

Hussain Ahmad Madni

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🎓 Hussain Ahmad Madni

🌐 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

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






Professional Experience

- 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](#).
- 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](#).
- 3 **H. A. Madni**, R. M. Umer, S. Zottin, C. Marr, and G. L. Foresti, "FI-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](#).
- 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](#).
- 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](#).
- 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](#).

- 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.
- 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.
- 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.
- 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.
- 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.

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.
- 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.
- 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.



Skills

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, \LaTeX typesetting and publishing.

Certification

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

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.