Anirvan Dutta

Personal Data

NAME:	Anirvan Dutta
DATE OF BIRTH:	19th April 1995
CONTACT INFORMATION:	anirvan.dutta95@gmail.com, a.dutta22@imperial.ac.uk
ORCHID ID:	0000-0001-5857-4769
RESEARCH INTERESTS:	Multimodal Perception (Vision & Touch)
	Robot Motion Planning and Control
	Human Robot-Interaction

Professional Experience

01/05/2021 – 30/04/2025

BMW Group AG, Munich, Germany
Marie Curie Doctoral Candidate
- Early Stage Researcher as part of EU H2020 MSCA ITN Project - INTUITIVE
- Worked on perception for grasp and manipulation using vision and tactile sensing.
- Contributed on perception of humans for intelligent interiors in vehicle via EU-PHASTRAC Project (Grant 101092096)
- Supervisor - Dr. Mohsen Kaboli, RoboTac Lab

19/04/2022 – 30/05/2022

Lund University, Lund, Sweden
Visiting PhD student
- Secondment as part of INTUITIVE Project
- Studied biological inspiration of Predictive coding & Active Inference for translation in robotics.
- Supervisor - Prof. Henrik Jörntell, Neural basis of sensorimotor control Lab

01/02/2019 – 31/07/2019

Robotics, Perception and Learning Lab, KTH
Research Engineer
- Worked on development of indoor SLAM and planning for mobile-manipulator as part of FACT 2020 project.
- Supervisor - Prof. Patric Jensfelt

15/09/2017 – 30/07/2018

Indian Institute of Technology, Jodhpur, India
Junior Research Fellow
- *Major Project* on "Sensorless Full Body Active Compliance in a 6 DOF Parallel Manipulator" in collaboration with DFKI GmbH, Germany.
- *Minor Project* on "Hybrid reactionless manipulation and visual servoing of a satellite mounted robot for autonomous on-orbit services." in collaboration with Department of Science & Technology, India
- Supervisors: Dr. Suril V. Shah, Dr. Arun Dayal Udai, Dr. Shivesh Kumar.
- Collaborator: Dr. Durgesh Haribhau Salunkhe.

01/01/2017 – 30/08/2017

Infineon Technologies IN, Bangalore, India
Design Engineering Intern, Design Enabling Services
- Worked on Electronic Design Automation tools and Requirements Engineering
- Responsible for integrating various tools in the design flow and testing architecture using meta-modelling tool.

EDUCATION

01/01/2022 *Current*	**Imperial College of Science, Technology and Medicine, London, UK** *Doctor of Philosophy (PhD)* • Thesis Title - Predictive Visuo-Tactile Object Perception via Robotic Manipulation. • Thesis Successfully Defended - 16/06/2025 • Partner Research Institute - BMW Group AG • Supervisor - Prof. Etienne Burdet, Human Robotics Group (HRG)
15/08/2018 *30/11/2020*	**KTH Royal Institute of Technology, Sweden** *Master of Science in Systems, Control and Robotics* • Department - Electrical & Computer Engineering • Key Courses - Introduction to Robotics, Modeling of Dynamical System, Nonlinear Control, Advanced Control Theory, Applied Estimation, Deep Learning • Thesis Title - Hybrid model-based hierarchical reinforcement learning for contact-rich manipulation tasks. Supervisors - Dr. Shahbaz A. Khader, Dr. Christian Smith, Robotics, Perception, Learning (RPL) Lab
13/09/2019 *30/01/2020*	**École Polytechnique Fédérale de Lausanne, Switzerland** *Erasmus Exchange Fall'19* • Key Courses - Applied Machine Learning, Model Predictive Control, Intelligent Agents, Legged Robots
15/08/2013 *30/06/2017*	**Birla Institute of Technology, Mesra, India** *Bachelor of Engineering* • Department - Electronics & Communication Engineering • CGPA - **8.81** (Absolute grading scale), Department Rank - 5/120 • Thesis Title - Sign Language Recognition and Translation using Custom Data Glove. Supervisor: Prof. Shrikant Pal
01/05/2015 *01/08/2015*	• Internship I: Computer Vision Lab, Indian Institute of Technology, Kharagpur *Project title*: Pulmonary cancer cell detection in lung CT images Supervisors: Dr. Ashish Kumar Dhara, Prof. Sudipta Mukhopadhya
01/05/2016 *01/08/2016*	• Internship II: Robotics Lab, Indian Institute of Technology, Kanpur *Project title*: Tracking and monitoring of underground pipeline using mobile robot Supervisor: Prof. Laxmidhar Behra
01/01/2017 *30/08/2017*	• Internship III: Infineon Technologies PVT Ltd., Bangalore Department: Design Enabling Services
01/04/2000 *30/05/2013*	**St.Xavier's School, Doranda, Ranchi** *Primary & Secondary Education* • Indian Certificate of Secondary Education Examination - 94.29% **Jawahar Vidya Mandir Shyamali, Ranchi** *Senior Secondary Education* • Central Board of Secondary Education - 92.6%

AWARDS & RECOGNITION

- Best Paper Award, IEEE International Symposium on Robotic and Sensors Environment (ROSE), 2024.
- Selected as Marie Skłodowska-Curie Early Stage Researcher, 2021.

- Erasmus Exchange Scholarship (4000 CHF) due to academic excellence and selection to EPFL.
- KTH One-Year Scholarship (155,000 SEK) due to academic excellence, 2019
- Secured a position in top 10% among one hundred fifty thousand candidates at Joint Entrance Examination (JEE) Advance India 2013.
- Attained an All India Rank 2 in 3rd Biotechnology Olympiad, 2010, among approx ten thousand participants.
- Selected for participation in International MDG Youth Camp 2010, Prague, Czech Republic among cohort of 120 students.
- Attained an All India Rank 19 in 8th National Cyber Olympiad 2009, among approx fifty thousand participants.

SCIENTIFIC COMMUNICATION & ACTIVITIES

- Conference presentation: **IEEE International Conference on Robotics and Automation (ICRA 2025)** – *ViTract: Robust Object Shape Perception via Active Visuo-Tactile Interaction*.
- Conference presentation: **IEEE International Symposium on Robotic and Sensors Environments (ROSE 2024)** – *Visuo-Tactile Based Predictive Cross-Modal Perception for Object Exploration in Robotics*.
- Conference presentation: **IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2023)** – *Push to Know! Visuo-Tactile Based Active Object Parameter Inference with Dual Differentiable Filtering*.
- Poster presentation: **IEEE International Conference on Robotics and Automation (ICRA 2023)** – *Dual Differentiable Filtering for Rigid Object Parameter Estimation*.
- Co-organised **RoboTac 2023** (5th IEEE/RSJ International Workshop) – *Visuo-Tactile Perception, Learning, and Control for Manipulation and HRI; Emerging Data-Driven Approaches*.
- Delivered tutorial on tactile-based slip detection at the **INTUITIVE Spring School 2023**, robotac.eu/intuitive-spring-school-2023.
- Co-organised **RoboTac 2022** (4th IEEE/RSJ International Workshop) – *Visuo-Tactile Predictive Coding and Active Inference for Grasp and Manipulation; New Advances in Tactile Sensing, Interactive Perception, and Learning*.
- Poster presentation: **International School on Technologies of Touch**, Sept 26–30, 2022.
- Poster presentation: **Advances in Robotics (AIR 2017), 3rd International Conference of the Robotics Society of India**, June 28 – July 2, 2017.

TEACHING & SUPERVISION

- Graduate Teaching Assistant (GTA), Imperial Summer School on Robotics, Aug 2025.
- Co-supervision of Master Internship: *Prehensile manipulation of soft objects.*, Ang Li, TU Munich, 2025.
- Co-supervision of Master Thesis: *Haptic Intelligence: Robotic Sensing Meets Machine Learning*, Zhihua Zhang, Imperial College London, 2024.
- Co-supervision of Master Thesis: *Tactile based Hand Gesture Recognition*, Chiara Fumeli, Politecnico di Milano, 2024.
- Supervision of Bachelor Thesis: *Visual Servoing for Head Tracking for in-vehicle entertainment*, Susana Reyes, Saarland University, Saarbrücken, 2023.

LIST OF PUBLICATIONS

[J] Journal, [C] Conference

[J] **Anirvan Dutta**, Alexis WM Devillard, Zhihuan Zhang, Xiaoxiao Cheng, Etienne Burdet. "Embodied Tactile Perception of Soft Objects Properties." arXiv preprint arXiv:2508.09836 *Nature Robotics*, (Under Review).

[J] **Anirvan Dutta**, Yerkebulan Massalim, Etienne Burdet, and Mohsen Kaboli. "Tacser and Action-Conditioned Latent Filter for Generalizable Robotic Surface Perception." *IEEE Robotics and Automation Letters*, 2025.

[C] Alexis Devillard, **Anirvan Dutta**, Zhihuan Zhang, Xiaoxiao Cheng, Mohsen Kaboli, and Etienne Burdet. "Modular, Multi-Layer e-Skin For Robotics Investigations and Applications." *IEEE World Haptics Conference (WHC)*, 2025.

[C] Victoria Clerico, **Anirvan Dutta**, Donato Francesco Falcone, Wooseok Choi, Matteo Galetta, Tommaso Stecconi, András Horváth *et al.* "Edge Training and Inference with Analog ReRAM Technology for Hand Gesture Recognition." In *IEEE International Symposium on Circuits and Systems (ISCAS)*, pp. 1–5. IEEE, 2025.

[J] **Anirvan Dutta**, Etienne Burdet, and Mohsen Kaboli. "Predictive Visuo-Tactile Interactive Perception Framework for Object Properties Inference." *IEEE Transactions on Robotics*, 2025.

[J] **Anirvan Dutta**, Etienne Burdet, and Mohsen Kaboli. "ViTract: Robust Object Shape Perception via Active Visuo-Tactile Interaction." *IEEE Robotics and Automation Letters*, 2024.

[C] **Anirvan Dutta**, Etienne Burdet, and Mohsen Kaboli. "Visuo-Tactile Based Predictive Cross-Modal Perception for Object Exploration in Robotics." *IEEE International Symposium on Robotic and Sensors Environments (ROSE)*, 2024.

[C] Chiara Fumelli, **Anirvan Dutta**, and Mohsen Kaboli. "Advancements in Tactile Hand Gesture Recognition for Enhanced Human-Machine Interaction." *IEEE International Symposium on Robotic and Sensors Environments (ROSE)*, 2024.

[C] **Anirvan Dutta**, Etienne Burdet, and Mohsen Kaboli. "Push to Know! – Visuo-Tactile Based Active Object Parameter Inference with Dual Differentiable Filtering." *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2023.

[J] Prajval Kumar Murali, **Anirvan Dutta**, Michael Gentner, Etienne Burdet, Ravinder Dahiya, and Mohsen Kaboli. "Active Visuo-Tactile Interactive Robotic Perception for Accurate Object Pose Estimation in Dense Clutter." *IEEE Robotics and Automation Letters*, 2022.

[J] **Anirvan Dutta**, Durgesh Haribhau Salunkhe, Shivesh Kumar, Arun Dayal Udai, and Suril V. Shah. "Sensorless Full Body Active Compliance in a 6 DOF Parallel Manipulator." *Robotics and Computer-Integrated Manufacturing*, 2019.

[C] Arun Dayal Udai, Durgesh Salunkhe, **Anirvan Dutta**, Sudito Mukherjee. "Force/Position Control of 3-DOF Delta Manipulator with Voice Coil Actuator." *3rd International Conference of Robotics Society of India (Advances in Robotics)*, 2017.

[J] Ashis Kumar Dhara, Sudipta Mukhopadhyay, **Anirvan Dutta**, Mandeep Garg, Niranjan Khandelwal. "Content-Based Image Retrieval System for Pulmonary Nodules: Assisting Radiologists in Self-learning and Diagnosis of Lung Cancer." *Journal of Digital Imaging*, Springer, 2016.

[J] Ashis Kumar Dhara, Sudipta Mukhopadhyay, **Anirvan Dutta**, Mandeep Garg, Niranjan Khandelwal. "A Combination of Shape and Texture Features for Classification of Pulmonary Nodules in Lung CT Images." *Journal of Digital Imaging*, Springer, 2016.

[C] Shrikant A. Mehre, Sudipta Mukhopadhyay, **Anirvan Dutta**, Nagam Chaithan Harsha, Ashis Kumar Dhara, Niranjan Khandelwal. "An Automated Lung Nodule Detection System for CT Images Using Synthetic Minority Oversampling." *SPIE Medical Imaging*, 2016.

[C] Ashis Kumar Dhara, Sudipta Mukhopadhyay, **Anirvan Dutta**, Mandeep Garg, Niranjan Khandelwal, Prafulla Kumar. "Classification of Pulmonary Nodules in Lung CT Images Using Shape and Texture Features." *SPIE Medical Imaging*, 2016.