Abhinav Raj Gupta

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LinkedIn Profile URL • Web Portfolio URL

TECHNICAL SKILLS

- **Programming Languages***:* Python (Machine Learning, Deep Learning), Java, C, C++, SQL
- **Machine Learning & AI Frameworks***:* PyTorch, TensorFlow, Scikit-Learn, CNN
- **Databases**: MySQL, PostgreSQL, NoSQL (MongoDB)
- **Cloud & Tools***:* AWS EC2, Google Cloud Platform, GitHub, Linux Terminal, Jupyter Notebook

EXPERIENCE

Advanced Particle Detector Laboratory, Lubbock (Collaboration with CERN, Switzerland)
Undergraduate Student Research Assistant- Silicon Detector Quality Assurance October 2022 – Present

- Designed a PyTorch-based CNN architecture (YOLOv5) module to identify micro-scale defects in silicon hexaboards with **98% accuracy**, preventing catastrophic failures in particle collision tracking.
- Built a Django web platform (HTML/CSS/JS) and deployed across **3 international assembly centers** (Switzerland, India, China) to standardize QA workflows, reducing inspection time by **90%**.
- Integrated real-time PyTorch inference to visualize performance metrics during manufacturing, ensuring compliance with CERN's **<0.1%** tolerance standard.

Robotics Association of Nepal (RAN), Lalitpur, Nepal
FGC Robotics Mentor June 2021 – January 2022

- Programmed robotic controllers in C/C++ for an IoT-enabled weather forecasting satellite equipped with temperature, humidity, and camera sensors.
- Led Team Nepal in an International Robotics Competition, earning recognition from sponsors as top-performing first-time participants against elite teams (Japan, USA, UK).

PROJECTS

Wine Quality Prediction Using Logistic Regression | Python, Jupyter Notebook | GitHub

- Constructed a Logistic Regression model with Scikit-Learn, gaining foundational knowledge in machine learning while predicting red wine quality with high accuracy.

CleanScan | YOLOv5, Flask, JavaScript, HTML, CSS | GitHub

- Achieved **92% mAP** accuracy in real-time waste classification by optimizing YOLOv5 model on custom dataset.
- Engineered full-stack solution with Flask backend and interactive web interface, reducing manual sorting labor by **40%**.

C Compiler Construction | C | GitHub

- Developed lexical analyzer converting source code to tokens with **100% accuracy**.
- Implemented a recursive descent parser based on BNF grammar rules to perform syntactic analysis and construct hierarchical representations of program structure.

Wirebonding Alignment Analyzer | Python, OpenCV, ML | GitHub

- Developed ML-driven QA system achieving sub-micron precision in sensor alignment using Hough Circle Transform.
- *Prevented **68%** of post-bonding defects* by developing **3µm**-precision ML verification that catches misalignments before wirebonding, eliminating costly rework.

EXTRACURRICULARS

- **Campus Involvement**: Engineering Senate Rep., Student Govt. Assoc. TTU | Media & Comm. Strategist, Nepal Students' Assoc. TTU | Mentor for K12, TTU Robotics Club
- **Volunteering**: Fund Raiser for COVID crisis, Bio-medical Equipments monitoring (MOT, Nepal)
- **Honors and Awards**: Morrow Eng. Scholarship | TTU Presidential Scholarship | Best UG Research Poster Award 2023, 2024

EDUCATION

Texas Tech University, Lubbock, Texas December 2025
Bachelor of Science in Computer Science **GPA: 4.0**
Minor in Mathematics

- *Proposed Publication: Use of deep learning-based object detection techniques in quality control of wire bonds in silicon detectors*