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NAME	JOB TITLE	PWS Tasks
Mohammad Abu Baker Siddique Akhonda	ITDI - Intermediate AI/ML Scientist	7.1.16; 7.4.5; 7.5.1; 7.5.5

Job Responsibility	Qualifying Skills
AI/ML Software Development & Bioinformatics Research: Design and implement machine learning models for medical imaging and healthcare applications.	· Developed and validated AI/ML models for regulatory science applications at FDA, improving AI model fairness and bias detection in medical imaging. · Designed AI-driven bioinformatics tools for MRI and neuroimaging analysis, enhancing disease marker identification for neurodegenerative disorders. · Built and optimized machine learning pipelines to process large medical datasets (e.g., ADNI, BLSA), ensuring high-performance healthcare AI applications.
AI/ML Strategy & Policy Development: Develop AI-driven solutions and contribute to policy frameworks for AI/ML in healthcare and regulatory science.	· Collaborated with FDA to develop AI-driven regulatory science tools, ensuring compliance with healthcare standards. · Developed AI governance and policy frameworks, integrating AI models with clinical workflows and regulatory practices. · Published over 40 peer-reviewed articles on AI ethics, AI bias detection, and machine learning applications in healthcare.
Product Development & Algorithm Optimization: Build and optimize AI algorithms for bioinformatics, medical image processing, and generative AI applications.	· Led the development of machine learning models for Schizophrenia, Bipolar Disorder, and Depression detection, improving clinical research efficiency. · Implemented generative AI frameworks for medical imaging applications, increasing diagnostic accuracy and patient outcome predictions. · Designed real-time AI-driven image processing algorithms for regulatory science, streamlining medical device evaluations.

Education

Ph.D. in Electrical Engineering, University of Maryland, Baltimore County **May 2022**

M.Sc. in Electrical Engineering, University of Maryland, Baltimore County **2019**

B.Sc. in Elec. and Comm. Engineering, Khulna University of Engineering & Technology, Bangladesh **2013**

Experience

Staff Fellow, AI Research Scientist **Aug 2023 – Present**
Food and Drug Administration (FDA)

- Conducting independent research to identify and mitigate bias in medical imaging AI models, developing and implementing novel algorithms that improve both model accuracy and fairness.
- Collaborating with multidisciplinary teams to define, develop, and implement industry-ready AI-driven solutions to regulatory science problems.
- Developing, validating, and implementing AI/ML pipelines for regulatory science tools (RST) development, utilizing cutting-edge techniques in computer vision, medical image processing, generative AI, and LLMs.

- Leading efforts to accelerate the FDA's tool development process, leveraging expertise in Docker, containerization, Unix shell, HPC, and GUI creation to streamline workflows and improve efficiency.

Postdoctoral IRTA **Oct 2022 – Aug 2023**
National Institute of Health (NIH)

- Investigation of brain's functional and structural changes due to age and neurodegenerative disorders
- Developed and implemented ML algorithms for multimodal fusion of functional and structural MRI data.
- Processed and analyzed large datasets (BLSA, ADNI), employing data cleaning, normalization, and feature engineering techniques to prepare data for advanced machine learning analysis.
- Created and optimized machine learning pipelines and toolboxes, incorporating version control and best practices for collaborative development, which streamlined research workflows.
- Collaborated with cross-functional teams to define research questions and translate them into actionable machine learning solutions, contributing to 7 publications in high-impact journals, including Hypertension (I.f.: 11)

Research Assistant **Jun 2017 – Sep 2022**
University of Maryland, Baltimore County

- Designed, developed, and implemented data-driven machine learning algorithms to analyze large-dimensional multimodal neuroimaging datasets (300-1000 subjects MRI, EEG, and MEG data with 50K-300K samples) for NIH and NSF-funded projects, leading to the identification of novel biomarkers for schizophrenia.
- Utilized state-of-the-art supervised, semi-supervised, and unsupervised methods for the detection, recognition, and classification of diseases (Schizophrenia, Bipolar Disorder, and Depression), achieving higher accuracy of identifying disease markers.
- Studied disease subtypes and implemented eigen-decomposition based technique for label-free subgroup identification in Schizophrenia patients.
- Maintained multidisciplinary collaboration, mentored new researchers, and generated ideas for grant proposals.

Specialist **Aug 2015 – July 2016**
Robi Axiata Limited

- Developed scripting solutions (UNIX, Python) for telecom equipment maintenance, demonstrating strong problem-solving and technical skills. Contributed to project planning and deployment.
- Software Engineer, Oct 2013 – Aug 2015, Samsung Research and Development (R&D) Institute, Bangladesh
- Developed and automated test cases using C++, Python, and JAVA for mobile android applications.
- Worked with cross-functional teams to ensure successful delivery of the projects on time and within budget.
- Participated in programming contests and code review workshops to maintain high standards in problem-solving.

SKILLS AND INTERESTS

- Programming Languages: Python (Expert), C/C++ (Proficient), Java (Familiar)
- Data Analysis: Python (Expert), MATLAB (Proficient)
- Machine Learning Frameworks: PyTorch (Expert), TensorFlow (Familiar)
- Containerization: Docker (Proficient), Apptainer (Proficient), Singularity (Proficient), Kubernetes (Familiar)
- High-Performance Computing (HPC): SLURM (Proficient)
- UI Development: PyQt (Expert), ptinker (Familiar)
- Version Control & Package Management: Git/GitHub (Expert), PyPI (Expert), Hugging Face (Expert)

Research Interests: Healthcare AI, Computer Vision, Deep Learning, Generative AI, Large Language Models (LLMs), Signal Processing, Medical Imaging (Ultrasound), Big Data Analysis, Optimization, Transfer Learning, Graph Neural Networks, Mobile Healthcare, Data Science.

SELECT PUBLICATIONS AND PRESENTATIONS (10 OF 40)- see Google scholar

J.P. Laporte, M.A.B.S. Akhonda, L.E. Cortina et al. Investigating the association between human brainstem microstructural integrity and hypertension using magnetic resonance relaxometry. Hypertens Res (2025).

M. A. B. S. Akhonda, A. Burgon K. Cha, Y. Yesha, S. Nawar, N. Petrick, R. Samala, “Optimal transport framework to indicate sources of AI performance bias through subgroup feature alignment,” 2024 RSNA conference.

C. Jia, M. A. B. S. Akhonda, H. Yang, V. D. Calhoun and T. Adali, "Fusion of Novel FMRI Features Using Independent Vector Analysis for a Multifaceted Characterization of Schizophrenia," 2024 32nd European Signal Processing Conference (EUSIPCO), Lyon, France, pp. 1112-1116, 2024.

B. Gabrielson, M.A.B.S. Akhonda, I. Lehmann and T. Adali, "An Efficient Analytic Solution for Joint Blind Source Separation," in IEEE Transactions on Signal Processing, vol. 72, pp. 2436-2449, 2024.

M.A.B.S. Akhonda, M. Faulkner, J. Laporte, Z. Gong, S. Church, J. D’Agostino, J. Bergeron, C. M. Bergeron, L. Ferrucci, and M. Bouhrara, "The effect of the human brainstem myelination on gait speed in normative aging." The Journals of Gerontology: Series A 78.12 (2023).

M.A.B.S. Akhonda, Y. Levin-Schwartz, V. Calhoun, and T. Adali, “Association of Neuroimaging Data with Behavioral Variables: A Class of Multivariate Methods and Their Comparison Using Multi-Task FMRI Data.” Sensors, vol. 22, art. no. 1224, Feb 2022.

T. Adali, F. Kantar, M.A.B.S. Akhonda, S. Strother, V. Calhoun, E. Acar, “Reproducibility in Matrix and Tensor Decompositions: Focus on Model Match, Interpretability, and Uniqueness” accepted in IEEE Signal Processing Magazine, March 2022.

M. A. B. S. Akhonda, B. Gabrielson, V. D. Calhoun and T. Adali, "Complete Model Identification Using Independent Vector Analysis: Application to the Fusion of Task FMRI Data," 2021 IEEE Data Science and Learning Workshop, 2021, pp. 1-6.

H. Yang, M.A.B.S. Akhonda, F. Ghayem, Q. Long, V. D. Calhoun, T. Adali, " Independent Vector Analysis Based Subgroup Identification from Multisubject fMRI Data," accepted in 2022 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), 2022.

B. Gabrielson, M.A.B.S. Akhonda, Z. Boukouvalas, S. J. Kim and T. Adali, "ICA with Orthogonality Constraint: Identifiability and A New Efficient Algorithm," IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), 2021, pp. 3720.