

# Carroll Vance

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*Machine Learning Engineer*

## Education

2018–Current **B.S. Computer Science**, *University of Houston*, 3.83.  
Expected Graduation Fall 2020 with Minor in Mathematics

2016–2018 **Computer Science**, *Houston Community College*, 4.0.

## Experience

### Vocational

2019–Current **Data Scientist Intern**, *Medical Metrics, Inc.*, Houston.  
End-to-end computer vision model creation, training, testing, refinement, and deployment for medical imaging. Fully integrated AI workflow with continuous integration, containerization, and deployment.

2009–2016 **Software Engineer**, *Wildcat Development*, Spring.  
Designed, implemented, and tested embedded controls software for companies such as Baker Hughes, Hewlett Packard Enterprise, and National Oilwell Varco

2008–2009 **Systems Validation Tester**, *Wailua Technology*, Houston.  
Executed test plan for flash memory technology created by Spansion and Virident Systems

## Skills

CV/ML/AI Medical Image Registration, Landmark Detection, Data Augmentation, Image Preprocessing, Object Detection, Custom NN Layers/Loss/Metrics, Inference Optimization, Model Deployment

Languages Python, C/C++, Shell Scripting/Command Line

Libraries Tensorflow, Keras, NumPy, OpenCV, TensorRT, imgaug, SciPy, sk-learn, sk-image

Operational Ubuntu LTS, Docker, Gitlab CI/CD, Github

2210 West Dallas St #1142 – Houston, Texas 77019

📞 832-991-0905 • ✉️ [cs.vance@icloud.com](mailto:cs.vance@icloud.com)

🌐 <https://csvance.github.io>

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## Extracurricular

- 2019 **SMBI Hackathon (3rd Place)**, *UTHealth*.  
Created a custom residual neural network and data augmentation strategy for detecting the onset of slow activity after a GTC seizure. Top ranking undergraduate student at the hackathon. Currently contributing to a peer reviewed publication on the subject in *BMC Bioinformatics and Medical Decision Making*.
- 2019–Current **Makers Codirector**, *IEEE UH*.  
Coordinating prototypes for demonstration at ECE Conferences involving companies and other institutions to showcase potential of students. Responsible for hosting Build-a-Bot, Makers Arcade, and Makers Showcase, as well as securing company sponsorship for events.
- 2018–2019 **Workshop Coordinator**, *IEEE UH Makers*.  
Coordinating educational workshops involving embedded systems, computer vision and machine learning. Working on group projects such as indoor autonomous drones and robotic arms.

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## Projects

- 2019 **Keras MobileDetectnet**.  
MobileDetectNet is an object detector which uses MobileNet feature extractor to predict bounding boxes. It was designed to be computationally efficient for deployment on embedded systems and easy to train with limited data. It was inspired by the simple yet effective design of DetectNet and enhanced with the anchor system from Faster R-CNN. It includes online data augmentation capabilities utilizing multiprocessing with generators.  
Github: <https://github.com/csvance/keras-mobile-detectnet>
- 2018 **Jetson TensorRT**.  
Created a series of ROS nodes for executing optimized deep learning object detection and classification inferences on nVidia's 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](https://github.com/csvance/jetson_tensorrt)
- 2017 **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>
- 2016 **Embedded Linux Board Bringup**.  
Conducted board bringup on a custom PCB based on NXP IMX6 reference design. Changes to device tree to support custom hardware and sensors. Creating custom Linux distribution with Yocto Project. Developing kernel patches to address issues with PCIe. Used kernel debugger along with logic analyzer to diagnose software and hardware issues.