

RAJKUMAR VAGHASHIYA

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An avid learner and researcher excited to solve real-world problems by leveraging machine intelligence and designing fair and sustainable systems that assist us in the existing workflows

EDUCATION

Gandhinagar, India	Pandit Deendayal Petroleum University	Aug 2016 – Aug 2020
<ul style="list-style-type: none">• Bachelor of Technology in Computer Engineering• Relevant Coursework: AI, ML, Data Mining and Warehousing, Mathematics• Recipient of Merit-cum-Means Scholarship 2016-2020		GPA: 9.89/10.0 (Dept. Rank: 1 st)

EMPLOYMENT

Teaching Assistant	Pandit Deendayal Petroleum University	Sept – Dec 2020
Course: AI for Everyone		Professor: Dr. Mohendra Roy
<ul style="list-style-type: none">• Delivered introductory sessions on the basics of Artificial Intelligence and prevalent use-cases• Grading coursework, quizzes, and assignments		

Clinical Research Intern	Forus Health Pvt. Ltd.	Jan - July 2020
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Screening Systemic Disorders via Retinal Vascular Biomarkers

- Developed an end-to-end AI pipeline for the pre-screening of ocular and systemic disorders (such as Bipolar Disorder and Alzheimer's) from fundus image analysis
- Extraction and quantification of vessel parametric features from the retinal vasculature for subsequent use as biomarkers in the detection of the disorders
- Results of initial iterations within $\pm 8\%$ of SIVA (Singapore 'I' Vessel Assessment) - a standard tool used for retinal vessel analysis by researchers. Python, OpenCV, ML, DL, Django

Dry Eye Disorder (DED) Analysis

- Adapted Bio-Design Innovation guided approach for DED screening and anterior segment imaging
- Conducted weekly brainstorming sessions for ideation, need analysis, and literature review
- Participated in clinical immersion to study the diagnosis criteria and curate the product scope

Retinopathy of Prematurity (RoP)

- Participated in a field study to understand the confounding factors affecting the grading criteria used by specialists
- Reviewed existing Clinical Decision Support Systems in other disorders to address the grading issues in RoP

Machine Learning Intern	Capgemini Technology Services Ltd.	June – July 2019
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Context-Sensitive Semantic Search Tool

- Developed a test-case similarity search tool for impact analysis in software testing with an accuracy of $\sim 95-98\%$
- Utilized NLP for tabular data processing and fine-tuned pre-trained ELMo (Embeddings from Language Models) to embed query and test-case semantic mappings via transfer learning
- Designed an interactive UI visualization scheme for the retrieved results using t-SNE and matplotlib

Civic Intern	Andhjan Shikshan Mandal, Surat	June 2017
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- Science tutor for eighth-grade students at a visually impaired children's school
- Organized weekly interactive sessions for quizzes and learning-based tasks

RECENT RESEARCH

Smart, Portable, and Cost-effective ELISA Reader	Sept – Nov 2020
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- Developed a microplate well segmentation pipeline with auto-adaptive calibration
- Implemented qualitative and quantitative real-time colorimetric analysis of microplate wells. Python, OpenCV, ML

Intelligent Digital Inline Holography Micrograph (DIHM) Cell-Enhancement and Characterization

Aug 2019 - Aug 20

- Segment cell-lines in DIH micrograph; Signal enhancement using CNN-based Autoencoder; Cell-line characterization using CNNs
- ROC-AUC: >0.98 for RBC, WBC, and microbeads; >0.88 for cancer cells HepG2 and MCF7
- Easy accommodation of newer cell-lines using transfer learning. Python, Tensorflow, OpenCV, DL, Flask

Secure and Smart University

Nov 2017 – Jan 19

- ORSP-PDPD funded IoT project to simulate a smart university for resource usage optimization.
- Deployed prototype modules in Computer Lab: Light Control, Lab Temperature Control, Authorized Personnel Access.
- Raspberry Pi and Arduino (prototyping), MQTT (communication), Firebase/MongoDB (database), Python

PUBLICATIONS

- Vaghashiya R. et al. *An Optimized Neural Network Architecture for Auto Characterization of Biological Cells in Digital Inline Holography Micrographs*. 2020 IEEE International Conference on Healthcare Informatics (ICHI), Oldenburg, Germany, 2020, pp. 1-3, doi: 10.1109/ICHI48887.2020.9374330.
- Thakore, R., Vaghashiya, R., Patel, C., & Doshi, N. *Blockchain - based IoT: A survey*. 2019 Procedia Computer Science, 155, 704–709. <https://doi.org/10.1016/j.procs.2019.08.101>
- Vaghashiya, R., Thakore, R., Patel, C., & Doshi, N. *IoT – principles and paradigms*. 2019 International Journal of Advanced Trends in Computer Science and Engineering, 8(1.6 Special Issue), 153–158. <https://doi.org/10.30534/ijatcse/2019/2481.62019>

EXTRACURRICULAR ACTIVITIES

Encode - Coding Club of PDPD	Technical Head	Aug 2016 – June 2019
Computer Society of India - PDPD Student Chapter	Technical Head	May 2017 – June 2019
Training and Placement Cell -PDPD	Student Coordinator	Feb 2018 – Feb 2019

CERTIFICATIONS

- Intel Edge AI for IoT Developers Nanodegree (Udacity Scholarship) (confirm.udacity.com/ACXAQDHHX)
- AI for Medicine Specialization (Coursera) (coursera.org/verify/specialization/LAENLEED7GJH)
- Generative Adversarial Networks (Coursera) (coursera.org/verify/specialization/BTYQ6FHHB5J8)

ACHIEVEMENTS

- Schweickert Challenge Winner at Hackdays Rhein-Neckar 2021
- Capgemini iSprint (West Division) Winner 2019
- ET Campus Stars 2.0 Winner 2018

TOOLS AND TECHNOLOGIES

- Python; C++; C; Java; JavaScript
- Tensorflow-Keras; OpenCV; Scikit-Learn; Flask; Intel OpenVINO
- Artificial Intelligence; Machine Learning; Image processing; NLP; Ubuntu; IoT (Raspberry Pi)
- Languages: English; Hindi; Gujarati

REFERENCES

Dr. Mohendra Roy
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