

# AKASH KUMAR SINGH

ksakash@iitk.ac.in | +91-7318019013 | Github:ksakash

## EDUCATION

### INDIAN INSTITUTE OF TECHNOLOGY, KANPUR

BT-MT, ELECTRICAL ENGINEERING

July 2016- Exp. April 2021

Kanpur, UP, INDIA

MT CPI: 6, BT CPI: 8/10

### 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

## COURSEWORK

- Analysis & representation of random signals (A\*)
- Introduction to Machine Learning (A)
- Introduction to Probability&Statistics(A)
- Convex Optimization
- Data Structures & Algorithms
- Essentials of Scientific Computing

## SKILLS

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

## LANGUAGES

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

## TOOLS

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

## ACHIEVEMENTS

- Secured rank **3146** at National level in **JEE Mains 2016**
- Secured rank **2477** at National level in **JEE Advanced 2016**
- Secured **2nd** position at **SAVe Competition, 2019**

## WORK EXPERIENCE

### MULTIMODAL SEMANTIC SEGMENTATION | RESEACH AND TECHNOLOGY CENTER (RTC), ROBERT BOSCH

May 2019 - July 2019 | MENTOR: Guruprasad M. Hegde

- The project aimed to improve the performance of semantic segmentation on 2D RGB images using data from **LiDAR point clouds** for an autonomous driving car.
- Trained **Pointnet++** network on CARLA & Apolloscape datasets and developed a framework to combine the results of a model trained on 2D RGB images and a model trained on 3D point clouds to perform semantic segmentation on a 2D RGB image.
- Implemented a **Fast LiDAR point cloud segmentation algorithm**, to get clusters in LiDAR point clouds for an autonomous driving car to infer accurate pose of objects in a scene.

### AUTONOMOUS UNDERWATER VEHICLE | AUV-IITK, IIT KANPUR

February 2017 - July 2019 | MENTOR: Prof. Mangal Kothari

- Implemented an Image Processing Algorithm (**Image Fusion**) to enhance the degraded underwater images in real time before feeding it to the perception module of the vehicle.
- Integrated **UUV Simulator**, an open source underwater simulator, to work with AUV-IITK code base.
- Designed and developed the software architecture for AUV consisting of dedicated layers for hardware integration, controls & navigation, motion planning, and perception.

### GOOGLE SUMMER OF CODE | ROBCOMP

May 2020 - Aug 2020 | MENTORS: Luis J. Manso, Esteban Martinena

- The project aimed to port the code base of a C++ library, **innermodel** (used to represent virtual environments for a simulator), to Python to make it easy for the developers to use.
- Used **PyBullet** as the rendering engine and **Numpy** to create a customized math library for the calculations in simulation.
- Added **ROS2 middleware** support to robocompds, a tool to generate boiler plate code for robotic component having different interfaces (sensor, actuators, etc.).

### GOOGLE SUMMER OF CODE | ROBCOMP

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 for robotics interfaces, corresponding to different sensors and actuators, to communicate with the Gazebo simulator.
- The integration is expected to allow developers more options from the framework and provide a better simulation with a more realistic physics engine.

## PUBLICATIONS

### MULTI-MODAL SEMANTIC SEGMENTATION USING SYNTHETIC DATA | RTC, ROBERT BOSCH

May 2018 - July 2018 | Kartik Srivastava, Akash K. Singh, Guruprasad M. Hegde

- Presented in a workshop on Deep Learning for Automated Driving: Beyond Perception (DLAD-BP 2019), IEEE International Conference on Intelligent Transportation Systems 2019 (ITSC '19). [arxiv]