

# Mark Naeem

## Robotics and Machine learning Engineer

A mechatronics engineer with hands-on experience in industry and research in machine learning and robotics. Very passionate about cognition and making machines smarter and better.



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## WORK EXPERIENCE

### Robotics Software Engineer - Perception Kingdom Technologies

01/2022 - Present  
Robotic lawn mowers

Glasgow, UK

#### Achievements/Tasks

- Building a custom navigation stack for efficient large-scale outdoor terrains mapping and navigation
- Working with a large sensor suite for outdoor navigation and mapping tasks (LiDAR, stereo cameras, GNSS, IMU)
- Enhancing current software architecture and introducing containerised modules for easier deployment
- Deploying perception modules on the running fleet
- Developed a robotics-specific CI/CD solution
- Implemented real-time 3D instance segmentation algorithms (on the edge)
- Enhanced internal communication between sensors, on-board computers, and actuation modules with CAN networking

### Machine Learning Research Engineer Uniparticle

09/2020 - 12/2021

Cairo, Egypt

#### Achievements/Tasks

- published a novel result analysis technique for the national coding competition NCC.
- Built a complete system for computerized adaptive testing CAT
- Improved the quality of adaptive quizzes by introducing various probabilistic student modeling and simulation.
- Optimized the running time of the existing adaptive testing simulations algorithms (from 100-120 to 3-5 secs).
- Used Knowledge Space Theory and deep learning-based recommendation systems to build an adaptive learning engine.

### Undergraduate Visiting Researcher Erasmus+ mobility project

06/2019 - 09/2019

Preston, Lancashire, UK

University of Central Lancashire

#### Achievements/Tasks

- Fully funded undergraduate research scholarship from Erasmus.
- Led a team of undergraduate researchers to fully design, simulate, and manufacture RHex robotic platform .
- Main targets: cultural exchange, soft skills, and research skills.

### ASU Racing Team Member

ASU Racing Team, Sussex Ainsams Racing Team

09/2017 - 09/2019

Cairo, Egypt

#### Positions

- **Senior Powertrain Team member - EV FSUK19:** Responsible for battery sizing, cells selection and configuration, Precharge Circuit Design, BMS Selection, Charger sizing, and Wire sizing.
- **Electric Team Member - ICE FSUK18:** Working as an embedded C developer for the engine control unit (STM32F103C8 microcontroller), I implemented *ignition*, *injection timing* algorithms, and CAN bus protocol.

## TOP SKILLS

C/C++

Python

Version Control

ROS, ROS2

Docker

Linux, RTOS

Machine Vision

State Estimation

SLAM

Localisation

Visual Odometry

Tensorflow, Keras, PyTorch

Sensor Fusion

Deep Learning

Motion Planning

## PROJECTS

### Depth Yolact ROS - ROS package

- A ROS wrapper for yolact instance segmentation with depth image extension for 3D bounding boxes and pointcloud segmentation.

### "Bayesian Knowledge Tracing For Assessment Results Analysis" Paper (02/2022)

- Publisher: IEEE, Main Author

### IDeepify - Robust face verification and ID data extraction

- IDeepify is a deep learning-based web service that allows for ID validation for Egyptian documents and fraud detection with liveness detection

### Swerve Steering Controller in ROS Control- ROS package

- A ROS package to control steering angles and velocities of any given set of wheels with any configurations in a wheeled platform.

### Move Base Sequence - ROS package

- (Published on ROS Kinetic/Melodic/Noetic) A ROS action server that handles sending multiple goals execution with the move base (navigation stack) action server.

### Autonomous mobile manipulator for agricultural tasks (fruit picking module) - Graduation project. (09/2019 - 07/2020)

- agricultural mobile manipulator controlled by ROS (Navigation, Visual Localization, and arm manipulation), and deep learning for real-time fruit detection and picking tasks.

### Linear time-invariant state-space system identification using adam optimization Paper. (02/2020)

- Publisher: IEEE , Main Author

### D435i stable outdoor VSLAM - ROS package

- A ROS package that modifies the D435i camera configuration and utilises RTABMap for accurate and stable outdoor localization and mapping

## EDUCATION

### Mechatronics Engineering (Class of 2020)

Bachelor of Engineering, Ain Shams University

09/2015 - 06/2020

Cumulative GPA 3.86/4.00

#### Scholarships

- Al-Alfi Foundation  
Scholarship (fall18-spring20)