Carroll Vance

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Profile

I have professional experience working with embedded and real-time systems for a variety of applications including IoT and robotics. My current passion is machine learning, especially when it comes to computer vision and inference optimization. After working in the oil and gas services industry for seven years, I am currently pursuing higher education to develop a rigorous understanding of the theory and mathematics required to solve industry problems with machine learning.

Skills

Trained, optimized, and deployed convolutional neural networks for object detection and classification on embedded systems. Proficient in Python and C/C++. Data cleaning and preprocessing at HPC scale with custom pipeline built with OpenMPI. Experience solving time series / sequence prediction problems with machine learning. Work with embedded Linux ranging from board bringup to custom distribution creation. Applied deep reinforcement learning techniques to solve problems in game theory.

Education

UNIVERSITY OF HOUSTON – 2018-CURRENT - CGPA 4.0

Expected Graduation: Fall 2020 with B.S. in Computer Science & Minor in Mathematics

HOUSTON COMMUNITY COLLEGE – 2016-2018 - CGPA 4.0

Studied Computer Science

Experience

SOFTWARE ENGINEER, WILDCAT DEVELOPMENT; SPRING, TEXAS – 2009-2016

Designed, implemented, and tested embedded software for companies such as Baker Hughes, Hewlett Packard Enterprise, and National Oilwell Varco

SYSTEMS VALIDATION TESTER, WAILUA TECHNOLOGY; HOUSTON, TEXAS – 2008-2009

Executed test plan for flash memory technology created by Spansion and Virident Systems

Extracurricular

IEEE UH MAKERS – WORKSHOP COORDINATOR, 2018-CURRENT

Coordinating educational workshops involving embedded systems, computer vision and machine learning. Working on group projects such as indoor autonomous drones and robotic arms. Community outreach events

DATA ANALYTICS IN STUDENT HANDS – MEMBER, 2018-CURRENT

PI MU EPSILON U.S. HONORARY NATIONAL MATHEMATICS SOCIETY– MEMBER, 2019-CURRENT

Projects

AIR POLLUTION TIME SERIES PREDICTION

Exploratory data analysis with 50GB dataset of pollution data in Texas ranging from 2000 to 2017. Created preprocessing pipeline using OpenMPI / multiprocessing to handle missing data, windowing, and sequence creation on an HPC cluster. Testing various machine learning models including LSTM and Random Forests as well as different problem structures such as multiple regression and classification. Current focus is addressing missing data by using models such as gradient boosted trees.

JETSON TENSORRT

Created a series of ROS nodes for executing optimized deep learning object detection and classification inferences on nVidias' Jetson platform. 100% GPU preprocessing pipeline for minimal inference latency. Utilized ImageNet and OpenImages datasets to train object detector. Currently being used to develop a system to keep squirrels from taking fresh produce from gardens using blasts of water

Github: https://github.com/csvance/jetson_tensorrt

DEEP CONNECT FOUR

Created a Deep Q Network that learned to play connect four purely by self play. Tuning reward levels and replay buffer to stabilize training and increase convergence speed.

Github: https://github.com/csvance/deep-connect-four

ARM A7 BOARD BRINGUP

Conducted board bringup on a custom PCB based on NXP IMX6 reference design running embedded Linux. Changes to device tree to support custom hardware and sensors. Debugging many hardware and software issues. This resulted in patches to the kernel in the case of PCIe, cutting a trace that was grounding a clock signal for ethernet, and many other issues being addressed. Used kernel debugger along with logic analyzer to diagnose issues