HARSH SHARMA

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INTERESTS

Computer Vision, Image Processing, Artificial Intelligence, Deep Learning, Machine Learning

EDUCATION

M. Sc. in Computing Science with specialization in Multimedia — Sept 2018-April 2020
University of Alberta, Edmonton, Canada
GPA: 4.0/4.0

B.E. (Hons.) Electrical and Electronics Engineering — Aug 2011-Jul 2015
Birla Institute of Technology and Science, Pilani, India
CGPA: 7.19/10.00

CERTIFICATIONS

- Microsoft Certified: Azure Data Scientist Associate (Exam DP-100) — Expires on 14 April 2023
- Microsoft Certified: Azure Data Engineer Associate (Exam DP-203) — Expires on 30 June 2022

WORK EXPERIENCE

Senior Machine Learning Developer, AltaML Inc., Edmonton, Canada — Sept 2021-Present
Machine Learning Developer — May 2020-Aug 2021
Machine Learning Developer (Co-op) — Sept 2019-Apr 2020
Leading development of client projects and mentoring junior developers — *Python, PyTorch, CoreML, AzureML*

- Leading development of a deep learning based pipeline to detect North Atlantic Right Whales in satellite images
- Leveraged XAI to establish trust in the developed deep learning models
- Developed a regression model to predict fuel consumption for trucks. Created dashboards using streamlit for the client to use the model. The model would lead to reduction in millions of dollars of fuel budget for the client.
- Contributing to development of internal tools for faster development and deployment of Computer Vision (CV) and Natural Language Processing (NLP) models.
- Developed a deep learning pipeline to detect and classify cats as Happy or Not Happy with over 85% accuracy. *(Patent Pending)*
- Ported the model to be mobile first using CoreML and integrated with an iPhone App, Tably. The app is intended to improve preventive health care for felines and was featured in the Wired magazine. Also deployed the model to AWS Sagemaker and GCP Compute Engine and created REST endpoints for consumption with a progressive web app.
- Worked on dimensionality reduction for RNA data using algorithms like Self Organizing Maps, etc.
- Developed a deep learning based Multi Camera Multi Target (MCMT) tracking pipeline to detect and track Cement Trucks at a construction site in real time. Also utilized Computer Vision algorithms to identify and track activities at the site
- Developed a deep learning pipeline to automatically locate and label cracks in fireproofing with over 70% accuracy. Improved the model by labelling more data using Active Learning.

Research Assistant, University of Alberta, Edmonton, Canada — Feb 2019-Aug 2019
Member of the Multimedia Research Center — *C++, Point Cloud Library, Python*

- Contributed to the development of a novel approach for 3D object recognition and 6D pose estimation without using external markers. Published in Sensors, a leading international, peer-reviewed, open access journal.
- Utilized Point Cloud Library for estimation of object pose based on a 3D scan of the objects.
- Created a new data set of industrial objects using a 3D printer and scanning them with a depth camera

Software Developer, Seven Lakes Technologies, Bangalore, India Oct 2016-July 2018
Core member of the Joyn-FDG^{TM} app development team *C#, Objective C, Java, JavaScript, Python*

- Implemented dynamic route generation algorithm - a priority based algorithm that helps the client prioritize the work and improve efficiency(Java)
- Helped stabilize the windows application by contributing to the redesign and implementing features like auto update and intra-day readings in record time (C#/.NET)
- Developed several key features for the windows and iOS applications and helped the company secure important deals with clients like XTO (subsidiary of Exxon Mobil), Range Resources, etc. (WPF/.NET/C#/Objective-C)
- Initiated the process of writing unit test cases for the Joyn^{TM} Analytics platform (Python)

Applications Engineer, Oracle India Pvt. Ltd., Bangalore, India Jun 2015-Sept 2016
Member of CPQ Cloud Development team *Java, Oracle ADF*

- Worked on enhancing the existing functionality for the product
- Added support for titles, icon sets, accessibility and translations

PROFESSIONAL TRAINING

Self-Driving Car Engineer Dec 2016-Jan 2018
Nanodegree program, Udacity.com *C++, Python - TensorFlow, Keras*

- Topics covered - Computer Vision, Deep Learning, Sensor Fusion, Localization, Control, Path Planning, Concentrations, and Systems

SELECTED ACADEMIC PROJECTS

Synthetic Aerial Image Generation using 3D Model for runway segmentation Jan-Apr 2019

- Used AHRS data to generate synthetic 2D images from a 3D model created using OpenSceneGraph, and Digital Elevation Map
- Developing a random walks based segmentation algorithm to segment the runway from the synthetic images

Image Compression using Deep Learning Jan-Apr 2019

- Developing a CNN based algorithm to compress images while maintaining high visual appeal
- Integrated with standard JPG encoder/decoder to maintain consistency and usability
- Achieved better compression ratio than state-of-the-art

Classification of Parkinson's disease using DTI data Sep-Dec 2018

- Developed a preprocessing pipeline involving eddy correction and brain extraction
- Developed a SVM based classifier to classify the scans with an accuracy of 70%

PUBLICATIONS

- *Automated Classification of Parkinsons Disease Using Diffusion Tensor Imaging Data*, H Sharma, S Soltaninejad, I Cheng, International Symposium on Visual Computing, 658-669
- *Marker-Less 3d Object Recognition and 6d Pose Estimation for Homogeneous Textureless Objects: An RGB-D Approach*, N Hajari, G Lugo Bustillo, H Sharma, I Cheng, Sensors 20 (18), 5098
- *Synthetic Aerial Image Generation and Runway Segmentation*, H Sharma, C Liu, I Cheng, International Conference on Smart Multimedia, 429-438
- *Semantic Learning for Image Compression (SLIC)*, K Mahalingaiah, H Sharma, P Kaplish, I Cheng, International Conference on Smart Multimedia, 57-66