

Education

2017 – 2021 **Sardar Patel Institute of Technology**,
University of Mumbai,
Bachelor of Technology (B.Tech) in Electronics Engineering CGPI – 9.02/10.

Experience

- Dec 2020 - Present **Research Intern**, *Video Analytics Lab (VAL)*, *Indian Institute of Science (IISc)*,
Supervisor: Prof. R. Venkatesh Babu.
- Working on improving Domain Adaptation techniques for Semantic Segmentation (GTA5 dataset to Cityscapes dataset).
 - Conducted literature survey of the topic and prepared summarized presentation for the survey.
 - Implemented analysis code for Deeplabv2 architecture's performance on Cityscapes dataset.
 - Implemented, performed and documented experiments of various approaches to incorporate edge detection features into the Deeplabv2 architecture for obtaining domain invariant features to improve domain adaptation for semantic segmentation
- May 2019 - Jul 2019 **Machine Learning Intern**, *Skinzy*.
- Evaluated different methods to improve data efficiency for classifying skin disease images using deep learning. Implemented *auto-encoders in Keras* for transferring useful pre-trained features to the classifier for improved performance.
 - The overall accuracy *increased by 4%*, while also reducing overfitting significantly.
 - Explored data augmentation techniques using *Generative Adversarial Networks (GANs)*.
- Dec 2017 - Mar 2018 **Software Engineering Intern**, *VPS Techub*.
- Designed and implemented backend web services like *CRUD*, attendance and payment logger for a website using *laravel MVC framework*.
 - Implemented the UI and backend of a desktop application using *Java Swings*.

Projects/Research Paper Implementations

- Learning Multi-Level Hierarchies with Hindsight** [\[GitHub Link\]](#).
- Implemented a *Hierarchical goal-based Reinforcement Learning algorithm*, Hierarchical Actor Critic, as described in the paper, *Learning Multi-Level Hierarchies with Hindsight*, in *PyTorch*.
 - Trained the algorithm to reproduce results on the Mountain Car gym environment.
 - Modified gym environments to render states with sub-goals produced by the agent.*
- Proximal Policy Optimization** [\[GitHub Link\]](#).
- Implemented a minimal version of clipped objective *Proximal Policy Optimization* reinforcement learning algorithm for OpenAI gym environments in *PyTorch*.
 - Reproduced results on several standard reinforcement learning environments.
- Deterministic Generative Adversarial Imitation Learning** [\[GitHub Link\]](#).
- Formulated a training procedure based on *Generative Adversarial Networks (GANs)* for offline imitation learning to improve sample efficiency.
 - The algorithm worked for the Bipedal Walker environment with varying success.
- Twin Delayed DDPG** [\[GitHub Link\]](#).
- Implemented the deterministic *Value-Based Reinforcement Learning* algorithm described in the paper, *Addressing Function Approximation Error in Actor-Critic Methods*, to reproduce results on the *Roboschool (PyBullet)* and *Box2d* gym environment simulators.

Actor Critic Policy Gradient

[GitHub Link].

- Implemented vanilla policy gradient reinforcement learning algorithm with a critic network for evaluating baseline returns to stabilize the training procedure in PyTorch.

Character level language modelling with RNNs

[GitHub Link].

- Implemented and trained a minimalist version of Char-RNN for character level language modelling using Multi-layer Recurrent Neural Networks (LSTM) in PyTorch.

University Projects

Jun 2020 - Dec 2020

Offline Imitation Learning using Contrastive Methods,

Supervisor: Prof. Rajendra G. Sutar.

- Working on developing a efficient offline imitation learning algorithm based on GANs.
- Implemented the preliminary algorithm in *PyTorch* and trained it on *Google Colab*.

Jan 2020 - Apr 2020

Obtaining Point Cloud using Ultrasonic Sensor,

Supervisor: Prof. Najib Ghatte.

- Designed and built a 3D point cloud constructing mechanism using ultrasonic sensor.
- Wrote a python script to plot points obtained via serial communication from the micro-controller (*MSP430*) using *pptk* library.

May 2019 - Jul 2019

Regularization in Deep learning methods for Diabetic Retinopathy,

Supervisor: Prof. Rajendra G. Sutar.

- Improved Generalization in Deep Learning based systems for diabetic retinopathy detection using transfer learning and autoencoder regularization.
- Implemented the proposed algorithm in *PyTorch* and carried out tests on *Google Colab*.

Publications

Oct 2020

Reducing Overfitting in Diabetic Retinopathy Detection using Transfer Learning,

Nikhil Barhate, Sahil Bhawe, Rugved Bhise, Rajendra G. Sutar, Deepak C. Karia,

IEEE International Conference on Computing, Communication and Automation (ICCCA 2020).

Skills

Languages Python, C/C++, SQL

Frameworks PyTorch, NumPy, Keras

Utilities Ubuntu Linux, Git, Docker, Jupyter Notebook

Coursework

Online Operating Systems, Deep Reinforcement Learning, Machine Learning, Convolutional Neural Networks for Computer Vision, Big Data Computing

College Database Management Systems, Data Structures and Algorithms, Micro-Architectures, Computer Organization and Architecture, Signals and Systems, Electromagnetic Engineering, Computer and Communication Networks, Power Electronics, Analog Electronics, Linear Integrated Circuits, VLSI Design, Probability and Random Variables, Linear Algebra