Tirthankar Halder

+(91)6291215783 tirthankarhalder70@gmail.com/tirthankar.23@kgpian.iitkgp.ac.in Portfolio

Education

Indian Institute of Technology, Kharagpur **January 2024 – Present**

Master of Science (Research) Area of Research: Pervasive Sensing, HCI, Edge Computing, UAV, CPS *Kharagpur, West Bengal, India*

Under supervision of Prof. Sandip Chakraborty and Prof. Debarati Sen in associated with UbiNet

Haldia Institute of Technology, Haldia **August 2019 – July 2023**

Bachelor of Technology- Computer Science and Engineering; GPA: 9.36/10 *Haldia, West Bengal, India*

Work Experiences

Sponsored Research and Industrial Consultancy **October 2023 – Present**

Indian Institute of Technology Kharagpur *West Bengal, India*

- **UDAAN - Ungrudging Drone Assisted Aid Network**, Sponsor: SERB, New Delhi
  Position: Junior Research Assistant (JRA) October, 2023 - Present
  Description: Designed and integrated a multi-modal quadcopter equipped with an onboard SBC for real-time blind-vision guidance.
  Hardware: Pixhawk 6X, Jetson Nano, TX16S, Zorro ELRS, YDLidar X4, IWR1843 & DCA1000EVM, Intel Realsense D457, Holybro X500V2, TMotor Navigator MN3110 780KV.
  Software: PX4/Ardupilot, QGroundControl, RTAB-MAP etc.

Internships

Indian Institute of Technology, Kharagpur.

G. S. Sanyal School of Telecommunications, Supervisor: Prof. Debarati Sen

- **Design GPS-denied Localization and object Detection Using UAV** November 2021 - January 2022
  Developed a prototype aerial vehicle for a GNSS-denied area using an inertial navigation system..
- **Adhoc Long-Range Communication Network in Swarm of UAVs** April 2023 - May 2023
  Implemented an ad-hoc communication network for a UAV swarm by configuring Raspberry Pi nodes with Alfa AWUS036ACH wireless adapters to enable decentralized data exchange.

UiT – The Arctic University of Norway, 9037 Tromsø, Norway

Department of Medical Biology, CANS & HMI Lab, Supervisor: Dr. Jonathan Hira, Dr. Christian S Lentz

- **Development and Testing of Colony Phenotype Tracking System (ColpheT)** October 2021 - January 2022
  Developed the backend for ColpheT, an embedded colony phenotype tracking system, using a U-Net model for biomedical image segmentation and Hungarian–Kalman filtering for bacterial colony detection and tracking, followed by growth analysis via statistical methods and PCA.

Skills & Expertise

- **Areas** : Multi-modal Sensing, mmWave/FMCW Radar Sensing, Vision-Guided Learning
- **Tools** : ROS2, MmWave Studio, MATLAB, Simulink, CCS Studio, Gazebo
- **Languages** : Python, C/C++, Bash, Docker, Lua
- **Hardware** : Jetson Nano, Raspberry Pi, Alfa AWUS036ACH , ESP32S3 , IWR1843BOOOST, DCA1000EVM, MR24HPC1, B210, D457, MMCascade EVM/DSP
- **Subjects** : Distributed Systems, Operating Systems, Digital Electronics, Architecture and Protocol of IoT.

Certification/Training/Achievement

- **Robotics**:Aerial Robotics by University of Pennsylvania (Ongoing)
- Teaching assistant at Hindustan Aeronautics Limited (HAL) Training Program and Spread Spectrum communication and Jamming(NPTEL)

Projects

- Prototype development of a Companion SBC-based GPSless UAV system.
- Design and Integration of 24GHz mmWave radar-based Threat/Intruder Monitoring in Indoor Environments.
- Built an X8 UAV with a Pixhawk 2.4.8 as the flight controller.

Areas of Interest

Pervasive Sensing, Ubiquitous Computing, Robotic Operating System, Vision Language Model, Large Action Model, Joint Communications and Sensing, Embedded Systems, Internet of Things, Swarm Unmanned Aerial Vehicles, Human-Computer Interaction.

Journal/Conference

- **T. Halder**, A. Sen, S. Pradhan, R. Sen and S. Chakraborty, "MIRO: Multi-radar Identity and Ranging for Occupational Safety." [Submitted in ACM Sensys 2026]
- **T. Halder**, A. Sen, D. Sen and S. Chakraborty, "RfSurfMap: mmWave-UAV Reconstruction of Room Geometry and Material-Aware Surface Perception." [Submitted to ACM Mobisys 2026]
- **T. Halder**, K. G. Panda, A. Qaiser and D. Sen, "Geo-Position Estimation and Navigation Under Satellite-Out-of-Coverage Area through UAV-Assisted Model," 2024 IEEE 35th International Symposium on Personal, Indoor and Mobile Radio Communications (PIMRC), pp. 1-6, https://doi.org/10.1109/PIMRC59610.2024.10817201.
- Hira, J., Singh, B., **Halder, T**. et al. Single-cell Phenotypic Profiling and Backtracing Exposes and Predicts Clinically Relevant Subpopulations in Isogenic Staphylococcus Aureus Communities. Commun Bio 7, 1228 (2024). https://doi.org/10.1038/s42003-024-06894-z.
- **T. Halder**, Hira, J., and Sekh. AA, "ColpheT: A Deep Learning-Based Image Analysis Tool for Real-Time Bacterial Heterogeneity Classification Using Time-lapse Colony Growth Kinetics Models." [Submitted to Oxford Bioinformatics Software]
- **T. Halder**, K. G. Panda, and D. Sen, "Design of UAV-Assisted Network for Maintaining Blue Flag Certification." [Under IEEE Transactions on Intelligent Transportation Systems (T-ITS)]

Patent

- **T. Halder**, K. G. Panda, A. Qaiser and D. Sen, "System And Method For Geo-Position Estimation Of Ground Objects And UAV Navigation Under Satellite-Out-Of-Coverage Areas.," Indian Patent Application-202531010544.

Extra Co-curricular Activities

Drone Racing, Swimming, Guitar