Hasaan Maqsood

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Specializing in machine learning, AI. Experienced in predictive modeling, multimodal data integration, and medical imaging analysis, with a focus on precision oncology and personalized healthcare. Proficient in Python and advanced AI frameworks, with a passion for leveraging data-driven insights to solve complex challenges in biomedical research and healthcare innovation.

Education

Skoltech University **Sep 2023 – Jun 2025**
Master in Data Science *Moscow, Russia*

University of Haripur **Sep 2018 – Aug 2022**
Bachelor's in Computer Science *Kpk, Pakistan*

Research Interests

- Multimodal Data Integration for Precision Oncology
- Machine Learning and Deep Learning in Medical Imaging
- Predictive Modeling for Cancer Recurrence and Treatment Outcomes
- High-Resolution Medical Image Segmentation
- AI-Driven Personalized Healthcare

Skills

- **AI/ML:** Deep Learning, Computer Vision, Transformers, Predictive Modeling, Statistical Analysis
- **Data Science:** Python (PyTorch, TensorFlow, Pandas), SQL, Data Visualization, Big Data Tools
- **Medical AI:** Medical Imaging Analysis, Multimodal Data Integration, Biomedical, MRI/CT Segmentation (MONAI, 3D Slicer), DICOM/NIfTI, Multimodal Fusion
- **Data Science:** Statistical Modeling, Pandas, NumPy, PySpark, Hypothesis Testing
- **Programming:** Python, SQL, Bash
- **Tools:** Git, Docker, Linux
- **Domains:** Computer vision, Healthcare Analytics, Precision Medicine, Biomedical Research, Clinical Decision Support

Experience

Skoltech - BIMAI Lab **Sep 2024 – June 2025**
Research Intern *Moscow, Russia*

- Conducting biomedical AI research at BIMAI-Lab, collaborating on a joint research project with N.N. Blokhin National Medical Research Center of Oncology to develop predictive models for cancer relapse risk assessment.
- Building machine learning models to predict cancer relapse risk using clinical, genomic, and imaging data from oncology patients.
- Developing time-series analysis methods to track disease progression and identify early warning signs of recurrence.
- Contributing to the development of software modules for rare event prediction in medical data, with applications in early detection of cancer recurrence and treatment outcome assessment.
- Collaborating with oncologists at Blokhin Cancer Center to validate models and integrate AI tools into clinical workflows.

NATIONAL UNIVERSITY OF SCIENCES TECHNOLOGY (NUST) **Nov 2022 – Jan 2023**
RESEARCH ASSISTANT *Islamabad, Pakistan*

- Classify fruit diseases with the help of varuious machine learning models on resource constraint devices (Respberry PI, Jetson Nano and Android)
- Incorporated scripts using Python and PowerShell to aggregate XML test results into an organized format and to load the latest build code onto the hardware, so that daily testing can be performed.
- Analysis and compare the model performances
- Proofreading Research Papers and thesis

University of Haripur **Nov 2020 – Nov 2021**
RESEARCH ASSISTANT *Haripur, Pakistan*

- Developed a machine learning-based warning system for waterborne diseases, utilizing patient records and employing Random Forest as the primary predictive model.
- Conducted extensive research on waterborne sample datasets from 2015 to 2022, identifying changes in keywords and distinguishing data analysis techniques used in previous studies.

Artificial Intelligence Research Institute (AIRI) **June 2024 – July 2024**
Research Intern *Moscow, Russia*

- Start working on predictive models for cancer recurrence by integrating multimodal data (MRI/CT imaging, histopathology, EHRs),
- Proposed a novel framework for multimodal data integration, improving patient risk stratification and treatment planning.

Projects

R2GenGPT-GT: Game-Theoretic Multi-Level Alignment for Chest X-Ray Report Generation

- Developing a multi-level game theory framework integrated with R2GenGPT for automated radiology report generation under the supervision of Dr. Saif ur Rehman Khan at the German Research Center for Artificial Intelligence (DFKI).
- Designed cooperative and Stackelberg game formulations to enhance cross-modal alignment, diagnostic reasoning, and structural coherence in medical reports.
- Implemented token-level ternary and disease-level Shapley games to improve interpretability, clinical accuracy, and narrative consistency in AI-generated chest X-ray reports.

NeuroScanAI: Segmentation and Classification of Tumors in MRI Brain Images

- Developed a deep learning framework using U-Net, DeepLabV3+, and EfficientNet for precise tumor segmentation (IoU: 0.87) and classification.
- Enhanced model accuracy through data augmentation and preprocessing, automating tumor detection to improve diagnostic efficiency.
- Improved diagnostic efficiency by automating tumor detection through data augmentation and preprocessing.
- Conducted experiments to enhance classification models' performance by overlaying segmentation masks on MRI data, optimizing precision and recall for clinical decision-making.

SegMed: Implementation of MedSAM Segmentation and Enhancement with FeatUp and GAFL

- Designed an advanced segmentation framework using MedSAM, integrating FeatUp and GAFL to enhance spatial resolution and segmentation accuracy.
- Achieved a 15% improvement in IoU and 46% increase in Dice Score, optimizing spectral feature extraction for brain tumor detection.
- Demonstrated significant clinical workflow improvements through experimentation, enabling faster and more accurate brain tumor diagnosis.
- Optimized spectral feature extraction for brain tumor detection, enabling faster and more accurate diagnosis.

Master's Thesis: MULTIMODAL APPROACHES FOR SPARSE DATA INCANCER RECURRENCE PREDICTION

- Developed predictive models for cancer recurrence by integrating multimodal data, including quantitative MRI/CT imaging, histopathology, and electronic health records.
- Leveraged advanced machine learning and deep learning techniques to enhance prognostic accuracy and identify novel biomarkers.
- Proposed a framework for multimodal data integration in oncology, contributing to improved patient risk stratification and personalized treatment planning.

OMDENA LIVERPOOOL CHAPTER

- Contributed to the Omdena project "Predicting RTC Severity using Machine Learning," focusing on data analysis to derive meaningful insights from extensive UK road incident datasets.
- Played a key role in the project plan, including data preprocessing, conducting Exploratory Data Analysis (EDA) to uncover insights, and feature engineering to create new features based on EDA findings.
- Collaborated with a team to develop predictive models for RTC severity, leveraging machine learning algorithms and techniques to provide actionable information for implementing traffic safety measures.

Publications

- M.H, Hasaan Maqsood, and Other Author. "Machine learning based efficient prediction of positive cases of waterborne diseases." *BMC Medical Informatics and Decision Making*, vol. 11, 2023. View Article
- Hasaan Maqsood, Saif-Ur-Rehman Khan. "MeD-3D: A Multimodal Deep Learning Framework for Precise Recurrence Prediction in Clear Cell Renal Cell Carcinoma (ccRCC)" *Expert Systems With Applications*, Accepted, 2025. arXiv:2507.07839.
- Hasaan Maqsood, Saif-Ur-Rehman Khan. "R2GenGPT-GT: Game-Theoretic Multi-Level Alignment for Chest X-Ray Report Generation." *In Preparation, 2025.*

Conference Papers

- Inzamam Shahzad, Asif Raza, Hasaan Maqsood, Saif-Ur-Rehman Khan, and Ghazanfar Ali. "Towards Robust Breast Cancer Diagnosis: A Hybrid Deep Learning Ensemble Framework." Accepted at *the International Conference on Hybrid Intelligence and Technology (HITE)*, 2025.

Relevant Coursework

- Advanced Machine Learning
- Biomedical Imaging and Analytics
- Deep Learning
- Introduction to Data Science
- Planning Algorithms in Artificial Intelligence
- Transformers in Computer Vision

Languages

- English: Fluent (Professional working proficiency)

Certifications

- **Machine Learning** - Date: May 21, 2021
  Stanford University (Coursera)
- **Crash Course on Python** - Date: July 2, 2021
  Google (Coursera)
- **Programming for Everybody (Getting Started with Python)** - Date: August 9, 2021
  University of Michigan (Coursera)
- **Exploratory Data Analysis for Machine Learning** - Date: December 23, 2021
  IBM (Coursera)
- **Introduction to TensorFlow for Artificial Intelligence, Machine Learning, and Deep Learning** - Date: August 9, 2021
  Deeplearning.ai (Coursera)
- **Foundations of Project Management** - Date: April 7, 2022
  Google (Coursera)