VICTOR ARANGO-QUIROGA

WWW.VICTOR-ARANGO-QUIROGA.COM

EDUCATION

University of California San Diego, **La Jolla, CA**
M.S. in Computer Science *Expected Dec 2023*
University of Massachusetts Amherst, **Amherst, MA**
B.S. in Computer Engineering – Cum Laude GPA: 3.8/4.0 *May 2018*
Honors &Awards: Dean's List (2015-2018), Jack Cryan Scholarship & Arlindo Jorge Scholarship from College of Engineering.
Relevant coursework: Robotics, Comm & Signal Proc., Image Processing, Embedded Systems, Data Structures, Networks & Internet.

CERTIFICATES: Stanford Professional Certificate in Artificial Intelligence (2022), MLOps (Machine Learning Operations) (2021), Google Cloud Platform (GCP) Big Data and Machine Learning Fundamentals (2021), GCP Big Data and Machine Learning Fundamentals (2021), GCP Fundamentals: Core Infrastructure (2021), Natural Language Processing in TensorFlow (2021), Machine Learning (Coursera) (2020), Neural Networks and Deep Learning (deeplearning.ai) (2017), Computational Thinking and Data Science (MITx) (2015).

AWARDS: 1st Place and People's Choice Awards at Ford-GCP Hackathon (2021). Ford Recognition Awards (2018-2019-2020-2021). 1st Place and People's Choice Awards at Ford College Graduate Hackathon (2019). Coordinator's Choice - Senior Design Project Award (2018).

SKILLS: Machine Learning (ML), MLOps, Natural Language Processing (NLP), Teaching, Agile Methodology, Test Driven Development.

PROGRAMMING LANGUAGES/FRAMEWORKS: Python, PySpark, FastAPI, Django, Flask, Java, C, C++, Verilog, Matlab, HTML, PHP, Angular, Pega, ROS, Bash/Shell, Elasticsearch/Kibana, GCP.

TOOLS/DATABASES/OTHER: GitHub, Docker, Kubernetes, Kafka, GCP-pub/sub, Cucumber, JMeter, Pytest, Splunk, Hadoop/Hive, SQL, MongoDB, High-Performance Computing (HPC), Jupyter Notebook, Scikit-learn/Tensorflow, Raspberry Pi (RPi)/FPGAs/Microcontrollers
LANGUAGES: Spanish (Native). English (Fluent). Portuguese (Basic).

WORK EXPERIENCE

FORD MOTOR COMPANY - FORD COLLEGE GRADUATE PROGRAM **DEARBORN, MI**

3RD ROTATION - ML ENGINEER /TECH LEAD – ARTIFICIAL INTELLIGENCE ADVANCED CENTER *JAN 2021 – PRESENT*

- Delivered three Proof-of-Concepts (POCs) and two Minimal Viable Products (MVPs) that leveraged ML and NLP algorithms coupled with Kubernetes applications to deliver robust and scalable enterprise solutions through Ford's internal ML platform (Mach1ML).
- Defined problem statements and scoping documents for project engagements. Designed and architected solutions for internal clients.
- Developed Ford internal Elasticsearch-based search engines for dealer technicians and customer surveys databases in the United States, Canada, and Mexico. Standardized multiple databases and data formats across the applications.
- Created the Extract, Transform, and Load (ETL) process to create an index hosted on a Kubernetes API serving Elasticsearch. Used Apache Beam pipelines in GCP Dataflows connected to GCP pub/sub topics to trigger ETL pipeline.
- Developed clustering algorithm that grouped tickets reporting issues that contained numerical and textual data. Used NLP techniques to create embeddings for textual data to use as features to the K-means algorithm. Deployed model to API.
- Defined technical tasks, estimated development time, delegated tasks to ML and software engineers, and demoed to stakeholders.
- Collaborated on hiring and recruiting ML and software engineers to form a new team to support new business AI initiatives.

2ND ROTATION - SOFTWARE ENGINEER & RESEARCH ASSOCIATE – FORD MOTOR CREDIT COMPANY *JAN 2020 – DEC 2020*

- Improved the accuracy of a Random Forest Regressor model by 10% while decreasing its number of features by 30% by creating Python programs with multiprocessing capabilities to perform feature engineering tasks and hyper parameter tuning.
- Delivered MVPs with Flask-based ML cloud APIs with a response time of ~250ms and model accuracies ranging from 70% to 97%.
- Acted as a point of contact to provide support on ML APIs to cross-functional teams at Ford Motor Credit Company.
- Researched and created starter code to deploy Flask and Django APIs integrated with ADFS (SSO) authentication to allow Ford teams to easily create a secured API endpoint on Ford's cloud platform integrated with Scikit-learn models saved as pickle files.
- Worked closely with managers, product designers, and system architects, in the design of new AI-based solutions to develop three MVPs to increase customer engagement and sales. Worked with data scientists and data architects to create data pipelines. Trained, tested, and validated different ML models (Scikit-learn models such as Random Forest Regressor, Logistic Regression, K-means).

1ST ROTATION - SOFTWARE ENGINEER – INTELLIGENT CUSTOMER INTERACTIONS *JULY 2018 – DEC. 2019*

- Co-created a distributed system integrating Pega and HPC servers and worked on a cross-functional teams in India, Canada, and the United States to integrate applications to send marketing communications based on a naive Bayes classifier prediction.
- Created Finite State Machines (FSM) based on customer journeys for EV market and helped defining technical requirements.
- Decreased runtime process by 10x by enhancing data extraction process from code and partition keys from database.
- Learned Pega Decisioning & Marketing. Supported development (Pega, Java, Python) and created architecture diagrams.
- Demoed software product to internal clients resulting in 3 new customers. Created onboarding guides and trained new members.

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PERCEPTION AND INTELLIGENT SYSTEMS, UNIVERSIDAD DEL VALLE **CALI, COLOMBIA**

RESEARCH INTERN – AUTONOMOUS VEHICLE PROJECT – PROF. BLADIMIR BACCA *SUMMER 2017*

- Conducted literature review on vision-based topological mapping and localization methods, and 2D Projective Transformations.
- Created, in an offline phase, a localization system using the Bag-of-Visual-Words (BoVW) model where nodes were detected based on Euclidean parameters (distance/angle variation) and described by the SIFT/SURF features. RANSAC was used to detect outliers.
- Created, in an offline phase, the inverted index of the BoVW model which, given visual features of an input image, retrieved the most likely node that the input image corresponded to.
- Evaluated performance (PR curves/confusion matrix). Achieved 90% testing accuracy.
- Explored new databases and found a drop in accuracy on a new database of the same path taken in different weather seasons.
- Created guide on how to create topological maps and reported findings and potential ways to improve the BoVW model.

CENTER FOR AUTOMATION TECHNOLOGIES AND SYSTEMS (CATS), RENSSELAER POLYTECHNIC INSTITUTE **TROY, NY**

RESEARCH INTERN - AUTONOMOUS VEHICLE PROJECT (DUCKIETOWN) - PROF. JOHN WEN *SUMMER 2016*

- Assembled, configured, and calibrated robot by using ROS and Python. Evaluated performance and improved software capabilities.
- Created new functionalities to follow pre-computed navigation commands and follow stipulated road rules, such as stopping at stop signs. To accomplish this, I reviewed papers by Prof. Liam Paul on the robot's Computer Vision (CV) algorithm.
- Discovered robot limitations in certain light environments in which the robot misunderstood the reflected colors from road markings, which negatively impacted the CV algorithm causing the robot to behave erratically.
- Collaborated with MIT's Computer Science Artificial Intelligence Duckietown Team by contributing to the official FAQ section and creating a detailed technical guide with a cost analysis section and explaining how to build and configure the robot.
- Reported limitations and potential future research opportunities.

UNIVERSITY OF MASSACHUSETTS AMHERST **AMHERST, MA**

UNDERGRADUATE RESEARCHER – PROF. BILL LEONARD *FALL 2016, 2017,2018*

- Developed and designed website using Django and Angular hosted on Heroku to improve and ease feedback communication between professors and students. Progress and new prototypes were demoed biweekly. Delivered prototype which TAs used.

RELEVANT SCHOOL PROJECTS

SENIOR DESIGN PROJECT (SDP) – PROF. GUANGYU XU **FALL 2017, SPRING 2018**

- Designed FSMs to develop a fault tolerant system that automatically validated an ID based on its unique pattern of microspheres to build a secure and unclonable personal ID system. Created APIs to integrate RPi to AWS databases.
- Integrated all sensors to RPi. Developed a customized template matching algorithm and improved its runtime by a factor of 10 by vectorizing all mathematical calculations. The accuracy of the system based on a synthetic database was 70%.

ROGER-THE-CRAB SIMULATOR - ROBOTICS – PROF. RODERIC GRUPEN **SPRING 2018**

- Designed and developed a simulated robot that implemented mathematical foundations of robotics such as actuation, control, kinematics, dynamics, path planning, uncertainty, probabilistic models and inference, and machine learning for motor control.
- Developed reinforcement learning algorithm (Q-learning) in C to teach robots abstract tasks such as touching, grabbing, and carrying.

REACHABILITY ANALYSIS LAB – MODELING AND VERIFICATION OF EMBEDDED SYSTEMS – PROF. DANIEL HOLCOMB **SPRING 2017**

- Created, for a traffic light interception, the state transition graphs and sequential Verilog modules with combinational logic and state updates. Wrote Verilog testbench integrated to Verilog modules to randomly cycle through the system and check for reachability.
- Wrote a Python program to parse Verilog modules, unroll the transition relation and convert it to DIMACS formatted Conjunctive Normal Form (CNF). Performed symbolic reachability analysis using SAT solvers on CNF clauses.

TEACHING & VOLUNTEERING EXPERIENCE

PYTHON 101 – PROGRAMMING CLASS INSTRUCTOR, FORD MOTOR CREDIT COMPANY **2020**

Volunteered as one of three instructors for a 12-weeks programming training for 50 plus engineers.

FORD VOLUNTEER CORPS – Delivered clean water to Flint and helped to pack food at the Gleaners Community Food Bank **2018-2019**

FORD HISPANIC NETWORK (FHN) – Helped create presentations for the FHN Heritage Gala. Helped as recruiter. **2018-2019**

SOCIETY OF HISPANIC PROFESSIONAL ENGINEERS (SHPE) – HEAD EVENT COORDINATOR **2015-2018**

Planned company tours and led activities with high and middle schools to motivate underrepresented communities to engage in STEM activities. Participated on the outreach committee where I coordinated events with other societies such as NSBE and ALPFA.

TEACHING ASSISTANT, CITIZEN SCHOOLS - BROWNE MIDDLE SCHOOL, CHELSEA, MA **2015**

Tutored Math to ESL students. Applied behavior strategies and worked with students, teachers, and parents to improve student's academic performance. Designed school material for students that successfully improved mathematical skills and MCAS scores for 10-15 students.

TEACHING ASSISTANT/ BETA TESTER (ADVANCED INTRODUCTORY CLASSICAL MECHANICS - MITX) **2015**

Tested new software features, reviewed class material, and helped students online. Reported bug findings to admins.

TEACHING ASSISTANT, DIFFERENTIAL EQUATIONS – PROF. HENDEL YAKER, ICESI UNIVERSITY, CALI, COLOMBIA **2013**

Taught differential equations and calculus to engineering students. Graded class material and hosted TA sessions.

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