

# Rahul Ranjan

Machine Learning Engineer — Computer Vision / Deep Learning / MLOps

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LinkedIn | GitHub | Portfolio

## PUBLICATIONS

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### Accepted

- Roha, V. S., **Ranjan, R.**, & Yuce, M. R. (2025). Evolving Blood Pressure Estimation: From Feature Analysis to Image-Based Deep Learning Models. *Journal of Medical Systems*, 49(1), 97.

## EDUCATION

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### Master of Artificial Intelligence

2023 – 2025

Monash University, Melbourne, Australia

*Relevant Coursework:* Deep Learning, Computer Vision, Neural Networks, Advanced ML

### M.Sc. (Hons.) Physics, B.E. (Hons.) Electronics & Instrumentation

2017 – 2022

Birla Institute of Technology and Science (BITS), Pilani, India

## EXPERIENCE

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### Graduate ML Research Engineer

2023 – 2025

Monash University, Melbourne, Australia

- Developed **hybrid CNN–Transformer** (<10M params) for HR and SpO<sub>2</sub> estimation using **PyTorch**; achieved **95%+ HR accuracy**.
- Built **full CV pipeline** (face detection → tracking → RGB extraction → filtering → inference) using **OpenCV, MediaPipe**.
- Designed **UNet + cross-attention BP estimation model** (**MAE < 5 mmHg**).
- Implemented **filtering, detrending, ICA/PCA, motion conditioning, temporal smoothing**.
- Built **evaluation suite**: bootstrap CI, Bland–Altman plots, correlation metrics.
- Optimized inference via **CUDA (A40 GPU) + quantization (40% latency reduction)**.

### Industry Project

2024

Monash University, Melbourne, Australia

- Built **LLM-based Civic Engagement Platform** using **Flask, React, OpenRouter** with safety filters, templates, and real-time email generation.
- Reduced drafting time and enabled consistent messaging across stakeholders.

### Information Technology Officer

2022 – 2023

Aglow Engineers, Kolkata

- Migrated manual logs to **SQL-based infrastructure** using relational schemas.
- Built **Python automation** to generate diff-based comparisons + **SMTP email summaries**.
- Developed **RF & LSTM forecasting models (89% accuracy)**, reducing downtime **22%**.
- Improved data reliability **85%** through automated ingestion + validation.

### Software Intern

2022

Centre for Railway Information Systems (CRIS), New Delhi

- Wrote **complex SQL joins, nested queries, temporal filters** on WISE DB to build ML datasets.
- Built **anomaly detection** using **Python + XGBoost (94% accuracy)**, 48h early failure prediction).
- Deployed **predictive maintenance models** on **200+ assets**, reducing downtime **18%**.

### Software Development Intern

2021

Xilinx (AMD), Hyderabad

- Designed **custom 4D dictionary structure** (file → module → stage → timestamp) for workflow modeling.

- Built **"Data Flow Synchronicity Checker"** in pure Python for file-hash verification.
- Automated nightly checks using **Bash cron jobs + SMTP notifications**.
- Tool used by **25+ engineers**; automated **1000+ file checks/day**, improved workflow **30%**.

## CORE COMPETENCIES

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**ML Frameworks:** PyTorch, TensorFlow, Scikit-learn, Keras, Hugging Face Transformers

**CV Tools:** OpenCV, MediaPipe, video processing, face detection/tracking, image segmentation

**Data Engineering:** SQL (complex joins, nested queries), Python automation, ETL pipelines

**Optimization:** GPU acceleration, model quantization, latency reduction, mobile deployment

**Evaluation:** Bootstrap CI, statistical validation, A/B testing, performance metrics