Aasman Bashyal

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EDUCATION

Pulchowk Campus, IOE, Tribhuvan University *Nov 2017 – Apr 2022*

Bachelor of Electronics and Communication Engineering *Lalitpur, Nepal*

RESEARCH EXPERIENCE

Angelswing Inc. *Jun 2022 – Present*

Research & AI Architect *Remote*

- Researching and developing a multimodal hazard detection system for drone imagery, combining RT-DETR with Vision LLMs alongside an agent-based verification framework using LLM-as-a-judge validation.
- Engineered a 360° panorama sky inpainting pipeline using LaMa, optimizing the zenith transformation algorithm to reduce 8K image processing time by 92% (from 5s to 400ms).
- Developed a 360° indoor navigation system using Visual SLAM based on stella_vslam to generate keyframes and trajectories from 360° timelapse videos. Integrated You Only Look Once (YOLO) based face detection to automatically blur workers and camera operators in equirectangular images for privacy protection.
- Researched 3D indoor scene reconstruction using Neural Radiance Fields (NeRF), Gaussian Splatting, and Structure from Motion (SfM) techniques.
- Shipped Auto Polygon for measuring stockpiles on drone maps. Converted MobileSAM (Segment Anything) to LiteRT with 16-bit decoder weights. A cached correction took 0.94 s in a WebAssembly benchmark.
- Created architecture for 3D terrain model editing MVP, optimizing performance to achieve 1-3 second response time.
- Developed a snapping feature for Computer-Aided Design (CAD) overlay, improving the precision of measurement tools.

KIAS *Apr 2021 – Sep 2021*

Research Engineer Intern *Lalitpur, Nepal*

- Designed portable solar-powered ESP32 weather station for real-time data collection.
- Integrated sensors for meteorological data, enhancing accuracy with Kalman filtering.
- Applied XGBoost and RandomForest models for weather forecasting.

Pulchowk Campus, IOE, T.U. *Nov 2017 – Oct 2021*

Robotics Engineer *Lalitpur, Nepal*

- Led 21-member embedded and robot navigation team for ABU Robocon 2020, Fiji, and worked as a student team member for ABU- Robocon 2019, Mongolia, and ABU- Robocon 2018, Vietnam.
- Developed semi-autonomous navigation system for a four-wheel omni-drive robot, overseeing the integration of LiDAR, encoders, and IMU sensors.
- Engineered custom boards including motor drivers, and STM32-based development boards. Created additional function-specific boards (e.g., Schmitt trigger, pneumatic control).

PROJECTS

Automatic Modulation Classifier | *Major project* *2021 – 2022*

- Explored deep-learning techniques, focusing on Convolutional Neural Networks (ConvNets) and Long Short-Term Memory (LSTM) models for signal modulation classification.
- Engineered a hybrid CNN-BiLSTM network with an attention mechanism, achieving an impressive 82% accuracy in classifying signals with SNR from -6 to 18.
- Experimented with Quantum Neural Networks (QNN) for BPSK and QPSK signal classification.

Simultaneous Localization and Mapping | *Junior Year Minor Project* *2020*

- Created a ROS package for LIDAR-based SLAM, enabling mobile robots to map and locate themselves in unknown environments.

Smart Baby Cot | *Junior Year Instrumentation Project* | *Team Lead* *2019*

- Led the development of a Smart Baby Cot with cry detection, wet bed sensing, and automatic rocking; won the SDG Health Category award at LOCUS 2020.
- Implemented a CNN model for baby cry pattern recognition using spectrograms.

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.

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 head of the Membership Committee in 2020, Organized efforts that grew our membership by 40%.

Mentoring at Robotics Club *2021 – 2022*

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

Lead Instructor and Course Designer *2020 – 2021*

- Launched and delivered specialized hardware curriculum for first and second-year students.
- Fostered practical learning by collaborating with Locus and representing the Robotics Club.
- Led engaging, interactive classes for primary students at Junior School GRS over 2 weeks.

Mentor Training *2018*

- Represented IOE as participant, in "Mentor Training to Foster Logical and Creative Thinking Using ICT in Basic Education" by Masatoshi Suzuki, Japan.

AWARDS AND SCHOLARSHIP

Tokyo Electron Award (2020): Outstanding robotic design, ABU ROBOCON, Fiji.

ROHM Award (2019): Technical innovation in circuit design, ABU ROBOCON, Mongolia.

Best Shuttlecock Award (2018): Innovative mechanism design, ABU ROBOCON, Vietnam.

Winner, SDG Health Category (LOCUS 2019): For a project contributing to infant care.

Second Position, Inter-college Soldering Competition: Demonstrated exceptional skills in soldering.

Mahatma Gandhi Scholarship: Received from the Indian Embassy for academic excellence in high school.

SKILLS

Programming Languages: Python, C, C++, MATLAB, Golang, SQL, HTML, CSS

Frameworks: PyTorch, TensorFlow, OpenCV, Numpy, Scikit-learn, FastApi, MLFlow, Agent Development Kit

Tools & Database: AWS (EC2, S3, Lambda, RDS), Docker, GIT, PostgreSQL, Kubeflow, Grafana

GIS & Embedded Systems: QGIS, GDAL, Embedded C, KiCad, Proteus, STM32CubeMX, Keil Microvision, Arduino, ROS, Raspberry Pi

Additional: Node-Red, LaTeX, Inkscape, Microsoft Office, Canva, MS Teams, Slack, Jira