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HANK WU

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EXPERIENCE

Autopilot Software Engineer **Autonomous Vehicle Research and Intelligence Lab UWaterloo** **Waterloo, ON. 4 months**

- Built a **facial recognition convolutional neural network** using **PyTorch** with fast.ai and to detect driver state and impaired driving. Generated **100,000 data points** by reimplementing both Star**GAN** and StackGAN (generative adversarial network) on **Kaggle** datasets using **GCS** (Google Cloud Services) **cloud TPUs**
- Applying **Mask R-CNN** on live vehicle footage to return **instance segmentation** for the AV **Autonomoose**
- Designed and built a **machine learning pipeline** using **Azure Machine Learning**, NumPy, Matplotlib, and OpenCV with **Python** and a data management and collection system using **PostgreSQL**, JDBC, and MATLAB to label datasets for an automated workflow to train new autonomous driving models

Autonomous Controls Engineer **Remora Inc.** **San Diego, CA. 4 months**

- Building an autonomous marine drone to collect garbage from rivers, lakes, and waterways around California
- Creating a local and global **path planning algorithm**, using **computer vision**, GPS, **ArduPilot**, MAVLink data streams, rangefinders, and IMUS. Congregating data inputs with **ROS** to produce a consistent path routing
- Training object tracking **TensorFlow model** to plan garbage collection. Integrating **image recognition** with Received Signal Strength Input, Analog Airspeed Sensors to account for **wave model deformations**

Lead Software Developer **Cozii Proptech** **Toronto, ON. 3 months**

- **Leading** development on **Android** app from ground up using **Kotlin** for backend, **Microsoft SQL** for database, and **Flutter** for frontend. Refining **IOS Backend** using **Swift** for native code and **Python** for server–side code
- Researching and implementing **Stripe** with Escrow payments, background checks with Sterling Backcheck, and both SMS and messaging app **notifications** with **Twilio**. Hosting **cloud database** on **Amazon Web Services**
- Building a **machine learning recommendation** model to suggest tenants, properties to rent, landlords to contact, and renovators/handymen based on user preferences and actions. Using **PyTorch** with **Spark**

Software Engineer **Maple Precision** **Kitchener, ON. 5 months**

- Worked on **Full Stack** development for the **Equator Web App**. Built **login system**, customer support live chat, and **user profile** and project portfolio. Improved existing features such as 3D view and **OAuth** tokens
- Built a **layered search engine** with an implementation of **PageRank**. Migrated key **server-side map rendering** processes from the GPU to CPU, increasing CRI efficiency by **76%** and time efficiency by **53%**
- Developed **3D geospatial maps** and models through **quantized meshing** of **lidar point clouds**, satellite imaging, and 2D maps applying custom made median cut octree algorithms on datasets

DESIGN TEAMS

Autonomous Vehicle Software **UWAFT (General Motors EcoCAR 3)** **Waterloo, ON. 8 months**

- Programming autonomous sensor software using **C++** in **ROS** (Robot Operating System) on **Linux** to **perform sensor diagnostics** and **sensor fusion** in order to compete in the **EcoCAR Competition**
- Using **MATLAB** and **Simulink** to create vehicle information simulations in order to test vehicle's autonomous capabilities and performance across anomaly and edge scenarios
- Processing **CAN** bus (Controller Area Network) data using C++ **data structures** and **algorithms** such as PCA and custom A* in ROS to counteract failures within **microcontrollers** and vehicle system

Linear Induction Motor Team Lead **Waterloop (SpaceX Hyperloop)** **Waterloo, ON. 8 months.**

- **Leading** a **team** of **over 25 students** prototyping, designing, and building a **linear induction motor**, creating a new method of transportation to compete in the **SpaceX Hyperloop** Competition. Integrating software and hardware subsystems to optimize wave current flow and achieve a closed loop design with **state estimation**
- Programming and wiring **embedded systems** with Magnetometer, Hall Effect sensor, Digital Temperature sensor, and IMUs. Creating computer simulations of the LIM using **ANSYS** to apply Maxwell's equations

Education

University of Waterloo **2019 – Present**

- B.E **Mechatronics Engineering** with Minor in **Software Engineering** and option in **AI**. In–major GPA: 3.86
- Courses Completed: Data Structures; Algorithms; Databases; Functional Programming; Embedded Software

Projects

Reach – Internet Access Through SMS **Backend**

- Built an automated program using **Node.js** that allows users to access the internet features through text messaging, including: Directions, Weather, News, Wikipedia Articles, Unit and Currency Conversion. Used **Google Maps and News** APIs and **Fixer API** for program features
- Used **Google Firebase** to host my program on cloud servers to process and compute user request and **Twilio** to automatically send and receive SMS

Train µ – Machine Learning Sports Trainer **Hackathon Win**

- Built, trained, and ran a **machine learning model** to analyze sports footage and help users improve athletic form, achieving **top 3** out of **over 100 teams** at **Hack the Valley 4**
- Used **TensorFlow** and **Openpos** for machine learning and dataset. Used **Python**, **Google Cloud Servers**, and Django for backend, and JavaScript, HTML, and **React** for frontend

Responsum – Educational Software **Full Stack**

- Building an educational **Web Application** with live surveying, forums, and learning resources. Will be **Launching** on **University of Waterloo Servers** for use in Professor Igor Ivkovic's class of **135 students** in Fall
- Utilizing **MongoDB, Node.js,** and **GCS** for backend, database, and **REST API**. Using React, HTML, CSS, and **JavaScript** for frontend UI development. Over **13,000 lines** of code, with more improvements ongoing

Syrinx – Malignant Cyst Detector **Neural Network**

- Using **TensorFlow** and **NumPy** along with published **medical MRI data sets** to build a **neural network** to differentiate between a safe benign cyst and a harmful malignant cyst and output percentage chance

Axel – Autonomous Chess Playing Robot **Embedded Systems**

- Programmed **event-driven software** for chess robot using RobotC along with mechanical movement, HMI, database of games played, and embedded software
- Integrated **Stockfish Artificial Intelligence API** using C++ for a Player vs Computer Mode

Skills

Experienced

Java, Python, JavaScript, C++, Node.js, C, Firebase, PostgreSQL, Git, Kotlin, MongoDB, Google Cloud Servers, Linux, PHP, Amazon Web Services, TensorFlow, PyTorch, GAN, Data Structures, Algorithms, REST API, MySQL

Intermediate

TypeScript, React, HTML5, CSS, XML, Bash, Docker, ROS, Mask R-CNN, RTOS, Django, Keras, Redis, Flutter, Unix, Swift, Matlab, Simulink, Arduino, Hadoop, mvvm, Unit Tests, Threading, Concurrency, StarGAN, StackGAN

Learning

Figma, WebGL, Potree, Chart.js, PyTorch, Agile, Entwine, AJAX, Agile, Kaggle, Spark, Ruby on Rails, CUDA C

Hackathons / Awards

- **Top 3/100 Teams: Hack the Valley** 4 **Hackathon** 2020. Built **Train µ** and awarded prize from Facebook
- **1st Place: Hack the North 2019** Deloitte Coding Challenge, a lightning coding challenge during the hackathon
- **Mentor:** StarterHacks (two times), HobbyHacks, Hack The 6ix, TerribleHack, NWHacks, SigmaHacks 2.0
- **1st Place:** Waterloo Engineering Competition (Senior Division 2019). Created an **autonomous skyjack robot**
- **1st Place:** Vancouver Math Olympiad 2019. Competed in a Vancouver Olympiad math competition
- **B1 DELF Certificate:** Certified French Professional Working Proficiency by France's Ministry of Education

Note

All **title names** and underlined words are **linked** (experience, projects, and design teams) (click Reach) for info!
Thank you very much for reading my resume! I'd really love to join your teams at Tesla and build great software!