Sarvesh Bipin Patil

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EDUCATION

BE, Electronics and Telecommunication Year of Passing: 2019
Vivekanand Education Society's Institute of Technology, Mumbai CGPA: **8.89**
University of Mumbai

Higher Secondary Examination (12th Std.) Year of Passing: 2015
Royal Junior College of Science and Commerce, Dombivli Percentage: **84%**
Maharashtra State Board

Secondary School Certificate (10th Std.) Year of Passing: 2015
Sister Nivedita English School, Dombivli Percentage: **88.73%**
Maharashtra State Board

RELEVANT WORK EXPERIENCE

HyperWorks Imaging, Bengaluru

Data Scientist *Aug 2019 – Present*

- Built a system for multi-modal Super-Resolution of Optical Microscope images to Scanning Electron Microscope images, using highly improved Pix2Pix and ESRGAN models for accurate object detection.
- Improved upon a Particle Sizing Algorithm using an in-house object detection model for highly agglomerated microscopic particles, that achieved 0.989 D50 and 0.982 CV values compared to human annotators.
- Developed a Full-Stack Web Application for an AutoML product using Django and Angular 8. The AutoML backend does feature engineering and model selection using Bayesian Optimization and generates insights about the models and their predictions.
- Deployed the Web App on a secure Gunicorn - Nginx server, residing in a Docker container controlled by a Jenkins automation server connected to GitHub for version control.
- Created an annotation tool for researchers to enable high-quality object detection of particles with very little, single class training data. Implemented an MLOps backend for the tool to make tracking and merging of experiments easier.
- Created a generalizable and robust pipeline for object of interest identification. Implemented synthetic generation of images using StyleGAN-2 to improve the classification accuracy of CNNs with very less ground truth data. The addition of synthetic images made models robust and improved testing accuracy by about 20%. This helped various businesses keep track of their stock in coolers across South-East Asian countries.

ACADEMIC PROJECTS

Automatic Traffic Management System *June 2018 – April 2019*

- Demonstrated use of YOLOv3 and Mask-RCNN on a custom Indian vehicle dataset, to perform intelligent traffic control in busy areas of the city.
- Extracted information about the density of vehicles and the presence of emergency vehicles from individual camera feeds to manipulate traffic signal timers.
- Added classification of vehicle brand and model for traffic rule offenders for an automatic fine generation. A custom dataset of about 11,500 indian vehicles was created to train the model.

Image Generation From Textual Input *August 2018 - January 2019*

- Implemented a conditional GAN to generate flower images using textual descriptions on a moderate laptop GPU.
- Gained a deep understanding of the challenges involved in cGAN training over several experiments.

TECHNICAL SKILLS

- **Programming Languages:** Python(Expert), JavaScript(Expert), TypeScript(Intermediate), C++(Intermediate).
- **Frameworks:** PyTorch, Tensorflow+Keras, Scikit-Learn, OpenCV, NLTK, Flask, Django, Angular 8, Nginx, MLFlow, JQuery, AJAX, Embedded-C.
- **Software:** Fiji (ImageJ), Jenkins, MLFlow, Git, MATLAB, Arduino, AutoCAD, Photoshop, Eagle.

CERTIFICATIONS AND PROFESSIONAL DEVELOPMENT

- **CS224N NLP (Stanford) -** From the online course, gained an in-depth understanding of Advanced Word Embeddings, RNNs, and Transformers. Unofficially completed assignments and coursework to increase knowledge in NLP, especially transformers.
- **Deep Learning Specialization (Coursera) -** Fundamentals of Linear Algebra, Calculus, Computer Vision, and NLP. Practical management of ML Projects and decision making. Implemented YOLO for object detection and a key-word detection algorithm using RNNs.
- **Deep Learning Nanodegree (Udacity) -** Practical Implementation of Neural Networks, CNNs, RNNs, GANs, VAEs, Reinforcement Learning. Implemented small projects for each category.
- **Algorithms and Data Structures Nanodegree (Udacity)** - Fundamental understanding of use of appropriate data structures. Practical implementation of algorithms - Searching, Sorting with and without recursion, Graph Algorithms, Dynamic Programming and Path Planning.

EXTRA-CURRICULAR AND VOLUNTEER EXPERIENCE

Emergency Distress Relief App

- Created an Android Emergency App in my third year, linked with the Dial-100 response of the Police Department of Navi Mumbai, using Android Studio with a FireBase backend for storage.
- The app provided an additional layer of proof in the form of video, images, and location to discourage prank callers and increase the efficiency of the police force response.

Student Committees

- Technical Coordinator, IEEE Students Chapter (2016 - 2017) - designed three original events to increase student participation. Lead a team of 10 coordinators while working on the annual symposium - Melange.
- Operational Head, Praxis (Technical Fest, 2016) - helped the organizing committee plan and create 7 technical events, 4 non-technical events, and an inter-city treasure hunt.

Miscellaneous Achievements

- Winner of an IEEE technical paper presentation competition (2018) for presenting a literature survey on Bi-Directional LSTMs and their application in end-to-end speech recognition and translation.
- Reached quarter-finals in a robotics competition E-Yantra-2017 conducted by IIT Bombay. Used VREP (Virtual Robotics Experimentation Platform) to simulate a collector bot, collecting fresh fruits and ignoring rotten fruits in an area.
- Reached the quarter-finals in E-Yantra-2016 (90th percentile). Created a maze solving algorithm and an object collection robot to navigate terrain that a rover might face on the surface of Mars.
- Volunteer for E-Summit (2016), an Entrepreneurship Festival conducted by the E-Cell department of the college.

Mini-Projects

- Created a model to determine bias and discrimination for Age, Gender, and Income, in advertisements using demographic information and user preferences.
- Implemented a facial recognition algorithm using Siamese Neural Networks for an automatic attendance app as a proof of concept.
- Built a Quadcopter from scratch, with IoT enabled Raspberry Pi for remote monitoring and hazard detecting in the mining industry. Used a CO_2 gas sensor with an ADC to measure the hazard level.
- Built a Bluetooth controlled bot for simple object holding and transportation.