

Hussain Ahmad Madni

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 Homepage

 hussain-ahmad

Research Interest

I am interested in addressing data and model heterogeneity challenges in cross-domain learning, with a focus on medical imaging and semantic segmentation. My research centers on advanced deep learning methods for medical image analysis, particularly segmentation and disease classification. Ultimately, I aim to develop robust AI-driven diagnostic tools to support clinical decision-making in healthcare.

Education

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| 2022 – 2024 |  PhD , Computer Science and Artificial Intelligence, University of Udine, Italy.
Research Topic: <i>Data and Model Privacy in Cloud Computing using Federated Learning</i> . |
| 2017 – 2018 |  MS , Computer Science, COMSATS University Islamabad, Pakistan.
Thesis title: <i>Intrusion Detection System Using Deep Learning</i> . |
| 2010 – 2014 |  BSc , Computer System Engineering, The Islamia University of Bahawalpur, Pakistan.
Thesis title: <i>Targeted Malicious Email Detection using Machine Learning</i> . |
| 2008 – 2010 |  Intermediate (FSc Pre-Engineering) , BISE, D. G. Khan, Pakistan.
Main Courses: <i>Mathematics, Physics, Chemistry, and English</i> . |
| 2005 – 2007 |  Matriculation (Science) , BISE, D. G. Khan, Pakistan.
Main Courses: <i>Mathematics, Physics, Chemistry, Biology, and English</i> . |

Professional Experience

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| 2025 |  Postdoctoral Researcher University of Udine, Italy. |
| 2019 – 2021 |  Research Assistant COMSATS University Islamabad, Pakistan. |
| 2015 – 2019 |  Software Engineer Integrated Dynamic Solutions (IDS), Rawalpindi, Pakistan. |

Research Publications

Journal Articles

- 1 **H. A. Madni**, H. Shujat, A. De Nardin, S. Zottin, and G. L. Foresti, “Fsbad: Data-efficient feature reconstruction for few-shot brain anomaly detection,” *Pattern Recognition Letters*, 2025.  DOI: [10.1016/j.patrec.2025.11.016](https://doi.org/10.1016/j.patrec.2025.11.016).
- 2 **H. A. Madni**, H. Shujat, A. De Nardin, S. Zottin, and G. L. Foresti, “Unsupervised brain mri anomaly detection via inter-realization channels,” *International Journal of Neural Systems*, 2025.  DOI: [10.1142/S0129065725500479](https://doi.org/10.1142/S0129065725500479).
- 3 **H. A. Madni**, R. M. Umer, S. Zottin, C. Marr, and G. L. Foresti, “Fl-w3s: Cross-domain federated learning for weakly supervised semantic segmentation of white blood cells,” *International Journal of Medical Informatics*, p. 105 806, 2025.  DOI: [10.1016/j.ijmedinf.2025.105806](https://doi.org/10.1016/j.ijmedinf.2025.105806).
- 4 **H. A. Madni**, R. M. Umer, and G. L. Foresti, “Exploiting data diversity in multi-domain federated learning,” *Machine Learning: Science and Technology*, vol. 5, no. 2, p. 025 041, 2024.  DOI: [10.1088/2632-2153/ad4768](https://doi.org/10.1088/2632-2153/ad4768).
- 5 **H. A. Madni**, R. M. Umer, and G. L. Foresti, “Robust federated learning for heterogeneous model and data,” *International Journal of Neural Systems*, 2024.  DOI: [10.1142/S0129065724500199](https://doi.org/10.1142/S0129065724500199).
- 6 **H. A. Madni**, R. M. Umer, and G. L. Foresti, “Blockchain-based swarm learning for the mitigation of gradient leakage in federated learning,” *IEEE Access*, vol. 11, pp. 16 549–16 556, 2023.  DOI: [10.1109/ACCESS.2023.3246126](https://doi.org/10.1109/ACCESS.2023.3246126).

- 7 H. A. Madni, R. M. Umer, and G. L. Foresti, "Swarm-fhe: Fully homomorphic encryption based swarm learning for malicious clients," *International Journal of Neural Systems*, 2023. DOI: [10.1142/S0129065723500338](https://doi.org/10.1142/S0129065723500338).
- 8 F. Abdullah, R. Imtiaz, H. A. Madni, et al., "A review on glaucoma disease detection using computerized techniques," *IEEE Access*, vol. 9, pp. 37 311–37 333, 2021. DOI: [10.1109/ACCESS.2021.3061451](https://doi.org/10.1109/ACCESS.2021.3061451).
- 9 K. Naveed, F. Abdullah, H. A. Madni, M. A. Khan, T. M. Khan, and S. S. Naqvi, "Towards automated eye diagnosis: An improved retinal vessel segmentation framework using ensemble block matching 3d filter," *Diagnostics*, vol. 11, no. 1, 2021, ISSN: 2075-4418. DOI: [10.3390/diagnostics11010114](https://doi.org/10.3390/diagnostics11010114).
- 10 M. Raza, K. Naveed, A. Akram, et al., "Davs-net: Dense aggregation vessel segmentation network for retinal vasculature detection in fundus images," *Plos one*, vol. 16, no. 12, e0261698, 2021. DOI: [10.1371/journal.pone.0261698](https://doi.org/10.1371/journal.pone.0261698).
- 11 M. Tabassum, T. M. Khan, M. Arsalan, et al., "Cded-net: Joint segmentation of optic disc and optic cup for glaucoma screening," *IEEE Access*, vol. 8, pp. 102 733–102 747, 2020. DOI: [10.1109/ACCESS.2020.2998635](https://doi.org/10.1109/ACCESS.2020.2998635).

Conference Proceedings

- 1 H. A. Madni, R. M. Umer, and G. L. Foresti, "Federated learning for data and model heterogeneity in medical imaging," in *International Conference on Image Analysis and Processing*, Springer, 2023, pp. 167–178. DOI: [10.1007/978-3-031-51026-7_15](https://doi.org/10.1007/978-3-031-51026-7_15).
- 2 A. Ahmed, A. Manzoor, A. Khan, et al., "Performance measurement of energy management controller using heuristic techniques," in *Complex, Intelligent, and Software Intensive Systems: Proceedings of the 11th International Conference on Complex, Intelligent, and Software Intensive Systems (CISIS-2017)*, Springer, 2018, pp. 181–188. DOI: [10.1007/978-3-319-61566-0_17](https://doi.org/10.1007/978-3-319-61566-0_17).
- 3 H. A. Madni, Z. Anwar, and M. A. Shah, "Data mining techniques and applications — a decade review," in *2017 23rd International Conference on Automation and Computing (ICAC)*, 2017, pp. 1–7. DOI: [10.23919/IConAC.2017.8082090](https://doi.org/10.23919/IConAC.2017.8082090).

Skills

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| Languages | English, Urdu. |
| Coding | Python, Java, C++, PHP, SQL, ... |
| Databases | Oracle, MySQL, PostgreSQL. |
| Web Dev | HTML, CSS, JavaScript, Apache Web Server, Tomcat Web Server. |
| Misc. | Academic research, teaching, training, L ^A T _E X typesetting and publishing. |

Certification

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| 2024 | Oxford Machine Learning Summer School, Oxford, UK. |
| 2023 | International Computer Vision Summer School (ICVSS2023), Sicily, Italy. |
| 2022 | International Summer School on Artificial Intelligence, University of Udine, Italy. |
| 2014 | Professional Software Development, Aptech Education, Pakistan. |

Awards and Achievements

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| 2021 | MIUR, Italy Scholarship for PhD in Computer Science and Artificial Intelligence. |
| 2017 | PEEF, Pakistan Scholarship for a Master's in Computer Science. |

Awards and Achievements (continued)

2011  **Merit Scholarship**, ICT R&D Fund, Pakistan for Bachelor in Computer System Engineering.