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RESEARCH STATEMENT

The overall goal of my research is to deploy and identify novel implementations of AI in real-world healthcare that have a positive impact on patient outcomes and provide clinicians with a decision-support system to improve clinical practices.

EDUCATION

PhD in Electrical and Computer Engineering

University of Oklahoma, Oklahoma, USA

2022 - Present

MS in Computer Science and Engineering

East West University, Bangladesh

2018 - 2019

BSc in Electronics and Telecommunication Engineering

Daffodil International University, Bangladesh

2007-2012

SKILLS

Artificial Intelligence:

Programming: Python, SQL, C/C++, MATLAB
Machine Learning Frameworks: TensorFlow, PyTorch, Keras
Libraries: OpenCV, SciPy, Scikit-learn, NumPy, Pandas, MNE-Python, Microsoft Cognitive Toolkit (CNTK)
Deep Learning: Convolutional Neural Networks (CNNs), Recurrent Neural Networks (RNNs), Long Short-Term Memory (LSTM), U-Net, Transformer
Traditional ML Algorithms: Linear Regression, Logistic Regression, Decision Trees, Random Forest, Gradient Boosting Machines (GBM), Support Vector Machines (SVM), K-Nearest Neighbors (KNN), Naive Bayes

Data Visualization:

Tools: Tableau, Google Data Studio, Microsoft Power BI
Libraries: Matplotlib, Seaborn, Plotly, ggplot2

Data Analysis:

Data Engineering, EMR (Electronic Medical Record),
Image Analysis: ImageJ, Sante DICOM viewer
Signal Processing: MATLAB, EEGLAB

Management:

Business Analysis, Project Management

Network Management/ Security:

Network Monitoring, Troubleshooting, Network Security, Routing and Switching, Incident Response, Performance Optimization, Network Documentation

PUBLICATIONS

Conference paper

S. Maitra, N. Akter, A. Mithila, T. Hossain, & M.S. Alam. (2020). [Apriori-backed Fuzzy Unification and Statistical Inference in Feature Reduction: An Application in Prognosis of Autism](#), In 5th International Conference on Advanced Computing and Intelligent Engineering.

Journal

S. Maitra, S. Eshrak, M.A. Bari, A. Al-Sakin, R.S. Munia, N. Akter, & Z. Haque. (2019). [Prediction of Academic Performance Applying NNs: A Focus on Statistical Feature-Shedding and Lifestyle](#), International Journal of Advanced Computer Science and Applications, 10(9).

THESIS

[Detection of Autism Spectrum Disorder Applying Deep Neural Network](#) | Masters Project

Developed a DNN classifier for early ASD diagnosis, improving symptoms and function in toddlers. A fine-tuned model with diverse data and considered ethical considerations for transparent and unbiased predictions.

[Acoustic Echo Cancellation for the Advancement in Telecommunication](#) | Bachelor Thesis

Designed and implemented an advanced echo cancellation system using the Frequency Domain Adaptive Filter (FDAF) method, resulting in improved performance. Analyzed frequency components and adapted filter coefficients to effectively remove echo in complex environments.

PROJECTS

EEG data EEG-driven Machine Learning for the classification of stroke and healthy subjects

Utilized Python to preprocess EEG data of 21 subjects in a total of 1000 trials, implemented 14 supervised ML algorithms e.g., DNN, KNN, Decision tree, LightGBM, RF, and Extratrees Classifier to classify stroke patients with 96.5% accuracy, and detected the regions of neural activity using explainable AI.

Classification of stroke patient from gait cycle using traditional ML algorithm

Preprocessed unstructured image data of unique gait cycles of 10 subjects and performed exploratory analysis, applied 6 different image registration techniques to classify diabetic neuropathy patients with 98% accuracy.

Brain MRI segmentation

Implemented UNet architecture to segment brain tumors from MRI images and performed an analysis of 110 patients' registered images and corresponding masks, the model achieved an average of 92% IoU on test data.

Automatic Breast Tumor Segmentation and Classification: A Deep Learning Approach

Developed a CAD system that can accurately segment regions of interest in ultrasound images of the breast and classify tumors as benign, normal, or malignant. I used the Breast Ultrasound Dataset to train and test the model and utilized the U-Net architecture, a deep-learning framework that has shown excellent performance in medical image segmentation tasks.

PROFESSIONAL EXPERIENCES

Machine Learning Independent Contractor

[Hearts for Hearing](#), Oklahoma, USA.

May 2023 - Present

- Developing an integrated data repository for Hearts for Hearing.
- Overseeing the integration of programs into the Hearts for Hearing data repository and with similar software programs.
- Developing Artificial Intelligence toolsets to optimize their treatment at the clinic.

Graduate Research Assistant

Neural Control and Rehabilitation Laboratory, [University of Oklahoma](#), Tulsa, USA.

January 2022 – January 2023

Multi-modal neuroimaging and computational neuroscience for brain research and movement rehabilitation.

- Conducted research in multi-modal neuroimaging and computational neuroscience to understand brain changes after a stroke and its relation to patient movement problems.
- Preprocessed EEG data of 20 individuals using EEGLAB, achieving an accuracy of 99% in classifying subjects into binary classes (stroke and healthy) using 16 traditional ML algorithms and 32 strategies.
- Provided research assistance, designed novel data acquisition and preparation methods, and developed 3 new datasets for future analysis.
- Ensured the precision and accuracy of lab equipment, recorded patient brain and muscle activity using non-invasive EEG systems, and conducted MRI scans in collaboration with the Laureate Institute for Brain Research.

Machine Learning Consultant

[REVE Systems](#), Bangladesh.

April 2021 – Jun 2021

- Developed predictive models using statistical modeling, machine learning, and analytics techniques to solve complex business problems on large-scale datasets.
- Partnered with the product team to build and manage a large-scale production speech-to-text system worth 1M USD.
- Actively participated in the ML value chain, collected, and organized speech data from 64 districts, 20+ dialects, and 500 participants.
- Implemented NLP algorithms such as LSTM and Transformers into the large software system.
- Formulated hypotheses and applied advanced analytics to evaluate and weigh a panel of responses based on evidence.

Business Systems Analyst, Manager

[REVE Systems](#), Bangladesh.

October 2015 – April 2020

- Evaluated project feasibility based on technical, regulatory, economic, and organizational factors and produced relevant documentation (e.g., gap analysis, RFI, RFQ, RFP, SRS, PAT, UAT, business cases, and software user manuals).
- Conducted research and reviewed state-of-the-art technologies to create innovative software solutions and enhance existing software features.
- Collaborated with cross-functional departments to research and develop new software and reviewed software documentation to ensure technical accuracy, compliance, and completeness.
- Prepared detailed technical reports, presentations, and charts based on data research, collection, and analysis.
- Acquired and analyzed both quantitative and qualitative data, developed solutions, and promoted data-driven decision-making.

Senior Engineer, Network Operation and Coordination

[Drik ICT Limited](#), Bangladesh

August 2014 – February 2015

- Collaborated closely with the departments of quality control and client relations.
- Led the Core NOC team in resolving network system infrastructure issues, resulting in a 10% improvement in network performance.
- Installed NAT devices and implemented basic policies on Mikrotik Wireless Routers.

Network Operation and Coordination/Transmission Engineer

[Mos5 Tel](#), Bangladesh

August 2012 – January 2014

- Monitored the network elements using diagnostic tools, such as, ifconfig, traceroute, and Ping.
- Examined call quality issues in VoIP environments to resolve end-user complaints.
- Gathered and extracted packet trace information to pinpoint the disordered packet.
- Planned and implemented the fiber optical network connectivity for different STM levels.
- Configured TEJAS 1600C MUX, ODF, and TDM carriers and routine inspections to ensure network consistency.
- Diagnosed network hardware and software components, (e.g., Genband Softswitch (C3), Media Gateway (Gg), Session Border Controller (S3), Real-Time Session Manager (RSM), Cisco routers and Switches to optimize the capacity and performance of systems.
- Generated reports on network outage events and monitored system alarms to keep records for investigations.
- Conducted traffic engineering to enhance the performance of voice traffic.

Support Engineer, Fiber infrastructure.

[Link3 Technologies Ltd](#), Bangladesh

Jun 2011 – July 2012

- Led the fiber technician's team to handle the disordered links to provide smooth support.
- Monitored fiber backbones, MIS, and trouble ticketing and resolved issues related to fiber networks.
- Carried out the Work Requests of new fiber optical networks and installation of optical devices in PoP.
- Updated database of fiber link termination, shifting, and new links and maintained Inventories.
- Prepared reports on network issues for organizational further records.

TEACHING EXPERIENCES

Graduate Teaching Assistant

Course- Computer Architecture, [University of Oklahoma](#), USA.

January 2023 - Present

- Evaluating and assigning grades to students' assignments.
- Providing homework assistance and resolving students' queries related to lecture material.
- Maintaining accurate records of student performance and progress.

Instructor

[CodeWorkshop](#), University of Oklahoma, USA

August - 2023

I teach an introductory Python course to students from high schools and undergraduate studies. The workshop exposes students to STEM fields by using REAL data to answer REAL questions.

CERTIFICATIONS

- Audiometry for Beginners, Interacoustics Academy, Denmark. February 2024
- Python Crash Course, Uplimit. August 2023
- Advanced sampling and retrieval methods: the compressive processing paradigm, University of Trento, ITALY July 2022
- Good clinical practice, Collaborative Institutional Initiative (CITI) February 2022
- Group 1 Biomedical Research Investigators and Key Personnel, CITI February 2022
- Signal Processing Onramp, MathWorks October 2021
- Introduction to Machine Learning, Kaggle August 2021

• Introduction to Python, Kaggle	August 2021
• Research Marathon, RadScholars, Canada	July 2021
• ITIL® Foundation Certification-IT Service Management, AXELOS Global Best Practice	October 2018
• Routing & Switching (IPv4/v6), South Asian Network Operators Group	January 2014
• Networking on Mikrotik OS, Daffodil Online Ltd	January 2012

HONORS AND AWARDS

• SWE Conference Scholarship, Society of Women Engineers, USA.	October 2023
• WiE Wayfinding Scholarship, Women in Engineering, University of Oklahoma, USA.	September 2023
• P.H. Robinson Fellowship, University of Oklahoma, USA.	July 2023
• Cleo Cross Scholarship, University of Oklahoma, USA.	May 2023
• Gallogly College of Engineering Scholarship, University of Oklahoma, USA.	May 2023
• Memorial Scholarship, University of Oklahoma, USA.	April 2023
• HWW Award, Women in Engineering, University of Oklahoma, USA.	January 2023
• OU-Tulsa Scholarship, University of Oklahoma, USA.	January 2023
• Merit-based scholarship titled "Medha Lalon Scholarship", East West University, Bangladesh.	July 2019
• Conference Fellow, Asia Pacific Regional Internet Conference on Operational Technologies, New Zealand.	February 2016
• Conference and Workshop Fellow, South Asian Network Operators Group, Bhutan.	January 2013
• Merit-based Scholarship, Daffodil International University, Bangladesh.	January 2007

LEADERSHIP

Corporate Outreach Chair

[Society of Women Engineers](#), University of Oklahoma local chapter, USA

April 2023 - Present

SWE ID: 2094401

- Empower women to achieve their full potential in careers as engineers and leaders; expand the image of the engineering and technology professions as a positive force in improving the quality of life and demonstrate the value of diversity and inclusion.
- Arrange corporate events independently and in conjunction with other student organizations on campus.
- Collaborate with industry professionals to foster mentorship, job placements, and partnerships.
- Conduct various information sessions, recruitment pitch sessions, and resume review sessions with several corporate organizations.

Mentor

[Women in Engineering](#), University of Oklahoma, Oklahoma, USA

February 2023 - Present

- Empower women and new students, helping them navigate through the challenges of the engineering program.
- Each semester, I mentor around 20 students from diverse engineering majors.
- Demonstrate science projects and introduce high school students to STEM education and potential opportunities in engineering.
- Volunteer in WiE professional and personal development activities focusing on strategies to cope with the challenges women face as engineers.

Vice President

International Students Organizations, University of Oklahoma-Tulsa

Jan 2022 - Dec 2022

- Led decision-making, planning, and executing initiatives to ensure the smooth operation of the organization collaborating with the President and other executive members.
- Conducted meetings, and events, and oversaw committees or subgroups within the organization.

PROFESSIONAL MEMBERSHIPS

[International Association of Engineers \(IAENG\)](#)

August 2023 - Present

IAENG is a non-profit international association for engineers and scientists. As an active member, I get the opportunity to promote the interactions between engineers, advancing the application of engineering techniques from academics to the industry. I am a member of the following societies:

1. the IAENG Society of Artificial Intelligence
2. the IAENG Society of Data Mining
3. the IAENG Society of Electrical Engineering
4. the IAENG Society of Imaging Engineering

[IEEE- Institute of Electrical and Electronics Engineers](#)

December 2023 - Present

IEEE is the world's largest technical professional organization dedicated to advancing technology for the benefit of humanity. I am a member of IEEE of their Oklahoma section.

[Data Institute for Societal Challenges \(DISC\)](#)

December 2023 - Present

The Data Institute for Societal Challenges (DISC) at OU is creating innovations in data science, artificial intelligence, machine learning, and data-enabled research. DISC develops and grows convergent research teams dedicated to solving local to global-scale challenges.

[Women Who Code](#)

January 2023 - Present

Empowering diverse women to excel in technology careers.

[Girls Who Code](#), University of Oklahoma

September 2023 - Present

Empowering women engineering students to excel in programming and technical industry.

[Artificial Intelligence/Machine Learning Club](#), University of Oklahoma

January 2023 - Present

OU AI aims to create a platform for students to learn and be involved in AI and ML through events with industry guest speakers, workshops, conferences, and projects.

CONFERENCE / FELLOWSHIPS

SWE Conference Fellow

Society of Women Engineers, Los Angeles, USA.

October - 2023

Attended the World's Largest Conference for Women in Engineering and Technology. Met with industry experts through personal talks and sessions, and attended interactive workshops on leadership and engineering subjects.

Conference Fellow and Presenter

Asia Pacific Regional Internet Conference on Operational Technologies, APRICOT, New Zealand.

February - 2016

APRICOT is the Internet Network Operators Summit for the Asia Pacific region, was organized by the Asia Pacific Network Operators Group Ltd, a not-for-profit organization providing APRICOT's corporate support, I was an [attendee](#) of the conference, met with industry experts through personal talks and sessions.

1. Attended conference tutorials. (Conference Link: <https://2016.apricot.net/41/fellowship.html>).
2. Presented NOG sessions to showcase bdNOG's contributions to the Bangladesh internet community.
3. Attended sessions for women in IT.
4. Attended a video promotion to welcome future fellows.
5. Attended blog session to illustrate the women battling against tradition to establish careers in the ICT sector of Bangladesh. (<https://blog.apnic.net/2016/05/10/women-battle-tradition-establish-career-ict-bangladesh/>)

Workshop Fellow

South Asian Network Operators Group- 23, SANOG, Bhutan.

January- 2013

The SANOG XXIII Fellowship program was granted by the Internet Society (ISOC), and active support from the Network Startup Resource Center (NSRC). As the nominated [fellow](#) from the South Asian Region, I participated in the workshop, tutorials, and conference.

Conference Presenter

Bangladesh Internet community, NOG sessions, APRICOT 2016, New Zealand.

February-2016

The NOG Updates session offered leaders or participants of the many regional and country network operations groups in the Asia Pacific region to give a short presentation, Lightning Talks style, to share the latest activities in their community. I presented the [bdNOG](#) Update.

PEER-REVIEW

Reviewer in peer-reviewed journal

Journal of Intelligent & Fuzzy Systems, Impact Factor 2023-2, Cite Score 2023-2.4

I have reviewed 3 papers and am currently reviewing a few others.
