Ahmed M. Ali

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Personal Summary

Participating in many national competitions and technical projects, I have built a versatile knowledge in the field of Robotics engineering in general and planning module in specific. Through these experiences, I have learned to master fundamental knowledge in path planning, convex optimization and robot control. As my master thesis, I am currently working on developing a new planner algorithm to estimate free space for mobile robots. I believe that my expertise and my current thesis topic guides me to be a solid candidate for your offer.

Education

Master of Science in Robotics and Computer Vision Aug 2021 - Jun 2023

- Innopolis University, Russia
- Accumulative GPA: 4.94 / 5.00.
- Master thesis: "Incremental Free Space Estimation for Mobile Robots Using Convex Hulls".

Bachelor of Science in Mechanical Engineering - Major: Mechatronics Aug 2016 - Jun 2021

- Nile University, Egypt.
- Accumulative GPA: 3.97 / 4.00. (High Honors)
- Bachelor thesis: "Designing and Control Optimization of Autonomous Mobile Industrial Robots".

Riga Technical University – Riga, Latvia. Jan 2020 - Jun 2020

- Exchange student as part of Erasmus+ Program.

Work Experience

Research Intern – Innopolis University, Russia May 2022 – Aug 2022

- Performed a literature survey about state of the art methods of optimization based motion planners.
- Analyzed open source implementations written in C++ and used multiple software tools such as Docker.

Engineer Intern – Sphinx glass Company, Egypt. July 2019

- Technical training for two weeks at a glass company.
- Took soft skills sessions along with technical tours inside the production lines.

Projects

Robot Navigation Using Reinforcement Learning - Innopolis University Oct 2022 – Dec 2022

- Implemented robot navigation using RL n a 2D static environment, which was create using OpenCV and OpenAI gym. Demo
- Build DDPG and TD3 models for continuous action space.

VJM Analysis for 7DOF KUKA on Linear Axis - Innopolis University Jan 2022 – May 2022

- Implemented **Virtual Joint Matrix** analysis for Kuka kr-210 r-2700. Demo
- Applied **redundancy resolution** using 3 methods: Damped Least Square (DLS), Task Augmentation, Weighted Pseudoinverse.
- Enhance robot accuracy by geometric and elastostatic calibration.

Human Eye Iris Center Detection - Innopolis University Nov 2021

- Implemented **CNN** model according to the procedures of a published paper using PyTorch. Demo.
- Applied multiple preprocessing steps such as: **dilation** and **gaussian** filters.

Design and Control of a Warehouse Robot - Nile University Aug 2020 – May 2021

- Implemented the ROS navigation stack including **Localization, Mapping,** and **Planning**. Demo
- Different algorithms were used: **AMCL, Hector SLAM, A* star** algorithm, and **Dynamic window**.
- This was my bachelor thesis, supervised by **Valeo** company.

Design and Manufacturing of E-car - EVER Competition Mar 2019 – Oct 2019

- Led the electric section in the team representing Nile University the competition. Demo
- Participated in the design and manufacturing phase of an electric rally car.
- Created the electric car simulation and **performance analysis** along with electric components sizing and car wiring using **Simulink**.

Publications

- Co-author: Ezzeldin, M. A., **Ali, A.** M., Mahmoud, J. A., Rabie, S. A., & Ammar, H. H. (2022). Impact of Charging on Battery Life and Battery Degradation in Electric Vehicles. In M. Alam, R. Pillai, & N. Murugesan (Ed.), Developing Charging Infrastructure and Technologies for Electric Vehicles (pp. 96-113). IGI Global. (Link)

Honors & Achievements

- Innopolis University Diploma for Excellent Academic Achievements. Jan 2023
- Receiving full Innopolis University scholarship. 2021 – 2023
- Receiving Nile University Full Scholarship for academic merit. 2016 – 2021
- 1st place in Electric Vehicles Rally (EVER) 2020. Mar - Dec 2020
- 1st place in Erudite War competition. June 2018
- 1st place in Robocombat category at Robogames competition. Nov 2017

Skills

- **Programming languages:** Python, C++, Bash, Latex
- **Software:** ROS1, ROS2, Docker, Git, Matlab
- **Frameworks:** Tensorflow, Pytorch, OpenCV
- **Soft Skills:** Teamwork, communications Skills, Work ethics
- **Spoken Languages:** Arabic (Native), English(C1)

REFERENCES

- Prof. Igor Gaponov
  Associate Professor of Robotics and AI, University of College London.
  ✉ i.gaponov@ucl.ac.uk
- Prof. Mirko Farina
  Associate Professor of Philosophy and Computer Science, Innopolis University.
  ✉ m.farina@innopolis.ru

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