Mohamad Orabi

+1 949 245 4310 | San Jose, California, United States | mohamad.orabi10@hotmail.com | http://www.orabim.com

WORK EXPERIENCE

OneNav, inc – *San Jose, California* Jan 2022 – Present

Navigation/ML Engineer

Optimize various blocks of the **Java**-based Positioning Engine/Manager to enhance its performance across real-world scenarios (cold start, assisted, urban canyon, foliage, parking garage, tunnel). My activities include, but are not limited to:

- Conducting research and development on **outlier detection** methods such as **RAIM, RANSAC**, and **UKF innovations**.
- Researching and developing **ML models** for **measurement classification** and **bias estimation**.
- Estimating and characterizing **measurement errors**.
- **Root-causing** and resolving **urgent issues** impacting receiver performance.
- Developing **interactive dashboards** for **massive data analysis** to support and guide R&D.
- Contributing to **analysis, debugging, and regression tools**.

ASPIN Lab - University of California Irvine – *Irvine, California* Aug 2020 – Jan 2022

Graduate Student Researcher

Conducted research that was published and presented at academic conferences, contributing to advancements in navigation and signal tracking technologies. Key responsibilities included:

- Set up specialized hardware and conducted numerous **experiments** and extensive **data collections**.
- Developed **specialized software-defined** receivers for tracking a variety of signal sources.
- Researched methods to use **cellular signals (LTE, 5G)** for navigation.
- Researched methods to use **low Earth orbit (LEO)** satellites for navigation **(e.g., Iridium, Orbcomm)**.
- Applied **machine learning (ML)** techniques in tracking filters to improve **multipath mitigation**, leading to a substantial reduction in signal errors.

ASPIN Lab - University of California Irvine – *Irvine, California* Jun 2019 – Sep 2019

Research Intern

Designed and implemented a **GPS receiver** in **C++:**

- Used **multiprocessing** to achieve **real-time performance**.
- **Acquired** and **tracked** satellite signals from collected IQ samples.
- **Decoded** the **navigation message**.
- **Computed** the **pseudorange, satellite positions**, and **correction parameters**.
- **Computed** a full **position-time** navigation **solution**.

EDUCATION

University of California – *Irvine, California* 2020 - 2022

M.S. in Electrical and Computer Engineer – GPA (3.80)

- **Research Project:** Opportunistic navigation exploiting LTE, 5G, and low Earth Orbit satellite signals.
- **Best Presentation Award** at **ION GNSS+ 2021** for my reinforcement learning for multipath mitigation work

Lebanese American University – *Byblos, Lebanon*

B.E. Electrical Engineering – GPA (3.91) 2016 - 2020

- **Full Scholarship** by the University Scholarship (USP) hosted by the **US Embassy**.

PROFESSIONAL SKILLS:

This section lists the skills I have acquired during each of my experiences:

1- OneNav, Inc.

This experience helped me gain industry-level coding skills necessary for collaboration on large projects.
Main languages used: **Java - C++ - Python**

- **Docker** for creating isolated, reproducible, and scalable **development environments**.
- **YAML scripting** for build and test **automation (CI/CD)**.
- **Code testing** and quality assurance for **reliability and performance**.
- **Training ML** for resource constraint devices optimizing for **performance, latency, and size**.
- **Deploying ML** on resource constraint devices using **TensorFlow Lite for Microcontrollers**.
- Building **interactive dashboards** for massive data analysis.
- **Multiprocessing** to speed up processing of **massive data.**

2- ASPIN Lab

This experience laid the foundational theoretical and mathematical frameworks crucial to my career.
Main languages used: **Matlab - C++ - Python**

- Comprehensive understanding of **Linear Algebra**, **Estimation Theory**, **Probability**, and **Stochastic Processes**.
- Theoretical and practical understanding of **Kalman Filtering** and **Sensor Fusion**.
- Deep understanding of **GNSS theory and design choices**: PRN gold codes, spread spectrum signaling, code and phase tracking, navigation message, pseudorange models, and error sources.
- In-depth knowledge of **machine learning** theory and techniques: supervised, unsupervised, and reinforcement learning.
- Familiarity with **cellular standards (LTE, 5G)**, specifically synchronization signals.
- Familiarity with **Low Earth Orbit (LEO) satellite signals**, namely Orbcomm and Iridium.

3-Personal Projects

Includes everything from games to utility scripts, message spammers, data scrapers, and even an augmented reality (AR) function visualizer.
Main languages used: **Python - Matlab - C++ - C# - HTML - JavaScript - Swift**

- Great **problem-solving** skills and a **can-do attitude**.
- Exceptional **debugging skills** and proficiency in **debugging tools** and techniques.
- **Quickly learning** new skills, programming languages, libraries, etc.
- **Swift** for iOS development.
- **Unity** for 3D games and physics simulations.
- **Image processing** and filtering.
- **HTML** for websites.
- **Intuitive UI** design.

PUBLICATIONS

- A Machine Learning Multipath Mitigation Approach for Opportunistic Navigation with 5G Signals
  First Author - ION GNSS+ - September 2021 - St. Louis, Missouri
- Opportunistic Navigation with Doppler Measurements from Iridium Next and Orbcomm LEO Satellites
  First Author - IEEE Aerospace - April 2021 – Virtual
- Iterative Learning Control: Practical Implementation and Automation
  Co-Author - IEEE Transactions on Industrial Electronics - March 2021
- Carpe Signum: Seize the Signal
  Co-Author - Inside GNSS Magazine - February 2021
- A Machine Learning Approach for GPS Code Phase Estimation in Multipath Environments
  First Author - IEEE/ION Position Location and Navigation Symposium PLANS - April 2020 – Virtual