

Akash Kumar Singh

FINAL YEAR UNDERGRAD · INDIAN INSTITUTE OF TECHNOLOGY KANPUR

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Education

- 2021 **Indian Institute of Technology Kanpur**, BT-MT, Electrical Engineering | MT CPI: 8.8, BT CPI: 7.8 *Kanpur, India*
- 2016 **D.A.V. Public School, NTS Barkakana, C.C.L.**, CBSE, class 12th | Result: 93.4% *Ramgarh, India*
- 2014 **D.A.V. Public School, Urimari**, CBSE, class 10th | Result: 10 CGPA *Hazaribagh, India*

Work Experience

Google Summer of Code, RoboComp

IITK, Kanpur, India

SOFTWARE DEVELOPER | MENTORS: LUIS J. MANSO, ESTEBAN MARTINENA AND RAMON CINTAS

June - Aug 2020

- The project aimed to port the code 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 **robocompds1**, a tool to generate boiler plate code for robotic component having different interfaces (sensor, actuators, etc.).

Google Summer of Code, RoboComp

IITK, Kanpur, India

SOFTWARE DEVELOPER | MENTORS: MARCO A GUTIÉRREZ AND RAMON CINTAS

May - Aug 2018

- 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.

Research and Technology Center (RTC), Robert Bosch

Bangalore, India

RESEARCH INTERN | MENTOR: GURUPRASAD M. HEGDE

May - July 2019

- 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.

New York Office, IIT Kanpur

IITK, Kanpur, India

FRONT END DEVELOPER | TEAM LEAD: PROF. MANINDRA AGARWAL

May - July 2018

- Worked as a front end developer to develop new features and improve **UI/UX** of a scalable web application.
- Used latest technology stacks like TypeScript in Angular 6 as well as HTML and SCSS for styling.

Projects Undertaken

Bellman optimals vs human optimals

IIT Kanpur

GUIDE: PROF. NISHEETH SRIVASTAVA

Aug - Nov 2018

- The central idea was to **compare human path-finding** with the **Bellman-optimal solution** found via value iteration, across various factors, in a stochastic two-dimensional grid world.
- Developed a **Graphical User Interface** to collect data via experiment on how humans choose an ideal path based on intuition and, analyzed the data collected to calculate the cognitive bias people have, along with different measures.
- Analyzed the data collected to calculate the cognitive bias people have, along with different measures.

AUV-IITK, IIT Kanpur

IIT Kanpur

AUTONOMOUS UNDERWATER VEHICLE | MENTOR: PROF. MANGAL KOTHARI

Feb - July 2019

- 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 using libraries such as **ROS, OpenCV & Gazebo**.

Skills

Languages C, C++, JavaScript, Python, HTML, CSS, BASH, AWK, Verilog, Matlab/Octave, TypeScript

Utilities ROS, OpenCV, Git, SolidWorks, Arduino, Gazebo, PyTorch, Angular, Tensorflow, Keras, GNU octave, Matlab, PyBullet, LaTeX

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

Relevant Coursework

Representation and Analysis of Random Signals (A*), Introduction to Machine Learning (A), Convex Optimization, Probability & Statistics (A), Data Structures & Algorithms, Essentials of Scientific Computing, Cyber Security of critical infrastructure, Principles of Communication System, Robot Manipulators: Dynamics and Controls, Formal Methods for Robotics and Automation