ABDELAZIZ WASFY ABDELAZIZ SHAARAWY

17b Hamid Fahmy basha st. ElMotamayez district, 6th of October city, Giza, Egypt
Telephone:
+201111344959 - Egypt
+7(919)-623-4933 - Russia
Email:
zizosharawy@gmail.com
A.Wasfy@nu.edu.eg
a.shaarawy@innopolis.university
Telegram:
@zizo_shaarawy

Professional Profile

- Graduate student from Mechatronics Engineering department at Nile University. I have spent my 5-year bachelor's degree working on projects in the field of mechanical design, electronics, control, automation and robotics. Constantly appointed in technical hardware design and different manufacturing processes. Experienced in developing software programs that serve operational tasks. Acknowledged for showing persistence and teamwork towards assigned roles.

Education

- Nile University – Faculty of Engineering and Applied sciences, Mechanical Department, Mechatronics Track.
- Graduated from Nile University in July 2020 with a bachelor's degree in Mechanical engineering, Mechatronics major.
- Current: Postgraduate Master student at Innopolis University, Russia. Studying Robotics and Computer Vision program.
- Bachelor's Courses studied: Analytical Geometry, Calculus I, Integration, differential equations, Physics I, Physics II (including Labs), Introduction to Engineering Disciplines, Engineering Design, Chemical Principles, Engineering Economy, Safety Engineering, Introduction to Programming, Engineering Mechanics (statics & dynamics), Natural Science, Numerical Methods, Introduction to Finite Elements techniques, Fluid Mechanics I, Solid Modelling, Manufacturing Technology, Rigid Body Dynamics, Metallurgy, Kinematics & Dynamics of Mechanical systems, Electronics & Power Circuits, Machine Design, Fundamentals of Mechatronics, Automatic Control, Modelling and Simulation, Mechanical Vibrations, Robotics, Pneumatics and Hydraulics of control systems, Digital & Industrial Control, Advanced Mechatronics, Microcontrollers, Signal processing.
- Bachelor's CGPA: 3.73/4.0
- Master's Courses studied: Dynamics of Non-Linear Robotics systems, Object Oriented Programming, Sensing-perception and Actuators, Machine Learning, Fundamentals of Robotics control.
- Master's CGPA: 4.0/5.0

Professional Experience

- [September 2017 – March 2020] FESTO professional Diploma in Industrial Automation & Mechatronics. Courses studied:
  - Fluidics (Pneumatics ~ Electro-Pneumatics ~ Hydraulics)
  - CNC (Milling, lathing)
  - Electrical Drives (DC & AC Drives)
  - Automation (Introduction & Advanced PLC programming)
  - Robotics (Kinematics & Robotics ~ Robotic Programming)

- [June 2018 - August 2019] Product designer and manufacturer, Engineering Op. Company:
    - Participated in manufacturing a Remotely Operated Vehicle (ROV) for a graduation project.
    - Involved in operating several manufacturing techniques and processes: Milling, Drilling, lathing, and different CNC operations.

- [August 2018 –July 2019] Participation in the Erasmus +KA2 VET-ENG project and achievement of Joint Project (NU – GBAUTO) program.
    - Design a 3D model of a 3D-printer using SOLIDWORKS software.
    - Designing the control box layout for the 3D-printer hardware.
    - Manufacturing and assembling of the 3D-printer parts.
    - Integrating the mechanical design and the electrical board.
    - Testing and developing for higher output accuracy.

- [July 2019 – November 2019] Embedded systems Diploma. Skills acquired:
    - C Programming and Data structures Algorithms
    - Embedded Systems Concepts
    - Embedded C for Microcontrollers
    - Embedded Systems Software Design Using UML
    - HW/SW Co-Design
    - Real Time Operating Systems and Scheduling
    - Software Engineering for Embedded Systems
    - Verification and Testing of Embedded Systems

- IEEE NUSB volunteer for 3 years. Helped in organizing a programing event called "Programabitious" hosted by IEEE NUSB that was of a great success.
- Participating in the international Robocon competition for the 2018 year as the Team leader of the mechanical team. Managed to design a manual robot with a forklift mechanism in addition to an automatic robot with a throwing mechanism.
- Machine Learning Winter School 2020 attendee. I had the chance to attend lectures from top world class professors and researchers from the field of my interest, Robotics and Machine Learning. Topic covered: Behavioral and Cognitive perception in Robotics, Reinforcement Learning, Deep Learning.

Projects

- **My Bachelor's Thesis** had two scopes, controlling a Teleoperated custom-made 7 DOF serial arm manipulator hardware via VR, and controlling it via application of AI techniques. First, using ROS, we managed to import the robot's URDF model in ROS visualization environment, and through ROS's tools, we were able to perform motion planning and execution to defined points in the robot's workspace. Furthermore, we used Unity3D game engine as the platform for integrating VR kit (headset and controllers). After creating a scene in Unity, a ROS-Unity teleoperated connection is established through a local network with the use of ROS-Sharp libraries and tools. Hence, when the user puts on the VR kit, enters the scene, and moves the robot in the Unity scene, the motion of the robot is transferred to the robot's actual hardware body, thus making the same motion given by the user from the VR Unity scene.

  On the other hand, we designed our own deep neural network (DNN) for training the robot to cover its workspace and create its own model without the use of conventional Inverse kinematics method. Till this moment we managed to reach to an accuracy of 97%, and currently we are working on increasing this percentage.

  I was mainly responsible for developing the hardware, parsing the URDF into ROS and

Unity, motion planning and execution of the robot, and establishing the connection between ROS and all other platforms (nodes) used, Unity, Gazebo simulation tool, Keras-Python, and hardware's microcontroller.

- Memory Game using Python coding language.
- Designing an apparatus for illustrating Magnetism using AutoCAD.
- Mathematical modeling of a mechanical based Seismograph using MATLAB.
- Solving ODEs and PDEs using Numerical Solutions; Finite Element techniques.
- Simulating the heat distribution on Earth and Mars'cores using COMSOL software.
- Measuring the speed of fluid(air) using pressure differential sensor connected with a pitot tube kit and displaying the data on a LED screen using Arduino.
- Simulation of a 4-DOF delta parallel robot via MSC Adams software and study analysis of its motions.
- Implementing and controlling of a 6-DOF serial robotic arm using MATLAB and ARDUINO software.
- Designing and making a vertical XY plotter and applying image processing technique using MATLAB and Arduino for controlling.
- Participated in Machine learning competition held on CodaLab as a part of a course. I built a deep neural network model for classifying 9 classes of various types of animals and vehicles using CNNs and FC networks. I took the 4th place out of 43 participants.
- Applying PD, Feedback linearization, and robust control techniques on a simulated PRR serial robot configuration using python and MATLAB.
- Object detection of a peg using YOLOv5 and hole detection using HoughCircles for a PegInHole task performed by KUKA iiwa.

Technical Skills

- Robot Operating System (ROS) [I have worked (self-studied) with ROS for almost one academic year. I was nominated by my professor to give an introductory session about ROS to undergrad freshmen]
- MATLAB Tools [4 years]
- Python coding language [2 year]
- C coding language [5 months embedded systems diploma]
- Arduino [3 years]
- SolidWorks: 3D CAD Design Software [3 years]
- Proteus Design Suite [1 year]

Linguistic Skills

- Arabic is my native language
- English: Academic IELTS Overall score (7.5/9); level (C1)

Achievements

- Awarded the 2nd place in the annual Research Forum in Nile University for the project entitled "Solving ODEs and PDEs using numerical solutions through finite element techniques"
- Awarded a certificate for publishing the paper entitled "Solving Inverse Kinematics of a 7-DOF Manipulator Using Convolutional Neural Network" in The International Conference on Artificial Intelligence and Computer Vision, Springer.
  https://link.springer.com/chapter/10.1007/978-3-030-44289-7_32
- Awarded the 5th place in the DELL EMC Technologies annual challenge for graduation projects from senior undergraduate students, year 2020.

Please refer to the project's video for more details:

https://www.youtube.com/watch?v=oxwMDySRGDk&list=FLdLXuDmeR83yVOlLKCYrV8w&index=1&t=497s

- Awarded the 1st place in graduation projects category at Egypt IOT & AI challenge competition 2020. Subsequently, our team got invited to attend and participate with presenting the project's idea in the IEEE GCAIoT 2020 Online Conference.

Hobbies

- I love practicing all kind of sports and outdoor activities.
- I have been practicing Parkour & Freerunning for 10 years.
- I am a parkour and fitness coach.
- Co-founder at Team Tracto, Parkour & Freerunning team based in Egypt.