



AARJAN BUDATHOKI

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WORK EXPERIENCE

ADAS Perception Intern

Dec 2024 - Mar 2025

LogicTronix [FPGA Design & Machine Learning Company]

Lalitpur, Nepal

- Developed robust pipelines for data acquisition & visualization of Velodyne 3D LiDAR sensor data using the Point Cloud Library (PCL).
- Annotated custom 3D point cloud datasets using 3D bounding box labeling tools(Latte).
- Implemented voxel grid down-sampling algorithms to optimized point cloud density for computationally efficient processing.
- Implemented RANSAC-based ground plane segmentation in C++ to effectively isolate dynamic objects such as pedestrians and vehicles from static ground surfaces.
- Implemented DBSCAN clustering algorithm in C++ for object detection and classification, targeting pedestrians, vehicles and traffic objects.
- Developed and optimized Kd-Tree data structure from scratch in C++ to accelerate nearest-neighbor search operations on large-scale point clouds.

Electronics Hardware Intern

Nov 2023 – Feb 2024

Abhiyan Engineering Nepal Pvt. Ltd.

Lalitpur, Nepal

- Contributed to hardware system development for the Automatic Sand Level Measurement Embedded System (PSLM Device), focusing on sensor integration, circuit design, and system prototyping.

Work Student

Aug 2022 – Sep 2023

Robotics Club, IOE Pulchowk Campus

Lalitpur, Nepal

- Implemented kinematics modeling and odometry of four omniwheeled motion robot.
- Implemented PID controllers for position and velocity tuning of brushed and brushless DC motors.
- Design & Fabrication of main controller board of the R2 BOT and power supply of bots in ABU ROBOCON 2022.
- Acquired proficiency in OpenCV, applying fundamental image processing techniques (thresholding, geometric transformations, filtering) and advanced computer vision (object detection, feature matching, video analysis).

PROJECTS

Greenhouse Management using AWS IoT and Yocto Embedded Linux

2025

Major Project, Tribhuvan University

- Embedded Linux: Developed an Embedded Linux OS for Raspberry Pi 4 (64-bit) using Yocto Project, featuring tools like git, python3, opkg, connman, mosquito, and systemctl. Enabled UART, modifiable root filesystem, and WIC image support for deployment.

Self-Driving Car

Mar 2024

Minor Project, Tribhuvan University

- Integrated `ros2_control` for precise control of car with ackermann wheel steering.
- Implemented SLAM algorithms to generate accurate Lidar-based maps of static environments.
- Incorporated `nav2` stack for autonomous navigation and real-time path planning.
- Real-time object detection using a YOLOv8 model on live camera.
- Transformed and projected 2d lidar scan onto the camera image and its visualization.

Elephant and Rabbit Robot

Aug 2023

ABU Robocon 2023 (Cambodia), Robotics Club Pulchowk Campus

- Used the scikit-learn framework DBSCAN clustering algorithm and Nearest Neighbors library for detecting field poles using 2D LiDAR point cloud data to accurately identify and localize the nearest pole within the game environment.

R1 and R2 Robot

Aug 2022

ABU Robocon 2022 (India), Robotics Club Pulchowk Campus

Maze Generation and Solving Algorithm

Feb 2023

Data Structures and Algorithms Project, 4th Semester

- * Implemented Depth-First Search (DFS) algorithm for procedural maze generation.
- * Applied shortest pathfinding algorithms, including Dijkstra's Algorithm and A* Search, for efficient maze solving.

Self-Balancing Robot

Jul 2022

Instrumentation Project 3rd Semester

- * Implemented PID Control for Angle Equilibrium using IMU.

AI/ML RELATED PROJECTS

Artificial Neural Network(ANN) for Multi-Image Classification (Fashion MNIST)

Developed an ANN for Fashion MNIST multi-image classification using TensorFlow Keras, with dense and dropout layers, and softmax activation. Trained and evaluated the model using scikit-learn metrics.

Traffic Sign Detection using CNN

Preprocessed a labeled traffic sign dataset by resizing, normalizing, and augmenting images to improve model robustness. Built and trained a CNN model using tensorflow and keras, for accurate classification and detection of traffic signs.

End to End Learning for Self Driving Cars in Udacity Simulator

Designed and trained an Nvidia CNN model using TensorFlow for behavior cloning in a self-driving car simulator. Improved model robustness through data augmentation techniques, including image flipping, brightness adjustment, and translation.

Tic Tac Toe game using Minimax Algorithm & Alpha Beta Pruning

Tic Tac Toe game where a human player competes against an AI opponent. The AI employs the Minimax algorithm, performing recursive computations to determine its optimal move.

EDUCATION

Bachelor in Electronics, Communication and Information Engineering

Tribhuvan University, Institute of Engineering, Pulchowk Campus

Apr 2021 – Present

Lalitpur, Nepal

High School

Hetauda School of Management and Social Sciences

Jun 2018 – Dec 2020

Hetauda, Nepal

HONORS AND AWARDS

Mabuchi Motor Award

ABU Robocon 2023, Asia-Pacific Robotics Competition, held in Cambodia

Aug 2023

2nd Runner Up

ABU Robocon 2022, Asia-Pacific Robotics Competition, held in India

Aug 2022

Nagase Award

ABU Robocon 2022, Asia-Pacific Robotics Competition, held in India

Aug 2022

Dronacharya Title Winner

LOCUS 2024

Jan 2024

TEACHING EXPERIENCE

Hardware Fellowship 2024

Robotics Club & Locus 2025, 8 Days Workshop

Jul 2024

IOE, Pulchowk Campus

Robo Line Dash

Locus 2024, 2 Days Workshop

Jan 2024

IOE, Pulchowk Campus

COMMUNITY INVOLVEMENT

Robotics Club, Pulchowk Campus

Participation in ABU Robocon 2023

Apr 2022 – Present

Lalitpur, Nepal

IEEE Student, Pulchowk Campus

General Member

Jan 2024 – Present

Lalitpur, Nepal

LOCUS 2025, Pulchowk Campus

Executive Committee Member(Hardware Coordinator)

Jun 2024 – Present

Lalitpur, Nepal

SKILLS

Programming Languages: C++, Python

Robotics Frameworks: ROS 2 (ros2_control, SLAM, nav2_stack)

Tools: YOLOv8, OpenCV, Latte(3D Annotation Tool), PCL

Hardware: Arduino, STM32, Velodyne VLP-16 3D LiDAR

Software: Kicad, Altium, STM32CubeIDE, STM32CubeMX, VeloView