Raza **Imam**

Mohamed bin Zayed University of Artificial Intelligence - MBZUAI

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EDUCATION

Mohamed bin Zayed University of Artificial Intelligence - MBZUAI, Abu Dhabi, UAE

Master of Science in Machine Learning, August 2022-Present *(Till Semester 1)* GPA: **3.63/4.00**

Aligarh Muslim University, Aligarh, INDIA

Bachelor of Science in Computer Science, August 2019-May 2022 GPA: **8.93/10.00**

Thesis: Attribute Based Encryption in Cloud Based Health Services

RESEARCH INTERESTS

Machine Learning, Computer Vision, Trustworthy AI, Federated Learning

EXPERIENCES & INTERNSHIPS

Sprint AI Lab, MBZUAI, UAE

***Research Student**, Sep 2022 – Present*

- Currently working on an efficient generic vision-language model based on CLIP on ImageNet data while in future, planning to develop a more specialized version of the model for a particular healthcare application.
- Exploring the line of work in Split-Federated learning environment which employs vision transformers for task agnostic healthcare applications.
- Implemented 8 transfer learning models, with the combination of 5 oversampling and undersampling methods, including SMOTE and ADASYN, to work on resolving the imbalance problem in the categorization of brain tumors.

Aligarh Muslim University, INDIA

***Research Assistant**, Mar 2021 – June 2022*

- Ideated and developed an enhanced version of RSA public key encryption algorithm that is based on xor-operations in the key generation, encryption and decryption phases of the RSA algorithm.
- Analyzed and researched various fast and secure variants of RSA frameworks and implemented them on SageMath library of Python to study and compare the security, time complexities and randomness analysis.
- Developing another fast variant of RSA algorithm by parallelizing the RSA algorithm and implementing the enhanced algorithm in C language using OpenMp and GMP libraries in parallel mode.
- Developed a framework model using Attribute Based Encryption (CP-ABE) and Blockchain to enhance security in sharing of Electronic Health Records over Cloud storages.

National University of Malaysia (UKM), MALAYSIA

***Research Intern**, Sep 2021 – December 2021*

- Conducted a Systematic Literature Review on cyberbully detection on social media using Convolutional Neural Networks.

Computer Science Society, AMU, INDIA

***Research Intern**, June 2021 – Aug 2021*

- Examined toxic levels of Ramganga River before-and-after Covid19 focusing on the concentration of 6 heavy metals using 6 Machine Learning algorithms, particularly XGBoost, Random Forest, LightGBM, SVM, and Ridge Classifiers, in the decreasing order of resulting accuracies.
- Conducted research on the classification of potato disease and quality prediction utilizing a Deep Learning approach, i.e., Transfer Learning using FastAI framework.
- Derived 1500 images dataset following processing and image augmentation on the collection of 600 potatoes belonging to 3 classes, i.e., Healthy, Diseased, and Rotten Classes.
- Designed a novel CNN model to evaluate aesthetic image quality trained on hand-drawn images and digital art posters without any human intervention. Initial dataset was taken from a Poster competition that our CSS team organized in our Computer Department of CS, AMU.

Indian Institute of Information Technology Allahabad, INDIA

***Research Intern**, May 2021 – Aug 2021*

- Analyzed various DNS-PKI solutions based on the Distributed and P2P frameworks consisting with and without Central Authority particularly using Blockchain.
- Conduct Research and compiled data for the various Consensus Algorithms, smart contracts, DApps based on Ethereum blockchain.
- Inspected several use cases of Blockchain technology for efficient data storage, data privacy, authentication and access control in IOT devices.

Chegg Inc., U.S. *(Remote)*

***Subject Matter Expert**, Sep 2020 – Mar 2021*

- Responsibility included that the content or information pertaining to the Computer Science expertise is accurate, and to provide specific optimal solution to a particular project or a problem related to the specific mentioned domain.
- Successfully helped over 200 students across the Globe from Prestigious Universities with their problems and projects pertaining to Undergraduate and Graduate level of problems related to the domain of Computer Science.

PUBLICATIONS

- Noor Fatima, **Raza Imam**, Mohd Belal, Preeti Verma, Ghufran Ullah, "A Computer Vision-Based Quality Analysis of Potatoes", ***4th International Conference on Sustainability and Resilience***, *University of Bahrain*, 2022. Available here.
- Noor Fatima, **Raza Imam**, Mohd Belal, Adnan Mohammad Siddiqui, Robeena Sarah, "Toxicity Assessment of River Ramganga", ***4th International Conference on Sustainability and Resilience***, *University of Bahrain*, 2022. Available here.

- **Raza Imam**, Kaushal Kumar, Syed Mehran Raza, et al., "A systematic literature review of attribute-based encryption in health services", ***Journal of King Saud University - Computer and Information Sciences, IF 8.9; SCI***, 2022. Available here.
- Umme Kulsum, **Raza Imam**, Mohd Abdullah Khan, Asra Ansari, "Representation of Potential Energy Surfaces using Neural Networks", ***International Journal of Engineering Development and Research***, 2022, Available here.
- Qazi Mohammad Areeb, Mohammad Nadeem, Shahab Saquib Sohail, **Raza Imam**, et al., Filter Bubbles in Recommender Systems: Fact or Fallacy - A Systematic Review, *Under review at* ***Nature Human Behaviour,*** 2022.
- **Raza Imam**, Faisal Anwer et al**.,** Practically adaptable CPABE based Health-Records sharing framework**.,** *Under Review at* ***SN Computer Science, 2022.***
- Qazi Mohammad Areeb, **Raza Imam**, Noor Fatima, "AI Art Critic: Artistic Classification of Poster Images using Neural Networks", ***International Conference on Data Analytics for Business and Industry***, *Bahrain*, 2021. Available here.
- **Raza Imam**, Soumyadev Maity, Neetesh Saxena, "An Analysis on the Applications of major Blockchain Implementations in Public Domain", ***Communicated***, 2021.
- **Raza Imam**, Qazi Mohammad Areeb, Faisal Anwer, "Systematic and Critical Review of RSA Based Public Key Cryptographic Schemes: Past and Present Status", ***IEEE Access***, 2021. Available here.
- **Raza Imam**, Faisal Anwer, "An Effective and Enhanced form of RSA based Public Key Encryption Scheme (XRSA)", ***Springer International Journal of Information Technology***, 2021. Available here.
- **Raza Imam**, Faisal Anwer, "An Empirical Study of Secure and Complex Variants of RSA Scheme", ***International Conference on Cyber Security, Privacy and Networking***, *ICSPN*, 2021. Available here.
- Mohammad Anas, **Raza Imam**, Faisal Anwer, "Elliptic Curve Cryptography in Cloud Security: A Survey", ***12th International Conference on Cloud Computing, Data Science and Engineering***, Confluence, 2021. Available here.
- **Raza Imam**, Qazi Mohammad Areeb, "Game Effect based on Particle System in Unity 3D", ***Academia Letters***, 2021. Available here.

PROJECTS

Transfer Learning approach for imbalance classification of Brain Tumor MRI - Link

- Employed 8 transfer learning models integrated with CNNs to increase the classification accuracy on four types of brain cancer.
- Applied 5 different approaches to solve imbalanced problems such as Focal loss, Cross Entropy, Data Augmentation, SMOTE, & ADASYN.

Comparative Evaluation of machine and deep learning algorithms for solar radiation Prediction - Link

- Implemented 4 time series prediction models to experiment with both predictions with ground truths and without ground truths to test the models' capabilities to tackle in-sample and out-of-sample predictions.

NLP-image-to-text

- Utilized Optical Character Recognition (OCR) to extract the text from images and achieved character level accuracy of 95%.
- Used a PyTorch pre-trained BERT model and an Enchant's spell checker function to correct words incorrectly read by OCR.
- Combined BERT's suggestions with SpellChecker's word-based suggestions to yield better predictions than relying solely on BERT.

Energy output and exhaust vacuum estimation for a power plant - Link

- Using functional API on Tensorflow, developed a shallow neural network with branching layers to forecast the net hourly electrical energy output and exhaust vacuum levels with given input parameters as temperature, relative humidity, and ambient pressure.
- Compared the same simulation on sequential API to conclude that functional modeling provides more flexibility and control in predictions.

Blockchain technology to improve and keep Medical Records Secure

- Idea based project that was presented at the Ideathon held at AMU presented by UAV-ZHCET, AMU.
- Presented the ideated methodologies and discussed the advantageous factors of using Blockchain framework in the field of Digital Medical Records considering the need and security in present medical architecture.

SKILLS

- **Technical:** Tensorflow, Keras, PyTorch, Blockchain, Data Structures, Git/Github, DBMS.
- **Programming Languages:** Python, C/C+, JAVA, C#, MATLAB, Solidity.
- **Languages:** English (IELTS - 8.0), Hindi, Urdu.

ACHIEVEMENTS & MEMBERSHIPS

- Secured **Fully Funded Scholarship** for Graduate School at MBZUAI for MS program in AI-ML program, 2022.
- Secured **2nd place** and **cash prize** in the **Ideathon**, 2021, AMU, for presenting blockchain solution in medical records.
- Participated in IMSAR in the **National PowerPoint presentation competition**, 2021.
- Participated in **Amuhacks 1.0 Hackathon**, AMU, 2020.
- Participated in **Hackathon AMU 2**, AMU, 2020.
- Secured 92 Percentile in **JEE Mains** examination among more than a million of applicants.
- Received **Merit-Cum Means Scholarship, 2018** for attending bachelor's program by Indian government.
- Secured **3rd place** among all district schools in the **National Mathematics Olympiad**, TIFR, 2013.
- **Cybersecurity Lead** at *Google Developer Student Club*, Aligarh Muslim University, 2021.
- Acting as a **Member** at *Computer Science Society* at Dept. of Computer Science, AMU.
- Acting as a **Member** at *UAV-ZHCET*, Aligarh Muslim University.
- Appointed as **Sports Captain** in final year of Intermediate school, 2018, represented school at the whole State-level Multi-Sports Competition.

MOOCs & WORKSHOPS

- **Neural Networks and Deep Learning**, DeepLearning.AI, 2022
- **Improving Deep Neural Networks: Hyperparameter Tuning, Regularization and Optimization**, DeepLearning.AI
- **Cryptography**, *Stanford University*, USA, 2021.
- **Machine Learning Essentials**, *Amazon Web Services*, 2021.
- **Information Security & Blockchain Workshop**, *National Institute of Technology, Hamirpur*, 2021.
- **Virtual Experience in Cyber Security**, *Goldman Sachs*, 2021.