

NITESH SUBEDI

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EDUCATION

Institute of Engineering, Tribhuvan University, Nepal
Bachelor's Degree in Mechanical Engineering

August 2017 - April 2022

EXPERIENCE

R&D Engineer, North Star Developer's Village (NSDeVil)

December 2021- ongoing

- Leading a team of 5 individuals working on autonomous navigation of wheeled robots in a classroom environment interacting with humans.
- Working on creating a custom Visual SLAM algorithm for unknown outdoor environment navigation, especially in the University.

Suspension Design Team Member, Microlab Innovations

April 2020- March 2021

- Experienced the procedure for Computer Aided Engineering (CAE), FEA of the swing arm with a maximum speed of 150 Km/hr.
- Collaborated with the chassis design team to evaluate the Dynamics in Control for Active Suspension System.

Mechanical Engineering Internship, E-Bolt Tech Pvt. Ltd

April 2021- May 2021

- Analysis of 2 wheeler suspension system was done. Collaborated with Electrical Department for the swing arm and suspension position.
- Model-based simulation of the motorbike in Python and simulation of tire road interaction in ADAMS-MATLAB co-simulation.
- Experienced the process of the vibration control system collaborating with the experiment department.

Mechanical Engineering Internship, Mantra Incorporation

June 2019- July 2019

- Had a firsthand experience with the Computer Aided Engineering (CAE) modeling and analysis process for sand screening equipment.

PROJECTS

Optimal Trajectory Generation For Autonomous Navigation Of Wheeled Robots

Institute of Engineering, Tribhuvan University

April 2021 - March 2022

- Final year project for the completion of bachelor's degree in Mechanical Engineering.
- MPC based path planning
- 360 degrees LiDAR used for obstacle detection
- ROS as main working architecture with embedded systems like Arduino and Raspberry Pi

Robots for ABU ROBOCON

Robotics Club, Institute of Engineering, Tribhuvan University

2018 - 2021

- In a lab facility provided by the university, I mentored for ABURobocon 2021 in China and oversaw a team of 21 undergraduate students for the mechanical design and control team for ABU Robocon 2020, Fiji. I also worked as a student team member for ABU-Robocon 2019, Mongolia, and ABU-Robocon 2018, Vietnam.
- Executed control of kicking mechanism mimicking the human leg using pneumatics to kick rugby ball to 12 m distance, four-legged walking mechanism, and ball shooting mechanism using the rollers.
- Autonomous path planning using MPC and ROS framework.

MPC based Optimal Control of Quadcopter and Segway

Personal Project

May 2022 - ongoing

- Autonomous Control of Quadcopter with custom flight planner and controller
- Autonomous Navigation and control with self-balancing of Segway

Design of full navigation stack based on MPC in ROS 2

Personal Project

March 2023 - ongoing

- A full navigation stack with a custom global planner and MPC-based local planner written in Python with NUMBA acceleration.
- CasADi framework with IPOPT solver used for the path optimization with fully customizable parameters.
- Design of local planner as controller plugin for Controller Server in ROS 2 written in C++.

Design and implementation of person reidentification using YOLO, DeepSort and OpenCV

Personal Project

May 2023 - ongoing

- Designing a full pipeline to select a person to follow, follow the person in dynamic environment and re-identify even if person goes out of frame autonomously.
- Navigation using own navigation stack and with goal location from the tracking and reidentification pipeline.

Design and implementation of autonomous environment exploration algorithm

Personal Project

Nov 2022 - ongoing

- Custom frontier exploration algorithm for autonomous map creation in an unknown environment for ROS 2 written in Python with NUMBA acceleration.
- Gives the goal location to the global planner based on frontiers position, density, and clusters of the map generated by the exploration algorithm.

Modified and maintaining a python package, [ros2numpy](#), and [roslibpy2numpy](#)

Personal Project

January 2023 - ongoing

- Forked the project([ros2numpy](#)), used for converting ros2 messages to numpy and vice versa, and made it a customized Python package with optimized methods and faster execution.
- Creating a standalone Python package([roslibpy2numpy](#)) for converting the roslibpy messages to numpy and vice versa.

ACHIEVEMENTS

- **Winner, Model-Based Design in Matlab/Simulink in DELTA 2.0**, IOE Purwanchal Campus
- **2nd runner up**, ABU Robocon 2022
- **2nd runner up**, Hult Prize National 2019
- **Best Shuttlecock Award**, ABU Robocon 2018
- **Rohm Award**, ABU Robocon 2019
- **Tokyo Electron Award**, ABU Robocon 2020

SKILLS

Programming Languages and Frameworks

Python, C, C++, ROS&ROS2, SQL, Solidworks, ADAMS, MATLAB&Simulink, Javascript, Containerization

Languages

Nepali, English, Hindi

CONFERENCE PAPERS(ACCEPTED)

N. Subedi, P. Koirala, A. Kharel, A. Acharya, M.C. Luintel, and S.Maharjan, "MPC-based trajectory generation for wheeled robot navigation", VETOMAC, 2022

N. Subedi, P. Koirala, and M.C. Luintel, "Design, modeling, and control of active hydraulic suspension system for vehicles", VETOMAC, 2022

N. Subedi, A.Pandey, T.Bhusal and M.C. Luintel, "Study of motorcycle rear suspension behavior with length of swing arm and its inclination angle", VETOMAC, 2022.

PUBLICATIONS

N. Adhikari, A. Pandey, A. Subedi, and **N. Subedi**, "Design of pelton turbine and bucket surface using non-uniform rational basis spline and its analysis with computational fluid dynamics", Journal of the Institute of Engineering, vol. 16, no. 1, pp. 41–50,2021

VOLUNTEERING EXPERIENCE

Workshop on Science and Robotics

Godawari Secondary School, Lalitpur

February 2020 - March 2020

- Mentor of one month workshop on science and basic robotics for Grade 8, 9, 10 students, conducted by Robotics Club, Pulchowk campus, Institute of Engineering.

One Month Basic Solidworks Training

SOMAES & Robotics Club

2019, 2020, 2021

- Mentor of a month-long solidworks training in years 2019, 2020, and 2021 conducted by SOMAES and Robotics Club, Pulchowk Campus.

Treasurer and Member

IEEE Pulchowk Student Branch and IEEE Robotics

2020 - 2021

- Member in 2020 and promoted to treasurer in 2021

Mentor

Robotics Club, Pulchowk Campus

2021 - ongoing

- Mentoring for building robots participating in ABU ROBOCON representing Nepal every year.

CERTIFICATIONS

Automotive Suspension and Chassis System Design and Engineering Fundamentals - RACE Software

Hexagon — MSC Software Indo-Pacific User Conference 2021 Attendance - MSC Software

Python Specialization - Coursera