Dr. Adeel Zafar

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EDUCATION

2014-2020: **Doctor of Philosophy in Computer Science** from National University of Computer and Emerging Sciences, ISB
Focus: General Video Game Level Generation using Machine Learning and Deep Learning

2010-2013: **Master of Science in Computer Science** from National University of Computer and Emerging Sciences, ISB
Focus: Procedural Content Generation using Evolutionary Algorithms

EMPLOYMENT

Postdoc Researcher in Machine Learning (Current Position) at Halmstad University, Sweden, Feb 2025 to present

- I am currently working on the different projects at Halmstad University, where I contribute to the development of AI and ML models that extract actionable insights from unlabelled industrial data. My work focuses on optimizing asset performance and enhancing predictive maintenance for complex equipment such as trucks, and pumps. I collaborate within an industry-academia partnership to drive innovation and improve operational efficiency in various industrial sectors.

Associate Professor at Riphah International University, Islamabad, Pakistan, Sep 2019 to Jan 2025

- I taught undergraduate and graduate courses for the BS in Computer Science and the MS in Data Science programs. I also conducted research in the fields of machine learning, healthcare, and procedural content generation for games. Additionally, I served as the Head of the Department at the Riphah Institute of Systems Engineering.

Senior Machine Learning Engineer at Paradigm Networks, USA, Dec 2023 to Jan 2025

- **Policy Engine**
  Designed and developed a Named Entity Recognition (NER)-based system as part of a larger product utilizing large language models (LLMs) to enforce policy compliance. Trained and fine-tuned domain-specific models for diverse areas, including personal information, healthcare, finance, and source code, ensuring high accuracy and adaptability. I also deployed the trained models to the Paradigm Network application, enabling seamless integration and policy application. In addition to that, I was also leading and managing the team responsible for data labeling.
- **AI Model Security Specialist (Red Teaming)**
  As a Red Team Lead, I performed security evaluations on policy engines and RAG functionalities. My main task was to identify vulnerabilities and test resilience through adversarial scenarios, including prompt injection and data manipulation. I assessed model responses for policy compliance and collaborated with cross-functional teams to provide actionable insights.

Senior Machine Learning Engineer at Scenarios Limited, Lahore, Pakistan Feb 2023 to Jan 2024

- **Relo Radar**
  Relo Radar is a website for property sales and purchases in the USA. I contributed as part of the AI team responsible for the recommendation system and chatbot. I developed a metric

to rank users based on behavior and proposed next steps using a custom recommendation algorithm.

- **Zoonova ChatBot**
  Collaborated with Zoonova, a technology company specializing in AI and machine learning for financial markets, to develop a chatbot using ChatGPT and Langchain. The chatbot was designed to understand stock data and provide precise, customer-facing insights.
- **Reel-AI**
  Developed a mobile application leveraging Stable Diffusion and DeepFake technologies to create engaging and entertaining content. Generated custom avatars based on prompts using Stable Diffusion, and seamlessly integrated them into videos via DeepFake models.

Data Scientist at SquareKnot, Canada, May 2022 to Jan 2023

- **Behavior Monitoring from Click Stream Data**
  Worked with a Canada-based start-up to design and implement a behavior monitoring system. My role involved understanding the project concept and assessing its feasibility during the initial phase. Subsequently, I utilized AWS services to store data in an S3 bucket, crawled it using AWS Glue, and applied queries with AWS Athena. The final processed dataset was used to apply machine learning techniques, enabling actionable insights and predictions.

Adjunct Professor at Pak-Austria Fachhochschule Institute of Applied Sciences and Technology, Haripur Pakistan, November 2021 to Feb, 2022

- I taught undergraduate and graduate courses in the BS Computer Science and MS Data Science programs.

Research Fellow at Tandon School of Engineering, New York University, USA, Sep 2018 to Jan 2019

- I was a research fellow at the Game Development Lab at NYU. I conducted research in the area of Procedural Content Generation in games and authored research papers on this topic.

Lecturer at Riphah International University, Islamabad, Pakistan, Mar 2012 to Aug 2018

- I taught undergraduate courses for the BS in Software Engineering program. Additionally, I supervised BS students for the final year projects.

Software Developer at Pakistan Revenue Automation Limited, Islamabad, Pakistan, Mar 2010 to Jan 2011

- As a software developer, I designed and developed web systems for Pakistan Revenue Automation Limited. The software products primarily focused on tax and audit-related applications.

SKILLS

Python, Pytorch, GenAI, Langchain, Keras, LATEX

IMPACT FACTOR JOURNAL PUBLICATIONS

Saud Sohail, Syed Muhammad Sajjad, **Adeel Zafar**, Zafar Iqbal, Zia Muhammad, and Muhammad Kazim. "Deepfake Image Forensics for Privacy Protection and Authenticity Using Deep Learning." *Information*, 16, no. 4: 270, (2025).

Atta Ur Rahman, Yousef Alsenani, **Adeel Zafar**, Kalim Ullah, Khaled Rabie, Thokozani Shongwe. "Enhancing heart disease prediction using a self-attention-based transformer model." *Nature Scientific Reports*, (2024).

Ifthikhar, Nimra, Ahthasham Sajid, **Adeel Zafar**, Atta Ur Rahman, Rida Malik, and Hamza Razzaq. "A Comprehensive Study on Phishing Attack Detection and Mitigation via Ransomware-as-a-Service (RAAS)." In *The Nucleus*, 61(2), pp. 93-100, (2024).

Ibrahim Shehzad, **Adeel Zafar**. "Breast Cancer CT-Scan Image Classification Using Transfer Learning." *SN Computer Science*, 4-789 (2023).

Tauseef Baig, Najla, **Adeel Zafar**, Muhammad Zubair, Saad Naeem Zafar. "Improving Prediction of One-Year Mortality of Acute Myocardial Infarction Using Machine Learning Techniques." *International Journal of Medical Engineering and Informatics*, (2023).

Azka Kishwar, **Adeel Zafar**. "Fake news detection on Pakistani news using machine learning and deep learning." *Expert Systems with Applications*, (2022).

Muhammad Abu Talha, **Adeel Zafar**. "Scrutinize Artificial Intelligence Algorithms for Pakistani and Indian Parody Tweets Detection." *Journal of Intelligent and Fuzzy Systems*, (2022).

Bilal Aslam, **Adeel Zafar**, Umar Khalil. "Comparative analysis of multiple conventional neural networks for landslide susceptibility mapping." *Natural Hazards*, (2022).

Bilal Aslam, **Adeel Zafar**, Umar Khalil. "Comparison of multiple conventional and unconventional machine learning models for landslide susceptibility mapping of Northern part of Pakistan." *Environment Development Sustainability*, (2022).

Bilal Aslam, **Adeel Zafar**, Umar Khalil. "Development of integrated deep learning and machine learning algorithm for the assessment of landslide hazard potential." *Soft Computing*, (2021): 1-20.

Bilal Aslam, **Adeel Zafar**, Umer Khalil, Umar Azam. "Seismic activity prediction of the northern part of Pakistan from novel machine learning technique." *Journal of Seismology*, 25, no. 2 (2021): 639-652.

Bilal Aslam, **Adeel Zafar**, Umar Azam Qureshi, Umer Khalil. "Seismic investigation of the northern part of Pakistan using the statistical and neural network algorithms." *Environmental Earth Sciences*, 80, no. 2 (2021): 1-18.

Adeel Zafar, Hasan Mujtaba, Omer Beg. "Procedural Content Generation for General Video Game Level Generation." *Inteligencia Artificial*, 24, no. 68 (2021): 33-36.

Adeel Zafar, Hasan Mujtaba, Mirza Omer Beg. "Search-based procedural content generation for GVG-LG." *Applied Soft Computing*, 86 (2020): 105909.

Adeel Zafar, Hasan Mujtaba, Mirza Tauseef Baig, Mirza Omer Beg. "Using patterns as objectives for general video game level generation." *ICGA Journal*, 41, no. 2 (2019): 66-77.

Mudassar Sharif, **Adeel Zafar**, Uzair Muhammad. "Design patterns and general video game level generation." *International Journal of Advanced Computer Science and Applications*, 8, no. 9 (2017): 393-398.

Usman Rauf, **Adeel Zafar**, Uzair Muhammad. "Optimal catheter selection for anomalous right coronary arteries (RCA)." *Jurnal Teknologi*, 78, no. 4-3 (2016).

CONFERENCE PUBLICATIONS

Sana Javaid Raja, **Adeel Zafar**, Aqsa Shoaib. "A Dataset for Programming-based Instructional Video Classification and Question Answering." In *Workshop EvalMG at COLING* , (2025).

Sarwar, Muhammad Shoaib, Syeda Arooj Fatima, Mehwish Aman, Aqsa Shoaib, and **Adeel Zafar**. "Landslide Susceptibility Mapping for Muzaffarabad Region Using Machine Learning Algorithms." In *2024 International Conference on IT and Industrial Technologies (ICIT)*, pp. 1-6, IEEE, (2024).

Waqas Ali Khan, Atta Ur Rahman, **Adeel Zafar**, Ayesha Ashfaq, Faria Karamat. "Facial Emotion Recognition: A Comparison of Classic and Novel Convolutional Neural Networks through Transfer Learning." In *2024 1st International Conference on Innovative Engineering Sciences and Techno-*

logical Research (ICIESTR), (2024).

Syeda Arooj Fatima, **Adeel Zafar**, Khalid Mahmood Malik. "YouFake: A Novel Multi-Modal Dataset for Fake News Classification." In *2023 3rd International Conference on Artificial Intelligence (ICAI)*, (2023).

Azka Kishwar, **Adeel Zafar**. "Predicting Fake News using GloVe and BERT Embeddings." In *2021 6th South-East Europe Design Automation, Computer Engineering, Computer Networks and Social Media Conference (SEEDA-CECNSM)*, pp. 1-6. IEEE, (2021).

Muhammad Abu Talha, **Adeel Zafar**. "Investigating Parody from Social Media Accounts." In *2021 6th South-East Europe Design Automation, Computer Engineering, Computer Networks and Social Media Conference (SEEDA-CECNSM)*, pp. 1-6. (2021).

Adeel Zafar, Hasan Mujtaba, Sohrab Ashiq, Mirza Omer Beg. "A Constructive Approach for General Video Game Level Generation." In *2019 11th Computer Science and Electronic Engineering (CEEC)*, pp. 102-107. IEEE, (2019).

Adeel Zafar, Ayesha Irfan, Muhammad Zeeshan Sabir. "Generating General Levels Using Markov Chains." In *2019 11th Computer Science and Electronic Engineering (CEEC)*, pp. 134-138. IEEE, (2019).

Ayesha Irfan, **Adeel Zafar**, Shahbaz Hassan. "Evolving Levels for General Games Using Deep Convolutional Generative Adversarial Networks." In *2019 11th Computer Science and Electronic Engineering (CEEC)*, pp. 96-101. IEEE, (2019).

Adeel Zafar, Shahbaz Hassan. "Corpus for Angry Birds Level Generation." In *2019 2nd International Conference on Computing, Mathematics and Engineering Technologies (iCoMET)*, pp. 1-4. IEEE, (2019).

Adeel Zafar, Hasan Mujtaba, Mirza Omer Beg, Sajid Ali. "Deceptive Level Generator." In *AIIDE Workshops*, (2018).

Tahir Ali Jan, Uzair Muhammad, Usman Rauf, **Adeel Zafar**. "Feature Set for Unicode-Based Word Processor Supporting Urdu and Arabic Scripts." In *2016 Sixth International Conference on Innovative Computing Technology (INTECH)*, pp. 155-161. IEEE, (2016).

Adeel Zafar. "An Experiment in Automatic Content Generation for Platform Games." In *2013 IEEE 9th International Conference on Emerging Technologies (ICET)*, pp. 1-5. IEEE, (2013).

Adeel Zafar, Hasan Mujtaba. "Identifying Catastrophic Failures in Offline Level Generation for Mario." In *2012 10th International Conference on Frontiers of Information Technology*, pp. 62-67. IEEE, (2012).

NON-IMPACT FACTOR JOURNAL PUBLICATIONS

Muhammad Faisal Iqbal, **Adeel Zafar**, Umer Khalil, Afia Ishaq. "Investigating Aptitude in Learning Programming Language Using Machine Learning and Natural Language Processing." *International Journal of Data Informatics and Intelligent Computing*, 3(4), 40–61 (2024).

Zafar Iqbal, Ahthasham Sajid, Muhammad Nauman Zakki, **Adeel Zafar**, Arshad Mehmood. "Role of Machine and Deep Learning Algorithms in Secure Intrusion Detection Systems (IDS) for IoT & Smart Cities." *International Journal of Information Technology, Research and Applications (IJITRA)*, (2024).

Adeel Zafar. "Book Review: Procedural Content Generation in Games by Shaker et al." *Journal of Immersive Media and Creative Arts*, 1(1), (2021).

Noor Saba, **Adeel Zafar**. "Evaluating the Performance of Agents for Deceptive Levels." *Manchester Journal of Artificial Intelligence and Applied Sciences*, (2021).

HONORS AND AWARDS

- **IRSIP Scholar-2019:** Issued by Higher Education Commision. Associated with NYU Tandon School of Engineering
- **Winner of ACU Early Academic Scholar-2012:** Issued by Association of Commonwealth Universities

RESEARCH THESIS SUPERVISION

Zohaib Ali, HMPR: A Dataset of handwritten medical prescriptions

Rabika Khalid , Evaluation of Large Language Models (LLMs) using metrics

Naureen Maqbool, Exploring the Light Weight LLMs for Educational Chatbot Development

Sania Afzal, Word Sence Disambiguation of Urdu Text Using Transformers

Muhammad Ayyaz Azeem, Covid 19 Detection Using Deep Learning Techniques on Chest X-Ray

Afia Ishaq, Hate Speech BERT

Sana Suhail, Investigation of Feminism Trends through Sentiment Analysis using Machine Learning and NLP Techniques

Furqan Amjad, Modeling of Cognitive Workload using EEG Signals

Haseeb Anwar, Emotion Recognition of Textual Responses in YouTube

Ibrahim Shahzad, Breast Cancer Detection for CT -Scan images Using Deep Learning

Ammar Khalid, Investigating Islamophobia in Hollywood movies using Natural Language Processing

Sana Tabasum, Mapping Introvert and Extrovert from Twitter Data Using NLP

Muhammad Faisal Iqbal, Investigating Aptitude in Learning Programming Language Using Machine Learning

Muhammad Abu Talha, Investigating Parody from Social Media Account

Azka Kishwar, Fake News Detection on Pakistani News using Machine Learning and Deep Learning

Bilal Aslam, Landslide Susceptibility Mapping of Northern Areas of Pakistan using Hybrid Models

COURSE INSTRUCTION AND CURRICULUM DEVELOPMENT

- Tools and Techniques in Data Science
- Machine Learning
- Deep Learning
- Natural Language Processing
- Design and Analysis of Algorithms
- Advanced Computer Programming
- Object Oriented Programming
- Programming Fundamentals
- Game Programming

HOBBIES

I usually take my regular time out to read books. My favorite books include deep work by Carl Newport and Think Again by Adam Grant.