# IBRAHIM ABDELMONEM

## Senior Software Engineer


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## EXPERIENCE

### Software Integration Engineer

**Kudan**

11/2021 - Ongoing  Bristol, UK

- Contributed and maintained ROS/ROS2 packages for Kudan's SLAM Libraries.
- Architected and developed the robust backend of KudanStudio application using the Flask framework, enabling seamless data processing and real-time updates for users.
- Developed Python bindings for Kudan's C++ Libraries, simplifying integration and allowing a broader range of developers to access our powerful libraries.
- Developed a Python application to manage KudanStudio deployment to the end users by providing easy to use GUI app made using TKinter framework.
- Packaged Kudan's applications into Debian packages, making them accessible to a wider audience and simplifying installation for users.
- Collaborated with the DevOps team to optimize and automate ROS CI processes, resulting in shorter build times and more reliable testing.
- Developed Kudan's Autonomous Mobile Robotics (AMR) package, including example launch files, to accelerate robotic development and improve navigation capabilities.
- Prepared Robotics demos for conventions like ROSCon and customers.
- Performed ongoing evaluations of SLAM algorithms against diverse customer datasets, leading to algorithm enhancements and ensuring better compatibility with real-world scenarios.
- Provided expert support to customers, guiding them in seamless integration of ROS packages and fine-tuning SLAM parameters, resulting in improved system performance.
- >_ Key Technologies: SLAM, C++, ROS, Python .

### R&D Software Engineer

**Avelabs**

09/2018 - 11/2021  Cairo, Egypt

Contributed to the development of Avelab's new Acoustic sensing product (AutoHears) by optimizing and porting existing algorithms to C/C++ for deployment on embedded hardware.

- Optimized existing Beamforming and DOA algorithms by offloading the slow mathematics computations to TI DSPs.
- Created benchmarks for the new developed algorithms.
- Created ROS packages for the product.
- Collected datasets to validate our algorithms against it.

Developer Advocate For Yonohub.com (A cloud-based system for Autonomous Vehicles, ADAS, and Robotics).

- Created tech content for publication as articles, tutorials, and showcase apps to effectively demonstrate use cases of Yonohub.
- Developed new Blocks from the state of the art ML/DL and ADAS Algorithms.
- Configured Hardware for Local Deployment (Nvidia Jetson AGX Xavier, Raspberry Pi).
- Created AVS Datasets for Yonohub, e.g. KITTI, DeepDrive, ApolloScape and Comma.ai
- >_ Key Technologies: Autonomous Vehicles, ROS, Autoware, ML/DL, Cloud, Embedded Boards

## EDUCATION

### BSc. Mechatronics Engineering

**The German University in Cairo**

2018  Cairo

Excellent with Honors

## ONLINE DEGREES

**Robotics Software Engineer Nanodegree**
Certificate — Description

- ROS Essentials.
- Localization.
- Mapping and SLAM.
- Path Planning and Navigation.

**Sensors Fusion Nanodegree - Udacity**
Certificate — Description

- Lidar Obstacles Detection, Plane Segmentation and PointsCloud Clustering.
- Camera and Lidar Fusion.
- Radar Obstacle Detection.
- Kalman Filters.

**C++ Nanodegree - Udacity**
Certificate — Description

- C++ Foundations.
- Object-Oriented Programming (OOP).
- Memory Management.
- Concurrency.

## PROGRAMMING LANGUAGES

C++ | Python | Rust | Java | MATLAB

## FRAMEWORKS AND LIBRARIES

- ROS/ROS 2
- Eigen3
- g2o
- Ceres
- FLask & Fast API
- PyBind11
- OpenCV
- Conan The C++ Package Manager

# EXPERIENCE

### Motion Planning and Control Engineer (Contractor)

**AeroVect**

11/2020 - 11/2021 Remotely

- Developed and implemented the motion planning and control software stack for The AeroVect Driver.
- Designed and developed safety and emergency stopping algorithms for The AeroVect Driver to ensure safe operation in all scenarios.
- Designed and executed simulations for testing and verification of The AeroVect Driver, ensuring accuracy,robustness and reliabilit of the system.
- Integrating ROS with the other software components.
- >_ Key Technologies ROS, C++, Control Theory, Autonomous Driving .

### Bachelor Thesis and Internship

**Daimler AG - Mercedes-Benz R&D**

02/2017 - 08/2017 Sindelfingen, Germany

- Devleoping a Test Robot for Touch Devices Testing.
- Hardware (Robot Construction,Kinematics and Touch Devices)
- Software (CANoe,CAN-bus,Databases and The Test System)
- Making Tests on The Touch Devices with the Robot to analyze the state and develop improvements.
- Implementing new Algorithms and Data structures for the Robot in MATLAB.
- Programming a Graphical User Interface for the System
- >_ Key Technologies: Delta Robots, MATLAB, CANoe .

# PROJECTS

- **binance-dca. Python app to setup DCA orders on Binance.** GitHub
- **Edrak. C++ Library for Visual SLAM.** GitHub
- **Pure pursuit ROS package for path tracking.** GitHub
- **C++ Implementation of a BlockChain.** GitHub
- **ngrok-ros. ROS package for ngrok.** GitHub
- **ros2-android, ROS2 package to use android's phone sensors.** Github
- **ROSbag2Videos, Extract videos from ROS bags.** Github
- **Teaching an online ROS2 course on Youtube.** Playlist
- **pclutils a C++ library for working with PointClouds.** Github
- **BaristaBot a robotics simulation package based on ROS and Gazebo.** Github
- **CarSim SFML and ROS based Car Simulator.** Github
- **Concurrent Traffic Simulation.** Github
- **Linux System Monitor C++.** Github
- **Route Planning Project using A* C++.** Github
- **Unscented Kalman Filter to estimate the state of multiple cars.** Github
- **Particles Filter C++ Implementation.** Github
- **Time To Collision System (TTC) based on Lidar and Camera.** Github
- **PointClouds Obstacles Detection, Segmentation and Clustering** Github
- **Jupyter-ROS (Contributor) ROS Support for jupyter notebooks** Github
- **Longitudinal and Lateral Control in CARLA Simulator** Github — Video
- **Deep Reinforcement Learning DQN Agent Playing Space Invaders** Github — Video
- **Road Semantic Segmentation Using Fully Convolutional Network (FCN)** Github
- **Building and Simulating TurtleBot using ROS and Raspberry Pi** Github — Video
- **Optimal LQG Control of Wind Turbine using Kalman Filter**
- **Non-Linear Controller (Feedback Linearization) for 2D Plotter Robot Arm**
- **PID Control of Two-Wheeled Self balancing Robot .** Video
- **Yu-Gi-Oh Video Game in Java** Github — Video

# HONORS & AWARDS

Academic Achievement Full Scholarship

# TECHNOLOGIES


# ONLINE COURSES

- State Estimation and Localization for SDC
- Introduction to Self-Driving Cars
- ROS1x: Hello (Real) World with ROS
- Electric and Conventional Vehicles
- Machine Learning with TensorFlow on GCP
- Python Parallel Programming Solutions
- Intro to FPGA Design for Embedded Systems
- Agile Software Development
- Control of Mobile Robots

# LANGUAGES

- Arabic ★★★★★
- English ★★★★☆
- German ★★☆☆☆

**The German University in Cairo**

2013-2018 Cairo, Egypt

Ranked 7th in Thanwya Amma (High School)

**The Egyptian Ministry of Education**

2013 Cairo, Egypt