VIRAL THAKAR

MACHINE LEARNING RESEARCH ENGINEER

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EXECUTIVE SUMMARY:

I am an aspiring Machine Learning Research Engineer working towards the development, deployment and improvement of core AI and machine learning algorithms for computer vision and natural language processing. With a background in both research and applied engineering, my current work focuses mainly on unsupervised domain adaptation, self-supervised learning and one-shot learning.

TECHNICAL SKILLS

- Python
- Tensorflow
- TensorRT
- Triton Server
- TF Serving
- TF Lite
- MLflow
- MLOps
- TF Hparam
- AWS Sagemaker
- Open CV
- Scikit Learn
- Trimesh
- Docker
- Nvidia Jetson
- Git
- Jira
- Confluence
- Latex
- NLTK

ALGORITHMS

CNNs, RNNs, UNET, FCN, Autoencoders, VAEs, DANN, GANs, Pix2Pix, CycleGAN, GNNs, PointNet, PointNet++, GCN, DGCN.

ACHIEVEMENTS

- Winner of Random Hacks of Kindness – Goa 2016
- Shortlisted among 25 Innovators for Presidential Award
- Short-listed by NIF-India and nominated for residential program at Presidential House, India.
- Shortlisted among 51 Innovations out of 600 participants all over India, by Department of Science and Technology, Government of India.

COLLABRATIONS

- Lead Teacher in Data Science @ LeWagon Montreal.
- Practise and teach universal human values.

PROFESSIONAL HISTORY:

Head of Research & Development

Dataperformers, Montreal
June 2016 - Present

- Theoretical and applied machine learning research to develop algorithms which can solve clients' specific problems.
- Responsible to look for new AI research developments and verify their feasibility to support new features in the product or client requirements.
- Worked with Autodesk Montreal team to provide machine learning for UV mapping. For more details refer : https://vimeo.com/356211642
- Build and maintain automatic end to end training and testing frameworks to benchmark the models on standard datasets.
- Build and maintain optimized data pipelines for training, evaluation and inference.
- Build processes for automatic data cleaning, quality control and clustering.
- Use Hyper-parameter tuning and model pruning to optimize the models.
- Explore, implement and share best practises for ML project development life cycle.
- Push the research boundaries in the field, including generating patents, publications, writing research proposals for grants.
- Work closely with infrastructure team for deployment of models on inference server.
- Developed, trained and evaluated models for object detection, instance segmentation, key-point extraction, super resolution, domain adaptation, anomaly detection and classification.
- Worked at different levels like Machine Learning Intern and Deep Learning Researcher.

Deep Learning Researcher

Indus.ai, Toronto
Sep 2016 - Oct 2018

- Member of ML research team and received funding under NSERC CRD
- Developed algorithms for real-time construction site asset monitoring and analysis.
- Proposed and evaluated improvements for object detection and segmentation models using techniques like ensemble methods, adaptive clustering instead of using non-maximum suppression, and logistic regression for better hyper-parameter initialization.
- Worked on problems like model generalization under the data distribution shift and object re-identification.

Assistant Professor

Atmiya Insttitute of Technology and Science, Rajkot
June 2012 - Apr 2016

- Research in the domains like context-based information retrieval, Digital signal processing, Image and Video Processing.
- Worked and supervised various Social and Grassroots Innovations which received national level recognition.

ACADEMIC BACKGROUND:

Concordia University

Doctor of Philosophy
Sep 2016 - Present

CHARUSAT

Master of Technology
Aug 2011 - May 2013

Saurashtra University

Bachelor of Engineering
June 2007 - May 2011

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OTHER PROJECTS

Point Cloud Classification & Segmentation

• Built training and evaluation modules for point cloud classification and segmentation. Benchmark the performance on ModelNet datasets.

Dynamic Graph Convolutional Neural Networks in Tensorflow 2.x

Domain Adversarial Neural Networks

• Built training and evaluation framework for domain adversarial neural network and benchmark its performance on Syn2Real dataset.

Worker Re-Identification using Domain Adaptation

• Used domain adaptation techniques to reidentify construction site workers across multiple cameras.

LazyCNN

• Built a python package which allows the quick and easy benchmarking of different classification algorithms like VGG, ResNet, Inception. It provides performance measures like Loss, Accuracy, Per class precision and recall, and Confusion Matrix.

Computer Vision for Fashion Analytics

• Built fashion landmark detection frameworks using stacked hour glass approach. Use Autoencoders and VAEs for fashion reidentification using one shot learning.
Proposal writing which received 30K CAD funding from Mitacs.

CERTIFICATIONS

- Preparing for Tensorflow Developer Certification.
- Coursera Deep Learning Specialization by Andrew Ng

PUBLICATIONS:

• Ensemble-based Adaptive Single-shot Multi-box Detector - arxiv 1808.05727
• Efficient Single-Shot Multibox Detector for Construction Site Monitoring - arxiv 1808.05730
• Other articles can be found on Google Scholar or Personal Website

PROFESSIONAL PROJECTS:

Deep Learning for Visual Inspection - Macula AI

Dataperformers
Jan 2020 - Present

Skills : Tensorflow, Tensor RT, Triton Inference Server, Nvidia Jetson, Optuna and MlFlow

• Explore new avenues to train machine learning models with synthetic data.
• Optimize models to balance the speed-accuracy trade-off on edge devices.
• Build tools to create optimized image and video data pipelines.
• Build models to solve general visual inspection problems using image classification, object detection, instance segmentation and anomaly detection approaches.
• Ensure the CI, CD and CT based on the Google's ML Ops guidelines. Maintain at least MLOps Level 1 or similar guidelines for smooth development and experimentation.
• Create service around Optuna and Hparams for hyperparameter tuning and visualization.
• Use ML flow to maintain track of experiments.

Machine Learning for UV Mapping

Autodesk
Jun 2018 - Dec 2019

Skills : Tensorflow, PIL, Sklearn, Tensorboard

• Reviewed and summarized different machine learning based approaches to solve the UV mapping problem, presented pros and cons of each approach and proposed a tentative research plan and direction for quick feasibility check.
• Defined the data requirements and collaborated with other team members for data collection, cleaning and indexing.
• Proposed, developed and evaluated different approaches like supervised multi-view segmentation, paired image to image translation, and autoencoders to fine tune predicted Seams.
• Worked closely with software development team to incorporate developed models in 3Ds Max and Maya for better understanding of user experience and limitations.
• Grasped good software development practices from senior developers and positively incorporated their code reviews.
• Closely followed other team members' work on Point clouds and Graph Neural Networks for fair comparisons and develop a better approach for user.

Data Cleaning and Labeling for Floor Plans

Autodesk
Jan 2020 - Jun 2020

Skills : AWS Sagemaker, Label Studio, Tensorflow

• Setup Sagemaker for electric floor plan annotations.
• Developed process to verify the quality of annotations and generate clean analytical reports to communicate it.
• Trained and evaluated models to develop an automatic annotation framework to speed-up the annotation process.
• Delivered a good quality annotated data and comparative performances benchmark of different state-of-the-art approaches.