Debjoy Saha

ASPIRING RESEARCHER · ENGINEERING STUDENT

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Summary

Engineering Student in his 3rd year at IIT Kharagpur and an Aspiring researcher. A sincere and dedicated student. Interested in Artificial Intelligence. Past experience working with Natural Language Processing, Computer Vision and Robotics. Currently exploring Speech Processing, Reinforcement Learning and Control. Beginner-level grasp over topics in Electronics and Communications.

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- **9.32/10.0**, Additional Cumulative Grade Point- **9.83/10.0**, after 5 semesters.
- Among the top 6% students at IIT Kharagpur in terms of cumulative grade point.

Kendriya Vidyalaya   *New Delhi, India*

HIGHER SECONDARY   *Mar. 2016 - Mar. 2018*

- Qualified AISSC Examination with a percentage of **97.4%**.

Skills

Programming Languages	Python, C++, C, MATLAB, Verilog
Relevant Coursework	Natural Language Processing, Image Processing, Algorithms, Reinforcement Learning, AI for Robotics
Other Coursework	Digital Electronics Circuits, Control Systems Engineering, Digital Speech Processing

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 guidanace 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.

Honors & Awards

COMPETITIONS

2021	**1st Rank**, Offensive Language Identification in Dravidian Languages-EACL 2021	*Kyiv, Ukraine*
2020	**11th Rank,** out of total 3173 participants, Hateful Memes Detection challenge, NeurIPS	*Vancouver, Canada*
2020	**National Finalists**, Top 9 out of a total 80 Qualifying teams, Flipkart GRID 2.0 Robotics Track Competition	*Bangalore, India*
2019	**Winners**, among 14 teams from 11 countries, IMAV-2019 Indoor Competition	*Madrid, Spain*
2019	**Gold Medal**, among total 20 teams, Inter-Hall Data Analytics Competition	*IIT Kharagpur, India*

ACADEMIC

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

Projects and Research

Offensive Language Identification in Dravidian Languages
CNERG, IIT Kharagpur

RESEARCHER
Dec. 2020 - Feb. 2021

- Trained transformer-based text classification models for Offensive Language detection in a low-resource setting.
- Developed novel BERT-CNN fusion architectures and a Genetic-algorithms based ensembling strategy.
- Ranked 1st in languages Tamil and Malayalam and 2nd in Kannada in the EACL competition on Offensive Language detection in Dravidian Languages.

Drone Racing Optimisation
Aerial Robotics Lab, IIT Kharagpur

RESEARCHER
Jun. 2020 - Jan. 2021

- Designed 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.
- Reached National Finals in Flipkart GRID-2.0 robotics track competition and presented our idea in front of an expert panel from Flipkart.

Detection of Hateful Memes in Social Media
CNERG, IIT Kharagpur

RESEARCH INTERN
Feb. 2020 - Present

- Performed Pretraining and Finetuning of cutting-edge Multimodal Attention-based models like Visual-BERT and Concat-BERT.
- Experimented with different weak-supervised and self-supervised training techniques like negative supervision.
- Performed model calibration using Monte-Carlo Dropout Technique.
- Ranked 11th/3173 participants in NeurIPS-2020 challenge: Hateful Memes Detection, organised by Facebook AI.

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 and 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.
- This project won us the first place in IMAV which also made us the first team from India to ever win at IMAV.

Detection of Camouflaged Objects using Quadrotor
IIT Kharagpur

RESEARCHER
Dec. 2019

- Worked as a part of the IIT Kharagpur Technology team 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

Ensembling strategies for Transformer-based Offensive language Detection
Kyiv, Ukraine

WORKSHOP ON SPEECH AND LANGUAGE TECHNOLOGIES FOR DRAVIDIAN LANGUAGES, EACL 2021
April. 2021

- Development of Transformer-based models for Offensive language detection in Dravidian languages in a low-resource setting.

Warehouse Management Using Real-Time QR-Code and Text Detection
Madrid, Spain

11TH INTERNATIONAL MICRO AERIAL VEHICLES COMPETITION AND CONFERENCE(IMAV), 2019
Oct. 2019

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

Talks

Self-Supervised and Weak-Supervised Techniques to improve Hateful Memes Detection
Vancouver, Canada

HATEFUL MEMES CHALLENGE SESSION, 34TH CONFERENCE ON NEURAL INFORMATION PROCESSING SYSTEMS(NEURIPS), 2020
Dec. 2020

- Discussed various techniques to improve classification of memes using multimodal BERT models

Extracurricular Activity

2020   **Mentor(SWG),** Guiding first year students from the dept. of Electronics and ECE through the semester.
2020   **Vice-Captain,** Hall Tech Team(Software) at Patel Hall, IIT Kharagpur
2019   **Mentor,** IEEE Winter School of AI and Robotics, IIT Kharagpur
2019   **Keyboardist,** Hall band, Patel Hall, IIT Kharagpur