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ABOUT ME

As a Research Assistant specializing in robotics, I have gained hands-on experience developing advanced solutions for autonomous systems. With a strong foundation in mechanical engineering and expertise in machine learning, I have contributed to cutting-edge projects, including quadruped robotics and manipulaion. My academic background, coupled with real-world research, enables me to drive innovation and make meaningful contributions to the evolving field of robotics. I am looking forward to further advancing my career through collaborative research and impactful projects.

WORK EXPERIENCE

Research Assistant

CYENS Centre of Excellence [03/09/2024 – Current]

City: Nicosia | **Country:** Cyprus

• Researcher on the innovative Robot Parkour project, focusing on enhancing quadruped Unitree A1's agility and adaptability in complex and dynamic environments using reinforcement learning.
• Collaborate with interdisciplinary teams to integrate cutting-edge AI and machine learning techniques into robotic systems.
• Author technical reports and contribute to academic publications in the field of robotics and automation.
• Present research findings at internal meetings, fostering knowledge exchange and collaboration opportunities.

Robotics Intern

Verzeo [09/09/2019 – 09/11/2019]

City: Chennai | **Country:** India

• My scope included being trained in industry standards and completing some projects under mentors.
• Linked up the IFTTT app with Google to voice out a trigger word to perform automated tasks.

Robotics Intern

Safer Industries Ltd [15/04/2023 – 08/06/2023]

City: Bristol | **Country:** United Kingdom

• Spearheaded the creation of meticulous design specifications for security agents, incorporating control systems, vision sensors, IR sensors, and thermal sensors to enhance surveillance capabilities.
• Executed comprehensive analysis on the operational requisites and associated costs of the security agents. The in-depth evaluation facilitated the formulation of optimized solutions, which substantially enhanced performance metrics and achieved cost-efficiency.

EDUCATION AND TRAINING

Master of Science in Robotics

University of Bristol [19/09/2022 – 26/09/2023]

Address: Beacon House, Queens Rd, BS8 1QU Bristol (United Kingdom) | **Website:** https://bristol.ac.uk/ | **Field(s) of study:** Robotics | **Final grade:** Merit | **NQF Level:** 7 | **Number of credits:** 120 | **Thesis:** Threshold response models applied to best-of-n in Swarm Robotics.

Modules taught are Robotics Systems, Robotic research and technology methods, Introduction to Artificial Intelligence, Bio-Inspired Artificial Intelligence, Robotics Fundamentals, Machine Vision, and Assistive Robotics.

Bachelor's Degree in Mechanical Engineering

SRM Institute of Science and Technology [15/06/2016 – 31/05/2020]

Address: Potheri, SRM Nagar, Kattankulathur, Tamil Nadu. , 603203 Chennai. (India) | **Website:** https://www.srmist.edu.in/ | **Field(s) of study:** Engineering, manufacturing and construction | **Final grade:** 77.78% (First Class) | **Level in EQF:** EQF level 6 | **Number of credits:** 186

LANGUAGE SKILLS

Mother tongue(s): Telugu

Other language(s):

English

LISTENING C2 **READING** C1 **WRITING** C1

SPOKEN PRODUCTION C1 **SPOKEN INTERACTION** C1

Hindi

LISTENING C2 **READING** B2 **WRITING** B2

SPOKEN PRODUCTION C1 **SPOKEN INTERACTION** C1

Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user

DIGITAL SKILLS

Arduino ESP8266 CC3200 / Matlab / Linux / C++ / Blender, 3D modeling / Python / Painting and Photography / ANSYS design modeler / Robotic Operative System (ROS) / Gazebo simulator / NVIDIA Isaac Sim / Isaac Gym / PyTorch, Torchvision / Frameworks & Libraries: OpenCV, Sci-kit learn, NumPy, Pandas, SciPy, Matplotlib. / HTML

NETWORKS AND MEMBERSHIPS

[09/2016 – 12/2018] Chennai

ISHRAE

Member recruitment and event management in the first year.

• Organising events like guest lectures and short quizzes in the second year.

• Managing most of the events and handling the recruits´ tasks and shifts in the third year.

CONFERENCES AND SEMINARS

[12/01/2023 – 13/01/2023] UWE, Bristol

The 4th UK Robot Manipulation Workshop

[09/2019]

Workshop on Advanced Finite Element Analysis

[10/2016]

Workshop on Basics of Robotics

MANAGEMENT AND LEADERSHIP SKILLS

Leadership

Problem Solving

Adaptability

Team Work

PROJECTS

[01/11/2024 – 01/12/2024]

A1-RealViz

A real-time visualization and control tool for the Unitree A1 robot.

- Interactive joint control sliders to command the robot's joints.
- Real-time graphical plots to visualize joint positions and foot forces.
- Synchronized visualization of the robot in Gazebo and RViz.

Link: https://github.com/Jellal-17/A1-RealViz

[25/12/2024 – Current]

Steel Defect Detection

This project implements a steel defect detection system using a UNet-based semantic segmentation model. The model identifies defects in steel surfaces from images, making it suitable for industrial automation and quality control.

Features

- **UNet Model**: Semantic segmentation architecture for pixel-level defect detection.
- **Real-Time Inference**: Process images in real-time and save predicted masks.
- **Metrics**: Evaluate model performance using Dice coefficient and IoU.

Link: https://github.com/Jellal-17/Steel-Defect-Detection

[15/12/2024 – 25/12/2024]

EEG Signal Classification for Hand Gesture Recognition

Developed and implemented machine learning algorithms to classify EEG signals and correlate them with physical hand gestures for intuitive control systems.

- Preprocessed EEG datasets to remove noise and extract relevant features for classification.
- Designed and trained machine learning models for accurate gesture recognition based on EEG signal patterns.
- Validated the models using recent experimental data to ensure reliability and precision.
- Gained expertise in signal processing, feature extraction, and real-time decision-making frameworks.

[01/06/2023 – 05/09/2023]

Threshold response models applied to best-of-n in Swarm Robotics.

This is a comprehensive exploration of threshold response models applied to the best - of - n problem in swarm robotics with options of more than three. Our model provides a balanced, effective mechanism that doesn't compromise on essential attributes like the number of options, average quality and robustness. This unique integration aligns well with the observations made in natural swarms. Moreover, our research validates the theoretical frameworks discussed, including collective consensus decision-making and decentralized control. The "best-of-n" models with threshold responses not only align with these theories but extend them by offering a more nuanced, adaptable mechanism for decision-making in swarm robotics. You can find the repositories of all my projects in the Github profile.

Link: https://jellal-17.github.io/github.io/thesis.html

[01/02/2023 – 01/05/2023]

A Case Study of Socially and Physically Assistive Robots in Human-Robot Interaction

Conducted an in-depth analysis of socially and physically assistive robots, examining their impact on human-robot interaction and potential applications in various settings. The two experiments discussed in the demonstrated the potential of socially and physically assistive robots in improving the quality of life for individuals with disabilities. In the first experiment, the socially assistive robot, Pepper, was able to assist a partially sighted social worker, Claudia, with various daily tasks. The results indicated that Pepper's interaction with Claudia was positive and effective in assisting her with these tasks. The second experiment aimed to determine whether a TurtleBot3 robot could assist Claudia with her daily medication routine. The robot was programmed to deliver medication at specific times throughout the day directly to Claudia's location, which was made possible by asking the robot to find the 'beacon location' and navigate to that location on the map. The results showed that the robot could successfully deliver medication to Claudia at the stipulated time.

Link: https://jellal-17.github.io/github.io/Documents/Social_Robots.pdf

[26/09/2022 – 15/12/2022]

Apple Counting Using Machine Learning

Employed machine learning techniques to accurately count apples in an orchard, streamlining agricultural processes. The first method used YoloV5s, a state-of-the-art object detection algorithm, and the second method was a conventional approach using a blob detection algorithm on top of a mask created using HSV colour space. The project aimed to compare the accuracy and efficiency of these two approaches. The results showed that YoloV5s performed better in accuracy and speed than the conventional image processing method.Write here the description...

Link: https://jellal-17.github.io/github.io/Documents/Machine_Vision.pdf

[03/02/2023 – 02/05/2023]

Nao as a Mediataion Assistant

The present research investigated the comparative efficacy of a robot and a smartphone application as meditation assistants. We hypothesise that the robot's human-like gestures, physical presence, and emotional support would enhance the meditative experience and mood outcomes. We randomly assign the participant's first scenario to either the robot or application condition and measure their emotional state before and after a guided meditation session in a relaxing setting. We then used questionnaires and a system usability scale to collect subjective data. The results show that participants who engaged first in robot-assisted meditation reported a significant improvement in mood levels compared to those using the application, with the robot condition having a mean improvement of 75.22% and a standard deviation of 14.31%. In contrast, the application condition had a mean improvement of 68.83% and a standard deviation of 16.14%. The SUS ratings also show a high level of satisfaction with the robot's performance. We infer that the robot's social and affective qualities make it a more effective meditation assistant than the application.

Link: https://jellal-17.github.io/github.io/Documents/22071773_UFMFHP-15-M Human-Robot Interaction.pdf

[11/11/2022 – 15/12/2022]

Investigating Odometry error caused during collisions due to bump sensors

Collisions are generally undesired in mobile robots. Most of the systems use a submodule of collision avoidance. In this report, we investigate the errors caused due to collision and how it varies according to different robot parameters, i.e. speed and angles. In the 3pi+ robot, we made an assumption based on existing literature on how it creates an Odometry inaccuracy. Our results use the mean and variance of the recorded error to explain the error magnitude in different scenarios.

[19/09/2022 – 10/11/2022]

Line Follower Challenge

The robot will be dropped into the ocean; it must autonomously survey the length of a pipeline to find an expected breakage and then return to its drop-off point to be recovered. The Line Following Challenge has been successfully completed using the Pololu 3Pi+ mobile robot. Using its sensors, the robot was programmed to navigate a black tape line on the provided map autonomously.

Link: https://www.youtube.com/watch?v=HMx_csyI2F0&feature=youtu.be

[12/2019 – 04/2020]

Design Modification of Temporomandibular Joint implant - A finite element study

Examined the TMJ implant on its ability to maintain its structure on the mandible and increased its ability to handle more stress and strain. This resulted in three different designs of temporomandibular joint implants of two different materials with five different positionings of screws which were tested with loading conditions of a practical scenario and the optimal design has been found among them.

[02/2019 – 05/2019]

Automated Pill Dispensor

This device increases the efficiency for the consumption of pills and costs quite less compared to the other devices that are produced and already available in the market right now. This device can be used for most of the types of pills that we take. The Device which we are now presenting is a Pill Dispenser capable of delivering two different types of pills at any time.

CREATIVE WORKS

3D Animations

Been doing 3D animations in Blender3D, Cinema 4D for a while and it has become an interesting hobby of mine and you can see some of my works in the link below.

Link: https://drive.google.com/drive/folders/1tr2gt95zJjXXFhx33WuUrt-rWcyMmWVm?usp=sharing