

# Kousheek Chakraborty

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## EDUCATION

### École Polytechnique Universitaire de Lille

Lille, France

*MSc in Robotics and Autonomous Systems (M2), Grade: 17.6/20, Rank 1*

Sep. 2023 – Sep. 2024

- **Graduated with Highest Honours (Mention Très Bien)**
- **Subjects covered** - Machine Learning and Computer Vision, IOT, Industrial Robotics, Mobile and Aerial Robots, Real-Time Systems, Applied Mechanics
- Attended the AERO-TRAIN Summer School hosted by ETH Zurich
- **Thesis** - Intelligent Task Scheduling for Swarm AGVs through Vision-Language-Action Models in Multi-Stage Manufacturing Systems

### École Centrale de Lille

Lille, France

*MSc in Robotics and Autonomous Systems (M1), Grade: 17.4/20, Rank 1*

Sep. 2022 – Sep. 2023

- **Subjects covered** - Kinematics and Dynamics, Advanced Programming, ROS1 / ROS2, Control Theory, Sensor Fusion, Project Management, Marketing, Intellectual Property
- Volunteered for the Technical Committee of the RoboCup Logistics League
- Project lead of our team for the CoHoMa contest hosted by the French Ministry of Defence

### Sri Aurobindo International Centre of Education

Pondicherry, India

*BSc in Mathematics and Computer Science, Prize for Academic Excellence*

Dec. 2018 – Oct. 2021

- **Subjects Covered** - Data Structures and Algorithms, Calculus, Linear Algebra, Numerical Analysis, Abstract Algebra, Analog Electronics, English, French
- Organised the annual science fair by managing funds, mentoring juniors and driving promotional activities
- **Thesis** - Morphology-Agnostic Reinforcement Learning for Quadrupedal Locomotion

## RESEARCH AND TECHNICAL CONTRIBUTIONS

- Pal, S., **Chakraborty, Kousheek**, Aditya, D., Datta, A., Peters, J. "**Controlling Industrial Machines by Tracking Movements of their Operators**". Patent application ([Link](#))
- **Chakraborty, Kousheek**, Fürbaß, L., Kohout, P., Rohr, A., Ruelas, D., Savage, J., Swoboda, D., Viehmann, T., "**Robocup Logistics League Rulebook 2024**" ([Link](#))
- Boutignon, A., **Chakraborty, Kousheek**, Deptula, M., Merzouki, R., "**Integrated Design of an Aerial Ground Collaboration Platform for Autonomous Navigation through Rough Terrain**". Technical report for the French Ministry of Defence.
- **Chakraborty, Kousheek**, Lalaux, M., Rousseau, M., Saleh, A., Sanz-Lopez, M., **Implementation of Intelligent Task Scheduling for Swarm AGVs for the Robocup Logistics League**. Robocup Symposium 2024.

## EXPERIENCE

### Saxion University of Applied Science, (SMART Mechatronics and Robotics Lab)

Enschede, Netherlands

*Robotics Research Engineer*

Sep. 2024 – Present

- Designed an RL-based control architecture for aerial robots to stabilize against impulse disturbances
- Developing a world model for aerial robot swarms using multi-modal reinforcement learning with touch and vision

### Lynxdrone

Canejan, France

*Embedded System Engineer*

Sep. 2023 – Sep. 2024

- Developed a high-frequency multi-sensor state estimation pipeline for PX4-based drones
- Optimised 3D lidar-based SLAM algorithms for embedded processors in a drone to contain GPS-based factors
- Created a GUI for aerial and mobile robot operators working in GPS-denied conditions

- Built an autonomous drone using a Pixhawk flight computer and an NVIDIA Jetson Orin offboard computer
- Integrated advanced functionalities like GPS denied waypoint navigation and obstacle avoidance through a custom state estimation pipeline
- Developed a Qt C++ Desktop application for simultaneous control of a drone and mobile robot

**Technical University Darmstadt, (Intelligent Autonomous Systems Lab)**

Darmstadt, Germany

Robotics and Machine Learning Engineer

Aug. 2020 – Aug. 2022

- Developed a PyTorch Reinforcement Learning Toolkit for robotic applications with 8 algorithms
- Developed a real-time, single object 6D object pose estimation pipeline
- Developed a C++ API for real-time motion control of industrial manipulator arms
- Conducted testing and evaluation of state of the art visual-inertial odometry algorithms
- Led the design and prototyping of an embedded system to track the orientation of a robot operator's hand

## PROJECTS

**Banter - Interactive GUI for Vision Language Action Models**

Mar. 2023 – Jul. 2023

Designed an interactive web-based GUI for interfacing with Vision-Language-Action models to control mobile manipulators powered by a Llama 3.1 8B-based LLM.

**DriftWood - Autonomous Port Monitoring**

Sep. 2022 – Dec. 2022

Developed a 4G-connected autonomous boat for port monitoring using a custom Pure Pursuit path tracking controller and an NVIDIA Jetson Nano running CNN-based debris detection and collecting water level/quality data.

**Open Source Kinematics Library for Arduino-based Microcontrollers**

Jan. 2022 – Mar. 2022

Developed an open source kinematics library for N-dof serial manipulator arms capable of running on Arduino-based microcontrollers with the help of a scratch built linear algebra and numerical optimisation library

**Garbage Monitoring System for Urban Environments**

Nov. 2016 – Jun. 2017

Developed an IOT based platform for monitoring garbage levels in garbage bins across the city and determining the most efficient path for the garbage collection truck. Deployed to a portion of the town of Pondicherry, India

## HONOURS AND AWARDS

- **Graduated with Highest Honours – MSc in Robotics and Autonomous Systems** Sep. 2024
- **Topper in Introduction to Robotics Course – Rank 5/8844 – NPTEL** (Link) Dec. 2020
- **Prize for Academic Excellence – Sri Aurobindo International Centre of Education** Oct. 2019
- **Winner of 23 contests hosted on instructables.com** (Link)

## SKILLS

**Programming Languages** – C++, Python, C, Matlab / Simulink, LabVIEW

**Computer and Digital Skills** – Fusion 360, Docker, Unreal Engine, Git, Isaac Sim, L<sup>A</sup>T<sub>E</sub>X

**Libraries and Frameworks** – Pytorch, Keras, JAX, ROS, PX4, OpenCV, Eigen, PCL, CUDA

**Languages** – English, French, Bengali, Sanskrit

## HOBBIES

**Co-Author of Technovation** (1.9M views) (Link)

**FPV Drone Pilot**

**Physical Education** (gymnastics, aquatic sports and team sports - basketball, volleyball, hockey)