VIKAS NATARAJA

Machine Learning Researcher/Engineer

EDUCATION

2018 - 2020 • University of Colorado Boulder, CO • Master of Science • Electrical and Computer Science

2014 - 2018 • Visvesvaraya Technological University, India • Bachelor of Engineering • Telecommunication Engineering

SKILLS

Programming: Python, C, C++, MATLAB
OS & Platforms: Linux (Bash), Git, AWS, GCP, ROS, CUDA, Jupyter Notebooks
Libraries: Tensorflow, Keras, PyTorch, OpenCV, Scikit-Learn, pandas
Publications: CubeSat paper, Cloud paper*

EXPERIENCE

Dec 2019 - Present

Laboratory for Atmospheric and Space Physics - Boulder, CO
Professional Research Assistant
- Researching ML and currently building a convolutional neural network (CNN) based on UNet in Keras to retrieve 3D cloud optical thickness from satellite cloud imagery.
- Created novel evaluation metrics and achieved an 88% decrease in training time with 0.87 mean IoU. **Publishing a paper** highlighting the work done by our team of 6.

May - Aug 2019

Allvision IO - Pittsburgh, PA
Software Engineering Intern
- Developed CNNs for a 15-person startup with AWS EC2 and S3 instances in Linux using TensorFlow for detection and recognition of license plates in real-life RGB camera data.
- Achieved an AP score of 0.78 using Faster R-CNN and 0.69 using Single Shot Detector, using transfer learning, and evaluated using COCO detection metrics.

Sept 2018 - May 2020

MAXWELL CubeSat - Boulder, CO
Software Engineer
- Designed software drivers for sensors in C and C++ in Linux for attitude determination of satellite to achieve pointing knowledge within ±2° and pointing accuracy within ±10°.
- Upgraded legacy code for reaction wheel controls with virtual machines (VMs), established coding standards, and aided team with Git and documentation support.

PROJECTS

Spring 2020

TAMER-ER: Augmenting TAMER with Expression Recognition *Code* *Paper*
- Worked with a team of 5 to augment facial expressions to TAMER using Reinforcement Learning with Variational AutoEncoder (VAE).
- Achieved on-par performance with TAMER; fine-tuned facial classification performance using encoder-decoder (unsupervised learning) models in OpenAI Gym environments.

Fall 2019

Fully Autonomous RC-sized Vehicle *Code*
- Developed an autonomous vehicle where I worked on LiDAR and camera-driven perception and motion planning optimization as a team of 4.
- Designed perception algorithms using 2D RPLiDAR and RealSense cameras for vision and depth perception on an Nvidia TX2 GPU using ROS with OpenCV.

Spring 2019

AV Lane Switching using Monocular RGB Camera Data *Code*
- Trained a CNN on UC Berkeley DeepDrive dataset in Python to enable AV lane switching decisions using camera (RGB) data.
- Created and experimented with Decision Trees, Random Forests, Logistic Regression, and Gradient Boosting and Bagging machine learning models to achieve 82% accuracy.

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