Aayush Dulal

Email : aayushdulal90@gmail.com
Linkedin: linkedin.com/in/aayush-dulal
Mobile : +977 9860478871
Github: https://github.com/aayushdD ?tab=repositories
Personal Website: https://aayushdulal.com.np/

Education

- **Tribhuvan University, Institute of Engineering, Thapathali Campus** Thapathali, Kathmandu
  Bachelors in Mechanical Engineering; Agg Percentage: 75.47 *2017 -2022*
  - **Coursework**: Control systems, Electric Machines, Manufacturing Technology, Theory of Machine, Mechanism and Vibration, Finite Element Analysis, System Design and Simulation, Operational Research and Management, Basic Electronics Engineering, Basic Electrical Engineering
  - **Thesis**: Comparative analysis of fuzzy logic controller and PID controller for trajectory control.
    - **Research:**: Focus on studying the affects of including motor acceleration as an input variable of fuzzy logic controller deployed in trajectory control of robot manipulator in the presence of disturbances and noise.

Research Experience

- **Research Assistant**
  Supervisor - Dr Khem Gyanwali *2022 - Current*
  - **EV charging station placement in kathmandu**: Working on performing linear programming in python to optimize cost, battery size, number of buses and charging stations placement in kathmandu. The linear programming and optimization done on python.
  - **Results**: Optimization of EV charging station for Kathmandu with a static energy loss function.

- **Research lead**
  Supervisor - Subodh Kumar Ghimire *2021 - 2022*
  - **Comparison of FLC and PID controller for trajectory control of multi DOF robot manipulator**: Worked on designing fuzzy logic controller, PID controller and simulation in MATLAB environment. Studied inclusion of acceleration as an input variable in fuzzy logic controller. Solid modeling and Simulation using python and Robot operating system.
  - **Results**:
    - : FLC with acceleration outperforms FLC without acceleration.
    - : The improvement from acceleration addition is more noticeable when simulated with disturbances.

- **Team lead**
  Shireto- Autonomous Division *2021 - 2022*
  - **Electric vehicle startup at Thapathali Campus**: Led a team of fellow undergraduates in research and development of autonomous systems for electric vehicle. Team studied applications of AI and computer vision in development of autonomous ground vehicles. Participated in several competitions organised by Shell.

Research Interests

- Linear and Non-Linear Control, Fuzzy Logic.
- Machine Learning, Artificial Intelligence, Computer Vision.
- Dynamic Systems and Optimization.
- Robotics and Autonomous systems.

Publications

- **XXII Vibration Engineering and Technology of Machinery Conference; VETOMAC 2022**
  Comparative analysis of FLC and PID controllers for trajectory control *Under peer-review*

- **EV charging station optimization for Kathmandu valley**
  Unpublished manuscript *Currently working*

Professional Experience

- **Junior Design Engineer**
  Darshan Engineering Consultancy *Oct 2019- Jun 2020*
  - **Upper Myagdi Hydropower Project**: Solid modeling and drafting of hydropower system components. Assisted Senior design engineers in domestic and commercial systems drafting and drawing.
- **Mechanical Design Intern**
  Darshan Engineering Consultancy *Jul 2019- Sep 2019*
  - **Mechanical Design**: Drafting and mechanical design of hydropower components
- **Maintenance Engineer Internship**
  Nepal Government Road and Transportation division *Sep 2020- Oct 2020*
  - **Achievements**: Completely reinstalled cat D11 engine.

Skills Summary

- **Languages**: C++, Python, C, MATLAB
- **Softwares**: Ansys,Solidworks,Openfoam,ROS,MS-office,AutoCad, Fusion 360
- **Tools**: Docker,GIT, Tensorflow, Keras, Hugging Face, LaTeX

Academic Projects

- **Boogie Rocker**: Designed and fabricated a mobile robot specializing in mobility on difficult terrain. This project won second place in annual robotics competition organized by Robotics and Automation Centre, Thapathali Campus
- **Lathe machine power transmission design**: Designed and drafted a power transmission mechanism for Lathe machine
- **Binary gender classifier**: Developed a binary gender classifier based on deep learning using python and tensorflow. This software localizes the faces in a frame and successfully classifies the binary gender of the individual.
- **Ancient Painting Generation using GAN**: Built a Generative Adversarial Network deep learning model to generate paintings of ancient theme
- **PV-Array design**: Designed and calculated PV solar panel for domestic and commercial applications
- **Trajectory control of autonomous vehicle**: Autonomous division of team SHIRETO participated in shell eco marathon's annual virtual event and participated in a coding competition for trajectory control of the vehicle
- **PID and Fuzzy logic controller Design**: For a three DOF robot manipulator, A PID controller and Fuzzy Logic controller was designed. These two controllers were simulated for studying trajectory control of the manipulator. The simulation was performed on SIMULINK and MATLAB
- **Machine Translation**: Deep learning model to translate German to English using transformer
- **Fifa 19- Data analysis**: Data analysis of Fifa-19 player stats
- **Settling basin**: Solid modeling of settling basin using fusion 360

Certifications and Training

- Registered Mechanical Engineer in Nepal
- Deep learning specialization
- Boiler training on industrial maintenance
- Convolutional Neural Networks using Tensorflow
- Natural language Processing using Tensorflow
- Ansys Training
- MATLAB Simscape Training

Honors and Awards

- Finalist in HULT PRIZE 2022 ON campus event
- College Representative for Thapathali Campus in HULT PRIZE 2022
- Second Place in annual robotics competition at Thapathali Campus

Volunteering and Community

- Volunteer in IOE Graduate conference
- Volunteer for Intra-College Football tournament