
BIOGRAPHICAL SKETCH

NAME: Adibuzzaman, Mohammad

eRA COMMONS USER NAME (credential, e.g., agency login): madibuzz

POSITION TITLE: Research Scientist

EDUCATION/TRAINING

INSTITUTION AND LOCATION	DEGREE (if applicable)	Completion Date	FIELD OF STUDY
Bangladesh University of Engineering and Technology, Dhaka, Bangladesh	B.Sc	01/2008	Computer Science and Engineering
Marquette University, Milwaukee, WI, USA	M.Sc.	05/2012	Computational Sciences
Marquette University, Milwaukee, WI, USA	Ph.D.	05/2015	Computational Sciences

A. Personal Statement

I am a computational scientist by training. My primary research interest is in health data analysis using artificial intelligence techniques, more specifically, causal inference methods. My secondary research focus is in high performance computing infrastructure for very large data sets in health sciences. I have been working at Purdue University on building campus wide initiatives for large clinical data analysis framework on distributed cloud computing environment using web based solutions such as Jupyter notebook, Kubernetes and Hadoop. The ultimate goal is add another layer on top of this system for artificial intelligence methods for reproducibility, share-ability and causal inference. I am leading multiple artificial intelligence projects with health data (e.g., large electronic health records (EHR) databases), using causal inference algorithms.

1. Fatemeh Rouzbeh, Ananth Grama, Pual Griffin, and Mohammad Adibuzzaman. Collaborative cloud computing framework for health data with open source technologies. The 11th ACM Conference on Bioinformatics, Computational Biology, and Health Informatics (ACM BCB) (under review)
2. M Bikak, M Adibuzzaman, Y Jung, Y Yih, and E Bareinboim. Regenerating evidence from landmark trials in ards using structural causal models on electronic health record. In Critical Care: Big Data in Health Care-Predictive Analytics, Clinical Decision Support, And Rapid Response, pages A4290–A4290. American Thoracic Society, 2018
3. Mohammad Adibuzzaman, Poching DeLaurentis, Jennifer Hill, and Brian Benneyworth. Big data in healthcare—the promises, challenges and opportunities from a research perspective: A case study with a model database. In AMIA Annual Symposium, pages 384–392, 2017
4. Mohammad Adibuzzaman, Ken Musselman, Alistair Johnson, Paul Brown, Zachary Pitluk, and Ananth Grama. Closing the data loop: An integrated open access analysis platform for the mimic database. In 2016 Computing in Cardiology Conference (CinC), pages 137–140. IEEE, 2016
5. Riddhiman Adib, Sheikh Iqbal Ahamed, Paul Griffin, and Mohammad Adibuzzaman. A causally formulated hazard ratio estimation through backdoor adjustment on structural causal model. Machine Learning for Healthcare, 2020

B. Positions and Honors

Positions and Employment

2007–2009	Software Engineer, AfriGIS Bangladesh, Dhaka, Bangladesh.
2009–	Lecturer, University of Asia Pacific, Dhaka, Bangladesh
2010–	Junior Research Fellow, National University of Singapore, Singapore
2011–	Instructor, Marquette University, Milwaukee, WI, USA
2012–	Research Assistant, International Breast Cancer Research Foundation and Marquette University, Milwaukee, WI, USA
2010–2015	Teaching Assistant, Marquette University, Milwaukee, WI, USA
2013–2014	Oak Ridge Institute of Science and Engineering Fellow, US Food and Drug Administration, White Oak, MD, USA
2015–2017	Assistant Research Scientist, Regenstrief Center for Healthcare Engineering (RCHE), Purdue University, IN, USA
2018–2020	Research Scientist, RCHE, Purdue University, IN, USA
2018–2019	Research Scientist, CausalAI Lab, Computer Science, Purdue University, IN, USA
2018–2020	Assistant Director, RCHE, Purdue University, IN, USA

Other Experience and Professional Memberships

2014–	Member, Association for Computing Machinery (ACM)
2016–	Member, Institute of Electrical and Electronics Engineers (IEEE)
2017–	Member, American Medical Informatics Association (AMIA)
2017–	Member, Intensive Care Unit Working Group, AMIA

Honors

2010	Best poster award at Forward Thinking Poster Session, Marquette University, WI
2011	Best international poster award at Forward Thinking Poster Session, Marquette University, WI
2012	Nominated for best paper award in CHI, Austin, TX
2013	Best paper award in ACM RACS, Montreal, Canada
2013–2014	ORISE Fellowship, US FDA, White Oak, MD

C. Contribution to Science

1. My early contributions to science included affective computing for clinical application, including pain detection from facial images for breast cancer patients, multi-modal emotion detection using mobile sensors, and detection of vital signs, including heart rate, and oxygen saturation using smart phone. I served as a primary investigator or co-investigators in all these studies. These projects were awarded best paper awards, and were highly recognized.
 - a. Md Haque, Ferdaus Kawsar, Mohammad Adibuzzaman, Sheikh Ahamed, Richard Love, Rumana Dowla, David Roe, Syed Hossain, and Reza Selim. Findings of e-esas: a mobile based symptom monitoring system for breast cancer patients in rural bangladesh. In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, pages 899–908, 2012
 - b. Mohammad Adibuzzaman, Niharika Jain, Nicholas Steinhafel, Munir Haque, Ferdaus Ahmed, Shiekh Iqbal Ahamed, and Richard Love. Towards in situ affect detection in mobile devices: a multimodal approach. In Proceedings of the 2013 Research in Adaptive and Convergent Systems, pages 454–460. 2013
 - c. Mohammad Adibuzzaman, Niharika Jain, Nicholas Steinhafel, Munir Haque, Ferdaus Ahmed, Sheikh Ahamed, and Richard Love. In situ affect detection in mobile devices: a multimodal approach for advertisement using social network. ACM SIGAPP Applied Computing Review, 13(4):67–77, 2013
 - d. Mohammad Adibuzzaman, Colin Ostberg, Sheikh Ahamed, Richard Povinelli, Bhagwant Sindhu, Richard Love, Ferdaus Kawsar, and Golam Mushih Tanimul Ahsan. Assessment of pain using facial pictures taken with a smartphone. In 2015 IEEE 39th Annual Computer Software and Applications Conference, volume 2, pages 726–731. IEEE, 2015
2. The works described above focused on sensors that are available in the smart phones such as camera and accelerometer. However, due to the limitation of sensors and data quality in mobile environment, my second

phase of research work focused on other sources of data for clinical decision making. I started to look into the mathematical modeling and understanding of the algorithms for transnational research. In this area, I was also looking into these algorithms from a regulatory perspective while working at the US Food and Drug Administration (US FDA). I was a the lead researcher for all of these projects and publications.

- a. Yao Chen, Xiao Wang, Yonghan Jung, Vida Abedi, Ramin Zand, Marvi Bikak, and Mohammad Adibuzzaman. Classification of short single-lead electrocardiograms (ECGs) for atrial fibrillation detection using piecewise linear spline and XGBoost. Physiological measurement, 39(10):104006, 2018
 - b. Mohammad Adibuzzaman, George C Kramer, Lorian Galeotti, Stephen J Merrill, David G Strauss, and Christopher G Scully. The mixing rate of the arterial blood pressure waveform markov chain is correlated with shock index during hemorrhage in anesthetized swine. In 2014 36th Annual International Conference of the IEEE Engineering in Medicine and Biology Society, pages 3268–3271. IEEE, 2014
 - c. Mohammad Adibuzzaman, David Strauss, Stephen Merrill, Lorian Galeotti, and Christopher Scully. Evaluation of machine learning algorithms for multi-parameter patient monitoring., 2014
 - d. Brett Collar, Marvi Bikak, Paul Brown, Zachary Pitluk, and Mohammad Adibuzzaman. Second largest eigenvalue of the transition probability matrix for the Markov chain constructed from the arterial blood pressure waveform is not correlated to shock index in hemorrhagic human subjects. Aisthesis: Honors Student Journal, 9(1):37–43, 2018
3. As I was developing the computational models and mathematical concepts for clinical applications, I realized there is a big gap in high performance computing infrastructure for transnational clinical research for reproducibility and validity. Consequently, my recent works are focusing on developing these large infrastructures with state-of-the-art technologies such as SciDB, Hadoop, Spark, Hbase and Hive, among others, and integration of data sets for seamless flow of information, with causal understanding of the machine learning algorithms with structured causal models (SCM).
- a. Fatemeh Rouzbeh, Ananth Grama, Pual Griffin, and Mohammad Adibuzzaman. Collaborative cloud computing framework for health data with open source technologies. The 11th ACM Conference on Bioinformatics, Computational Biology, and Health Informatics (ACM BCB) (under review)
 - b. Riddhiman Adib, Sheikh Iqbal Ahamed, Paul Griffin, and Mohammad Adibuzzaman. A causally formulated hazard ratio estimation through backdoor adjustment on structural causal model. Machine Learning for Healthcare, 2020
 - c. Mohammad Adibuzzaman and Paul M Griffin. Big data in health care delivery. 2020
 - d. Mohammad Adibuzzaman, Ken Musselman, Alistair Johnson, Paul Brown, Zachary Pitluk, and Ananth Grama. Closing the data loop: An integrated open access analysis platform for the mimic database. In 2016 Computing in Cardiology Conference (CinC), pages 137–140. IEEE, 2016

Complete List of Published Work in MyBibliography:

https://scholar.google.com/citations?user=me_HJ54AAAAJ&hl=en

D. Research Support

Ongoing Research Support

Grand Challenges in Neuroscience Grant Heinz(PI) 06/01/2020-5/30/2021

Data-science infrastructure for precision auditory neuroscience. The seed project is to establish infrastructure and protocols for the rapid accumulation of harmonized multidisciplinary cross-species data for precision auditory neuroscience. (Role-coPI)

Indiana Family and Social Services Administration (FSSA), Griffin(PI), 01/01/19–2020

Addressing Opioid Crisis and Long Term Care Cost in the State of Indiana. (\$12M) (Role: I)

Discovery Park Integrative Data Science Initiative, Purdue University, Adibuzzaman(PI), 06/01/19–2020

Causally-driven Healthcare Science – From Observational and Experimental Studies to Personalized and Improved Patient Outcomes. (\$265,000) (Role: PI)