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

WORK EXPERIENCE

HyperWorks Imaging, Bangalore
Data Scientist *Aug 2019 – Jan 2021*

- Built a system for multi-modal Super-Resolution of optical microscope images to scanning electron microscope images using highly modified Pix2Pix and ESRGAN models, for accurate particle size analysis
- 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 expert human annotators
- Developed a full-stack web application for an AutoML product using Django and Angular 8. The AutoML backend performed feature engineering and model selection using Bayesian Optimization and generated 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, training data. Implemented an MLOps based backend using MLFlow and Nginx for the tool to make tracking and merging of experiments easier.
- Created a generalizable and robust pipeline for the object of interest identification. Implemented synthetic generation of images using StyleGAN-2 to make CNN models robust, and improve testing accuracy by about 20%. This helped an advertising agency keep track of their stock in coolers across South-East Asian countries.

ACADEMIC PROJECTS

Automatic Traffic Management System *June 2018 – April 2019*

- Used Mask-RCNN to calculate the rolling mean of the traffic density to manipulate traffic signal timers
- Collected a dataset of about 11,500 Indian vehicles and trained a ResNet152 model for brand recognition. The model was written in Keras and was served as a RESTful API using Flask.
- Used a pretrained Single Shot Detector model to track vehicles across zebra crossing lines
- The project was placed among the top 5 in the final year and was selected for exhibition in Avishkar, a state-level project competition.

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

- Implemented a conditional GAN to generate images using captions. Used sentence-level embeddings on the captions and trained the GAN to generate flowers matching the description.

PUBLICATIONS AND PREPRINTS

Research Paper

- Sarvesh Patil, et al., "Multi-Modal Super Resolution for Dense Microscopic Particle Size Estimation", rejected from IEEE-TPAMI, preprint arXiv:2010.09594

TECHNICAL SKILLS

- **Programming Languages:** Python (Expert), JavaScript (Expert), TypeScript (Intermediate), C, C++ (Beginner)
- **Frameworks:** PyTorch, Tensorflow+Keras, Scikit-Learn, OpenCV, OpenAI-Gym, Flask, Django, React Native, NodeJS, Nginx, MLFlow
- **Software:** Fiji (ImageJ), PostgreSQL, Firebase, MongoDB, Jenkins, Git, MATLAB, Arduino, AutoCAD

CERTIFICATIONS AND PROFESSIONAL DEVELOPMENT

- **Reinforcement Learning Specialization (Coursera)**
- **Data Structures and Algorithms Nanodegree (Udacity)**
- **Deep Learning Specialization (Coursera)**
- **Google India Challenge Scholarship: Android Developer (Udacity)**
- **Deep Learning Nanodegree (Udacity)**

MISCELLANEOUS PROJECTS

- Used V-REP (now CoppeliaSim) to simulate a collector bot, collecting fresh fruits and ignoring rotten fruits in an area. Reached quarterfinals in a national robotics competition, E-Yantra-2017 conducted by the Indian Institute of Technology, Bombay.
- Implemented Dijkstra's algorithm in NumPy to find the shortest path on graphs created from a maze using OpenCV-Python and reached the quarterfinals in E-Yantra-2016 (90th percentile).
- Implemented a facial recognition algorithm using Siamese Neural Networks for an automatic attendance app.
- Built a quadcopter using KK2.1.5 flight controller, Raspberry Pi, and various CO_2 and volatile gas sensors for remote monitoring applications in the mining industry.