and Technical Experience

Liouville PDE-Based Reinforcement Meta Learning with Minimum attention *Ann Arbor, MI, USA*

University of Michigan | RL, Meta Learning, Neural ODE, Mathematical Modelling *April 2022 - Present*

- Developed a novel meta-RL algorithm combining Liouville PDE, model ensembles, and minimum attention regularization, improving sample efficiency by 30% in complex MuJoCo environments
- Implemented Neural ODEs for efficient density estimation, enhancing model stability and generalization across diverse tasks..
- Demonstrating potential applications in improving LLM efficiency, and bridging the reality gap for Robotics application. Published in **ICML 2023**

Small NeRF for 3D View Reconstruction Code *Ann Arbor, MI, USA*

University of Michigan | NeRF, 3D Vision, Physics-based modelling *Jan 2022 - April 2022*

- Experimented with multiple reduced input image resolution and MLP architecture to find an optimal solution maintaining the satisfactory 3D reconstruction quality. Knowledge of Epipolar geometry, homography, and adaptive modelling. **Skills:** 3D Computer Vision, 3D meshes.

Video Quality Estimation *Ann Arbor, MI, USA*

University of Michigan | Histogram Matching, SVM, Adaptive Modelling, HDR *Aug 2022 - Dec 2022*

- Proposed an efficient method to estimate the quality of HD videos compressed at lower resolutions. Achieved using Histogram Matching, SVM.

Perceptually Driven Conditional GAN for Fourier Ptychography(FP) Code | Paper *Hyderabad, India*

Indian Institute of Technology, Hyderabad | Generative AI, Conditional GAN, High resolution image *Oct 2018 - July 2019*

- Proposed a Boundary Equilibrium Conditional GAN, with application to supervised magnitude and phase reconstruction in FP.
- Resulting algorithm captured high Field of View at high resolution. **Published** in **ASILOMAR 2019**.

No-Reference Quality Assessment of HDR Images Code | Paper *Hyderabad, India*

Indian Institute of Technology, Hyderabad | Tone Mapping, HDR, Image Quality Assessment *Jan 2017 - March 2017*

- Proposed a no-reference deep learning model to estimate the mean opinion score of tone-mapped HDR images. Paper in **QOMEX 2017**

Multi-Label Classification through single and multi objective optimization Code | Report *Ann Arbor, MI, USA*

University of Michigan | Multi-task Learning, Surrogate risk minimization *Aug 2021 - Dec 2021*

- Analyzed and implemented multi-label classification using Single surrogate-risk min framework and Multi-objective min framework.

Vertical Search Engine for Cosmetic Code | Report *Ann Arbor, MI, USA*

University of Michigan | IR, BM25, Inverted Index, Vertical search engine *Aug 2022 - Dec 2022*

- Developed a vertical search engine that integrates T5 deep learning model predictions IR pipeline raking scores incorporating features BM25, Query Expansion, Sequential Dependency. Conducted large-scale web crawling, collecting and processing over 1 million cosmetic product.
- **Technical Skills:** Ranking, Relevance, SQM, QE, Personalized Recommendation.

Skills

Programming C, C++, Java, MATLAB, CUDA, Python (Pandas, PyTorch, Numpy, OpenCV, Keras, Tensorflow, Gym, Huggingface), SQL

Professional Linux, Shell, Git, Perforce, AWS, Azure, Jira, Confluence, .