KAUSHIK BHOWMIK

Computer vision - Machine learning - Artificial Intelligence - Autonomous systems - Sensor technology

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Educational Qualification

Degree	Batch	University	Grade
Joint Ph.D. from **INRIA** & École doctorale Mathématiques, sciences et technologies de l'information, informatique, **UGA, Grenoble**	2023-2026	Grenoble Alpes University, Grenoble, France	-
Master of Science. Computer Control and Automation	2018-2019	Nanyang Technological University, Singapore.	3.12/5
Master of Technology Power Electronics and Electric Drives	2016-2018	Indian Institute of Technology, (ISM), Dhanbad, India.	8.03/10
Bachelor of Technology Electronics and Instrumentation	2011-2015	Haldia Institute of Technology, India	7.96/10

Research Experience

Doctoral researcher, INRIA, Grenoble, France **May 2023 –**

Present Project: Trajectory forecasting of heterogeneous multi-agent systems in dynamic shared spaces.

- Perform multi-agent trajectory forecasting in dynamic shared spaces for providing better navigation capability to autonomous cars.

Senior Research Assistant, SUTD, Singapore **Sep 2021 – 2023**

Project: Multiple robot mapping & localization.

- Using LIDAR data to solve the SLAM problem for multiple robots.

Project: Mobile collaborative robot platform with vision feedback, adaptive & learning soft end-effectors for coning & de-coning wharf operations.

- Using the RGBD data, utilizing the deep learning models & registration methods to classify, localize & get the orientation of the object (corner block & cone type).

Research Associate, HP-NTU Digital Manufacturing Lab, Singapore **Sep 2019 - Sept 2021**

Project: Inspection of PCB using computer vision techniques.

- Worked on creating & improving the image acquisition setup for the project.
- Worked on creating the image database, writing scripts for automating the database creation & recording database information through creating scripts.
- Manually created defects on acquired PCB images using GIMP software which will act as defective image dataset.
- Worked on image pre-processing tasks like creating automated edge detection algorithm for PCB, analyzing image quality analysis.
- Organizing meeting with industrial vendors for possible collaborations, understanding industry requirements & improving the quality of product.

M.Sc. Thesis, Nanyang Technological University, Singapore. **2018 - 2019**

Project: Classification of electrographic seizures from scalp EEG recording using deep learning approach

- Used TUH Dataset, classified and labelled the dataset.
- Preprocessed the dataset.
- Defined model architecture.
- Performed training, validation, and testing of the model.

MTech Thesis, **Indian Institute of Technology, ISM, Dhanbad, India** **2017 - 2018**
Project: Comparative analysis of traditional and optimization-based methods for the tuning of PID controllers.

- Analyzing the output response of traditional methods like Cohen Coon method, Zeigler Nichols method.
- Analyzing the output response of optimization-based methods like Genetic Algorithm, Ant colony optimization.
- Comparing their performance on First Order plus transportation delay systems.

B.Tech Thesis, **HIT, India** **2014-2015**
Project: PC Based EMG monitoring system.

- Capturing and preprocessing of EMG signal, using the DAQ device to monitor EMG on PC.
- Completed summer training at 'DHUNSERI PETRO CHEMICAL LIMITED', Haldia, India in the year 2014.
- Calibration of various instruments and observed transducers of various categories like pressure, temperature, flow, level and how the whole plant was being controlled by SCADA.

Academic Achievements

- Passed GATE examination in the year 2016 with 98.06 percentile.
- Received scholarship for good performance in GATE 2016 from MHRD, Government of India during the academic period 2016-2018 at IIT(ISM), Dhanbad.

Personal Projects

Listed in GitHub repository.

Research Interests & Skills

Research Interests	Skills
Robotics	ROS, Python, C++
Autonomous Systems	ROS, Python
Computer Vision	Python & its libraries like OpenCV
Deep Learning	Python & its libraries like Keras, Pytorch.
Data Science	Python & MATLAB

Publications

- Distributed Ranging SLAM for Multiple Robots with Ultra-Wideband and Odometry Measurements (Ran Liu, Zhongyuan Deng, Zhiqiang Cao, Muhammad Shalihan, Billy Pik Lik Lau, Kaushik Bhowmik, Chau Yuen, and U-Xuan Tan)- (2022 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2022)

Extra-Curricular and Co-Curricular Activities

- Participated in Robotics competition organized by Robosapiens in association with IIT Kharagpur.
- Participated in National Service Scheme.
- Member of the winning football team in the intra-college competition.
- Won Bronze medal in 1500m race in Annual Sports Meet 2016 & 2018 in IIT(ISM), Dhanbad.
- Represented IIT(ISM), Dhanbad in Water polo at National Inter IIT-Aquatics Meet.

Declaration

I declare that the details furnished above are true to the best of my knowledge.

Date: 24-03-2024
Place: Grenoble, France **KAUSHIK BHOWMIK**