

PERSONAL INFORMATION **Muhammad Suffian**JOB APPLIED FOR **Explainable Artificial Intelligence in Contesto Urbano (CTE SQUARE PESARO)**

## EDUCATION AND TRAINING

2020–2024 (Expected) **Ph.D. Research Methods in Science and Technology - Formal Models, Data Analysis and Scientific Computing**

Dept. of Pure and Applied Sciences, University of Urbino Carlo Bo, Urbino, Italy

PhD-Thesis Title: "Generation and Evaluation of Human-centered Counterfactual Explanations in Explainable AI"

Research Interests: Explainable Artificial Intelligence, Human-centered AI, Counterfactual Explanations, Interpretable AI, Machine Learning, Problem-Solving, Cognitive Learning

Ongoing Projects:

XAI-Game: Alien Fitness Hub, A Gamified User Study to Evaluate User Feedback-based Counterfactual Explanations.

CL-XAI: Toward enriched Cognitive Learning with eXplainable Artificial Intelligence.

UFCE: User Feedback-based Counterfactual Explanations (under review).

2016–2018 **Master of Science in Computer Science**

Dept. of Computer Science, Mohammad Ali Jinnah University, Karachi, Pakistan

Thesis: Formulating Patient descriptions to support Evidence based Medicine with ML

Grade: 3.67/4.0 CGPA

2012–2015 **Bachelor of Science in Computer Science**

Dept. of Computer Science, Sukkur IBA University, Sukkur, Pakistan

Project: Remote Patient Information Monitoring for Vital Signs

Grade: 3.22/4.0 CGPA

Traineeship: Microsoft Innovation Center, Lahore (2-months)

## WORK EXPERIENCE

2022 – 2023 **Internship-Mobility Abroad**Feb 2022 – May 2022 **CITIUS (Centro Singular de Investigación en TecnoloXias Intelixentes), Santiago, Spain**

Investigated the explainable methods for recreation of a counterfactual XAI method.

Mainly, research work revolved around exploring cutting-edge XAI techniques, striving to create XAI models that provide clear explanations with a particular emphasis on human-in-the-loop methodologies.

- Jul 2023 – Oct 2023 CiTIUS (Centro Singular de Investigación en Tecnoloxías Intelixentes), Santiago, Spain  
The design and development of CL-XAI and XAI-Game for conducting the user study to evaluate how humans understand and appreciate counterfactual explanations.
- Jan 2020 – Jan 2021 **Lecturer Computer Science**  
NU-FAST National University of Computer and Emerging Sciences, Faisalabad, Pakistan  
Taught various bachelor level computer science courses including Applied Programming, Information Processing Techniques, and Machine Learning.
- Jan 2018 – Jan 2020 **Lecturer Computer Science**  
Mohammad Ali Jinnah University, Karachi, Pakistan  
Taught various bachelor level computer science courses including Computer Programming, Information Processing Techniques, and Machine Learning.

## PUBLICATIONS

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### Accepted–Forthcoming

- XAI.it–2023 **Suffian Muhammad**, Ilija Stepin, Jose Maria Alonso-Moral, and Alessandro Bogliolo, "Investigating Human-Centered Perspectives in Explainable Artificial Intelligence", in "4th Italian Workshop on Explainable AI co-located with AI\*IA".
- CIFMA–2023 **Suffian Muhammad**, Ulrike Kuhl, Jose Maria Alonso-Moral, and Alessandro Bogliolo, "CL-XAI: Toward enriched Cognitive Learning with eXplainable Artificial Intelligence", in "5th International Workshop on Cognition: Interdisciplinary Foundations, Models and Applications".
- ICCIDA–2023 **Suffian Muhammad** "How does XAI-assisted Decision-making Steer Human Behaviour", in "2nd International Conference on Computing, IoT, and Data Analytics".
- IEEE CIM–2023 Ilija Stepin, **Suffian Muhammad**, Alejandro Catala and Jose M. Alonso-Mora, "How to build self-explaining fuzzy systems: From interpretability to explainability", in *Artificial Intelligence eXplained (AI-X)*.
- ECML-PKDD–2023 Christel Sirocchi, Federica Biancucci, **Muhammad Suffian**, Riccardo Benedetti, Matteo Donati, Stefano Ferretti, Alessandro Bogliolo, Mauro Magnani, Michele Menotta, and Sara Montagna. "Molecular Fingerprints-based Machine Learning for Metabolic Profiling", in MARBLE: Machine Learning and Artificial Intelligence for Biologics Engineering at ECML-PKDD 2023.
- CIBB–2023 Riccardo Benedetti, Sara Montagna, **Muhammad Suffian**, Alessandro Bogliolo, Stefano Ferretti, Barbara Canonico, Stefano Papa, and Claudio Ortolani, "Supervised Machine Learning for Automating Cellular Population Extraction in Flow Cytometry", in Proceedings of the 18th Conference on Computational Intelligence Methods for Bioinformatics & Biostatistics (CIBB 2023).
- HC@AI–2023 Christel Sirocchi, Federica Biancucci, Matteo Donati, Nunzio D'Amore, Riccardo Benedetti, Alessandro Bogliolo, Stefano Ferretti, Mauro Magnani, Michele Menotta, **Muhammad Suffian**, Sara Montagna, "Machine Learning-Enabled Prediction of Metabolite Response in Genetic Disorders", in 2nd AIXIA Workshop on Artificial Intelligence For Healthcare.

## Published

- IEEE Access–2022 **Suffian, M.**, Graziani, P., Alonso, J.M. and Bogliolo, A., 2022. "FCE: Feedback based counterfactual explanations for explainable AI". IEEE Access, 10, pp.72363-72372.
- IEEE Explore–2022 **M. Suffian**, M. Y. Khan and A. Bogliolo, "Towards Human Cognition Level-based Experiment Design for Counterfactual Explanations," 2022 Mohammad Ali Jinnah University International Conference on Computing (MAJICC), Karachi, Pakistan, 2022, pp. 1-5, doi: 10.1109/MAJICC56935.2022.9994203.
- CEUR.WS–2022 **Suffian, Muhammad**, and Alessandro Bogliolo. "Investigation and Mitigation of Bias in Explainable AI." CEUR-workshop, Vol-3319, paper-9, (2022).
- CEUR.WS–2022 **Suffian, Muhammad**, Sara Montagna, Alessandro Bogliolo, Claudio Ortolani, Stefano Papa, and Mario D'Atri. "Machine Learning for Automated Gating of Flow Cytometry Data." In CEUR WORKSHOP PROCEEDINGS, vol. 3307, pp. 47-56. Sun SITE Central Europe, RWTH Aachen University, 2022.
- IEEE Explore–2022 A. Basit, M. Y. Khan, S. S. Ali, **M. Suffian**, A. Wajid and S. Khan, "Gender Classification Using Smartphone Sensors and Machine Learning Approaches," 2022 Mohammad Ali Jinnah University International Conference on Computing (MAJICC), Karachi, Pakistan, 2022, pp. 1-6, doi: 10.1109/MAJICC56935.2022.9994132.
- IEEE Access–2021 T. Ahmed, **M. Suffian**, M. Y. Khan and A. Bogliolo, "Discovering Lexical Similarity Using Articulatory Feature-Based Phonetic Edit Distance," in IEEE Access, vol. 10, pp. 1533-1544, 2022, doi: 10.1109/ACCESS.2021.3137905.
- Complexity–2021 Khan, Muhammad Yaseen, Abdul Qayoom, **Muhammad Suffian**, Muhammad Shoaib Siddiqui, Shaikat Wasi, and Syed Muhammad Khaliq-ur-Rahman Raazi. "Automated prediction of Good Dictionary EXamples (GDEX): a comprehensive experiment with distant supervision, machine learning, and word embedding-based deep learning techniques." Complexity 2021 (2021): 1-18.
- Springer–2020 **Muhammad Suffian**, Khan, M.Y., Ahmed, T. (2020). Towards a Generic Approach for PoS-Tagwise Lexical Similarity of Languages. In: Intelligent Technologies and Applications. INTAP 2019. Communications in Computer and Information Science, vol 1198. Springer, Singapore. [https://doi.org/10.1007/978-981-15-5232-8\\_42](https://doi.org/10.1007/978-981-15-5232-8_42).
- MAJICC–2021 S. Shaikh, M. Y. Khan and **M. Suffian**, "Using Patient Descriptions of 20 Most Common Diseases in Text Classification for Evidence-based Medicine," Mohammad Ali Jinnah University International Conference on Computing (MAJICC), Karachi, Pakistan, 2021, pp. 1-8, doi: 10.1109/MAJICC53071.2021.9526252.
- IJACSA–2020 **Muhammad Suffian**, Tafseer Ahmed, and Muhammad Yaseen Khan. "Hindustani or hindi vs. urdu: A computational approach for the exploration of similarities under phonetic aspects." International Journal of Advanced Computer Science and Applications 11, no. 11 (2020).
- ICISCT–2020 Khan, Muhammad Yaseen, and **Muhammad Suffian**. "Urdu sentiment corpus (v1. 0): Linguistic exploration and visualization of labeled dataset for urdu sentiment analysis." In International Conference on Information Science and Communication Technology (ICISCT), pp. 1-15. IEEE, 2020.
- IJACSA–2018 **Suffian, Muhammad**, Muhammad Yaseen Khan, and Shuakat Wasi. "Developing disease classification system based on keyword extraction and supervised learning". In International Journal of Advanced Computer Science and Applications 9, no. 9 (2018).

**PERSONAL SKILLS**

Mother tongue Urdu

**Other languages**

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	C2	C2	C1	C1	C1
Italian	A2	A2	A2	A1	A1

Levels: A1 and A2: Basic user – B1 and B2: Independent user – C1 and C2: Proficient user  
Common European Framework of Reference for Languages

**Communication skills**

- team work: I have worked in various types of teams from research teams to student advisory teams. I have initiated discussions among the advisors as an advisory member for student counselling.
- mediating skills: I served as an advisor for the Programming Societies, where I mediated group discussions and facilitated multiple groups of students in problem solving and developing software solutions.
- intercultural skills: I have been working in an international environment since 2018 when I first participated in international workshop organised by DAAD Germany, later I started my PhD in Italy and also worked in Spain during mobility abroad.

**Digital competences**

SELF-ASSESSMENT				
Information Processing	Communication	Content creation	Safety	Problem solving
Proficient user	Independent user	Proficient user	Independent user	Proficient user

Digital competences - Self-assessment grid

**Computer skills**

- LIME, SHAP, What-If Tool, Alibi.
- Python, Java, C++/.NET, R.
- Scikit-learn, TensorFlow, Keras, PyTorch, RapidMiner, Weka.
- Data mining, statistical analysis, and data visualization (NumPy, SciPy, Pandas, Matplotlib).
- SQL/MySQL
- Git, github
- JS/HTML
- MS Office Packages

**Other skills**

Due to time management and planning skills, I adeptly balanced conference schedules, academic commitments, and sightseeing opportunities, maximising my learning experience while immersing myself in diverse cultural environments. My meticulous planning and organisational prowess facilitated seamless transitions between academic pursuits and cultural exploration, showcasing my ability to manage complex logistical challenges effectively.