PRITISH SAHA | 22MF3IM15

Indian Institute of Technology Kharagpur

EDUCATION

Year	Degree/Exam	Institute	CGPA/Percentage
2027	B.Tech+M.Tech, Manufacturing Science and Engineering	Indian Institute of Technology Kharagpur	7.00
2022	Class XII, CBSE	Bodhicariya Senior Secondary School, Kolkata	90.80%
2020	Class X, ICSE	Delhi Public School Megacity, Kolkata	95.60%

INTERNSHIPS AND PROJECTS

Home Service Robot *Dec'23 - Feb'24* *ROS, Gazebo, SLAM, C++*

- Developed an autonomous home service robot using SLAM, pure localization, navigation, and C++ programming with ROS nodes. Integrated components from Turtlebot packages and customized them for a custom Gazebo environment.
- Implemented environment mapping, robot localization, object pick-up and delivery, and marker visualization. Overcame challenges such as adapting configurations, fine-tuning navigation parameters, and synchronizing marker displays with robot actions using ROS tools like slam_gmapping, map_server, and teleop_twist_keyboard.

Automated Image Captioning with CNN-RNN Model *Jan'24 - Feb'24* *PyTorch, Keras, NumPy, Matplotlib*

- Developed a deep learning model combining CNNs and RNNs to generate image captions, trained on Microsoft Common Objects in COntext (MS COCO) dataset with rich annotations for precision.
- Implemented data preprocessing, CNN-based image feature extraction, and LSTM-based caption generation. Utilized ResNet-152 for image encoding and a custom LSTM architecture for decoding. Achieved successful inference on various images, demonstrating the model's capability to generate contextually relevant captions.

Automatic Speech Recognition (ASR) Pipeline Implementation *Feb'24 - March'24* *TensorFlow, Keras, NumPy, Matplotlib*

- Developed an end-to-end ASR pipeline using deep neural networks to transcribe raw audio into text. Implemented various deep learning models including RNN, CNN, and Bidirectional RNN architectures to map audio features to transcribed text, achieving state-of-the-art results.
- Utilized LibriSpeech dataset and TensorFlow framework to train & evaluate the models, with a focus on optimizing performance & efficiency.

Training Agents to Play Tennis Using DDPG *Apr'24 - May'24* *Unity ML-Agents, PyTorch, NumPy, Matplotlib*

- Developed an end-to-end deep RL system using DDPG to train two agents to play tennis in Unity's ML-Agents environment.
- Implemented actor-critic models, replay buffer, and Ornstein-Uhlenbeck noise process for stable learning and effective policy development.
- Achieved successful training of agents, evaluated their performance, and saved the trained models for future use and analysis.

SKILLS AND EXPERTISE

- **Languages and Tools:** Python, C, C++, Solidity, ROS, Keras, Java, HTML, CSS, JavaScript, MySQL, Arduino IDE.
- **Libraries and Frameworks:** NumPy, Pandas, Matplotlib, Seaborn, OpenCV, Scikit-learn, Beautiful Soup, Tensorflow, Node.js, Express.js.
- **Software Packages:** Microsoft Office, Canva, SolidWORKS, TinkerCAD.

COURSEWORK INFORMATION

- Operations Research
- Linear Algebra, Numerical and Complex Analysis
- Probability and Statistics
- Programming and Data Structures

POSITIONS OF RESPONSIBILITY

Corporate and Public Relations Member | TeamKART Motorsports Mar'23 - Present

- Attended Knowledge sessions on functioning of a FS Car and Finance in Specific. Made Pitch Decks for businesses and solved real cases around Formula Student. Learnt Basics of finance. Helped in creating Cost Reports. Was involved in the sponsorship drive for the 2022-23 season. Organized Formula RC Event in collaboration with DIY Lab which had 900+ participants.

Senior Executive Member | KodeinKGP Aug'23 - May'24

- Conducted selections for the AI & Metaverse Team and the Blockchain Team and made the selection tasks. Took Knowledge Meets in Blockchain and AI & Metaverse Team. Wrote articles in Medium for the AI & Metaverse Team and the Blockchain Team.

Associate Member | Kharagpur Blockchain Society Jul'23 - Feb'24

- Attended sessions on DeFi, Web-3, NFTs, Metaverse, and business models. Developed smart contracts for a DEX on Tezos. Created reports on Mantle Ecosystem, CBDC use cases for Indian banks, and risks in Angle protocol’s economic design for Nethermind.

COMPETITIONS

- **Smart India Hackathon, IIT Kharagpur**: Ranked among the foremost teams within the Institute, successfully qualifying in the internal hackathon. Worked on Creating a Smart Parking Solution using Computer Vision and implementing a Dynamic Pricing algorithm using RL.
- **Hardware Modelling, General Championship**: Led the development of Self-Navigating Control system for a Water Cleaning Bot using computer vision and PID control, achieving 1st place among all halls at IIT Kharagpur's General Championship. Implemented real-time object detection with YOLOv8 to identify and localize garbage in the water body. Designed an algorithm to maneuver the bot towards detected debris by processing visual data from an onboard camera and controlling motorized components via PID control.
- **Freshers Quiz, organized by Space Technology Students Society (spAts)**: Participated in Freshers Space Quiz and achieved 2nd position.

EXTRA CURRICULAR ACTIVITIES

- Member of Football and Case Study Team of Patel Hall of residence in Interhall Sports General Championship 2024-25. Karate black belt. Participated in various Karate tournaments. Was an NSS volunteer in nearby villages of Kharagpur. Worked on improving conditions there.