RAJKUMAR VAGHASHIYA

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

EDUCATION

Gandhinagar, India **Pandit Deendayal Petroleum University** **Aug 2016 – Aug 2020**

- Bachelor of Technology in Computer Engineering GPA: 9.89/10.0 (Gold Medalist)
- Received Merit-cum-Means Scholarship 2016-2020
- Dissertation: Bio-Design Guided Clinical Research for Ophthalmic Disorder Prognosis

EMPLOYMENT

Teaching Assistant **Pandit Deendayal Petroleum University** **Sept – Dec 2020**

Course: AI for Everyone (20IC206T)

- Delivered introductory sessions on the basics of Artificial Intelligence and the prevalent use-cases
- Graded coursework, quizzes and assignments (Total of 160 students from 3 batches)

Clinical Research Intern **Forus Health Pvt. Ltd.** **Jan - July 2020**

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 were within ±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., Gandhinagar** **June – July 2019**

Context-Sensitive Semantic Search Tool

- Developed a test-case similarity search tool for impact analysis in software testing with an accuracy of ~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

RECENT RESEARCH

Smart, Portable, and Cost-effective ELISA Reader **Sept – Nov 2020**

- 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 Holographic 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-PDPU funded IoT project to simulate a smart university for resource usage optimization.
- Deployed prototype modules installed 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., Kapadiya K., Nandwani I., et al (2020). *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
- Vaghashiya R., Thakore R., Patel C., & Doshi N. (2019). *IoT – principles and paradigms.* 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
- Thakore R., Vaghashiya R., Patel C., & Doshi N. (2019). *Blockchain - based IoT: A survey.* Procedia Computer Science, *155*, 704–709. https://doi.org/10.1016/j.procs.2019.08.101

ACADEMIC SERVICE AND EXTRA CURRICULAR ACTIVITIES

Encode- Coding Club of PDPU	Technical Head	Aug 2016 – June 2019
Jharokha–Literary Club of PDPU	Logistics & Finance Head	Aug 2016 – June 2019
Computer Society of India- PDPU Student Chapter	Technical Head	May 2017 – June 2019
Training and Placement Cell-PDPU	Student Coordinator	Feb 2018 – Feb 2019
Andhjan Shikshan Mandal, Surat	Civic Intern	June 2017 – July 2017

CERTIFICATIONS

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

ACHIEVEMENTS

- Schweickert Challenge Winner at Hackdays Rhein-Neckar 2021
- ET Campus Stars 2.0 Winner Class 2018-19
- Capgemini iSprint (West Division) winner 2019

LANGUAGES, 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
  Dept. of ICT
  Pandit Deendayal Petroleum University
  Mohendra.Roy@sot.pdpu.ac.in
- Dr. Prakash Kamaraj
  Clinical Research Head
  Forus Health Private Limited, Bengaluru
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