

# Sandesh Jain

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## EDUCATION

**M.S, Computer Engineering** (GPA: 3.94/4.0)

(Expected) Dec 2022

Virginia Tech, Blacksburg

Relevant Coursework: Deep Learning, Deep Reinforcement Learning, Computer Vision, SWE, Advanced Machine Learning.

**B.E, Electronics Engineering** (CGPA: 8.33/10)

Oct 2020

University of Mumbai, India

## SOFTWARE SKILLS

• Python, C++, MATLAB, Java, MySQL, Bash | Pytorch, Tensorflow, Keras, OpenCV, OpenAI-gym | Git, AWS.

## WORK EXPERIENCE AND RESEARCH

Virginia Tech, Blacksburg

Jan 2021 – Present

### Graduate Research

- 3D Hands-object Interaction (advised by Dr. Abbott): The goal is to introduce novel priors (for occlusion immunity) and/or post-processing (fingertip contact separation) methods that predict 6D object pose and ND hand joint parameters.
- Achieved 22 joint parameter estimation on the MSRA Hand Gesture Dataset with an MSE of 14mm 3D positional offset using the *PointNet++* network and trained on NVIDIA A100-80G node.

### Graduate Teaching Assistant.

- Advanced Machine Learning (Spring 2022), Machine Learning (Fall 2021), Introduction to Unix (Spring 2021). Supported over 200 students with course concepts, program debugging, and assignment doubts.

Indian Institute of Technology, Bombay

June 2019 – Sept 2019

### Research Intern

- Developed feature vector and dataset generation module for a standalone GUI for Video-based object tagging and classification on MATLAB and Python with an accuracy of 96% (however, we suffered from dataset bias as well).
- Optimized manual labeling time for target and background windows through semiautomatic tagging which further improved data consistency and integrity resulting in tagging time of 30-40 seconds per unique frame.

## PUBLICATION

- Vijayraj Gohil, Sandesh Jain, Ashish Kanojia, "[Feature Fusion and Dataset Generator for Vehicle Classification & Ranging](#)," 2019 IEEE Intern. Conf. on Advances in Computing, Communication, and Control, Mumbai, India, Dec 2019.

## ACADEMIC PROJECTS

### Stocks and Cryptocurrencies [CV + NLP + SWE + AWS]

- Developed a cloud software application in a team of 3 that enables a user to visualize stock/crypto information with *Twitter sentiment analysis* for any given stock/crypto keyword via the *StanfordCoreNLP* library.
- The user profile setup involves facial detection to extract the region of interest from the camera input. 2-factor authentication is provided for added security. The deployment platform utilized AWS EC2 and Wildfly application servers.

### Visual Identification of State-Space for *Street Fighter II* [CV + ML]

- Applied computer vision techniques to extract a few key state features from the frame information of the video game *Street Fighter II*. The state estimation loop runs at 35ms which is close to the real-time frame rate.
- The implementation involves features like character position, health-bar info, action pose, and round timer achieving 66% accuracy on action pose estimation on very low-resolution Atari game screen images.

### DQN and Expected SARSA in the OpenAI Gym Environment [DRL]

- Implemented two popular Reinforcement Learning algorithms with several CNN architectures and meta-parameter tuning wherein we gained 13% more reward for the same number of episodes through our experimentation approach.
- The first is an implementation of DQN on the Atari game Breakout-v0 with the frames of the game given as input to the convolutional neural network. The second was an implementation of the E-Sarsa algorithm for a smaller state- space.

### Modified Shortest Path Algorithm for Image Segmentation [CV + ML]

- Implemented Image Segmentation (MR Images and Synthetic Datasets) using graphical transformation and application of shortest path algorithm for cluster formation in non-convex shaped proximal instances.
- Compared the results with popular clustering algorithms demonstrating superior performance on the *Flame* Dataset recording an F1-score of 1.0 via our method and 0.97, 0.78 via DBSCAN and CDP.

### Stock Data (news) Analysis [Web scraping + NLP]

- Designed a Stock Data Analysis Engine using Python that utilizes quarterly transcript reports from the NYSE webpage and populates the available data on an excel file.
- The information is acquired using a web-scraper. Integrated sentiment analysis for the transcript's text and combined the same with the stock rate to gain valuable insights into the underlying patterns in pricing.

## EXTRACURRICULAR ACTIVITIES

**Toastmasters:** Student member of Blacksburg Toastmasters Club at VT Language and Culture Institute. Enhancing my communication and leadership skills through collaborative learning activities.

**IEEE:** Vice Chairperson of the Technical Team (2018-2020). Held bi-weekly meetings with the committee members to discuss and execute exciting project sessions for the juniors.