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: 8.8, BT CPI: 7.8

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 | Robocomp
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 robocompdsl, a tool to generate boiler plate code for robotic component having different interfaces (sensor, actuators, etc.).

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 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]