

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 Ltd

01/2022 - Present

Glasgow, UK

Robotic lawn mowers for large-scale fields

Achievements/Tasks

- Building a traversability estimation pipeline for outdoor navigation (elevation mapping, traversability estimation, terrain segmentation).
- Designing and customising a navigation stack for efficient large-scale outdoor terrain mapping and navigation.
- Working with a large sensor suite for outdoor navigation and mapping tasks (LiDAR, stereo cameras, GNSS, IMU).
- Built entire software modules; translated features from business needs, implemented low-level drivers, high-level interface, ROS wrappers, and built unit and integration test for the modules.
- Built a novel ICP (iterative closest point)-based docking procedure.
- Helped developing an in-house software deployment platform for the company's different assets.
- Worked on 3D instance segmentation algorithms (on the edge).
- Enhanced internal communication between sensors, onboard computers, and actuation modules with CAN networking.

Machine Vision Teaching Assistant Ain Shams University

09/2020 - 03/2021

Achievements/Tasks

- Tutored the machine vision 4th-year undergraduate course. The course covered traditional computer vision and modern machine learning-based approaches.

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 simulation 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.

TOP SKILLS

C/C++

Python

Version Control

Linux

RTOS

Embedded Software

IoT

Docker

ROS, ROS2

Machine Vision

State Estimation

Localisation

SLAM

Visual Odometry

Sensor Fusion

Motion Planning

CUDA

Reinforcement Learning

Deep Learning

Tensorflow, Keras, PyTorch

PROJECTS & PUBLICATIONS

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

ROS Control Package - Swerve Steering Controller

- A ROS package to control any given set of wheels with any configurations in a wheeled platform. It's now part of ROS control package.

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 (five-year degree), Ain Shams University

09/2015 - 06/2020

Cumulative GPA 3.86/4.00

Scholarship

- Al-Alfi Foundation Scholarship (fall18-spring20)