RAFAY AAMIR GULL

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Home: (France)

ABOUT MYSELF

A results-driven Computer Vision Engineer with expertise in scalable microservices using C++, Python, and CUDA. Skilled in structure from motion, camera calibration, stereo 3D reconstruction, perception, object detection, feature extraction and matching, and robotics simulation. Passionate about deep reinforcement learning and robot perception, with hands-on experience since childhood, including building an obstacle-avoiding robot at 13.

TECHNICAL SKILLS

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Python3 (5 years of project experience) | C++ (5) | CUDA (3) | PyTorch (4) | Seaborn (3) | CoppeliaSim (3) | Nvidia Omniverse (2) | IsaacSim (2) | IsaacLab (1) | ROS (1) | Colmap (2) | MeshLab (2) | OpenCV (4) | Open3D (3) | OpenGL (1) | UNet | ResNet | RetinaNet | Matlab (4) | FastAPI (2) | Rest APIs (2) | Microservices (2) | GCP (1) | SQLite (2) | MongoDB (1) | gRPC(2) | CI/CD (3) | Docker (3) | Unit test (2) | PyTest (2) | Linux (6) | Multi-Threading (4) | GitHub (5) | GitLab (3) | bash scripting (3) | Redis (2) | MQTT (2) | ProtoBuffer (2) | JSON (2) | Eigen (2) | Ceres (2) | Pandas (4) | Numpy (4)

WORK EXPERIENCE

Horizon Telecom – Montceau les Mines, France

City: Montceau les Mines | **Country:** France

Internship (Computer Vision)

[03/2025 – Current]

Developing Robot Perception System for real-time 3D visual scene understanding for pick-n-place tasks with mobile manipulators.
Technologies used: Ros2, IsaacSim, IsaacLab, Omniverse, Dossan M-series Robot, Python, CenterSnap

Hazen.ai – Remote

City: Remote | **Website:** https://www.hazen.ai/

Software Engineer (Computer Vision)

[03/2023 – 12/2024]

Worked in an agile team of 7, initiated and launched the application from scratch using Python, PyTorch, CUDA, OpenCV, Ceres, and Colmap.
Collaborated, maintained, and Built 3+ modern C++ (17 and 20) microservices and 12 Rest APIs to develop the overall service architecture.
Built and improved 5+ CUDA C++ kernals and APIs for better synchronization among CUDA cores for real-time video analytics service for a resource-constrained platform (Nidia Jetson).
Containerized and deployed the application on 9+ sites in UK, Saudia Arabia, UAE.
Wrote extensive Unit test cases with a code coverage of 92% using PyTest
Implemented 600% faster and 42% accurate image feature extraction and matching techniques (EfficientLoFTR, XFeat) for a stereoscopic vision and SFM service.
Developed GPU-accelerated camera lens distortion correction API with Nvidia-VPI2 hence, improved video analytics application accuracy by 22%
Built a 14% faster python API for global structure from motion using Glomap.
Improved video analytics application accuracy by 13% using FastSAM object segmentation to get perfectly padded frame.
Technologies used: Python, C++ (17 and 20), CUDA, OpenCV, Open3D, Colmap, Glomap, XFeat, EfficientLoFTR, SFM, Docker, SQLite, JSON

Scuola Superiore Sant'Anna – Pisa, Italy

City: Pisa | **Country:** Italy

Deep Learning Research Intern

[07/2022 – 02/2023]

- Enhanced data quality by **23%** through data pre-processing and cleaning techniques using Scikit-learn, seaborn, matplotlib, and pandas.
- Designed and trained a deep learning model from scratch for time-series data using PyTorch with 97.4% test data accuracy.
- Deployed LSTM models on **STM32** IoT nodes for real-time predictions.

Technologies used: Python, Pandas, Scikit-learn, Seaborn, Matplotlib, Numpy

EDUCATION AND TRAINING

VIBOT Masters in Computer Vision
Université de Bourgogne Europe

City: Dijon | **Country:** France

Relevant Coursework: Computer Vision, Visual Perception, Scene Segmentation, Autonomous robotics, Probabilistic Robotics, Medical Imaging.

Bachelor of Science in Electrical Engineering (Major: Computing)
Information Technology University of the Punjab (ITU)

City: Lahore | **Country:** Pakistan | **Thesis:** Vision Guided Robotic Arm Manipulation with Deep Reinforcement Learning and 3D computer vision.

Publication: IEEE EDUCON 23 "1 Robotics Primer for Independent Learners: Background, Curriculum, Resources, and Tips"

PROJECTS

[03/2025 – Current]

ManipulateSim

Trying to build a robotic manipulator for generic pick and place in IsaacSim and IsaacLab with ROS2 and Vision guided Deep Reinforcement Learning.

[01/2025 – 04/2025]

Incremental Structure From Motion

Designed and implemented incremental structure from motion pipeline from scratch. A GPU accelerated bundle adjustment technique was used and utilized Pytorch optimizer LBFGS. The E2E runtime is around 2.5 minutes for 100 frames.

[12/2024 – 02/2025]

Dog Robot To Detect and Follow Human

Built a perception application for **Unitree Go1** robot at **ImVIA Lab** to track and follow human in scene using real-time video feed from realsense RGBD camera and LIDAR mounted on robot head.

[10/2024 – 12/2024]

Scene understanding for commercial autonomous vehicle

Using 3D-RetinaNet with resnet50 backbone and FPN, optimized an open-source code for 3D scene understanding, object detection, and pedestrian recognition for real-time video feed from autonomous robot with an accuracy of 87% and runtime of 25 FPS.

Mimic Me Bot

Designed an algorithm and code a UR-5 robotic manipulator in simulated environment to use an RGB camera and move as human arm moves in real-time.

CERTIFICATIONS AND MOOCS

Fundamentals of Reinforcement Learning (Coursera, University of Alberta)

Introduction to Intel OpenVino (Coursera, Intel)

Robot Perception (Coursera, University Of Pennsylvania-UPenn)

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