

# Fady Algyar

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## EDUCATION

### New York University (NYU), Tandon School of Engineering, New York, USA.

Master of Science in Robotics, Automation and Control.

Sept 2021-May 2023

- GPA: **3.89/4.0**
- Relevant Courses: Robot Perception, Machine Learning, Robot Localization and Navigation.

### The American University in Cairo (AUC), Cairo, Egypt.

Bachelor of Science in Mechanical Engineering.

Sept 2012-May 2017

- GPA: 3.71/4.0
- Relevant Courses: Automatic Control, Microcontrollers Programming, Advanced Manufacturing.

## SKILLS

Programming: Python, C++, ROS, MATLAB, Data Structures and Algorithms, Linux, Eigen, Ceres, OpenCV.

Computer Vision: Structure from Motion (COLMAP), Visual Inertial Odometry, SLAM, Multi-View Geometry.

## ROBOTICS PROFESSIONAL EXPERIENCE

### Visual SLAM Engineer | Nokia Bell Labs: New Jersey, USA.

Jan 2023-Present

- Designed a mapping pipeline to generate 3D structure from overlapping images with **COLMAP**.
- Explored methods to enhance robustness of map generation through integrating prior poses from **VIO**.

## RESEARCH EXPERIENCE

### Computer Vision Research Assistant | NYU: New York, USA.

July 2022 – Present

- Proposed a novel **multi-level transformer** to improve **feature extraction** of 3D **lidar point clouds**.
- Evaluated the performance of the proposed architecture by training on **KITTI** dataset in **PyTorch**.
- Achieved **3 times** reduction in the translation error through implementing the proposed architecture.

## PROJECTS

### Motion Planning and Inverse Dynamics Control for SCARA Manipulator (MATLAB, SIMULINK) Dec 2022

- Designed a **trajectory** that follows **trapezoidal velocity** profile for the manipulator's end effector.
- Implemented a **second order Inverse Differential Kinematics** to generate reference joint values.
- Developed **decentralized Inverse Dynamics Control** enabling independent control of the joints.

### Implementation of Transformer Based Feature Matching LoFTR Algorithm in TensorFlow Dec 2022

- Implement **Deep Learning** based **LoFTR** algorithm for feature matching in **TensorFlow**.
- Created customized data loading pipelines for **MegaDepth** and **ScanNet** datasets.

### Vision Based Pose and Velocity Estimation of Quadrotor (MATLAB)

June 2022

- Explored vision-based pose estimation of **Nano+ quadrotor** using planar grid of **April Tags**.
- Implemented **Planar Homography** algorithm in **MATLAB** to estimate the pose of the quadrotor.
- Computed **Optical Flow** with **KLT** algorithm to estimate the linear and angular velocity of quadrotor.

### Kalman Filter for State Estimation of Micro Aerial Vehicle (MATLAB)

May 2022

- Implemented **Unscented Kalman Filter** to estimate the pose and velocity of quadrotor.
- Performed **sensor fusion** of **vision-based data** with **IMU** to provide measurement update for **UKF**.

### Object Detection and Path Planning Algorithm for Autonomous Mobile Robot (Python)

Apr 2022

- Programmed **Propeller** microcontroller to develop algorithm for **collision prevention** for ground robot.
- Implemented **Fiducial Marker Detection** using **OpenCV** with **Raspberry Pi** cam for tag detection.

## WORK EXPERIENCE

### Continuous Improvement Engineer | Cemex: Mexico

May 2018 – Oct 2020

- Discovered opportunity for **\$50K cost reduction** in inspection process and presented a plan of action.
- Led launch of autonomous maintenance system reducing lost time by **35%** and saving **\$50K/year**.