RUTWIK JAYANT PALASKAR

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SUMMARY

Interested in interdisciplinary research combining Machine Learning, Healthcare and Bioengineering.

EDUCATION

Duke University, Durham, USA Aug 2022
Master of Science (M.S.), Biomedical Engineering 3.5/4
MIT ADT University, Pune, India Aug 2018 - Jul 2022
B.Tech. Bioengineering 8.4/10

EXPERIENCE/INTERNSHIPS

Duke University *Graduate Research Assistant* May 2023 - Present
- Working on Automating Traumatic Brain Injury (TBI) Assessment in Mice.
- Utilizing an autoencoder to extract features from the EEG signals and employing these features in clustering and topic modeling techniques, including Latent Dirichlet Allocation (LDA), to uncover TBI severity clustering.

Duke University *Graduate Teaching Assistant* June 2023 - Aug 2023
- Graduate Teaching Assistant/Co-Pilot at The Fuqua School of Business.
- Facilitated courses in Strategy, Financial Accounting, and Managerial Economics as a valuable member of the instructional team.

Duke University *Graduate Research Assistant* Jan 2023 - May 2023
- Graduate Research Assistant in Computational Optics Lab under Prof. Roarke Horstmeyer.
- Acquired and processed white blood cell image data using a microscopic system at various magnifications.
- Developed code to annotate cells in low-magnification images and transfer annotations to higher-magnification counterparts.
- Demonstrated proficiency in maintaining and updating the lab's websites.

Duke University *Graduate Teaching Assistant* Jan 2023 - May 2023
- Graduate Teaching Assistant for Medical Instrumentation course.

Nihilent Technologies Pvt Ltd *Intern* Jan 2022 - Jul 2022
- Collaborated on developing a machine learning model aimed at detecting facial landmarks to enhance the precision of the company's emotion analysis tool, Emoscape.

University of Pennsylvania *Intern* Jun 2021 - Dec 2021
- Extended the capabilities of the large-scale deep learning framework GaNDLF for kidney tumor segmentation utilizing computed tomography (CT) scans.
- Implemented algorithms to extract intensity distributions, amplifying kidney and tumor structures.

Stony Brook University *Intern* Oct 2020 - May 2021
- Refined my work on oral cancer detection.
- Implemented histogram matching augmentation as a generalization technique over multi-site data for cardiac image segmentation.
- Extended histogram matching augmentation for generalization of machine learning models for Oral Cancer Detection.

Tech Smart Systems *Data Science Intern* Mar 2019 - Apr 2019

- Trained machine learning models for classification and regression tasks on in-house housing prices dataset.

PROJECTS

Reinforcement Learning for Generation of Novel Non-toxic Molecules
Duke University, Machine Learning in Pharmacology Dec 2022

- Generated non-toxic molecules from the Tox21 dataset. Employed Reinforcement Learning to enhance molecular generation, biasing it toward non-toxicity.
- Successfully coupled a Support Vector Machine (SVM) predictive model with a Recurrent Neural Network (RNN) generative model to optimize molecule generation.
- Demonstrated that reinforcement learning produced molecules biased towards non-toxicity.

Analysis of Spherical Aberration Correction in Microscopic Images using Physical Layers
Duke University, Machine Learning in Imaging May 2023

- The project aimed to enhance the robustness of machine learning models when applied to microscopic image data affected by spherical aberrations, a factor known to disrupt the accuracy of segmentation tasks.
- Developed an approach involving the integration of a trainable physical layer into the UNET network architecture.
- This solution, utilizing Zernike polynomials for correction, significantly improved segmentation accuracy.

Exploring Bias in Clinical Prediction Models: Does Race Effect Model Performance?
Duke University, Intro to Biomedical Data Science May 2023

- Evaluated the predictive capabilities of machine learning algorithms for 30-day hospital readmission after hip fracture repair surgery, specifically examining potential performance disparities by race
- Model performance didn't significantly differ when predicting minority patients.

Shwaas: Social Distance Tracking and Health Monitoring App
iBase Electrosoft LLP, Virtual Mar 2021

- An App that ensures social distancing during the Covid 19 pandemic where recording a person's temperature and O2 saturation can be noted by just scanning a QR code to reduce contact and decrease the chances of the virus spread.
- View Project

Transfer Learning for Oral Cancer Detection using Microscopic Images
Research Assistant, MIT ADT University Oct 2020

- Collaborated with medical professionals at a Pune hospital to curate one of the first datasets of microscopic images for oral cancer detection.
- Evaluated and compared the performance of transfer learning models, including ResNet-50, Inception V3, and MobileNet, against baseline CNNs, achieving a significant 10-15% performance enhancement.
- Technical Report

Predicting Urinary Incontinence in Elderly
Medhacks Hackathon, Johns Hopkins School of Medicine Oct 2020

- Built an assistive technology for the elderly to predict urinary incontinence.
- View Project

Collection and Utilization of Single-Use Plastics and Various Other Industrial Wastes
Smart India Hackathon Oct 2019 - Jul 2020

- Built a sustainable solid waste management system
- Developed an online B2B e-commerce service for buying and selling of single-use plastics and various types of industrial wastes.
- Developed machine learning algorithms for real-time waste classification to segregate waste.
- View Project

ENTREPRENEURSHIP

Prosthocentric Pvt Ltd *Co-Founder* Since 2019
We are developing innovative medical devices based on granted patents from the United States of America (USA), European Union (EU), France, Germany, United Kingdom and Finland.

GRANT

1. Our start-up Prosthocentric Pvt Ltd received funding of Rs.50,00,000 ($62,500) from Biotechnology Industry Research Assistance Council (BIRAC), Government of India for early development of innovative medical devices.
2. We received another grant from Niti Aayog, Government of India of Rs. 1 Crore($1,25,000) for manufacturing of our devices.

PUBLICATIONS

1. **Rutwik Palaskar**, Renu Vyas, Vilas Khedekar, Sangeeta Palaskar and Pranjal Sahu, "Transfer Learning for Oral Cancer Detection using Microscopic Images", Under arXiv
2. Shreyas Patil, Mihir Kulkarni, Shubham Hajare, Tanvi Parkhe, **Rutwik Palaskar**, Diksha Zutshi, Reema Shyamsunder Shukla, Sameer Desai, "Assistive Device for Hemiplegic Patients", *3D Printing*, Book Chapter

SKILLS

Platforms TensorFlow, PyTorch, Keras, Arduino, Django, Flask, Web Development
Programming Languages Python, R, Java, C, C++, HTML, CSS

RELEVANT COURSES

Duke University Machine Learning in Pharmacology, Signal Processing and Applied Mathematics, Genome Tools and Technologies, Machine Learning in Imaging, Brain Computer Interfaces, Introduction to Biomedical Data Science, Medical Electrical Equipment, Digital Image Processing, Introduction to Deep Learning

MIT ADT C, Java, Advanced Java, Machine Learning, Python, Data Mining and Warehousing, Microcontrollers and Bioelectronics, Electrical engineering, Applied Mathematics, Genomics, Microbiology, Biostatistics, Genetics, Molecular Biology, Genetic/Pharmaceutical Engineering, Biochemistry

HONORS AND AWARDS

Smart India Hackathon, Finalist 2020
Represented my university at the all-India level in this hackathon

Class Representative 2019
A mediator between students and teachers for communicating student welfare issues to the administration department.

Team Player Award 2019
Dedication to Social Causes by Odser Charitable Trust, Pune