Omer Raza

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Education & Accolades

Masters in Computer Science from **Purdue University (4.0 GPA)** **2023-2025**

Bachelors in **Engineering (Computer Science)** from **The University of Hong Kong (HKU)** **2016-2020**

- **First Class Honors** & **Deans' Honor List** in **2016-2017 & 2019-2020**
- **HKU Foundation Scholarship 2016-2020** (for **outstanding** undergrads)
- **Young Tsun Dart Scholarship 2017** (reserved for **only one student** in a particular year of study)

Research & Employment Experience

RA Machine Learning role at renowned **CIVS** in **Purdue University** Sep 2023 - present

- **Silicon content prediction via ML** in blast furnace **– research paper** under review & **extension paper** underway
- **Hearth erosion modeling –** created **first principle** models (forward) and **engineered optimization flow** (inverse)

RA Machine Learning (remote) at **CUHK** and **HKUST** universities Sep 2022 - Mar 2023 & Mar - Jul 2024

- **First author** and **co-author** of 3 papers

Machine Learning Engineer at **Lalamove (Multinational) - Hong Kong** Feb 2022 - May 2023

- Improved **image localization & detection models** for accurate market penetration count
- Developed **image detection models, OCR & clustering models** for real-time license plate number detection.
- Improved **image localization & detection models** for accurate market penetration counts.
- Established data pipeline, modeling and deployment flow for **risk assessment models** to **predict fraud**
  *** Received the highest bonus in the year** (4 people among 150 in the office)

Machine Learning & Software Engineer at **Gense Technologies (Startup) - Hong Kong** Nov 2020 - Dec 2021

- Developed LSTM and Conv1D models for **waveform pattern classification**.
- Developed & deployed **EIT Amplitude Image Classifier** using two distinct iterative improvement approaches
- Developed & deployed **Gense Mobile App (React native)**

Software Engineer (Remote Commission) at **BeardBee - Hong Kong** Feb 2020 - Mar 2020

- Produced **maintainable and portable code base** for **web, desktop and mobile** platform of a charging system

Tech Intern (Software Engineer) at **Lalamove - Hong Kong** Jun 2019 - Aug 2019

- **Refactored** & **debugged** a **microservice** for order grouping and route formation - deployed to India & Thailand

Publications & Preprint

FIRST: Efficient Trustworthy Distillation Paper – Co-Author **Accepted in EMNLP 2024**

- Pipeline for efficient LLM training for better **calibration** and **accuracy**.
- **Distillation** with **trustworthy maximization process** whilst using only a **fraction of training data**

Sequential CycleGAN Conference paper – First Co-Author **Accepted in IEEE EMBS BHI 2024**

- **RA** at **Chinese University of Hong Kong (CUHK)**
- Improved smoke removal by **incorporating sequential information** from temporal frames
- Separate **attention, convolution & LSTM mechanisms in CycleGAN** base skeleton
- Results implied that temporal incorporation help **achieve better smoke removal** in live surgical videos

EIT to CT Structurally Aligned Transformation Conference Paper – First Author **Accepted in IEEE EMBC July 2023**

- Researched during tenure at **Gense Technologies**
- **Modified CycleGAN** arch to convert low resolution time based EIT images to high resolution CT images
- **Mutual Information loss** was the key to gain **better structurally aligned** generated CT images

Silicon Content Prediction in Blast Furnace via Machine Learning – First Author **(Results Pending: MDPI Materials)**

- Comprehensive & generalized **data processing pipeline** for large scale industrial data
- Hyperparamater optimization & **model selection** to forecast silicon content with **90 % accuracy**

Mutual Information prior enhances EIT reconstruction – First Author **(Preprint available & Results Pending: IEEE JBHI)**

- An **extension journal paper** of IEEE EMBC conf paper
- Incorporates modified Cyclegan to infer prior in upstream pipeline for improved reconstruction

Surgical Blender journal paper – Co-Author **(Results Pending: Journal CBM)**

- **Experimented and established improved metrics** for improved CycleGAN architectures using synthetic data.
- Potential to **alleviate the load** for acquiring real images in training tasks like smoke removal

Image Feature Transfer Project – **Personal Study** **2020**

- **Latent space transformation** encodings versus **direct image transformations** were studied and compared

3D Texture GAN Project – FYP Bachelors **2020**

- **Final Year Bachelors Project** to produce 3D textured car meshes based on 2D texture input for cars

Certifications

Machine Learning Specialization from **Coursera - Certificate** **Sep-Dec 2016, Nov 2017 & Dec 2019**

- 5 part specialization with Certification

Skills & Technologies

- Machine Learning: GAN, Diffusion, LLM, XGBoost,
- Deep Learning Frameworks: PyTorch, TensorFlow
- Cloud Computing: AWS (Amazon Web Services)
- Web Development: React, Electron, JavaScript
- Data & Image Processing: Sklearn transform & OpenCV
- Programming Languages: Python, Javascript, C++, Java
- Database: SQL(intermediate)
- Design Tools: Adobe Premiere, Adobe Photoshop
- Languages: English (fluent), Urdu (native proficiency)

References

any other references or pending results docs are available upon request and consent of other authors

- **Google Scholar Profile:** https://scholar.google.com/citations?user=oPbPzGgAAAAJ&hl=en
- **Coursera Machine Learning Certificate:** https://coursera.org/share/ae5cbf8d757883c352ba6933527bbded