AMAN CHANDRA | 15BT30001

BIOTECHNOLOGY & BIOCHEM. ENGG. (M.Tech Dual 5Y)

EDUCATION

Year	Degree/Exam	Institute	CGPA/Marks
2020	M.TECH Dual Degree 5Y	IIT Kharagpur	7.27 / 10
2015	All India Senior School Certificate Examination	St. Michael's High School, Patna	95.6%
2013	All India Secondary School Examination	St. Xavier's Hr. Sec. School, Bettiah	10 / 10

INTERNSHIPS AND PROJECTS

University of Quebec at Trois Rivieres(UQTR) | Robotics Research Intern — May - Jul 2019

• Designed a novel **waypoint-based global planner** for known environments based on A* search algorithm on navigation graphs
• Integrated **Iterative Closest Point** algorithm with existing AMCL stack for robot pose (re)initialization in case of localization failure
• Worked at the intersection of academia and industry to build a **product release**, validating the algorithms in **real life environments**
• Designed a client-end QT-based GUI for robot management and deployment with flexible user control using ROS states

Capillary Technologies | Computer Vision Intern — May - Jul 2018

• Developed an end-to-end **pedestrian tracking** pipeline for **super-wide fisheye cameras** in crowded scenes working in real time
• Built a **novel pedestrian detector** for **undistorted overhead fisheye images** using modified and retrained versions of **YOLO & ACF**
• Conceptualized a **Heirarchical Skew NMS** algorithm based on **skew-IOU** to filter repeated detections at varying orientations
• Designed a **multi-person tracker metric** for Hungarian data association using **Deep Visual Features** and **Kalman Filter**

Protein Structure Prediction | Bachelor's and Master's Dissertation — Jul 2018 - Present

• Implemented two different models based on RNN and RGN as a part of literature review for ab-initio protein structure prediction
• Devised method for **splitting protein data** into train/ test/ validation sets using **clustering** of evolutionary relationship data
• Working toward identifying key fragments using autoencoders and using them for generation and assembly using GANs

Swarm & Aerial Robotics | Student Research Groups — Mar 2016 - Present

• Stitched image feeds from multiple robots using homographies to get a **panoramic view** using **RANSAC** and OpenCV libraries
• Implemented **Q-Learning** algorithm on Arduino for a robot with a 2-DOF arm and an encoder to learn to crawl on its own
• Built mathematical model of a quadcopter with **two-layered PID controller** in Simulink for testing its control and dynamics
• Engineered mechanism for automated parachute deployment in a copter as a safety fallback in case of motor failure or crash

Ideaforge Technology | Computer Vision Intern — Dec 2018

• Reviewed and benchmarked multiple **SuperResolution algorithms** including deep CNN and sparse representation models
• Retrained the existing tensorflow implementation of DCSCN architecture on 200 drone images and achieved a PSNR of 31.2

COMPETITION/CONFERENCE

DRDO Robotics & Unmanned System Exposition (DRUSE), DIAT Pune — May 2018

• Secured **second position** at the National Level robotics competition organized by DRDO with 1088 nationwide entries
• Developed **heterogenous swarm** of ground and aerial robots capable of multi-storey surveillance and soldier assistance

6th Inter IIT Technology Meet, IIT Madras — Jan 2018

• Secured the **Gold Medal** in the Warehouse Inventory Check event among the 13 participating teams from different IITs
• Developed an **indoor reconaissance drone** capable of autonomous flight over a grid of colored lines drawn on the floor
• Research paper based on the novel implementention of the grid based localization stack accepted at **IEEE IRC 2019**

International Aerial Robotics Competition, Beijing — Aug 2017

• Represented institute as part of the 6 member team securing **Most Innovative Design** award among 20 teams from 7 countries
• Implemented and simulated algorithm for **vision-based landing** of a hexacopter on or in vicinity of a **mobile robotic platform**
• Designed **State Machine** for the entire software stack using **smach** library on ROS for mid-flight behaviour swtching

SKILLS AND EXPERTISE

• **Programming Languages**   : C, C++, Python, MATLAB
• **Tools and Libraries**   : Tensorflow, Darknet, OpenCV, Simulink, Docker, Git
• **Robotics and Hardware**   : ROS, Gazebo, MAVLink, rviz, Arduino
• **Undergraduate Courses**   : Deep Learning Foundations and Applications, Educational Data Analytics, Image Processing, Partial Differential Equations, Probability and Statistics, Basic Electronics
• **Massive Open Online Courses**   : Algorithms, Machine Learning, Introduction to Computer Vision, CNNs for Visual Recognition, Control of Mobile Robots, Mathematics for Computer Science

POSITIONS OF RESPONSIBILITY

Contingent Vice Captain, 7th Inter IIT Technology Meet — Dec 2018

• Led the **bronze winning** contingent of IIT Kharagpur consiting of 81 members across 11 events for participation in the meet
• Participated in **PAN IIT meetings** and discussions for deciding key rules of the meet and quality of the events being organized
• Ensured quality participation from the institute by organizing mock presentations and update meetings for all events

Governor, Technology Robotix Society — Feb 2018 - Jan 2019

• Spearheaded the official robotics group of the institute responsible for all robotics related activities on campus
• Launched the **Makerspace Lab** in the institute with free software and hardware resources for all of the student community
• Led the 3-tier team toward conduction of national level robotics events in the institute's techno-management fest, Kshitij 2019

Mentor, IEEE Workshops — Dec 2016

• Mentored a group of 40 students toward successful completion of workshop on Autonomous Robotics and Embedded Systems
• Realized the problem statement of making a Motion Imitating robot using human gestures or another bot's motion on ATMega