

# Arushi Khokhar

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## EDUCATION

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- **King's College London** London, UK  
*Master of Science (Postgraduate Taught)* *September 2023 - Present*  
*Robotics*
- **Jaypee University of Information Technology** Solon, India  
*Bachelor of Technology, GPA: 9.8/10* *August 2019 - July 2023*  
*Major: Computer Science and Engineering, Minor: Electronics and Communication Engineering*

## SKILLS SUMMARY AND COURSEWORK

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- **Programming:** Python, C++, C, Matlab
- **Tools for robotics:** Robot Operation System (ROS/ROS2), Gazebo, Airsim, Blender, Fusion 360, SolidWorks, MeshLab
- **Other Software and Libraries:** Unity (MRTK), Unreal Engine, OpenCV, OpenSim, Tensorflow, PyTorch, Keras
- **University Coursework:** Robot Kinematics, Agents and Multi Agent Systems, AI Planning, Robotics and Automation Systems, Operating Systems, Design and Analysis of Algorithms, Artificial Intelligence, Discrete Mathematics, Probability and Statistics, Microprocessor and Interfacing, Object Oriented Programming, Advanced Calculus, Machine Learning, Compiler Design, Data Structures and Algorithms, Wireless and Data Communication, Internet of Things, Deep Learning, Linear Algebra
- **Independent Study:** Reinforcement Learning (David Silver), Aerial Robotics (Coursera), Computational Motion Planning in Robotics (Coursera), Robotics: Mobility (Coursera), Robotics: Perception (Coursera), Deep Learning specialization (Coursera), Machine Learning specialization (Coursera), AI Summer School at IIIT Hyderabad

## EXPERIENCE

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- **Acceleration Robotics** Remote  
*Robotics R&D Engineer* *January 2023 - September 2023*
  - **Multi-Robot Systems:** Leveraged ROS 2 capabilities to facilitate seamless communication and coordination among ground robots, manipulators, and other autonomous systems.
  - **Robot Fleet Management:** Developing reusable, scalable libraries and tools built on top of ROS 2 that enable the interoperability of heterogeneous fleets of any type of robotic systems.
- **Indian Institute of Science** Bengaluru, Karnataka  
*Robotics Research Intern* *December 2021 - January 2023*
  - **Intelligent Inclusive Interaction Design Lab:** Supervised by Dr Pradipta Biswas
  - **Demand-Aware Multi-Robot Task Scheduling:** Worked on complex multi-robot systems using ROS which involve a human in the loop and created a demand-aware task scheduler. Designed a mixed reality based user interface for humans to interact with the multi-robot system.
  - **Decentralized Collision Avoidance in Multi-Robot Systems:** Worked on a decentralized grid based approach for collision avoidance in multi-robot systems.
  - **Virtual obstacle avoidance and heterogeneous multi-robot coordination in mixed reality with a human in the loop:** One of the contributors for a video submission to the International Conference on Robotics and Automation (ICRA) 2023 (accepted). Used ROS and Unity
  - **Heterogeneous Multi-Robot Coordination:** Worked on heterogeneous multi-robot coordination using ROS for a warehouse scenario. Co-authored a book chapter titled "A multi-armed bandit approach for optimizing the task sequences of a fixed-base robot in a warehouse environment".
  - **Obstacle Avoidance in a Mixed Reality Environment:** Used Microsoft HoloLens 2 to create a mixed reality environment and implemented control algorithms for a mobile robot to avoid both real-world and virtual obstacles (holograms) at the same time using ROS
- **Yale University** Remote  
*Robotics Research Intern* *May 2022 - December 2022*
  - **Intelligent Autonomy Lab:** Supervised by Dr Ian Abraham
  - **Adaptive and Robust Framework for multi-robot coordination:** Developed a constraint-driven framework for the coordination of robot teams which emphasize both adaptiveness and robustness with respect to environmental disturbances.
- **Indian Institute of Technology** Gandhinagar, Gujarat  
*Research Intern* *May 2021 - December 2021*
  - **Human-Centered Robotics Lab:** Supervised by Dr Vineet Vashista
  - **Human Gait Assessment Using Computer Vision:** Studied the biomechanics of walking and worked on a controlled, monitored, and digitized alternative to conduct standardized functional gait assessment tests. Developed a pipeline application that provides spatiotemporal gait parameters and joint kinematics characterization from a single camera video of the participants' activities. Won the best poster award for presenting this research.

## PUBLICATIONS

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Sandula, A. K., Biswas, P., Khokhar, A., Ghose, D. (2023). Multi-armed Bandit Approach for Task Scheduling of a Fixed-Base Robot in the Warehouse. In Artificial Intelligence for Robotics and Autonomous Systems Applications (pp. 271-301). Cham: Springer International Publishing.

(accepted) Sandula, A. K., Khokhar, A., Biswas, P. Ghose, D. Demand-Aware Multi-Robot Task Scheduling with Mixed Reality Simulation. 32nd IEEE International Conference on Robot and Human Interactive Communication (RoMAN 2023)

## ACADEMIC PROJECTS

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- **An Autonomous UAV-UGV Collaborative Framework for Search and Rescue Operations:** Developed an autonomous multi-robot system which is capable of exploring an unstructured and unknown environment, including GPS denied areas. It's a robust mechanism which takes sensor failure into account, to aid complex rescue and search operations to ensure minimum loss of life of rescuers and potential survivors by providing timely assistance. (May '22)
- **Multi-Robot Collaboration:** Collaboration between a robotic arm and a mobile robot for a pick and place task. Established communication between the two robots for collaboration (Feb '22)
- **Vision-based Object Classification using Deep Learning:** In this project, a Deep Neural Network Framework (YOLO) and the PR2 robot has been used. Using this framework, the PR2 robot can detect objects and classify them. The robot can detect objects in both 2D and 3D space. (Jan '21)
- **Monopod Robot Simulation Using Reinforcement Learning:** A single-legged hopping robot simulation created using ROS and Gazebo. The robot retains its position using the QLearning algorithm. ( Dec '21 )
- **Early Detection of Parkinson's Disease using Machine Learning:** The goal of this project was to develop an image classification algorithm to detect Parkinson's disease using images of spirals/waves/handwriting obtained during clinical exams. Although pen pressure plays an important role in determining the presence and the extent of the disease, this project aimed to find out whether images alone can be useful in detecting Parkinson's disease. (Oct '21)

## ORGANIZATIONS

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- **ACM Student Chapter, JUIT:** Served as the Vice Chairperson and Research Coordinator for the student chapter during the 2021-2022 tenure. Organized various bootcamps and workshops during the tenure to foster a tech-flair environment on campus. Established an undergraduate research group to promote research activities amongst students. Taught the basics of data science, machine learning and robotics to the freshmen.
- **Women Who Code:** Volunteered in the Data Science track of the community. Organising various activities in the community like webinars, group discussions, etc. to encourage women in STEM.

## ACHIEVEMENTS

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- Best Poster Award: Awarded the best poster award at the Advances in Robotics Conference 2023
- Kaggle Notebooks Expert (amongst the top 0.6% Kaggle users)
- Selected for AI Summer School 2021 from a large pool of applicants, IIIT Hyderabad
- Received Grace Hopper Celebration Scholarship, 2020