Aasman Bashyal

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EDUCATION

Pulchowk Campus, Institute of Engineering, Tribhuvan University Nov 2017 – Apr 2022
Bachelor of Electronics and Communication Engineering *Lalitpur, Nepal*

- **Relevant Courses**: Probability and Statistics | Discrete Structure | C Programming | Object-Oriented Programming in C++ | Numerical Method | Computer Organization and Architecture | Control System | Computer Graphics | Calculus I | Calculus II | Computer Networks | Database Management Systems | Microprocessors | Digital Signal Processing | Digital Communication | Signal Analysis | Filter Design | Advanced Electronics | Enterprise Computing | Wireless Communication | RF and Microwave Engineering

RESEARCH EXPERIENCE

Angelswing Jul 2022 – Present
Research Engineer (Computer Vision) *Seoul, Korea*

- Implemented a Modified Segment Anything Model to facilitate real-time user interaction (50ms to 200ms latency) for segmenting large TIFF images, generating precise polygon masks, and improving the efficiency and accuracy of polygon drawing tools.
- Design and implement architecture for a Minimum Viable Product (MVP) capable of editing 3D terrain models. Optimized performance to achieve real-time responsiveness (1s to 3s latency), enhancing user engagement and design versatility.
- Developed the Snapping feature for a Computer-Aided Design (CAD) overlay, enhancing the precision and efficiency of the product's measurement tools.
- Led a feasibility study on 3D reconstruction of indoor scenes, employing Neural Radiance Fields (NeRF) and Structure from Motion (SfM) techniques

NEAR Aerospace Sep 2021 – Jan 2022
Research Engineer (Embedded Systems) *Lalitpur, Nepal*

- Designed and programmed an embedded ignition system for an amateur rocket base station, utilizing an Arduino with RF communication for remote signal transmission and ignition control.
- Developed a data logger based on ESP32, equipped with a dual-memory system (flash and SD card) for redundancy. The logger records vital telemetry, including accelerometer and gyroscope data from an IMU and barometric pressure readings for altitude, ensuring detailed analysis of flight dynamics.

KIAS Apr 2021 – Sep 2021
Research Engineer Intern *Lalitpur, Nepal*

- Led a team of four in the comprehensive design and development of a portable weather station with a focus on sustainability and real-time data analysis.
- Spearheaded the embedded system design, employing an ESP32 as the client, which harnessed solar power and was equipped with a suite of sensors: a BME280 for pressure, temperature, and humidity readings; a DS18B20 digital thermal probe for precise temperature data; as well as an anemometer, wind vane, and a high-resolution tipping bucket rain gauge for detailed meteorological data.
- Implemented a Kalman filter algorithm on the client side to refine sensor data, enhancing accuracy and reliability.
- On the server side, configured a Raspberry Pi to serve as a robust MQTT receiver, interfacing with Node-RED for data flow management.
- Engineered the backend to store data in a time-series InfluxDB, and utilized Grafana for dynamic data visualization, allowing for comprehensive weather analysis and reporting.

Pulchowk Campus, IOE, T.U. Nov 2017 – Oct 2021
Navigation and embedded Design Team Member *Lalitpur, Nepal*

- Led the team of 21 undergraduate students as head of the embedded and navigation team for ABU Robocon 2020, Fiji, and worked as a student team member for ABU- Robocon 2019, Mongolia, and ABU- Robocon 2018, Vietnam, and mentoring for ABU Robocon 2021, China in lab facility arranged by the University.
- Led the development of the semi-autonomous navigation system for a four-wheel omni-drive robot, overseeing the integration of LiDAR, encoders, and IMU sensors.
- Engineered multiple custom boards, including a motor driver, Arduino Mega, and STM32-based development board, each tailored to project specifications for seamless integration. Designed additional boards for specific functions, such as Schmitt trigger, pneumatic control, etc.

PROJECTS

Automatic Modulation Classifier | *Major project*   **2021 − 2022**
- Worked under Prof. Dr. Shashidhar Ram Joshi to explore various deep learning methods for classifying modulation types of a signal.
- Different neural network architectures were used. This includes a combination of a modified Convolutional Neural Network (ConvNet), and Long Short-Term Memory (LSTM) units enhanced by an attention layer, Bidirectional Long Short-Term Memory (Bi-LSTM). Additionally, CNN-LSTM architecture for efficient and comprehensive feature extraction.
- Conducted experiments using Quantum Neural Networks (QNN) for the classification of BPSK and QPSK modulated signals, exploring the intersection of quantum computing and signal processing.
- Conducted a study on existing likelihood-based classifiers.

Simultaneous Localization and Mapping | *Junior Year Minor Project*   **2020**
- Studied various algorithms and approaches used in solving the SLAM problem.
- Developed a ROS package based on Breezy SLAM, enabling a LIDAR-based mobile robot to map unknown environments and determine their location within them.

Smart Baby Cot | *Junior Year Instrumentation Project* | *Team Lead*   **2019**
- Engineered a Smart Baby Cot, integrating cry detection, wet bed sensing, and automatic rocking features. This project garnered the SDG Health Category award at LOCUS 2020, highlighting its contribution to infant care.
- Developed and implemented a Convolutional Neural Network (CNN) model to analyze baby cry audio signals. Successfully transformed these signals into spectrograms and Mel-frequency cepstral coefficients (MFCCs) for precise pattern recognition using CNN.

Baag Chal and Bouncy Ball | *Junior Year C++ and C Projects* | *Team Lead*   **2018 − 2019**
- Developed two games: 'Baag Chal' in C++, demonstrating object-oriented programming skills, and 'Bouncy Ball' in C, showcasing proficiency in fundamental C programming.

Visual Light Communication System | *LOCUS 2018 Project* | *Team Lead*   **2018**
- Engineered a Visual Light Communication (VLC) system for audio transmission, incorporating an audio-responsive LED transmitter circuit with an amplifier.
- Designed a solar panel receiver with an amplifier to extract audio from light signals for playback.

LEADERSHIP AND TEACHING EXPERIENCE

IEEE Pulchowk Student Branch (2020-2021):

- As President (2021), led various technical and professional development initiatives, successfully launching 4 major technical workshops.
- As Membership Committee Chair (2020), spearheaded efforts that increased membership by 40

Mentoring at Robotics Club:

- Guided the team for ABU Robocon 2022, focusing on innovative design and teamwork.
- Mentored the team for ABU Robocon 2021, achieving second runner-up position.

Lead Instructor and Course Designer, Hardware Fellowship (2020 & 2021):

- Engineered and delivered specialized hardware curriculum for first and second-year students.
- Fostered practical learning by collaborating with Locus and representing the Robotics Club.

Instructor, Hardware Fellowship (2019):

- Taught foundational hardware technology concepts with a focus on real-world applications.
- Involved in curriculum development and student assessment strategies.

Robotics Camp Instructor, Junior School GRS (2-week Program):

- Designed and led a robotics camp, introducing young students to robotics and STEM.
- Created engaging and interactive learning experiences.

Training:

- Participated in "Mentor Training to Foster Logical and Creative Thinking Using ICT in Basic Education" by Masatoshi Suzuki, Japan.
- Represented IOE, enhancing skills in ICT integration in education.

AWARDS AND SCHOLARSHIP

Tokyo Electron Award: For outstanding performance and innovative robotic design in ABU ROBOCON 2020, Suva, Fiji.

ROHM Award: Awarded at ABU ROBOCON 2019, Ulaanbaatar, Mongolia for excellence in technical innovation in circuit design.

Best Shuttlecock Award: Recognized for developing an innovative Shuttlecock throwing mechanism at ABU ROBOCON 2018, Ninh-Binh, Vietnam.

Winner: In the SDG Health Category at LOCUS 2020 for a project contributing to infant care.

Second Position: In the Inter-college Soldering Competition.

Mahatma Gandhi Scholarship: Awarded by the Indian Embassy for academic excellence in high school.

SKILLS

Programming Languages: Python, C/C++, JavaScript, Matlab, SQL

Machine Learning and Data Analysis: Proficient in Numpy, Scikit-learn, TensorFlow, Keras, PyTorch, Matplotlib, OpenCV, Pandas, SciPy

Cloud and DevOps: Experienced with AWS (EC2, S3), Docker, GIT, Grafana, InfluxDB

GIS and Mapping Tools: Skilled in QGIS, GDAL, GeoServer, OpenLayer, with practical project experience

Database Technologies: Proficient in PostgreSQL

Embedded Systems and Simulation: Experienced with Embedded C, KiCad, Proteus, MATLAB, STM32CubeMX, Keil Microvision, Arduino, Raspberry Pi

Scripting and Other Tools: Proficient in Node-Red, Bash-script, LaTeX

Additional Skills: Competent in Inkscape, Microsoft Office, Canva, MS Teams, Slack, Jira