

Debjoy Saha

ASPIRING RESEARCHER · ENGINEERING STUDENT

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“Optimism in the face of Uncertainty”

Summary

Engineering Student in his 3rd year at IIT Kharagpur and an Aspiring researcher. A sincere and dedicated student. Super interested in Artificial Intelligence. Past experience working with Natural Language Processing, Computer Vision and Robotics. Currently exploring Reinforcement Learning and Control. Beginner grasp over topics in Electronics and Communications. Looking for research internship opportunities for the summers of 2021.

Education

Indian Institute of Technology, Kharagpur

Kharagpur, India

B.TECH+M.TECH(DUAL DEGREE) IN ELECTRONICS AND ELECTRICAL COMMUNICATION WITH A MINOR IN COMPUTER SCIENCE

Mar. 2018 - Present

- Cumulative Grade Point- **9.34/10.0** after 4 semesters

Kendriya Vidyalaya

New Delhi, India

HIGHER SECONDARY

Mar. 2016 - Mar. 2018

- Qualified AISSCE Examination with a percentage of **97.4%**

Skills

Programming Languages Python, C++, C, MATLAB

Relevant Coursework Natural Language Processing, Image Processing, Algorithms, Reinforcement Learning*, AI for Robotics*

Work Experience

Complex Networks Research Group(CNERG)

Kharagpur, India

RESEARCH INTERN

Feb. 2020 - Present

- Worked under Prof. Animesh Mukherjee on a multimodal deep learning project.
- Developed models capable of recognising hateful content in memes, with image and text context.
- Developed UI tools for studying and analyzing hateful content.

Aerial Robotics Laboratory, IIT Kharagpur

Kharagpur, India

SOFTWARE AND AI TEAM MEMBER

Mar. 2019 - Present

- Responsible for seamless functioning of the research group under the guidance of Prof. Somesh Kumar, IIT Kharagpur.
- Developed various image processing tools for object recognition and image understanding using OpenCV.
- Worked on SLAM, Localisation, Path-Planning and State estimation for aerial robots using sensor(LIDAR, camera) data in ROS framework.

IIT Kharagpur Technology Team

Kharagpur, India

SUPPORT TEAM MEMBER

Dec. 2019

- Part of the technology team from IIT Kharagpur to participate in the 8th Inter-IIT Tech Meet, IIT Roorkee.
- Worked on computer vision tools for quadcopter based search and rescue missions.

Winter School of AI and Robotics

Kharagpur, India

MENTOR

Dec. 2019

- Mentored over 50 first and second year students in the Computer Vision workshop under IEEE Winter School of AI and Robotics organized by Technology Robotix Society in association with Centre for Artificial Intelligence, IIT Kharagpur.
- Subjects covered were basic spatial image processing, basics of path planning and blob detection algorithms.

Honors & Awards

INTERNATIONAL

2020 **27th Rank***, out of total 2949 participants, Hateful Memes Detection challenge, NeurIPS

Vancouver, Canada

2019 **Winners**, IMAV-2019 Indoor Competition

Madrid, Spain

DOMESTIC

- 2020 **Finalist***, Top 3 out of a total 80 Qualifying teams, Flipkart GRID 2.0 Robotics Track Competition
2019 **Gold Medal**, among total 20 teams, Inter-Hall Data Analytics Competition

Bangalore, India
IIT Kharagpur, India

ACADEMIC

- 2018 **1155th Rank / 2.5L students**, JEE Advanced Examinations
2018 **983rd Rank / 14L students**, JEE Mains Examinations
2018 **452nd Rank / 50K students**, KVPY-SX Fellowship Examinations
2017 **375th Rank / 50K students**, KVPY-SA Fellowship Examinations
2017 **Qualified**, RMO(Regional Mathematics Olympiad)
2016 **Qualified**, NTSE(National Talent Search Examination)
2016 **24th Rank**, National Science Olympiad

India
India
IISC, India
IISC, India
New Delhi, India
NCERT, India
SOF, India

Projects and Research

Drone Racing Optimisation

Aerial Robotics Lab, IIT Kharagpur

RESEARCHER

Jun. 2020 - Present

- Work done as a part of Drone-Acharya Team, IIT Kharagpur for the Flipkart GRID-2.0 Robotics Track Competition: Autonomous Indoor Drone.
- Working on an Imitation-Learning based algorithm for fast Quadrotor trajectory planning using DAGGER.
- Deployed expert minimum-snap trajectory generation on a custom environment built on Unreal Engine using Microsoft AirSim Simulator.
- Currently, Drone-Acharya is among the top 3 finalists out of total 80 qualifying teams in the ongoing competition.

Detection of Hateful Memes in Social Media

CNERG, IIT Kharagpur

RESEARCH INTERN

Feb. 2020 - Present

- Ranked 27th/2949 participants in NeurIPS-2020 challenge: Hateful Memes detection, organised by Facebook.
- Performed Pretraining and Finetuning of cutting-edge Multimodal Attention-based models like Visual-BERT and Concat-BERT.
- Experimented with different dataset augmentations and training techniques like negative supervision.
- Improved model performance across different target communities by adding knowledge embeddings during training.
- Performed model calibration using Monte-Carlo Dropout Technique.

Warehouse Inventory Management using UAVs

Aerial Robotics Lab, IIT Kharagpur

RESEARCHER

Jun. 2019 - Oct. 2019

- Developed an algorithm for autonomous warehouse inventory management using UAVs for the 11th International Micro Aerial Vehicles competition and conference(IMAV-2019).
- Developed the OCR tools for accurate detection of alphanumeric codes using google's Tesseract library and QR-codes using Zbar library for inventory management of boxes in a warehouse, obtaining 96% detection.
- Devised a traversal algorithm using coloured frames for localisation on a DJI-Tello microdrone.
- This project won us the first place in IMAV among 14 teams from across 11 countries, which also made us the first team from India to ever win at IMAV. A paper on our text detection algorithm was presented at IMAV-2019 conference.

Detection of Camouflaged Objects using Quadrotor

IIT Kharagpur

RESEARCHER

Dec. 2019

- Developed for the 8th Inter-IIT Tech Competition.
- Developed a ROS-integrated camera-based detection module for a search-and-rescue quadrotor.
- Developed an algorithm capable of detection and tracking of camouflaged objects in real-time from heights ranging from 2 to 10 metres.

Publications

Warehouse Management Using Real-Time QR-Code and Text Detection

Madrid, Spain

11TH INTERNATIONAL MICRO AERIAL VEHICLES COMPETITION AND CONFERENCE, 2019

Oct. 2019

- Development of the computer vision tools for efficient inventory management of packages in a warehouse.

Extracurricular Activity

Hall Band

Kharagpur, India

KEYBOARDIST

Mar. 2018 - Mar. 2019

- Qualified Trinity College Keyboard grade-2 and grade-4 practical examinations with scores of 84 and 73 respectively.
- Played accompaniment pieces for multiple band performances across different genres.

Hall Tech Team

Kharagpur, India

DATA ANALYST

Mar. 2018 - Mar. 2019

- Did data visualisations and feature engineering on a mobile-service availability dataset for the Inter-Hall Competition.