

# Neelesh Verma

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## Education

### Stony Brook University

M.S. in Computer Science (Specializing in Machine Learning)

Aug'22 – Present

GPA : 4/4

- Relevant Courses: Advanced Machine Learning, Advanced Computer Vision, Introduction to Robotics, Medical Imaging

### Indian Institute of Technology Bombay

B.Tech in Computer Science (with Honors)

Aug'16 – July'20

GPA : 8.78/10

- Relevant Courses: Automatic Speech Recognition, Intelligent and Learning Agents, Advanced Topics in Deep Learning.

## Work Experience

### SRI International | Research Scientist Intern

Menlo Park, California (May '23 - Aug '23)

- Adversarial Patch Detection** - Developed a pipeline leveraging frequency-based components to detect adversarial regions and trained a binary SVM in PyTorch to localize the adversarial patches in the images with 92 % accuracy.
- Inpainting with Stable Diffusion** - Integrated stable diffusion-based inpainting to restore the adversarial segment, reducing the attack success rate from 7.92% to 1.81% on the Apricot dataset.

### Samsung Research Institute | Machine Learning Engineer

Bengaluru, India (Sept '20 - July '22)

- Penup Features** - Implemented Weekly Supervised Object Detection using the Penup Artwork Dataset, achieving  $AP_{50}$  of 0.67 on **People-Art** dataset. Improved image stylization latency, enhanced GAN-generated drawing quality by  $\sim 7\%$ .
- DevOps and MLOps** - Successfully transitioned development pipeline from Chef to Ansible. Architected a scalable MLOps pipeline with Kubeflow, resulting in a 5x speed improvement in machine learning model deployment.

### SMC Global Capitals | Software Engineer (Internship)

Delhi, India (June '20 – Aug '20)

- Performance Monitoring** - Created a Python-based stock performance monitoring interface, implemented custom metrics and heuristics to refine trading strategies, resulting in a 10% profit increase in trading

### Samsung Research Institute | ML Intern

Bengaluru, India (May '19 – July '19)

- Artistic Style Transfer with Network Pruning** - Built a controlled Artistic Style Transfer system using PyTorch on an artwork database. Applied correlation-based network pruning to reduce 78% of StyleNet parameters, increasing efficiency.

## Publications

### Crack Segmentation using Swin-based attention - IEEE TITS (Under Review)

Neelesh Verma, Mengyang Pu, Mei Zhang, Danil Prokhorov, Eric Blasch, and Haibin Ling

\* Served as a reviewer for AAAI '24

## Research Work

### Shadow Removal via Diffusion Models [report][code]

Sept' 22 - Dec '22

Guide : Prof. Dimitris Samaras

Stony Brook University

- Built a **Denosing Diffusion Implicit Model** by extending **RePaint** architecture to remove shadows from images
- Designed a decay method to pass shadow features that improved the RePaint by **5.04%** in terms of the **LPIPS** score

### Optimal Transport Distances based Reward Function [report][code]

Feb '23 - Apr '23

Guide : Prof. Michael Ryoo

Stony Brook University

- Computed optimal alignment between an unlabeled trajectory and expert dataset to obtain reward function using **JAX**
- Utilized rewards to train **IQL** agent and obtained **2%** average performance gain on **Gym-MujoCo Locomotion Tasks**

### Speech Enhancement with Perceptual Feature Losses [report][code]

Jan' 20 - July '20

Guide : Prof. P. Balamurugan (Bachelor's Thesis)

IIT Bombay

- Developed a fully convolutional **context aggregation network** in PyTorch, to effectively remove noise from speech signals
- Applied **perceptual feature losses** during training, outperformed the baseline on **68%** of the **Voice Bank** dataset.

## Key Projects

### Adversarial Testing for Robust Content Moderation [code] | Guide: Prof. Amir Rahmati

Sept '23 - Nov '23

- Devised a patch attack exploiting **Grad-CAM** features, bypassing content moderation filters with **93%** accuracy

### Facial Features Extraction from Speech [code] | Guide: Prof. Preethi Jyothi

Sept '19 - Nov '19

- Constructed a neural network model that converts a speech into a 4096-dimensional feature vector representing the face

### Sparse Monocular Slam [code] | Guide: Prof. Arjun Jain

Feb '19 - April '19

- Proposed an algorithm to recover **3D trajectory** of video from a single camera using **sparse-feature based SLAM**

## Scholastic Achievements

- Secured **AIR 209** in JEE Advanced 2016 out of 200,000 candidates
- Awarded the **Kishore Vaigyanik Protsahan Yojana (KVPY)** Fellowship by Govt. of India
- Recipient of the prestigious **National Talent Search Examination (NTSE)** Scholarship