JASKARAN SINGH WALIA

1405 Amalfi Hiranandani, Navallur, Chennai, Tamil Nadu, India - 603103
Email: karanwalia2k3@gmail.com; **Phone:** +91-7708293783; **LinkedIn; Website; GitHub; Google Scholar**

ACADEMIC QUALIFICATION:
B.Tech, Computer Science, Vellore Institute of Technology, CGPA: 9.04   **April 2021 - April 2025**

RESEARCH EXPERIENCE:
Institution: Massachusetts Institute of Technology, CSAIL Lab   **March 2024 - Present**
Title: TactStyle: Enhancing 3D Model Stylization with Realistic Texture Generation for Digital Fabrication
Summary: Developed Tactstyle, an architecture to improve 3D model stylization by inducing tactile properties in objects by heightfield generation using a VAE. Performed a formative & perception study on the 3D printed objects.

Institution: Mohamed bin Zayed University of AI, BioMedia Lab   **May 2024 – September 2024**
Title: Beating the SOTA Performance to Win BraTS by MICCAI 24 for 3D Brain Tumor Segmentation
Summary: Selected for a fully funded fellowship & contributed to the research of BraTS competition by proposing a new approach under Dr. Yaqub, utilising attention-based UNets with schedule-free optimisation and model souping leading us to win the best research award at MBZUAI and #3rd place in BraTS globally (and at MICCAI'24)

Institution: The University of Cambridge, AFAR Lab   **October 2023 - May 2024**
Title: Lifelong multi-modal facial expression analysis using causal replay and multi-task continual learning
Summary: Created a multimodal & multi-task learning architecture utilizing continual learning and causality pruning for feature engineering (to minimize catastrophic forgetting) of facial affect recognition in robots for HCI.

Institution: Indian Institute of Technology Kanpur, Hamim Zafar ML-Lab   **May 2023 – October 2023**
Title: Spatially Resolved Multi-Omic Data Integration using Graph-Attention Variational Autoencoder
Team Size: 2   Role: Team Lead
Summary: Designed a novel variational-auto-encoder architecture for high-dimensional, multi-modal data integration. Used transcriptomic, proteomic, genomic, and spatial tissue datasets by developing graph self-attention networks. First authored research received funding and won the best research award from IIT, under the guidance of Dr. Hamim Zafar.

Institution: The University of Lincoln, UK   **Feb 2023 - June 2023**
Title: Optimized Custom Dataset for Efficient Detection of Underwater Trash
Summary: Created a custom dataset using semi-supervised learning addressing the shortcoming in current Underwater trash localization datasets and benchmarked it for underwater debris localization. Published in Springer Nature.

Institution: National University of Singapore (NUS), Singapore   **June 2022 – July 2022**
Title: Vulnerability analysis of Captchas using deep learning | ECG classification for arrhythmia detection
Team Size: 4   Role: Team Member
Summary: • Project 1: Created an explainable AI model detecting vulnerabilities in captchas to prevent cyber attacks.
• Project 2: Utilized ECG signal data to detect and classify arrhythmia using a custom CNN.
• First authored (project 1) paper published in an IEEE journal and second (project 2) for open access.

Institution: Vellore Institute of Technology, India   **July 2022 – March 2023**
Title: Deep Learning Innovations for Underwater Waste Detection: An In-Depth Analysis
Summary: Benchmarked performance and efficacy of current methodologies (classical neural-architectures against YOLO models) on multiple datasets reviewing over 300 works of literature in the domain of underwater trash detection.

INDUSTRIAL INTERNSHIPS:
Travellio, Founder & CEO   **August 2023 – Current**
- Founded Travellio as a registered startup, grew to a team of 15, utilizing AI to connect travelers across the globe
- Highest pre-seed offer received was of $600,000 USD of mixed equity-debt funding.

Assurant, Data Science Internship (Fortune 300)   **May 2023 – August 2023**
- Worked with the US and Canadian teams on 3 projects, deployed on cloud & servers using Databricks, Docker
- **Project 1**: Designed a NoSQL database for a custom-made ETL pipeline and developed an API to automate the scheduled retrieval of financial data (1.6 million mnemonics in terabytes) via threading and containerization.
- **Project 2:** In a team of six, utilized PowerBI, Tableau, and Excel to create a BI dashboard and process mining visuals interlinking warehouse data from 30+ Excels. Produced analytical results to reduce expenses by 15%.

MellonAI, Artificial Intelligence Developer   **August 2022 – February 2023**

- Leading a team of 4 deployed a 2-stage automated diet predictor using ensemble models & generative AI.
- The dual-stage pipeline, models blood-test parameters such as hemoglobin and iron to calculate daily nutritional requirements (calories, proteins, etc) in the 1st stage & generates personalized diet plans with GenAI in second.

Hewlett Packard Enterprise Singapore, Machine Learning & Cloud Solutions intern   **June 2022 – July 2022**
- Hosted cloud computing AI solutions using Microsoft Azure, enabling business automation and scalability.

TECHNICAL SKILLS:
Languages: Python, R, Java, C, C++, HTML/CSS, JavaScript, Matlab, SQL, Shell scripting, Shell, Bash, TF/Pytorch
Developer Tools: VS Code, Azure, GCP, Tableau, PowerBI, Linux, MongoDB, Cassandra, Data Bricks, Docker, Excel

RESEARCH PAPERS:
Published/Accepted:
• TactStyle: Enhancing 3D Model Stylization with Realistic Texture Generation for Digital Fabrication [ACM-CHI'25]
• Optimizing Brain Tumor Segmentation with custom MedNeXt: BraTS SSA and Pediatrics [MICCAI'24]
• Optimized Custom Dataset for Efficient Detection of Underwater Trash [TAROS '23, Springer Nature]
• Vulnerability analysis of captcha using Deep learning [IEEE-ICTBIG'23]
• ECG Classification System for Arrhythmia Detection Using Convolutional Neural Networks [Arxiv'22]
Submitted/Completed:
• SAG-VIT: A Scale-Aware, High-Fidelity Patching Approach with Graph Attention for Vision Transformers [CVPR'25]
• ConFAR: Causal Pruning for Continual Facial Affect Recognition under Multitask Learning [IEEE FG'25]
• Cross-lingual transfer of multilingual models on low-resource African Languages [COLING'25]
• Deep Learning Innovations for Underwater Waste Detection: An In-Depth Analysis [Journal: Marine bulletins]
• DAMN: Dual-path Spatial Enhancement of Underwater Images using Mult-Attention Networks [IEEE Access]
• 3D-Graph spatial Attention UNet for Glioma Tumor Segmentation [IEEE Access]
• SAGE: Self-Attention Guided Augmented Embeddings for Low Resource Sentiment Classification [ACL' 25]
• Afro-Distilled XLMR for Masked Language Model Augmentation [ACL' 25]
Ongoing:
• Spatially Resolved Multi-Omic Data Integration using Graph-Attention Variational Autoencoder [Zafar MLLab-IIT]
• Histopathological Cancer Stage Transition with Nucleus-Pair Spatial Attention integrated Multi-Stage VAEs [VIT]

ACHIEVEMENTS/CO-CURRICULAR/EXTRACURRICULAR:
- Won 3rd place in the BraTS 2024 challenge and presented research at MICCAI'24 conference.
- Received a Fully Funded fellowship for an International Research Program at MBZUAI, Abu Dhabi (UGRIP)
- Recognized for outstanding research in the prestigious SURGE program with Dr. Elizabeth & Dr. Verkey Cherian Award for Best Research, IIT Kanpur.
- Won the Best Team award for best research project at MBZUAI for 3D brain tumour segmentation research.
- Attended NUS Summer School 2022 focused on AI and Deep Learning, awarded with 'A' grade and an LOE
- Awarded Category-1 Scholarship (merit based) by achieving a top 3k rank (out of 2,00,000 in VITEEE)
- Regional level swimmer (bronze) for the south-India region (2017)

LEADERSHIP ROLES:
University of Pretoria, Research Assistant & TA (DSFSI Lab)   **February 2024 - Present**
• Worked as a project lead leading 8 Google student developers in researching and developing NLP architectures for multilingual low-resource African-language models and for data augmentation, with over 165,000 users utilizing this platform worldwide. Authored 3 papers leading 3 distinct teams and submitted to COLING and ACL.

Google Developer Community and IEEE RAS Community   **November 2022- May 2024**
Lead, Data Science Department
• Led the data science division in projects and research; delivered seminars and guided teams in competitions.
• Held 3 recruitment drives with 1200+ applications & interviewed over 200 people to form a competitive team.
• Hackathon Judge: Evaluated 100+ projects for Google's House of Developers Hackathon with revenue of Rs1,00,000.

COMMUNITY INVOLVEMENT:
- Topmate, Mentor (2024 - Present): Guided (1:1) over 500 students toward international internships | research.
- Featured in IEEE-Podcasts & conducted seminars representing Google Communities on AI and Vision
- Punjab Association - Destitute Home for Children Orphanage, Volunteer Educator (Winter 2022, Summer 2023), Provided computer science and mathematics classes to students at an orphanage.
- Developed an open-source debris localizer tested on AUVs towards the UNDP cause of Clean Water.
- Grew to over 40,000 Followers on LinkedIn by guiding and helping students through posts & DMs.