Tanay Varshney

tanay@nyu.edu linkedin.com/in/tanayvarshney github.com/killermachine

Education

- **New York University** **May 2020**
  Master's of Science in Computer Science
- **Mumbai University** **June 2018**
  Bachelor's of Technology, Computer Engineering

Work Experience

Research Assistant, AI4CE Lab, New York University, USA **February 2019 - Present**

- Unsupervised Learning: Pattern/Object Recognition
- Working on SLAM systems.
- Tech Stack: Python, MATLAB, OpenCV.

Research Assistant, NYU Robert F. Wagner School, USA **October 2018 - Present**

- Used multiple spectral bands to **identify water sources** via **remote sensing** data while tackling issues like shadow, cloud cover, water quality and surrounding occlusions.
- Tech Stack: Python, MATLAB, OpenCV.

Machine Learning and Vision Researcher, Indian Space Research Organization, India **March - July 2018**

- Designed and implemented a **novel hybrid algorithm** based using rendezvous points for image acquisition and analysis by multiple UAVs in swarm formation to acquire images to **generate DEM**
- Built **Image Stitching Engine, 2D & 3D simulations,** module to **identify objects** and **scenes**.
- TechStack: C++, Python, OpenCV, JavaScript, Unity.

Computer Vision Intern, General Motors, India **June - July 2017**

- Worked with **L2 Automation** for autonomous vehicles (Lane and Obstacle Detection) .
- Compiled guides, **conducted seminars and learning sessions** on **Deep Learning**.
- Tech Stack: Python, MATLAB, Tensorflow,OpenCV.

Data Analyst Intern, Parallax Labs LLP, India **Oct 2016 - Feb 2017**

- Designed a **real time data analytics** platform for a pharmaceutical packaging client.
- Deployed platform on **Mixed Reality** (Microsoft HoloLens) and Web platform.
- Tech stack: Python,R, JavaScript.

Research Thesis

Master's Thesis: Point Cloud Semantic Segmentation **April 2019 - Present**

- Generating 3D Point cloud and performing 3D semi supervised semantic segmentation in urban setting
- Tech Stack: Python, pytorch OpenCV.

Bachelor's Thesis: Autonomous Swarm Drones **March 2017- April 2018**

- Built a **coordinated swarm of drones** using a **De-centralized** approach(novel).
- Prototyped models to facilitate **autonomous navigation** for quad copter using Optical Flow and sensor data fusion to build localization and obstacle avoidance
- Built a **companion app** for hands on control and personal assistant modules
- Developed a **video processing** stack for **surveillance** application.
- TechStack: Python, C++, OpenCV, Tensorflow, Unity, ROS, AirSim, Java.

Publication

- Sheetal Thakkar, Ashok Patel, Tanay Varshney**,** Farheen Kamal, Saloni Parekh, "Low Power Anomaly Detection and Notification Systems using Deep Learning", **IJCS.2017.0409004 (2017)**

Skills

- **Languages:** Python, R, SQL, MATLAB, C++, JavaScript, Java.
- **Tools and framework:** Pytorch, OpenCV, ArcGIS, Tableau, Spark, Kafka, Microsoft Azure Databricks
- **Platforms and Hardware:** ROS, ArcGIS, RaspberryPi, Arduino, Linux(Ubuntu and Raspbian).
- **Buzz words:** Computer Vision, Real Time Data Analytics, Robotics, GIS., Drones, Autonomous Vehicles

Projects

MTA (Subway) traffic analysis for leveraging dynamic marketing **April 2019**

- Using MTA turnstile ridership data for real-time ticket subsidy using private bidding by enterprises
- Leveraging traffic information for increasing effectiveness of real-time and traditional marketing
- TechStack: python, spark, kafka

International Foreign Aid Data Visualization and Analysis **April 2019**

- Using International foreign aid data to answer policy questions using interactive visualizations
- Techstack: python, javascript, d3.js

Quadcopter Localization using Optical Flow and APRIL tags **April 2019**

- Used optical flow to compute quadcopter velocity and APRIL tag to compute POSE
- Performed localization using Extended Kalman Filter to build flight paths
- TechStack: MATLAB

Quadcopter Localization using sensor fusion **March 2019**

- Performed sensor data fusion on Vicon and IMU data
- Performed localization using Extended Kalman Filter/Kalman filter hybrid to build flight paths
- TechStack: MATLAB

Portfolio Management using Deep Learning **December 2018**

- Used the opening, closing, highest values of a stock along with other indicators to train a DDPG agent. (Deep Reinforcement Learning)
- Performed news sentiment analysis(NLP) for the particular stocks and providing it as a feature.
- Achieved a 75% return on investment over the period of 2 years on a starting capital of USD 10,000
- TechStack: python, tensorflow,pytorch

Handpicked feature guided one-shot human recognition **November 2018**

- Built a one shot learning model for human recognition(5 images per class)
- Used HoG and SIFT guided feature extraction to achieve over 95% accuracy.
- TechStack: Python, OpenCV

Credit Card Fraud Detection **June 2018**

- Built a model to flag possibly fraudulent credit card transactions using AutoEncoders
- Achieved accuracy of 92.6% and F1 score of 0.96 over a heavily skewed dataset (found on kaggle)
- TechStack: Keras, Python

Single Node Image Stitcher **March 2018**

- Designed a robust image stitcher capable of seamlessly stitching images of varied resolution.
- Efficient at 20% overlap
- TechStack: OpenCV, Python

Autonomous RC car **August 2017**

- Built an obstacle avoidance system for a toy car using camera and ultrasonic sensor data
- Used GoPiGo and RaspberryPi for hardware
- Tech Stack: C++, Python, OpenCV, RaspberryPI, ROS

Driver Awareness Detector **April 2017**

- Uses facial Landmarks and Haar Cascades to detect if the driver is drowsy or not looking on the road
- Deployed on raspberry pi to create a cost-efficient device for deployment
- TechStack: Python, OpenCV, RaspberryPI, c++

Scholarships and Achievements

- **Stood 2nd** in **Smart India Hackathon 2018,** under problem statement provided by **Indian Space Research Organization**(ISRO - Department of Space). 100,000+ participants across 27 departments.
- Earned **Machine Learning NanoDegree** by Udacity.
- Completed 17+ MOOCs on topics covering Machine Learning, data analysis and algorithms
- **Stood 1st** In **Technical Paper Presentation** at Tatva Convergence, Mumbai. March 2017.
- Total academic scholarship of **$16,000** from New York University