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 — July 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 each semester)
- Research Project: Clinical AI for Ophthalmic Disorder Prognosis (@ Forus Health Pvt. Ltd.)

Experience

Freelance Developer Nov 2021 — Jul 2022

- Developed a product identification model for the analysis of grocery market shelf images
- Developed a dental appointment scheduler based on the disease severity and treatment procedure

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

- Developed an explainable ML pipeline for the diagnosis of Diabetic Retinopathy (DR) and Hypertensive Retinopathy (HTR) using biomarkers extracted from the retinal vasculature. Python, OpenCV
- Achieved AUC $\sim$ 0.70 for DR detection and stage-grading, 0.98 for HTR detection, 0.89 for HTR stage-grading

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

Clinical AI Research Jan 2020 — July 2020
Forus Health Pvt. Ltd. *Bengaluru, IN*

- Developed a clinician-in-the-loop AI pipeline for the extraction and quantification of retinal vascular parameters
- Achieved results within $\pm$8% of the research benchmark tool SIVA. Python, OpenCV, Django
- Formulated decision support system plan to address the confounding factors in grading Retinopathy of Prematurity

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

Synthetic cell-line generation for Lens-free Imaging Micrographs Mar 2022 — Ongoing
Dr. Mohendra Roy, PDEU *Gandhinagar, IN*

- Developing a GAN to generate synthetic samples of cancer cell-lines imaged using DIH technique

MediSinGAN July 2021 — Feb 2022
Jonas Adler, EEML *Remote*

- Implemented SinGAN in JAX with a 20% reduction in training time for the generation of synthetic medical data
- Evaluated the model applicability in cross-modality image-to-image translation and image segmentation

ML based Lens-Free Shadow Imaging Technique for Cytometry Aug 2019 — Feb 2022
Dr. Mohendra Roy, PDEU *Gandhinagar, IN*

- Developed an end-to-end pipeline for analysis of cell-lines generated using lens-free shadow imaging technique
- ROC-AUC >0.98 for RBC, WBC, and microbeads; >0.90 for cancer cells HepG2 and MCF7

Portable AI-powered Microplate Reader for Point-of-Care Applications Sept 2020 — Nov 2020
Dr. Abhijit Roy, Indian Institute of Science *Remote*

- Developed a microplate well segmentation pipeline with adaptive calibration
- Implemented qualitative and quantitative real-time colorimetric analysis of microplate wells. Python, OpenCV

SESAU: Secure and Smart University Nov 2017 — Jan 2019
Dr. Nishant Doshi, PDEU *Gandhinagar, IN*

- ORSP-PDEU funded IoT project to simulate a smart university for resource usage optimization
- Deployed prototype modules in Computer Lab for equipment control and authorized access

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

Extracurricular Training

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
- Hackdays Rhein-Neckar 2021: Schweickert Challenge winner — March 2021
- Capgemini iSprint 2019 winner — July 2019
- Economic Times Campus Stars 2.0 (2018-19) winner — April 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 (Beginner)

Academic Service & Extracurricular Activities

Technical Head | Encode – Coding Club of PDEU — Aug 2016 — June 2019

Technical Head | Computer Society of India – PDEU Student Chapter — May 2017 — June 2019

Student Coordinator | Training and Placement Cell – PDEU — Feb 2018 — Feb 2019

Civic Intern | Andhjan Shikshan Mandal, Surat — June 2017 — July 2017