Sarfraz Ahmad

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Sarfraz Ahmad | SarfrazAhmad307 | Location: UAE

Profile

Dedicated Natural Language Processing researcher and data scientist with 5 years of experience in AI, machine learning, and NLP-driven research. Specializing in fact-checking, temporal reasoning, and spatial reasoning, with a strong focus on Large Language Models (LLMs) and their applications in NLP. Proficient in deep learning, transformers, and knowledge extraction, leveraging advanced AI techniques to enhance research methodologies and problem-solving. Skilled in technical writing, data visualization, and clear presentation of complex findings. Experienced in developing NLP solutions, optimizing data pipelines, and integrating advanced AI models. Passionate about advancing LLM reasoning capabilities and contributing to cutting-edge NLP research and real-world applications.

Education

- **Mohamed bin Zayed University of Artificial Intelligence (MBZUAI)** *Sep.2024 - Jun.2026*
  M.S. Natural Language Processing Abu Dhabi, United Arab Emirates
  - GPA: 3.83/4.00
- **University of Engineering & Technology (UET)** *Oct.2016 - Jul.2020*
  B.S. Electrical Engineering (Computer Major) Lahore, Pakistan
  - GPA: 3.49/4.00

Experience

- **GoPython Software Solutions, LLC** *Jun.2021 - Sep.2024*
  Lead Data Scientist for Prognos Health Inc Chatham NJ, United States of America
  - Developed automated data transformation pipelines that provide critical insights about the bulk of data at hand.
  - Led the transition of the organization's data ingestion system to a more advanced and efficient data pipeline, significantly improving data processing capabilities.
  - Redefined the client's data schema to align with the standardized OMOP Common Data Model, ensuring consistency and interoperability.
  - Developed automated frameworks, triggered by AWS Lambda, for efficiently updating and managing large volumes of web files through web scraping.
  - Created a query handler using Fluent Interface architecture in Python, streamlining complex query processes.
- **GoPython Software Solutions, LLC** *Nov.2020 - May.2021*
  Front-End Developer for Instant Labs Inc Chatham NJ, United States of America
  - Developed a drag-and-drop web application using React.js, enabling users to effortlessly create and visualize complex database schemas.
  - Designed a web tool with Blockly and React.js that dynamically generated and executed SQL queries at runtime.
  - Engineered backend functionality in Go, including the design and implementation of RESTful APIs for seamless integration.
- **Data Science Lab, Al-Khawarizmi Institute of Computer Science** *Jan.2020 - Sep.2020*
  Research Officer Lahore, Pakistan
  - Developed and implemented advanced models for Explainability and Interpretability in AI systems, improving transparency and trust in decision-making processes.
  - Automated clinical coding processes by designing and deploying machine learning models, which increased coding accuracy and efficiency.
  - Implemented and optimized algorithms including Particle Swarm Optimizer (PSO), Principal Component Analysis (PCA), and Singular Value Decomposition (SVD) to enhance model performance and reduce computational complexity.
- **Data Science Lab, Al-Khawarizmi Institute of Computer Science** *Oct.2019 - Dec.2019*
  Intern Lahore, Pakistan
  - Explored text processing libraries (NLTK, SpaCy, NumPy, Pandas, Sci-Kit Learn) for effective data preprocessing and analysis.
  - Worked with word embeddings (Word2Vec, GloVe) to capture word semantics for NLP models.
  - Gained experience with deep learning frameworks (TensorFlow, Keras, PyTorch) for neural network development.
  - Evaluated deep learning activation functions and optimizers to improve model accuracy.
  - Applied feature engineering techniques to enhance model performance.

- **Sabz Qalam** *Dec.2018 - Jun.2020*
  Intern Lahore, Pakistan
  - Published a research article on Metabolic Syndrome in a peer-reviewed journal.
  - Conducted research on Metastatic Breast Cancer, contributing to advancements in the field.
  - Engaged in research on Uveal Melanoma, enhancing understanding of the disease.
  - Acquired expertise in research methodology techniques.

PUBLICATIONS

C=CONFERENCE, J=JOURNAL, P=PATENT, S=IN SUBMISSION, T=THESIS

[C.1] **UrduFactCheck: An Agentic Fact-Checking Framework for Urdu with Evidence Boosting and Benchmarking**.
Ahmad, S.*, Iqbal, H.*, Ahsan, M., Naeem, N., Khan, M., Riaz, A., Manzoor, M., Wang, Y. & Nakov, P
In Proceedings of the 2025 Conference on Empirical Methods in Natural Language Processing: System Demonstrations, Accepted, Suzhou, China. Association for Computational Linguistics. [EMNLP'25]

[J.1] **Unearthing Insights into Metabolic Syndrome by Linking Drugs, Targets, and Gene Expressions Using Similarity Measures and Graph Theory**.
Zafar, A., Wajid, B., Shabbir A., Awan, FG., Ahsan, M., **Ahmad, S.**, Wajid, I., Anwar, F., Mazhar, F.
Current Computer-Aided Drug Design, Vol. 20, Issue 6, pp. 773-783. DOI: 10.2174/1573409920666230817101913

[B.1] **Linux programming for the faint of heart**.
Sobahi, N., Al-Rashed, F., Shabbir, A., **Ahmad, S.**, Jamil, M., Wajid, B.
Volume 1, p. 167. Sabz Qalam. ISBN: 978-969-7941-00-1, 79-87

PROJECTS

- **ImageCLEF 2025: Multimodal Reasoning Challenge** *2025*
  Organizer and Contributor ImageCLEF
  - Curated a high-quality image dataset for Urdu Multiple Choice Questions, facilitating multimodal reasoning tasks in low-resource languages.
  - Developed competitive baselines using Vision-Language Models (VLMs) on images, and integrated LLMs on extracted captions to benchmark cross-modal understanding.
  - Collaborated with the ImageCLEF 2025 team to design task setup, data structure, and evaluation pipeline for the challenge.
- **Automatic Evaluation of Structured Text Using LLMs** *2025*
  Semester Project for course "Advanced Natural Lanuguage Processing-702" MBZUAI
  - Investigated the limitations of traditional metrics like ROUGE and entity-based measures in evaluating long-form, structured text generated by models.
  - Leveraged LLMs to parse and compare structural and logical elements of AI-generated articles against expert-written ground truths, revealing deeper insights into content quality.
  - Proposed evaluation strategies for structure-aware assessment at node, argument, and claim levels, enabling fine-grained analysis of logical flow and factual consistency.
- **AI-Driven Framework for Identifying COVID-19 Severity Using Single-Cell Data** *2025*
  Semester Project for course "Introduction to Single Cell Biology and Bioinformatics-703" MBZUAI
  - Developed a machine learning pipeline leveraging single-cell RNA sequencing (scRNA-seq) data to classify COVID-19 severity at both cell and patient levels.
  - Implemented data preprocessing, dimensionality reduction (PCA), and classification using SVM, achieving 85% accuracy at the cell level and 67% at the patient level.
  - Identified key gene biomarkers such as RSAD2, CXCL10, and S100A8 through SHAP analysis, revealing molecular signatures linked to immune response and disease progression.
- **Leveraging LLMs for Digital Discourse Detection and Analysis in Multilingual Contexts** *2024*
  Semester Project for course "Foundations of Artificial Intelligence-701" MBZUAI
  - This study evaluates hate speech detection in German, Hindi, and English using both traditional ML models and advanced LLMs, demonstrating the superiority of LLMs in low-resource settings.
  - LLMs effectively handle linguistic complexities, outperforming traditional models, and provide insights for building adaptable multilingual tools for hate speech detection.
- **From Sequences to Insights: An NLP Based Exploration in Peptide Classification** *2024*
  Semester Project for course "Natural Lanuguage Processing-701" MBZUAI
  - The project utilized LLM embeddings and CNNs in an ensemble framework to classify peptides, capturing sequence-specific patterns without handcrafted features.
  - Combining CNN outputs with Logistic Regression achieves state-of-the-art results for Anti-Viral Peptides and competitive performance for other peptide types.

- **Document Classification using Transfer Learning** *2022*
  Freelance Project Freelancing
  - Understood the working mechanism variety of transfer learning algorithms for document classification.
  - Downstreamed BERT, BART and XlNet for Document classification task.
- **Incorporating interpretability in ML/DL models using Shapley values and SHAP** *2022*
  Freelance Project Freelancing
  - Studied and incorporated the concepts of corporate game theory and shapley values.
  - Studied the concept of interpretability and understood the structure and working of SHAP library of python.
  - Utilized the aforementioned concepts to induce interpretability in sentiment analysis task using deep learning.
- **Breast Cancer Histopathological Image Classification using Transfer Learning** *2022*
  Freelance Project Freelancing
  - Utilized transfer learning-based model, DenseNet-201, and customized the pre-trained model for the task of binary classification of Breast Histopathology images.
  - The experimentation was performed on the basis of magnification factor. For images at each magnification level, we trained 5 models on 5 folds provided by the creators of this dataset and accuracy for these model were averaged for final results.
  - The proposed architecture achieves accuracy scores of 84.4%, 84.6%, 87.4% and 0.83% for 40x, 100x, 200x and 5400x magnification factor, respectively, for binary classification task.
- **Covid-19 Exploratory Data Analysis** *2021*
  Freelance Project Freelancing
  - Cleaned and preprocessed data for analysis.
  - Conducted detailed EDA using pandas, matplotlib, and seaborn.
  - Calculated Confirmed Cases, Deaths, and Mortality Rates.
  - Created interactive graphs and a 3D geo-scatter plot to visualize the spread over time.
- **Sentiment Analysis with LSTM for deep emotional insights** *2021*
  Data Science Lab Project KICS
  - Conducted sentiment analysis on the IMDB Movie Review dataset using LSTM.
  - Developed a reusable class for similar downstream tasks.
- **Electrical Load Forecasting using Deep Learning Techniques** *2021*
  Data Science Lab Project KICS
  - Performed load forecasting on "Individual Household" and "SML2010" datasets using dimensionality reduction and regression analysis.
  - Further explored the ideas behind wind forecasting.
- **Multi-Label Emotion Classification using ML and DL Algorithms** *2021*
  Freelance Project Freelancing
  - Evaluated the performance of 8 machine learning and 3 deep learning algorithms for multi-label emotion classification on the Go-Emotions Dataset.
  - Proposed a customized BERT model with pre-trained RoBERTa-base embeddings, achieving a macro F1-score of 0.73 across 5 Ekman-level emotion categories, outperforming both ML and DL approaches.
- **Employing Machine Learning to understand Drug Mechanisms in Diseases** *2020*
  Capstone Project of Under-graduation UET
  - Classified Breast Cancer Metastases using optimal classifiers, with preprocessing, filtering, and filter-based feature selection to identify key genes.
  - Utilized network analysis to predict drug synergy scores for Metabolic Syndrome, Hepatitis C (HCV), Uveal Melanoma (UM), employing centrality, similarity measures, and Markov blankets to pinpoint key genes.
- **Customer Churn Prediction using Machine Learning Techniques** *2020*
  Freelance Project Freelancing
  - Developed a predictive model for customer churn using machine learning techniques, enhancing retention strategies by identifying at-risk customers.
  - Analyzed customer behavior and patterns, utilizing feature engineering and model optimization to achieve high accuracy in churn prediction.
- **House Management System-Python** *2019*
  Semester Project for course "Introduction to Machine Learning" UET
  - Predicted the voltage and solar output at specific time, So that house can be managed on low cost by switching between Grid and Solar Energy.
- **MetabolicWare** *2018*
  Semester Project for course "Data Structures and Algorithms" UET
  - An installation package for Metabolomics Tools.
  - Utilized Linux command line interface and Zenity to develop shell files for different software packages.
  - Designed GUI on QT.

SKILLS

- **Programming Languages:** Python, C++, Java, JavaScript, Scala, Go
- **Web Technologies:** HTML, CSS, Angular, React, Node.js, Vue3
- **Database Systems:** MySQL, PostgreSQL, MongoDB
- **Data Science & Machine Learning:** TensorFlow, PyTorch, Scikit-learn, Pandas, NumPy, Keras, Selenium, OpenCV, Scrappy
- **Cloud Technologies:** AWS (Athena, ECS, S3, Lambda), Microsoft Azure, Databricks
- **DevOps & Version Control:** Docker, Terraform, Kubernetes, Git, GitHub
- **Specialized Area:** Natural Language Processing, Deep Learning, Time Series Forecasting, Biomedical Data Analysis
- **Mathematical & Statistical Tools:** MATLAB, R, SAS, SPSS, Excel
- **Other Tools & Technologies:** Apache Spark, Tableau, JIRA
- **Research Skills:** Literature Review, Experimental Design, Data Analysis, Statistical Modeling, Hypothesis Testing, Academic Writing

CERTIFICATIONS

- **Cousera** Completed 65 hours course named "Machine Learning" offered by Stanford Online *2020*
- **Cousera** Completed 24 hours course ”Neural Networks & Deep Learning” offered by Deeplearning.ai *2020*
- **Cousera** Completed ”Improving Deep Neural Networks” course offered by Deeplearning.ai *2020*
- **Cousera** Completed 35-hour "Introduction to Programming with MATLAB" course by Vanderbilt University. *2020*
- **365 Data Science** Completed courses ”Intro to Git & Github” *2020*
- **365 Data Science** Completed course ”Introduction to Python Programming” *2020*
- **365 Data Science** Completed course ”Introduction to Data & Data Science” *2020*
- **365 Data Science** Completed course ”Introduction to Tableau” *2020*
- **365 Data Science** Completed course "Probability" *2020*
- **365 Data Science** Completed course "Introduction to SQL" *2020*
- **World Health Organization** Participated in ”Infection Prevention and Control (IPC) for Novel Coronavirus” *2020*
- **Microsoft** Got certification from Microsoft for completing MS Office Powerpoint Specialist test *2017*

REFERENCES

Available upon request