AHMED MAGD ALY SHEHATA

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RESEARCH INTERESTS

Interested in the intersection of RL and CV (e.g. pixel based and model-based RL), Generative models (Diffusion, VAEs), and Sequence Models (Transformer, SSMs) for embodied agents (e.g. games and robotics)

EDUCATION

Korea Advanced Institute of Science and Technology (KAIST) Aug 2021 - Aug 2023
M.Sc. in Robotics - Focused on AI and Computer Vision
Thesis: Exploring Diffusion Models for Semantic Segmentation in Bird's Eye View Mapping for Autonomous Vehicle Perception [Link]
Current CGPA: 4.05/4.30

Innopolis University — Transferred Aug 2020 – June 2021
Incomplete M.Sc. in Robotics and Computer Vision (Transferred)
GPA before leaving: 4.67/5.00

Nile University Aug 2016 - Aug 2020
B.Sc. in Mechatronics Engineering
Thesis: Intelligent EMG-Assisted Continuous Knee Motion [Link]
CGPA: 3.98/4.00 (2^{nd}/110 students)

Misr University for Science and Technology (MUST) — Transferred Aug 2015 – Jun 2016
First year of B.Sc. in Engineering (Transferred)
CGPA before leaving: 4.74/5.00 (1^{st}/250 students)

RESEARCH EXPERIENCE

Research Internship April 2024 – Present
Johns Hopkins University – Advised by Zongwei Zhou and Alan Yuille at CCVL Lab
A remote internship focused on the use of RL and generative models for vision analysis.

Researcher Jun 2023 - Mar 2024
KAIST – Machine Learning & Mind Lab, advised by Sungjin Ahn

- RetNet WM: Enhanced the long-term memory capability of S4WM by two-fold, contributing to advancements in model-based reinforcement learning by integrating RetNet to a DreamerV2-like world model.
- Worked on fine-tuning diffusion models (based on Diffuser code) to perform better with RL tasks.

Graduate Student Researcher Aug 2021 – Aug 2023
KAIST – VDC Lab, advised by Dongsuk Kum
Mapping the surroundings of the ego-vehicle in bird's eye view (BEV)

Undergraduate Researcher Jun 2019 – Jul 2020
Nile University - SESC, advised by Hossam Hassan Ammar

Worked on multiple research topics related to robotics, as mentioned in my publication section

Participating in Undergraduate Research Forum (UGRF) Feb 2016 – Jul 2019
Nile University
Conducted research activities in a number of course projects, and presented their posters during the event.

PUBLICATIONS

1. A. Bangunharcana, **A. Magd**, KS Kim. DualRefine: Self-Supervised Depth and Pose Estimation Through Iterative Epipolar Sampling and Refinement Toward Equilibrium. Conference on Computer Vision and Pattern Recognition (CVPR) 2023. [Link]
2. A. Sayed, AA Mohamed, **A. Magd**, et al. Experimental modeling of hexapod robot using artificial intelligence. In the International Conference on Artificial Intelligence and Computer Vision (AICV) 2020. [Link]
3. H. Elkholi, AT Azar, **A. Magd**, et al. Classifying Upper Limb Activities Using Deep Learning. In the International Conference on Artificial Intelligence and Computer Vision (AICV) 2020. [Link]
4. AT Azar, **AM Aly**, AS Sayed, et al. Neuro-Fuzzy System for 3-DOF Parallel Robot Manipulator. In Novel Intelligent and Leading Emerging Sciences Conference (NILES) 2019. [Link]

HONORS & AWARDS

Scholarships:

- M.Sc. Full scholarship recipient at KAIST 2021
- Full scholarship recipient at Inopolis University 2020
- Funding support from the Academy of Scientific Research and Technology (ASRT) in Egypt, for my graduation project. 2020
- Bank of Egypt full scholarship recipient for B.Sc. at Nile University 2016

Contests:

- Finalist in IDAO (International Data Analysis Olympiad, Yandex) Begemot's Team [Link] 2021
- 1st place in deep learning contest (domain generalization) in Inopolis University. [Link] 2020
- Best project in Rigid Body Dynamics for modeling and controlling Steward platforms. 2018

Honorary Titles:

- Graduating from Nile University with highest honors 2020
- Recipient of the Dean's Honor award – Nile University 2019

SKILLS

Programming Languages:	Python, C++, C#, Java, MATLAB, HTML, CSS, JavaScript and React.js
Libraries:	PyTorch, TensorFlow, Keras, OpenCV, ROS
Software (since undergrad):	LabVIEW, SolidWorks, Fusion360, ANSYS, MSC Adams, MAXIMA
Languages:	Arabic (Native), English (Advanced)

SELECTED PROJECTS & EXPERIENCE

For a comprehensive list of projects and demos, visit my GitHub page and website. Note that many projects were not documented or cannot be disclosed at the moment.

- Worked on a project that builds on Diffuser and is applied to offline RL environments, such as D4RL benchmark tasks.
- Worked on improving the long-term memory of world models in model-based RL (tested on Memory Maze)
- Engaged in ML research projects, working with sequence models such as Transformers, S4, and model-based RL including Dreamer and BLAST (Tested on MiniGrid and DMC environments).
- Built a diffusion model for high-definition map prediction in my Master's thesis, with an aim to enhance autonomous vehicle perception.
- Created a tutorial on the SAC algorithm in RL with comprehensive slides and a Colab project, accessible [Link].
- Implemented and validated AI algorithms like BLAST, SAC, PPO, YOLO, and ResNet, gaining hands-on experience.
- Regularly participated in seminars featuring experts from KAIST, Google DeepMind, OpenAI, and MILA.
- Contributed to weekly ML paper reviews and presentations at the MLML lab, discussing topics like GFlowNets, Coarse-to-Fine Q-attention, RT-2 and MaskDiT).
- Wrote extensive reviews of famous AI papers, e.g. [Link].
- Presented critiques and summaries of influential AI research, such as the review presented [Link].
- Completed over eight AI-related courses at KAIST and Innopolis University, supplemented by self-study from sources like cs231n and DeepMind x UCL RL course.
- Applied ML to various tasks, training models for lane segmentation, object detection, and neural machine translation.
- Developed a computer vision algorithm for 360° image stitching and depth estimation to assist UAV navigation.
- Programmed a convex optimization algorithm for UAV path planning, aiming to avoid obstacles during flight.
- Designed computer vision and hardware integration for UAV localization and autonomous landing.
- Simulated robotic manipulators, including 6DOF KUKA, using Python and MATLAB for motion control and automation tasks.
- Competed in ACM programming contests and robotics competitions, honing problem-solving skills.
- Attained a professional diploma from FESTO in robotics programming, control systems, and CNC operation.

UNDERGRADUATE PROJECTS

For demos, visit my website.

- Built an automated vacuum cleaner with PID motion control.
- Built a 6DOF robotic arm from scratch with a team during an Erasmus+ project.
- Applied PD, Feedback linearization + PD and Robust controls on SCARA manipulator.
- Built the "2048" game with Python.
- Designed a potato harvester machine using SolidWorks.
- Simulated and studied different motions for Stewart Platform (a parallel manipulator) using MSC Adams.
- Video encryption using MATLAB.

Freelancing

- Served consecutively as a judge at the Korea Science & Engineering Fair (KSEF) in 2022 and 2023, evaluating student projects in Computer Science, Engineering, Mathematics, Invention and Design, etc. Links: 2022, 2023.
- Designed a linear peristaltic pump operated with a non-standard four-stroke engine for FX GROUP (a startup group at Latvia) in 2019. [Link]
- Programmed a PLC to automate a production line for pipes in one of the factories in Egypt (2019).

Volunteering

- Head of scientific committee in "Building" club at MUST, where I used to help students in their courses by preparing detailed notes and solutions that they can get from the library.

MISC.

- Long-distance cycling (∼150km), sightseeing, exercising, and watching anime.