Hasan Shaikh

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Research Interests:
Radiomics | Auto-segmentation | LLM
Adaptive-Radiotherapy | AI & ML
Deep Learning | Radiation Oncology

LinkedIn: linkedin.com/in/hasan
GitHub: github.com/hash123shaikh
Portfolio: hash123shaikh.github.io
Scholar: Hasan Scholar Profile

Work Experience

Quantitative Imaging Research and Artificial Intelligence Lab (QIRAIL) Tamil Nadu, India
Project Assistant, *Christian Medical College (CMC) Vellore, Dept. of Radiation Oncology* *Aug. 2024 – Present*

[P1] Radiomics-Based Risk Stratification in Head and Neck Cancer

- **Addressed clinical need**: Current risk stratification inadequately predicts locoregional recurrence in HNC patients, motivating the development of improved prediction models using radiomics features.
- **Conducted systematic comparison** of 8 metaheuristic feature selectors (e.g., PSO, GA, GWO etc.) across multiple classifiers on 367 patients to identify optimal approaches for high-dimensional radiomics data.
- **Developed interpretable prediction model**: 10-feature signature (4 clinical + 6 radiomics) achieved **AUC 0.81 (95% CI: 0.62-0.95)** on held-out test set while maintaining clinical interpretability.
- **Provided mechanistic insights**: Analyzed why larger feature sets underperformed due to overfitting and validated biological plausibility of selected features with oncology collaborators.

[P2] Reproducibility Study: CNN-Based Head and Neck Cancer Prognosis (GitHub)

- **Challenged reproducibility claims** of published CNN model by attempting complete replication across three HNC outcomes (distant metastasis, locoregional failure, overall survival).
- **Identified major dataset and documentation issues**: Incorrectly provided datasets, multiple errors in data files, inadequate result reporting protocols, and poor documentation that contradicted reproducibility claims.
- **Successfully reproduced results** despite paper's flaws by correcting dataset errors, implementing missing preprocessing steps, and establishing proper validation protocols.
- **Authors acknowledged reproducibility failures**: Communicated findings that led to author recognition of dataset errors and documentation inadequacies in their published work.

[P2] CHAVI: CompreHensive Digital ArchiVe of Cancer Imaging – India's First National Oncology Imaging Biobank

- Contributed to CHAVI, a national biobank led by Tata Memorial Centre and IIT Kharagpur.
- Curated and uploaded **304+ anonymized HNC cases** with validated clinical/imaging metadata.
- Built **automated pipelines** ensuring compliance with **FAIR principles (Findable, Accessible, Interoperable, and Reusable)** and interoperability for multi-institutional research.

[P3] CT-based Automated Segmentation of Head and Neck Cancer Using 3D CNNs (Collaboration with NIT Surathkal, India)

- Curated and de-anonymized multi-institutional datasets (**167 cases**: 137 MAASTRO public + 30 CMC private), ensuring data quality and harmonization for model training and validation.
- 3D nnU-Net segmentation model achieving **Global Dice scores: 0.62 (HN1), 0.63 (CMC), 0.65 (combined)** demonstrating the feasibility of a CT-only approach in resource-limited settings.

[P4] Large-Scale Imaging and Clinical Data Curation for Prospective Trials (DBT/Wellcome Trust India Alliance, India)

- Contributed to a **DBT/Wellcome Trust India Alliance–funded prospective study** (2020–2025), supporting the collection, curation, and quality assurance of imaging and clinical data from ∼**1700 patients**.
- Designed an **end-to-end radiomics pipeline**: DICOM retrieval (Orthanc), GTV-P segmentation (Citric), PyRadiomics-based extraction, enabling reproducible model training.

- Helped coordinate data annotation workflows and implemented automated AWS S3 pipelines for secure cloud backups and data recovery.
- Drafted the **NVIDIA Academic Grant Proposal**, justifying infrastructure needs for in-house deployment of large-scale deep learning models in clinical environments.

STARlab Capital Lucknow, India
Research Analyst *Dec. 2023 – June 2024*

- Designed, backtested, and deployed volatility-based strategies (e.g., Nebula, ARUT, A2) using **OptionNet Explorer, Mesosim, OptiTrade, OptiBot** tools.
- Enhanced the ARUT strategy, increasing ROI by **52.38%** through scenario-driven optimization and real-time feedback.
- Refined internal platforms: improved trade logs, added dynamic filters, and led contributions to [OptiTrade's open-source GitHub repo].

Publications

Hasan Shaikh and Rashid Ali, *"Cancer Survival Prediction Using Artificial Intelligence: Current Status and Future Prospects",* Data Science in the Medical Field, Academic Press, Elsevier, 2024. ISBN-13: 978-0-443-24029-4. DOI: 10.1016/B978-0-443-24028-7.00016-7. [Book Chapter]

Hasan Shaikh, Amal Joseph Varghese, Hannah Mary Thomas T et al., *"Can CT Radiomics Predict Recurrence in Head and Neck Cancer? Early Results from a Prospective Imaging Trial",* 14th Research Day at Christian Medical College, Vellore, Tamil Nadu, India, 2024. [Poster]

Piyus Prabhanjans, Asjad Nabeel P, Aparna V K, Rajendra Benny Kuchipudi, Hannah Mary Thomas T, Balu Krishna S, **Hasan Shaikh**, Amal Joseph Varghese, Simon Pavamani, Jeny Rajan, *"Automated Segmentation of Head and Neck Cancer from CT Images Using 3D Convolutional Neural Networks",* International Conference on Artificial Intelligence for Healthcare, AIHC, 2025. [Under Submission] (Paper)

Hasan Shaikh, Amal Joseph Varghese, Balu Krishna S, Julia Priyadarshini Rao, Ezhil Sindhanai, Rajendra Benny Kuchipudi, Manu Mathew, Jino Wilson Victor, Rajesh I, Simon Pavamani, and Hanny Mary Thomas T, *"Before We Treat, Can We Tell? A Locoregional Recurrence Signature in Head & Neck",* 15th Research Day at Christian Medical College, Vellore, Tamil Nadu, India, 2025. (Abstract)

Hasan Shaikh, Hannah Mary Thomas T, Rajendra Benny Kuchipudi, Balu Krishna S, Simon Pavamani, *"Metaheuristic-Driven Machine Learning Pipelines for Radiomics-Based Prediction of Locoregional Recurrence in Head and Neck Cancer",* International Conference on Artificial Intelligence for Healthcare, AIHC, 2025. [Under Submission]

Hasan Shaikh and Rashid Ali, *"A Prognosis Prediction of Breast Cancer using Multimodal Gated Attention Convolution Neural Network by integrating Multi-dimensional Data (MGAttCNNMD)"* [Under Preparation]

Projects

Multimodal Data Analytics for Predicting the Survival of Cancer Patients Aligarh, India
Advisor: Prof. Rashid Ali, Aligarh Muslim University (Thesis) *Aug. 2022 – Nov. 2023*

- Implement a deep learning architecture, **Multimodal Gated Attention Convolution Neural Network (MGAttCNNMD)**, for cancer survival prediction using heterogeneous data types.
- Integrated clinical, gene expression, and copy number alteration data from the METABRICS dataset, achieving a prediction accuracy of **91.2%**.

Study of AI Tools & Techniques for Legal Text Processing Aligarh, India
Advisor: Prof. Nesar Ahmad, Aligarh Muslim University *Apr. 2022 – Jul. 2022*

- Explored AI-based approaches for improving the efficiency of legal document summarization and retrieval.
- Applied topic modeling using **Latent Dirichlet Allocation (LDA)** to identify key topics within lengthy legal texts.
- Built an abstractive summarization tool to generate concise summaries of legal documents, enhancing decision-making for legal professionals.

Technical Skills

Programming Languages	: Python, Java, SQL (Postgres), HTML, CSS
Frameworks	: TensorFlow, PyTorch, Keras, Flask
Tools & Platforms	: Docker, Orthanc PACS, XNAT, Git, GitHub Actions, CTP, 3D Slicer
Data Science & ML	: Radiomics, Feature Selection, Predictive Modelling, Deep Learning
Other Skills	: Data Management, S3 Bucket, SQL, Bash, YAML, JSON, XML
Collaboration	: Project Management, Cross-Functional Collaboration

Education

Master of Technology in Computer Engineering — Nov. 2021 – Nov. 2023
Aligarh Muslim University (AMU), ***CGPA: 8.80 / 10.00*** — *Aligarh, India*

Bachelor of Technology in Computer Science and Engineering — Aug. 2017 – Jul. 2021
Dr. A.P.J. Abdul Kalam Technical University (AKTU), ***CGPA: 8.04 / 10.00*** — *Lucknow, India*

Academic Achievements & Honors

Third Prize, Oral Presentation at the 2nd National Symposium on Health Data and AI (March 2025) – Presented *"Automated Segmentation of Head and Neck Cancer from CT Images Using 3D nnU-Net"* and was awarded by the BioMedical Informatics Unit, CMC Vellore.

Honors Degree awarded for exceptional academic performance, ranking in the top 1% out of 128 students in the undergraduate engineering program.

Completed NPTEL courses conducted by IITs (Elite + Silver Certified):

- Data Analytics with Python (80%) (Link)
- Essential Mathematics for Machine Learning
- Deep Learning
- Python for Data Science (78%) (Link)
- Machine Learning
- Demystifying the Brain (Link)

Workshop/Conference Attended

1. Participated and served as part of the Organizing Team for the **2nd Annual Winter Symposium on Health Data and AI**, conducted by Biomedical Informatics Unit, Christian Medical College (CMC) Vellore, Tamil Nadu, India (March 13–15, 2025). (Link)
2. Attended the Continuing Medical Education (CME) program on **Revolution and Precision in Radiation Oncology**, Ida B. Scudder Cancer Center, Christian Medical College (CMC) Vellore, Tamil Nadu, India (March 1, 2025). (Link)
3. Participated in the **14th Annual Research Day**, organized by the Office of Research, Christian Medical College (CMC) Vellore, Tamil Nadu, India (October 24–25, 2024). (Link)
4. **AI & ML for Engineering & Social Sciences Research**, 2023 IEEE Computational Intelligence Society (CIS) Summer School, organized by Malaviya National Institute of Technology Jaipur (MNIT) Jaipur, India, 4 – 8 Sep. 2023. (Link)
5. **7th Summer School on AI with Focus on Computer Vision & ML**, coordinated by International Institute of Information Technology (IIIT) Hyderabad, India, 1 – 31 Aug. 2023. (Link)
6. **Emerging Research Trends in Computational Intelligence Techniques to Address Challenges in Biomedical Data and Imaging**, 2022 IEEE CIS Summer School, organized by National Institute of Technology (NIT) Arunachal Pradesh, India, 7 – 11 Nov. 2022. (Link)