

SHAURAV KHADKA

APPLIED AI RESEARCHER | AI SYSTEMS ENGINEER

Sydney, NSW, Australia | +61 416 989 794 | khadka.shaurav@gmail.com | Portfolio | LinkedIn | GitHub | ORCID

RESEARCH PROFILE

Early-career applied AI researcher and AI systems engineer with MIT (Artificial Intelligence) coursework and final examinations completed at Macquarie University; official completion letter and transcript are pending, with Distinction expected subject to final release. Builds and evaluates dependable systems for messy real-world data across document intelligence, semantic retrieval and RAG, temporal modelling, computer vision and robotics, and reinforcement learning. Current interdisciplinary research preparation extends this base toward quantum information science, open quantum systems, non-Markovian noise, scalable device characterisation, and mitigation-oriented optimisation. Background spans software engineering, technical leadership, production-oriented AI/ML R&D, and long-term community technology volunteering.

RESEARCH INTERESTS

AI / ML systems: trustworthy AI; ML-system reliability; document intelligence; semantic retrieval and RAG; NLP and language models; temporal reasoning; computer vision and Sim2Real robotics; reinforcement learning; reproducible experimentation. Interdisciplinary scientific direction: scientific machine learning; optimisation; quantum information science; open quantum systems; non-Markovian noise and crosstalk; quantum-process tomography; process matrices and process tensors; AI-assisted quantum-device characterisation; scalable correlated-noise detection and mitigation; quantum-control and gate-sequence optimisation; tensor-network methods.

TECHNICAL SKILLS

Programming: Python, SQL, JavaScript, Java, C#, PHP

AI / ML: PyTorch, TensorFlow, scikit-learn, Hugging Face Transformers, Sentence Transformers, FAISS, NetworkX, Stable-Baselines3, Gymnasium

Systems & Data: pandas, NumPy, Jupyter, Streamlit, ROS2, Git, Docker, Linux, AWS S3, boto3, Azure Document Intelligence, JSON, MySQL, Oracle

Methods: RAG, semantic search, NLP, OCR evaluation, modular ML pipelines, temporal GNNs, CNN transfer learning, Sim2Real adaptation, reinforcement learning, benchmark design, error analysis, reproducible experimentation

PROFESSIONAL EXPERIENCE

AI/ML Research and Development Intern | Truth

Feb 2026 - Jun 2026

Sydney, NSW, Australia | Hybrid | Document intelligence, fraud detection, and production-AI reliability

- Built repeatable OCR-evaluation workflows spanning document ingestion, OCR configuration, confidence scoring, field mapping, transformations, validation checks, and error-code review using Python, pandas, AWS S3/boto3, Azure Document Intelligence, and JSON.
- Supported adversarial fraud-detection evaluation by reviewing labels, detector outputs, reruns, edge cases, and False Acceptance Rate / False Rejection Rate trade-offs.
- Translated findings into system-level recommendations on traceability, reproducibility, validation dependencies, latency, cost, and human-review boundaries rather than treating model accuracy as the whole problem.

Chief Technology Officer | Picpoint Nepal Pvt. Ltd.

Jun 2021 - Jun 2024

Kathmandu, Nepal | Hybrid | Technical roadmap, digital operations, and export-logistics support

- Led the technical roadmap across web operations, remote workflows, business coordination, and data-informed decision support for an export-logistics business.
- Maintained resilient digital workflows connecting operational records, partner communication, and remote execution; prioritised practical systems improvements as business requirements evolved.
- Applied geospatial and market-intelligence inputs to support pathway analysis, sourcing decisions, and operational planning.

Jr. Full Stack Developer | Thakur International

Jun 2019 - May 2020

Kathmandu, Nepal | On-site | Agile web and mobile application development

- Built and maintained web and mobile application components in an agile engineering team using PHP, Python, and JavaScript.
- Integrated SOAP and REST APIs, Google Maps geolocation workflows, and OAuth-based social-login components.
- Improved backend reliability through debugging, refactoring, performance analysis, and participation in sprint planning.

Operations and Digital Support Assistant (Part-time) |

Oct 2024 - Jun 2026

Ingleburn Convenience Store

Ingleburn, NSW, Australia | Additional work completed during postgraduate study

- Supported transaction and inventory accuracy, POS troubleshooting, basic network and hardware issues, digital administration, and customer-facing operations during postgraduate study in Australia.

EDUCATION

Master of Information Technology (Artificial Intelligence) | Macquarie University

2024 - 2026

Sydney, NSW, Australia

- Coursework and final examinations completed; completion letter and transcript pending. Expected Distinction, subject to final release. Relevant study: NLP/LLMs, graph ML, computer vision/action, reinforcement learning, data science, AI governance, and an industry AI/ML R&D internship.
- Completed the Macquarie University Postgraduate Global Leadership Program.

BSc Computer Science - First Class Honours | London Metropolitan University (Islington College)

2017 - 2021

Kathmandu, Nepal

- Ranked among the top 10 students in the cohort. Built recommendation, trip-planning, and database-backed systems across Python, PHP/MySQL, Oracle, C#, and Java.

SELECTED AI / ML SYSTEMS

Production AI Reliability and Document Intelligence | 2026

Python, pandas, AWS S3, boto3, Azure Document Intelligence, JSON

- Developed a reliability-oriented evaluation workflow spanning OCR configuration, extraction, transformation, validation, reruns, and operational recommendations.
- Kept public scope bounded: sanitised or synthetic illustrations only; confidential records, proprietary logic, and private metrics excluded.

RedditPulse - Semantic Retrieval and Grounded Insight Platform | 2026

NLP, Sentence Transformers, FAISS, RAG, Streamlit

- Co-developed a seven-module NLP/LLM prototype over 1,989 filtered posts and 1,588 comments from 10 subreddits, integrating preprocessing, sentiment analysis, topic detection, semantic retrieval, and grounded insights.
- Evaluated 384-dimensional embedding-based retrieval with FAISS, reaching Precision@5 = 0.68 and Recall@5 = 0.68 under the executed evaluation.

Fine-Grained Vision and ROS2 Robot Deployment | 2026

ResNet50, transfer learning, augmentation, ROS2, Sim2Real adaptation

- Contributed to a collaborative pasta-recognition and vision-to-action robot pipeline; documented team-level robot-image accuracy recovery from 2.38% to 95.24% after deployment-specific data collection, augmentation, and fine-tuning.
- Mapped predictions to ROS2 navigation commands while keeping individual and team-level attribution explicit.

Reinforcement-Learning Benchmark Suite | 2026

Python, Gymnasium, Stable-Baselines3, Q-learning, DQN, PPO

- Implemented and compared agents across Taxi-v3, LunarLander-v3, AirRaid, and custom MountainCar wrappers, examining algorithm choice, temporal context, and reward shaping.
- Improved AirRaid PPO mean reward from 300 to 1,925 using frame skipping and frame stacking; achieved a 100% final MountainCar success rate under the executed evaluation.

Retrieval-Augmented Financial Advisory Prototype | 2026

RAG, semantic retrieval, vector indexing, evidence gating

- Designed a prototype for retrieval-augmented financial question answering with document ingestion, embedding-based retrieval, prompt construction, and evidence-gated response generation.
- Scoped the system as a research prototype rather than a financial-advice product, with explicit abstention and escalation boundaries.

RESEARCH PREPARATION DIRECTION

AI-assisted quantum-device characterisation: developing foundations in quantum information, open quantum systems, non-Markovian noise, process matrices and process tensors, quantum-process tomography, scientific computing, and mitigation-oriented optimisation. Intended contribution: bring disciplined computational modelling, temporal reasoning, and reliable evaluation to scalable correlated-noise detection and control. This is a preparation direction, not a claim of completed quantum expertise.

SELECTED NON-PEER-REVIEWED TECHNICAL PREPRINTS AND REPORTS

Repository deposits and early research outputs. These records are not peer-reviewed journal publications.

- FieldTrace-OCR: A Reliability-Oriented Evaluation Protocol for OCR-Based Invoice Parsing Pipelines. *Technical preprint*. DOI: [10.5281/zenodo.20669709](https://doi.org/10.5281/zenodo.20669709)
- A Lightweight Multilingual Semantic Search Pipeline for Document Discovery and Question Routing. *Technical report*. DOI: [10.5281/zenodo.20652874](https://doi.org/10.5281/zenodo.20652874)
- Temporal Context and Momentum-Aware Reward Shaping in Reinforcement Learning: An Auditable Exploratory Study of AirRaid and MountainCar. *Technical report*. DOI: [10.5281/zenodo.20669675](https://doi.org/10.5281/zenodo.20669675)
- A Retrieval-Augmented Financial Advisory Prototype with Evidence-Gated Response Generation. *Technical preprint*. DOI: [10.5281/zenodo.20652567](https://doi.org/10.5281/zenodo.20652567)

COMMUNITY IMPACT AND LEADERSHIP

Technical Volunteer and Systems Support | Swogun Energy

2015 - Present

Nepal and remote support | Periodic volunteer contribution

- Supported field deployment, testing, and troubleshooting of small-scale solar-power and IT systems in remote and off-grid settings in Nepal, adapting practical setups to constrained operating conditions.
- Continues to provide occasional remote technical and digital support while based abroad.

Certified UPG Sustainability Leader | United People Global

2024 - 2025

Global online program

- Completed sustainability-leadership training focused on positive citizen action, community-driven initiatives, and the United Nations Sustainable Development Goals.
- Engaged with an international cohort to exchange approaches to local sustainability challenges and community impact.

Aspire Leaders Program Alumnus and Peer Support

2023 - Present

Contributor | Aspire Institute

Global online program

- Completed leadership-development training and continues to support emerging participants through occasional resource sharing and peer guidance.
- Engaged with a global community focused on leadership, professional development, and community-centred problem solving.

MQ Incubator x KPMG Design Thinking | Macquarie University

2026

Sydney, NSW, Australia

- Applied human-centred problem solving, opportunity framing, and collaborative ideation within an innovation-focused program.

Postgraduate Global Leadership Program Graduate |

Macquarie University

2025

Sydney, NSW, Australia

- Completed a university leadership-development program focused on reflective practice, cross-cultural collaboration, and professional growth.

SELECTED CREDENTIALS

- CS50x: Introduction to Computer Science - Harvard University
- Elements of AI - University of Helsinki
- Ethics and Governance of Artificial Intelligence for Health - World Health Organization
- Quantum Mechanics - University of Colorado Boulder via Coursera (Jun 2026; verify 861MS6P64X8I)
- Understanding Modern Physics II: Quantum Mechanics and Atoms - The Hong Kong University of Science and Technology via Coursera (Jun 2026; verify NGRUYQGSMAMJ)

LANGUAGES

English, Nepali, Hindi; intermediate Spanish.

RESEARCH PROFILES AND LINKS

ORCID: 0009-0009-9874-8239 | Portfolio | GitHub | LinkedIn