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).
- Building entire software modules; translating business needs into features, implementing embedded low-level drivers, high-level interface, ROS wrappers, and building unit and integration test.
- 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

Machine Learning Research Engineer
Uniparticle

09/2020 - 12/2021 *Cairo, Egypt*

Achievements/Tasks

- Built IDeepify, a complete KYC pipeline for Egyptian IDs (Face recognition and matching, document segmentation, data extraction, OCR, and liveness detection).
- Used Knowledge Space Theory and deep learning-based recommendation systems to build an adaptive learning engine.
- published a novel Hidden Markov Model-based result analysis technique for NCC (coding competition in KSA).
- Built a complete BKT-CAT system (Bayesian knowledge tracing-based computerized adaptive testing).
- Introduced various probabilistic student modeling and simulation to improve adaptive quizzes quality.
- Optimized the running time of the existing adaptive testing simulation algorithms (from 100-120 to 3-5 secs).

Visiting Researcher
Erasmus+ mobility project (UCLan)

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 | Reinforcment 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*

Scholarships

- Al-Alfi Foundation Scholarship (fall18-spring20)
- Erasmus+ mobility project (undergrad research grant)