

# SUSIM MUKUL ROY

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## EDUCATION

**Indian Institute of Technology, Jodhpur**

4th Year Undergraduate, Dept. of CSE

*December 2020 - Present*

Overall CGPA: 8.71 (Till Sem-VI)

**Garden High School, Kolkata**

12th Standard

*2020*

Percentage : 96.8%

## TECHNICAL STRENGTHS

**Computer Languages**

Python, C, C++, JAVA, VueJS, SQL, PHP

**Open-Source Libraries**

Sklearn, OpenCV, Pytorch, TensorFlow, Hugging Face,  
NLTK, Scipy, ROS

**Tools and Softwares**

MATLAB, Docker, SCVAT, Gazebo, Moveit, RVIZ, NS-3, GIT

**Platforms**

Linux, Arduino, Raspberry Pi

**Soft Skills**

Leadership, Event Management, Public Speaking, Time Management

## COURSEWORK

Pattern Recognition and Machine Learning - **A**

Deep Learning - **A**

Data Structures and Algorithms - **A-**

Dependable AI - **A**

## EXPERIENCE

**Visual Motion Analysis from Images and Videos(Under Dr.Li Cheng)**

May'23 - Aug'23

*MITACS GRI'23*

**SGA Website**

- Worked in the AI team at Super GeoAI on computer vision data collection, annotation, and analysis
- Improving and finetuning existing object detection models like **EfficientDet**, **Yolov8** for accurate wheat-head growth stage detection and canola flower count
- Deployment of trained model for demo on website

**RefMOS, IIT Guwahati (Under Dr.Santosh Kumar Vipparthi)**

May'22 - Jan'23

*AI Research Intern*

- Worked on **video object instance segmentation** in which the videos were guided with **natural language** features using some advanced Deep-learning architectures like **DeepLab-V3**, encoder-decoder structures etc.

**ABU-ROBOCON 2k22 (Under Dr.Jayant Mohanta & Dr.Anoop Jain)**

Nov'21 - Apr'22

*Team Member (IIT Jodhpur)*

**Github Link**

- Lead the team in the domain of **ROS** for making the Semi-Automated Shooter(R1) and Picker(R2) Robots to perform on '**Lagori**' **Problem Statement**.
- Integrating AI with ROS for proper detection of disks to perform the necessary path planning of the Robots.

## ASSISTANTSHIP

**Teaching Assistant(Under Dr.Richa Singh & Dr.Pratik Mazumder)**

Jan'23-May'23

*IAB Lab*

TA for the course **Pattern Recognition and Machine Learning(CSL2050)** at IIT Jodhpur.

## PROJECTS

## **Vulnerability of Diffusion Models against Adversarial Attacks (Under Dr.Richa Singh & Dr.Mayank Vatsa)**

Aug'23 - Present

*B.Tech Research Project*

- Working on the shortcomings of diffusion models like **DDPMs** by exploiting their noise maps in creating a novel adversarial attack.
- Studying the effects of **Class-Activation Maps** of pretrained classifiers on CelebA-HQ, CIFAR10 etc.

## **Training with Continuous Sensor System Parameters and Irregular Data (Under Dr.Michael Moeller)**

Aug'23 - Present

*AI Research Intern*

- Working on non-uniform noise modelling for the **sinogram** generated from forward propagation algorithm for CT Images.
- Working on suitable reconstruction technique for the noisy images(**Poisson/Gaussian**) like **FPB** for ULDCCT.

## **Discriminating Noises with Intention for Adversarial Attack Detection(Under Dr.Richa Singh & Dr.Mayank Vatsa)**

Aug'22 - Sep'23

*Undergraduate Research Project*

- Reviewed literature and designing techniques for **black-box** adversarial defence mechanisms.
- Created a novel method to discriminate between noise and adversarial attacks through a two-stage architecture. The first stage minimizes the cosine similarity between three different variations of an image while the second stage does binary classification between intentional and non-intentional noises.

## **Autonomous UAV-UGV Navigation(Inter-IIT 2k22)**

Feb 2022

*Core Contributor*

*[Github Link](#)*

- Designed an algorithm to move an **UAV** on a mountainous terrain with no texture and thereby made a UGV follow it's path to the destination.
- Used depth image to segment between road and terrain following which we used **OpenCV** to separate it into two classes and drew a line joining the midpoints of the road which the UAV follows as it moves ahead.
- Used **ROSBags** to record messages from UAV and scaled them down to prius messages for **UGV** movement.

## **ACHIEVEMENTS**

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### **MITACS Scholarship Awardee**

- Awarded the MITACS GRI-2023 scholarship for on-site internship at **University of Alberta**
- Rewarded by CEO of Super GeoAI Technology Inc.(**Dr.Weiping Zeng**) for exceptional work and called to the **University of Saskatchewan** to work in their office.

### **InterIIT 2K21 and 2k22**

- Secured **5th** and **8th** rank in **DRDO** problem statements in InterIIT 2021 and 2022 respectively with an overall rank **8** in InterIIT 2022.

### **Robocon 2022**

- Our team secured **full marks(100/100)** in Stage-I

### **Batch Rank**

- In Top **5** of a batch of **500** students and department rank **2** after Sem-VI at IITJ.

### **JEE Advanced**

- Secured **AIR 3199** with ranking among the top 0.3 % among over 1 million candidates

## **POSITIONS OF RESPONSIBILITY**

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### **Robotics Society, IIT Jodhpur**

Dec'21 - Feb'23

*Coordinator*

- Overall Management of society by organising sessions on ML, ROS, Mechanics of robots etc. along with leading the **ROS** department