

AKASH KUMAR SINGH

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EDUCATION

INDIAN INSTITUTE OF TECHNOLOGY, KANPUR | B.TECH IN ELECTRICAL ENGINEERING

July 2016- April 2020 | Kanpur, Uttar Pradesh (INDIA)

CPI : 8.2/10

D.A.V. PUBLIC SCHOOL, NTS BARKAKANA, C.C.L. | AISSCE

June 2014 - March 2016 | Ramgarh, Jharkahnd (INDIA)

Result : 93.4%

D.A.V. PUBLIC SCHOOL, URIMARI | AISSE

March 2014 | Hazaribagh, Jharkahnd (INDIA)

CGPA : 10/10

WORK EXPERIENCE

AUTONOMOUS UNDERWATER VEHICLE | UNDERWATER ROBOTICS TEAM, IIT KANPUR

February 2017 – Present | Prof. Mangal Kothari

- Developed an image processing pipeline, which can enhance raw underwater images coming from the live video stream through a camera and then using color based segmentation to get essential information about objects present around the robot.
- Worked on Feature Extraction and Matching using various algorithms like SURF, SHIFT, etc. to recognize a known object in a particular scene.
- Developed Vision Processing ROS packages using OpenCV library implemented in C++, in order to perform particular tasks in Singapore AUV Challenge 2018.
- Developed a PID based controller for the vehicle to achieve a particular state and configuration for the robot.
- Designed and developed software architecture to produce intelligent behaviour by the vehicle, using actionlib provided by ROS.

TRAFFIC LIGHT DETECTION USING DEEP LEARNING | NYU-IITK RESEARCH TRACK

June 2018 – July 2018 | Prof. Yi Fang (New York University)

- The project aimed to build and design a lightweight traffic light detection model based on Deep Learning.
- Built a CNN using a real time object detection algorithm called RFCN using tensorflow object detection apis.
- Proposed model compression techniques to reduce the size of model and latency.

GOOGLE SUMMER OF CODE | ROBOCOMP

May 2018 – Aug 2018 | MENTORS: Marco A Gutiérrez and Ramon Cintas

- The project aimed to integrate Robocomp, a robotic framework, with a 3D robotic simulator, Gazebo, using zeroc-ice as a communication middleware.
- Used Gazebo plugins to provide access to different components in a simulation like sensors and actuators, and sharing the data from the simulator using ice-interfaces.
- The integration is expected to allow developers more options from the framework and provide a better simulation with a more realistic physics engine.

TIC-TAC-TOE (REINFORCEMENT LEARNING) | IIT KANPUR

November 2017 - April 2018 | Prof. Nisheeth Srivastava

- The project aimed to help an artificial agent learn to play tic-tac-toe game with the help of a reinforcement learning algorithm called Temporal Difference Learning.
- Further used the technique of representing the states by set of feature vectors to reduce the state space in order to reduce the time complexity of the algorithm used.

FRONTEND DEVELOPEMENT | NEW YORK OFFICE, IIT KANPUR

December 2016 | Prof. Manindra Agrawal

- Developed new features and improved UI/UX of a scalable web application.
- Used latest technology stacks like TypeScript in Angular 6 as well as HTML and SCSS for styling while following reactive paradigm using NgRx.

CLUB AUTOMATION | ROBOTICS WINTER CAMP

December 2016 | Robotics Club, IIT Kanpur

- Managed to count the number of people inside a room using PIR sensors so that all electric devices can be turned off in case room is empty.
- Used Arduino as a microcontroller in order to read data from sensors and perform calculations.

RESEARCH INTERESTS

Robotics • Reinforcement Learning • Computer Vision • System Controls

SKILLS

Image Processing • Computer Vision • Linux Command Line • Robotics • 3D simulation

LANGUAGES

C • C++ • Python • LATEX • HTML • CSS • Typescript • shell(BASH)

TOOLS

ROS • OpenCV • Git • SolidWorks • Arduino • Gazebo • zeroc-ice • Angular • Tensorflow • Keras • GNU octave

SCHOLASTIC ACHIEVEMENTS

Secured rank 3146 at National level in JEE Mains 2016.

Secured rank 2477 at National level in JEE Advanced 2016.

COURSES

Principles of Communication (Ongoing) • Data Structures and Algorithms (Ongoing) • Digital Electronics

Introduction to probability and Statistics • Control Systems • Introduction to Microelectronics

Signal, Systems and Networks • Essentials of Scientific Computing • Introduction to Electronics

POSITIONS OF RESPONSIBILITY

SOFTWARE TEAM HEAD | AUV-IITK, IIT KANPUR

February 2018 – Present

- Leading the software team to develop a robust software stack for a semi-autonomous underwater vehicle.
- Managing the software team to prepare for AUV competitions at Chennai and Singapore in January and March 2019 resp.

SECRETARY | ROBOTICS CLUB, IIT KANPUR

April 2017 – March 2018

- Involved in the promotion of Robotics in the campus community.
- Assisted coordinators in organizing workshops, lectures and tutorials and general upkeep of the club.