

# Hussain Ahmad Madni

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🎓 Hussain Ahmad Madni

🌐 Homepage

🌐 hussain-ahmad

## Research Interest

I am interested in investigating the challenges posed by data and model heterogeneity in cross-domain learning scenarios, particularly within the context of medical imaging and semantic segmentation. My research explores advanced deep learning architectures for medical image analysis, especially white blood cell segmentation and disease classification tasks. The overarching goal is to contribute to the development of robust AI-driven diagnostic tools that can support and enhance decision-making in clinical healthcare applications.

## 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.
- 2018 – 2019 **Sr. Software Engineer** SK Technologies, Islamabad, Pakistan.
- 2015 – 2017 **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, "Unsupervised brain mri anomaly detection via inter-realization channels," *International Journal of Neural Systems*, 2025. [DOI](#): 10.1142/S0129065725500479.
- 2 **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. 105806, 2025. [DOI](#): 10.1016/j.ijmedinf.2025.105806.
- 3 **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. 025041, 2024. [DOI](#): 10.1088/2632-2153/ad4768.
- 4 **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.
- 5 **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. 16549–16556, 2023. [DOI](#): 10.1109/ACCESS.2023.3246126.

- 6 **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.
- 7 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.
- 8 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.
- 9 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.
- 10 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, $\text{\LaTeX}$ typesetting and publishing. |

## Certification

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

## Awards and Achievements

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

## Awards and Achievements (continued)

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