# PRANAV JOSHI

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## Research Orientation

Seeking post-graduate academic research positions, aiming to contribute to stimulating, innovative research at the intersection of embedded systems development and intelligent edge devices, leveraging my relevant experience with hardware acceleration, image processing and firmware development for embedded platforms.
**Test Scores: TOEFL - 117 (28R, 30L, 29S, 30W) | GRE - 330 (170Q, 160V, 4.5AWA)**

## Education

- **Pulchowk Campus, Institute of Engineering, Tribhuvan University** *April 2021 - April 2025*
  *Bachelors in Engineering - Electronics, Communication and Information*
  ◦ Grade: Distinction | Aggregate: 81.24% **(Top 10%)**
- **Saint Xavier's College, Maitighar** *June 2018 - May 2020*
  *High School - Plus Two in Science*
  ◦ Grade: A+ | GPA: 3.79/4 **(Top 10%)**
- **Nobel Academy Higher Secondary School** *April 2018*
  *Secondary Education*
  ◦ Grade: A+ | GPA: 3.95/4 **(School Topper)**

## Experience

- **Firmware Programmer** *On-Site, Full-Time*
  *Real Time Solutions Pvt. Ltd. [🌐]* August 2025 -
  ◦ Convertible internship role at the Research and Development wing. Programmed production-ready serial peripheral drivers, engineered blocking, as well as real-time implementation. Currently working to refactor implemented code base for energy efficiency.
- **Research Assistant** *Hybrid, Full-Time*
  *Electronics Devices, Materials and Embedded Systems(EDMES) lab, DoECE, Pulchowk Campus [🌐]* May 2025 - July 2025
  ◦ Research Assistant under Asst. Prof. Nishchal Acharya and visiting scholar Prof. Atsushi Ito(Chuo University, Japan). Conducted extensive literature review, methodology improvement and achieved 2% mIoU improvement from the previous baseline model developed during the course of major project.
  ◦ Consolidated the research findings into two research manuscripts as co-first author.
- **Research Intern** *Remote, Part-Time*
  *Kathmandu Institute of Applied Sciences [🌐]* September 2024 - December 2024
  ◦ Worked on porting legacy Arduino-based code base to STM32 Blue Pill based system. Interfaced multiple analog sensors across a single ADC channel. Established serial communication between two Raspberry Pi Pico micro-controllers for distributed sensor reading and weather data logging.

## Projects

- **RTK, GDPS, LiDAR Research: [R&D Wing, Real Time Solutions]** *August 2025 -*
  *C99, EFM32GG980(Cortex-M3), Energy Modes, I2C, UART, Point-to-Point Protocol, Schematics and Datasheet Definition, RTOS, GitLab*
  ◦ Developed BARR-C compliant C99 firmware drivers for EFM32GG980F1024-based board with LidarLite v3 and ST7036i (I2C), built an M2M server on in-board MODEM over PPP(UART). Implemented in both bare-metal and FreeRTOS approaches, currently refactoring code base to reduce MCU current consumption from 180 µA/MHz to 45 µA/MHz.
- **Final Year Capstone Major Project: [DoECE, Pulchowk Campus]** *May 2024 - April 2025*
  *Pytorch, Google Colab, Kria KR260 MPSoC, Vitis-AI, Docker, VIVADO, Linux System Remote Access* [🐙]
  ◦ Developed novel ReLUKAN-based convolutions in SwiftNet architecture encoder and implemented the network on the Xilinx Kria KR260 MpSoC FPGA board. Retained 70% mIoU while halving parameters from 5.68M to 2.99M.
- **Low Cost Meteorological Station: [Kathmandu Institute of Applied Sciences]** *September 2024 - December 2024*
  *STM32F030C8T6, ADC, Raspberry Pi Pico RP2040, C/C++ SDK, Makefiles, Cortex-M0+, NVIC* [🐙]
  ◦ Interfaced wind vane, cup anemometer, rain gauge across a single ADC channel of STM32F030C8T6, with both polling and interrupt based methods. Programmed interrupt based UART transmission between two RP2040s, with FreeRTOS based sender.
- **AI Curriculum Capstone Project: [DoECE, Pulchowk Campus]** *August 2024 - September 2024*
  *Python3, Virtual Environments, NumPy, Pandas, Matplotlib* [🐙]
  ◦ Implemented k-Nearest Neighbors from scratch across various distance alternatives, outperformed SKLearn library's kNN by 3% on PIMA Diabetes Dataset classification task.
- **Junior Year Capstone Minor Project: [DoECE, Pulchowk Campus]** *November 2023 - March 2024*
  *Raspberry Pi Pico RP2040, MicroPython, Object Oriented Programming, Forward and Inverse Kinematics* [🐙]
  ◦ 4 DoF Manually Controlled Robotic Arm. Implemented analog input with de-bouncing and DH-based inverse kinematics solution, both analytical and numerical, achieved robust control with only 0.58 cm deviation in validation plots.

## Publications

C=Conference, R=In Internal Review

**[C.1]** Pranav Joshi, et al. (2025). **Lightweight and Efficient Semantic Segmentation Model for FPGA-based Acceleration**. Manuscript accepted at *The 11th IEEE International Conference on Edge Computing and Scalable Cloud (IEEE EdgeCom), 2025.*

**[R.1]** Pranav Joshi, et al. (2025). **Convolutions with Kolmogorov-Arnold Networks based ReLUKAN Activation in Residual Networks for Semantic Segmentation**. Manuscript draft under initial internal review at the EDMES lab, Department of Electronics and Computer Engineering, Pulchowk Campus.

## Skills

- **Programming:** Python, C, C++, Verilog, VHDL, MatLab, GNU Octave, Bash Scripting, Makefiles
- **Micro-controller Boards:** EFM32, ESP32, Raspberry Pi Pico, STM32, 8051, Arduino
- **Development Environments:** Visual Studio Code, C/C++ SDKs, Keil, Eclipse IDE, Thonny, Jupyter Notebooks, Google Colab
- **Data Science & Machine Learning:** NumPy, Seaborn, Matplotlib, Scikit-Learn, Keras, Tensorflow, PyTorch, CV2, Xmodel
- **Laboratory and Experimental:** Oscilloscopes, Logic Analyzers, Multimeters, Breadboards, Miniature Antennas, Transistors and Diodes, Op-Amps
- **Simulation Suites:** MatLab, Proteus, Advanced Design System
- **Version Control:** Git, GitLab with CI/CD, GitHub
- **Software Packages:** MS-Office Suite, Latex, Google Workspace
- **Research and Technical Skills:** Neural network architecture optimization, Datasheet specification consistent programming, Linux CLI and System Administration, Research report writing, Technical and research communication

## Supplementary Coursework and Certifications

- **Machine Learning Specialization : Stanford Online | DeepLearning.AI** *July 2023*
- **Convolutional Neural Networks : Stanford Online | DeepLearning.AI** *November 2023*
- **Sequence Models : Stanford Online | DeepLearning.AI** *January 2024*
- **Python | Intro to Machine Learning | Pandas | Intro to Deep Learning | Data Cleaning : Kaggle** *May 2023 - June 2023*
- **CUBEEK CubeSat Training : Orion Space Nepal** *January 2024*
- **VLSI CAD Part I - Logic : University of Illinois Urbana Champaign | Coursera** *September 2025*

## Academic Achievements

- **Recipient of Full-Fee Topper Scholarship** *2024*
  *Tribhuvan University*
  - Full-Fee topper for sixth semester. Received the tuition fee of one full semester as the scholarship amount.
- **Recipient of Stipend for Academic Excellence** *2021 - 2025*
  *Tribhuvan University*
  - Ranked in top 20% of a highly competitive class in all eight semesters of undergraduate study.

## Leadership Roles

- **Content Lead and Research Executive** *May 2024 - March 2025*
  *LOCUS*
  - Executive Board member for the LOCUS 21st National Technological Exhibition.
  - Led the publication team as the chief author and editor for LOCUS 2025 Official Theme.
  - Presented the theme at the Minister of Communication and Information Technology's offices, and at the Minister of Science, Education and Technology's offices, Government of Nepal.
  - Co-founded the first ever LOCUS Research Collegiate, organized the inaugural LOCUS Research Symposium, Pulchowk Campus' pioneering undergraduate-exclusive research symposium. Collaborated with the campus Free Students' Union and conducted research methodology events prior to the symposium.
  - Secured crucial partnerships with private research institutions for manuscript review and student guidance for their research projects.
  - Event Coordinator for Children in Technology : LOCUS x WorldLink. Led a team to design secondary-level student materials on internet safety and career prospects in electronics engineering.
  - Led a team of four colleagues to six schools in Far-Western Province as the province in-charge for CiT, and two schools in the Kathmandu valley, delivering the prepared materials to over one thousand students.
  - Lead Instructor for Hardware Fellowship-2025. Prepared materials on beginning micro-controller programming with Arduino, serial peripherals, actuator control, PWM, 555 timers, and delivered it to over two hundred first-year engineering students.
  - Procured sponsorships of over $2000 for the main exhibition.
- **Content Superintendent** *May 2023 - April 2024*
  *LOCUS*
  - Led a team of over 20 content writers for social media content preparation.
  - Part of the author and editorial team for the LOCUS 2024 official theme.
- **Social Media Manager** *June 2022 - August 2023*
  *Pulchowk Music Club and Research Center*
  - Handled content creation and social media management. Contributed in furnishing new on-campus office with new equipments and sound-proof acoustics.
  - Organizer of Signal Processing and Acoustic Mixing workshop. Acted as a liaison between professionals and faculty members from Department of Electronics and Computer Engineering.

## Additional Information

**Languages:** English (Native-level proficient), Nepali (Native)
**Interest:** Creative Writing (Medium account: [])
**Student Society Membership:** Student Member and Volunteer: IEEE-Pulchowk Chapter

**References:**

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|---|---|---|
| Asst. Prof. Nishchal Acharya | Assoc. Prof. Sanjeeb Pd. Panday | Mr. Krishna Gaihre |
| DoECE, Pulchowk Campus | DoECE, Pulchowk Campus | LogicTronix Technologies |
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