# AKASH KUMAR SINGH

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## EDUCATION

### INDIAN INSTITITE 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.

### BELLMAN OPTIMALS VS HUMANS | IIT KANPUR
Aug 2018 - Nov 2018| Prof. Nisheeth Srivastava
- The central idea was to compare human path-finding in a stochastic two-dimensional grid world with the **Bellman-optimal** solution found via value iteration, across various factors.
- Developed a **graphical user interface** to collect data via experiment conduction on how humans choose an ideal path based on intuition.
- Analyzed the data collected to calculate the **cognitive bias** people have, along with different measures.

### TRAFFIC LIGHT DETECTION | NYU-IITK, RESEARCH TRACK
June 2018 – July 2018 | Prof. Yi Fang (New York University)
- The project aims to explore the possibilities of developing a **lightweight traffic light detection model** based on Deep Learning, using various model compression techniques.
- Explored various techniques of reducing the size of neural networks without any significant decrease in accuracy.
- Implemented a **RFCN** network using tensorflow object detection APIs.

## 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]