Rajkumar Vaghashiya

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Education

Saarland University — March 2023 — Ongoing
Master of Science in Computer Science — *Saarbrücken, DE*

Pandit Deendayal Energy University — Aug 2016 — Aug 2020
Bachelor of Technology in Computer Engineering — *Gandhinagar, IN*

- GPA: 9.89 / 10.0 (Gold Medalist)
- Awarded Merit-cum-Means Scholarship 2016 to 2020 (Top 3 in the class)
- Research Project: Clinical AI for Ophthalmic Disorder Prognosis (Forus Health Pvt. Ltd.)

Experience

Graduate Student Research Assistant (HiWi) — Oct 2023 — Mar 2024
Max Planck Institute for Informatics — *Saarbrücken, DE*

- Quantum Computing for 3D Computer Vision

Freelance Developer — Nov 2021 — Sep 2022

- Developed a product recognition model with 80% accuracy for analyzing supermarket shelf inventory
- Utilized unsupervised learning (LOST) for product localization and embeddings for analyzing product similarity

Clinical AI Research — Jan 2021 — June 2021
Forus Health Pvt. Ltd. — *Bengaluru, IN*

- Developed an ML pipeline for diagnosing Retinopathy (AUC 0.98) using Python, OpenCV, and TensorFlow
- Conducted comprehensive review of clinical AI-based retinal imaging telecare services in India

Jan 2020 — July 2020

- Developed a clinician-in-the-loop ML pipeline for analyzing retinal biomarkers in ocular images
- Achieved results within ±8% of the research benchmark SIVA in 3 months using Python, OpenCV, TensorFlow, Django

Teaching Assistant — AI for Everyone (20IC206T) — Sept 2020 — Dec 2020
Pandit Deendayal Energy University — *Gandhinagar, IN*

Machine Learning Intern — June 2019 — July 2019
Capgemini — *Gandhinagar, IN*

- Developed a semantic search tool for impact analysis in testing with an accuracy of $\sim 95\%$
- Fine-tuned a pre-trained ELMo (language model) to extract embeddings for semantic mapping
- Designed an interactive UI visualization scheme for the retrieved results using Python, t-SNE, and matplotlib

Projects

GenAI for Interactive Systems — Nov 2023 — Ongoing
HCI Lab, Saarland University — *Saarbrücken, DE*

- Developing workflow for integrating Generative AI to assist human engineers in designing Interactive Systems

3D Pose Tracking — Apr 2023 — Sep 2023
DFKI — *Saarbrücken, DE*

- Implemented 3D Human Pose estimation and tracking using AlphaPose and MotionBERT for provisioning Digital Twins in Industry 4.0

Data synthesis for Boosting AI — Apr 2023 — Sep 2023
DFKI — *Saarbrücken, DE*

- Leveraged synthetic data to improve product recognition performance up to 90% for Retail using YOLOv8 and Unity

MediSinGAN — July 2021 -– Feb 2022
EEML — *Remote*

- Adapted SinGAN for synthetic medical data generation, reducing training time by 10% using JAX

Intelligent Cell-Line Analyzer — Aug 2019 —- Feb 2022
PDEU — *Gandhinagar, IN*

- Developed a deep learning pipeline to segment, denoise, and recognize cell lines, achieving ROCAUC >0.88 for cancer cells using Python, TensorFlow, OpenCV

Publications

- Kamaraj, P., Annamalai, A., Vaghashiya, R., Kulkarni, M., Kazi, A., & Appaji, A. (2023). *Clinically Applicable Artificial Intelligence for Retinal Imaging based Teleophthalmology for Primary Eye Care in India: A Review*. Submitted.
- Vaghashiya, R., Shin, S., Chauhan, V., Kapadiya, K., Sanghavi, S., Seo, S., & Roy, M. (2022). Machine Learning Based Lens-Free Shadow Imaging Technique for Field-Portable Cytometry. *Biosensors*, *12*(3). doi:https://doi.org/10.3390/bios12030144
- Vaghashiya, R., Kapadiya, K., Nandwani, I., Thakore, R., Seo, D., Seo, S., & Roy, M. (2020). An Optimized Neural Network Architecture for Auto Characterization of Biological Cells in Digital Inline Holography Micrographs. In *2020 IEEE International Conference on Healthcare Informatics (ICHI)*. doi:10.1109/ICHI48887.2020.9374330
- Thakore, R., Vaghashiya, R., Patel, C., & Doshi, N. (2019). Blockchain - based IoT: A Survey. *Procedia Computer Science*, *155*, 704–709. doi:https://doi.org/10.1016/j.procs.2019.08.101
- Vaghashiya, R., Thakore, R., Patel, C., & Doshi, N. (2019). IoT – Principles and Paradigms. In *International Journal of Advanced Trends in Computer Science and Engineering* (Vol. 8(1.6), pp. 153–158). doi:https://doi.org/10.30534/ijatcse/2019/2481.62019

Extracurriculars

Google Developer Student Clubs : Campus Lead — Aug 2023 – July 2024

Eastern European Machine Learning Summer School: EEML — July 2022
Selective Admission — *Budapest, HU*

Qiskit Global Summer School on Quantum Machine Learning: QGSS — July 2021
Selective Admission — *Remote*

- Certificate of Quantum Excellence (Score: 100%)

Eastern European Machine Learning Summer School: EEML — July 2021
Selective Admission — *Budapest, HU*

Edge AI for IoT Developers Nanodegree: Udacity-Intel — Dec 2019 – July 2020
Selective Scholarship — *Remote*

Certifications

- IBM Certified Associate Developer - Quantum Computation using Qiskit v0.2X — Feb 2022
- Machine Learning Engineering for Production (MLOps) (Coursera) — Sept 2021
- Generative Adversarial Networks (Coursera) — April 2021
- AI for Medicine (Coursera) — July 2020

Achievements

- IBM Quantum Challenge - Fall 2021: Advanced (Score: 100 %) — Nov 2021
- IBM Quantum Challenge Africa 2021: Advanced (Score: 100 %) — Sept 2021
- Winner of Schweickert Challenge in Hackdays Rhein- Neckar 2021 — March 2021
- Winner of Capgemini iSprint 2019 (West Divison)
- Winner of ET Campus Stars 2.0 (2018-19)
- Finalists in Smart India Hackathon 2019

Skills

Coding: Python, C, C++, Java, JavaScript, HTML, CSS

Tools/Technologies/Frameworks: TensorFlow, Keras, OpenCV, Intel OpenVINO, Flask, PyTorch, JAX, Qiskit, Jupyter, LaTeX, Figma, Git, Google Cloud Platform

Languages: English, Gujarati, Hindi, German (A2)