Kapil Mirchandani

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Education

Pune Institute of Computer Technology — Pune, India
Bachelor of Engineering in Electronics and Telecommunication, GPA: 9.45/10 — *Aug. 2017 – May 2021*

Experience

Software Development Engineer in Machine Learning — March 2021 – Present
Avoma — *Pune, India*

- Working on the research and development of various Machine Learning algorithms used for semantic similarity, clustering, OCR and various other tasks.
- Conducting research to build custom Machine Learning models as well as evaluating pre-trained models to perform tasks associated with note taking.
- Assisting in backend system design and data platform design for deployment of these models.
- Also involved in operationalization and deployment of the researched algorithms ie. creating pipelines for training and inference of models.

Software Engineer I (Machine Learning) — July 2021 – February 2021
Helpshift — *Pune, India*

- Contributed to the development of various Machine Learning solutions to help automate end user issues.
- Involved in research, scoping, benchmarking, operationalization and deployment of different NLP algorithms.
- Worked on developing Machine Learning pipelines to handle training, updation and deletion of Machine Learning models, and also inference pipelines for these models.
- Investigated and solved high priority bugs and helped improve underperforming models for clients.

Deep Learning Intern — July 2020 – October 2020
SegMind — *Remote(Bangalore, India)*

- Contributed to the development of CRAL, a library used for abstraction of well known deep learning architectures for Computer Vision.
- Worked on the addition of well known deep learning architectures for computer vision into the library.
- Intensively involved in implementation, integration and testing of object detection models.
- Achieved mAP scores of more than 0.6 on standard benchmark datasets for all the integrated object detection models.

Publications

DPSRGAN: Dilation Patch Super-Resolution Generative Adversarial Networks
Full paper at the 6th International Conference for Convergence in Technology (I2CT), 2021

- Developed a novel Generative Adversarial Network architecture to increase the resolution of images.
- The input to the network is a low resolution image, which is upscaled natively by the network.
- The model is capable of upscaling input image by 4x the original resolution.
- The metrics obtained from our DPSRGAN are better than the previously proposed SRGAN, with a MOS of 3.91 out of 5 and a PSNR of 32.24
  Publication link: https://ieeexplore.ieee.org/document/9417903
  Code link: https://github.com/kushalchordiya216/DPSRGAN

Big Data Analytics for Sustainable Cities: Pune Tree Census Data Exploratory Analysis
Full paper at the 11th International Conference for Computing, Communication and Networking Technologies (ICCCNT), 2020

- Developed a pipeline for analysis of tree census data using data of Pune, India.
- Introduced a novel metric, the Flora Biodiversity Index (FBI), to quantify the diversity of trees in a region.
- Drew insights from the data to determine uniformity of tree cover, areas deficient in trees and areas having a lower biodiversity.
- Our pipeline will be useful for cities to analyse their current green cover and work on making it better.
  Publication link: https://ieeexplore.ieee.org/document/9225530
  Code link: https://github.com/Infernolia/ICCCNT

Technical Skills

Languages: Python, C/C++, MATLAB, Java, Clojure, SQL
Frameworks: Tensorflow, Pytorch, Scikit-Learn, Django, Flask
Libraries: Pandas, NumPy, Matplotlib, Seaborn, OpenCV
Developer Tools: Git, Docker
Databases: MySQL, PostgreSQL

Projects

Automatic License Plate Recognition Application | *Pytorch, Django* September 2020 – March 2021

- Developed an application which can automatically read license plates of vehicles and send an email to the owner of the corresponding vehicle, which could be useful to record traffic violations.
- Used a Neural Network model for Object Detection, namely YOLOv3, to detect the number plate, followed by an Optical Character Recognition model, namely Tesseract, to read the number.
- Involved in training and testing of the Machine Learning models and in creating an inference pipeline for deployment of these models.
- Achieved a mAP of 0.91 for object detection on the test set of the UFPR-ALPR dataset.
  Code link: https://github.com/KapilM26/license-plate-reader

Network Anomaly Detection using Machine Learning | *Django, Scikit-Learn, Matplotlib* February 2020

- Created an application to detect various kinds of network security threats such as Port Scan and Denial of Service attacks.
- Programmed the application to accept a packet capture (.pcap) file, analyse it and generate a report of whether an anomaly was detected or not.
- Worked on data cleaning, visualization and analysis, and training of a machine learning model and achieved a test accuracy of 99.6%.
  Code link: https://github.com/kushalchordiya216/Network-Anomaly-Detection

Survey and Rescue Drone | *ROS, OpenCV* October 2019 – February 2020

- Worked on an autonomous drone for survey and rescue, for the e-Yantra Robotics Competition (eYRC) held by IIT Bombay.
- Programmed the drone controller with a PID algorithm and an image processing algorithm to detect beacons.
- Engineered the drone to be capable of autonomously maneuvering itself and responding to the beacons being lit.

Achievements

3rd place, IEEE AI-ML Competition Pune, India
Analysis of Tree Census Data of Pune *May 2020*

- Analysed and drew insights from a subset of the tree census data of Pune.
- Visualized the data and used an unsupervised machine learning algorithm to gain useful information from it.
- Used the Matplotlib and Seaborn libraries in Python for data visualization and the Scikit-Learn framework to perform K-Means Clustering on the data.

Extra-Curricular

Technical Head July 2019 – July 2020
PICT IEEE Student Branch (PISB) *Pune, India*

- Development head for XOdia '19, an online AI combat competition, leading a team of 20 juniors for development of the website, personally handling server configuration, authentication and containerization.
- Headed a team of 10 juniors for constructing, engineering, structuring and analysing datasets for DataWiz '19, a publicly hosted data science competition on Kaggle, under Credenz '19.