Carroll Vance

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Profile

I have professional experience working with embedded and real-time systems for a variety of applications including robotics, networking, and storage. I am also passionate about machine learning, especially when it comes to inference optimization for embedded systems. After working in the oil & gas services industry for seven years I am currently pursuing higher education to develop a rigorous understanding of the theory and mathematics required for data science and engineering related applications of computer science.

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 OpenMPI. Experience with time series prediction and outlier detection. Work with embedded Linux ranging from board bringup to custom distribution creation.

Education - CGPA 4.0

UNIVERSITY OF HOUSTON – 2018-CURRENT

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

HOUSTON COMMUNITY COLLEGE – 2016-2018

Studied Computer Science

Experience

EMBEDDED SYSTEMS CONSULTANT, SELF-EMPLOYED; HOUSTON, TEXAS – 2019-CURRENT

Providing IC selection for concept validation as well as expertise in embedded software

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

CULLEN COLLEGE OF ENGINEERING 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

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 nulls in data by utilizing spacial information and time-lagged correlations to improve interpolation.

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

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

SD CARD BACKUP DEVICE

Created firmware for a small form factor file backup device with high speed USB and wireless capability. Implemented high speed file transfer between SD, eMMC, and USB 3.0 Mass Storage Mode. Ported Qualcomm QCA4002 driver and TCP/IP stack to ThreadX RTOS and implemented wireless file transfer. Due to memory constraints, a finite state machine design was implemented to exercise tight control over memory allocations and power consumption.