JESSICA SHARMIN RAHMAN, AFHEA

CERC Postdoctoral Fellow

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EXPERIENCE

CERC Fellow Health Intelligence

Commonwealth Scientific and Industrial Research Organisation (CSIRO)

📅 November 2021 – Present

- Develop, validate and implement novel and interpretable machine learning algorithms and workflows for applications in healthcare such as improving productivity and efficiency, informing treatment effectiveness, risk stratification and clinical decision support.

Subject Matter Expert

OpenLearning Limited

📅 May 2021 – May 2022

- Provided expertise and content in designing online course CS101 - Programming and Computational Thinking
- Assisted in preparing 10 lecture modules on history of computing, machine language, C and Python programming language
- Reviewed overall course structure

Lecturer

The Australian National University

📅 February 2021 – August 2021

- Lecturer for the Fuzzy Logic Section of COMP4660/8420 Neural Networks, Deep Learning and Bio-inspired Computing
- Prepared 5 lecture modules and delivered in online environment of 300 students
- Prepared assignment content and resources
- Prepared and reviewed lab materials, final examination questions
- Marked final examination

Chief Academic Tutor

The Australian National University

📅 February 2019 – August 2021

- Chief tutor for COMP1710/6780 Web Development and Design and COMP3710 Topics in Computer Science
- Facilitated online learning activities for a class of 280 students
- Assisted with preparing course and lab content
- Led a team of 10 tutors to prepare and deliver lab tutorials and marking assignments.
- Conducted and marked oral examinations and final examination scripts
- Provided practical training on wearable devices and guided students on running experiments

EDUCATION

Doctor of Philosophy, Engineering and Computer Science

The Australian National University

📅 December 2017 – December 2022

Bachelors of Science (Honours) in Computer Science and Engineering

University of Dhaka

📅 January 2012 – March 2016

SKILLS

Physiological Signal Processing

Medical Data Analysis

ECG, EEG, HR, BP, fNIRS, EDA, BVP Analysis

Machine Learning   Python   Matlab

C/C++   Pandas   Numpy

Scikit-learn   Tensorflow   Keras

Jupyter   HTML   CSS   JavaScript

PHP   User Experience Research

Qualitative & Quantitative Analysis

ACHIEVEMENTS

- Best EMCR poster award at Westmead research and innovation conference 2022
- Winner of People's Choice Award in ANU 3 Minute Thesis Finals 2020
- Australia Representative in Global Young Scientists' Summit - Singapore 2020
- Recipient of Australian Government Research Training Program International Fee Offset and Stipend Scholarship (2017-2021)
- 1st Place in Australian Dance Crew Championship ACT Qualifier (2021)
- Recipient of RFL Inspiring Women Award in Category: Leaders of Tomorrow
- Recipient of EBL-DUAA Inspiration Scholarship (2015)
- Winner of Startup DU: Business Process Tool Competition (2014)

EXPERIENCE

Research Assistant

Commonwealth Scientific and Industrial Research Organisation (CSIRO)

📅 February 2020 – May 2020

- Team member in Immersive Analytics Lab's project Immersive Data Visualisation of Population-Scale Genome Architectures
- Conducted interviews of experts to gather requirements for the project
- Performed qualitative analysis on the collected data and provided design recommendations
- Prepared evaluation reports

Academic Tutor

The Australian National University

📅 July 2018 – December 2020

- Tutor for COMP3900/6390 Human Computer Interface Design and Evaluation and COMP1710/6780 Web Development and Design
- Delivered tutorials in both in-person and online learning environment
- Conducted oral examinations
- Marked assignments and final examination scripts

SELECTED PROJECTS

Virtual Baby (VBaby) - Predictive Physiological Modelling of Critically Ill Preterm Newborns

📅 November 2021 – present

- Analysed large scale physiological signals such as ECG, HR, ABP to understand patterns associated to adverse outcome in preterm infants such as: mortality, Sepsis, NEC, IVH
- Performed data pre-processing techniques, feature extraction and selection
- Developed machine learning methods to predict the early onset of adverse outcomes

Music and Emotion

📅 April 2019 – October 2021

- Collected physiological signals such as GSR, HRV, EEG, functional imaging of brain and eye gaze behavior to understand effects of music in identifying emotion from different categories of videos
- Performed qualitative, quantitative and visual analysis on the data
- Developed machine learning methods to computationally understand the effects of music on human physiological response

Immersive Data Visualisation of Population-Scale Genome Architectures

📅 February 2020 – May 2020

- Conducted interviews of experts for the project
- Performed qualitative analysis on the data to identify recommendations for the visualization methods

AFFILIATIONS

- Associate Fellow of the Higher Education Academy (AFHEA)
- Member of CSIRO H&B Early to Mid-Career Researcher Committee
- Proceedings Chair of OzCHI '22
- Associate Chair of CHI '22, DIS '21
- Logistics Chair of OzCHI '20
- Program Committee Member of PRICAI '22, CHI '22, OzCHI '22, DIS '21, ICONIP '19
- Student Volunteer of CSCW '21, IUI '21
- Reviewer for Elsevier Neural Networks Journal, ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT) Journal, PRICAI '22, OzCHI '22, CHI '21, INTERACT '21, DIS '21, ICMI '21, OzCHI '20, OzCHI '19, ICONIP '19
- Member of the Association for Computing Machinery (ACM)
- Member of the Institute of Electrical and Electronics Engineers (IEEE)
- Dance Crew Member at Project Beats Dance Studio (2019 - 2022)
- Dance Crew Member at Samarpana Dance Studio (2022 - Present)

SELECTED TALKS

- Workshop Facilitator at ANU Student Research Conference, SRC'22.
- Oral Presentation at CHI Conference on Human Factors in Computing Systems, CHI'21.
- Invited Talk at ABC Science Ockham's Razor
- Invited Talk at Global Young Scientists' Summit 2020
- Oral Presentation at 3-minute thesis 2020
- Invited Talk at Ada Lovelace Celebration 2020
- Oral Presentation at 32nd Australian Conference on Human-Computer-Interaction, OZCHI'20
- Oral Presentation at The 2020 International Joint Conference on Neural Networks, IJCNN 2020
- Oral Presentation at The 2019 International Joint Conference on Neural Networks, IJCNN 2019

SELECTED PROJECTS

Understanding psychophysiological behavior during reading and music listening

📅 May 2018 – December 2018

- Collected physiological signals such as GSR, HRV, EEG and eye gaze behavior to understand effects of different music genres on emotional response and reading behavior
- Analyzed the physiological signals using machine learning techniques to predict participants' emotional response

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Advanced Analytics to Reveal Novel Insights into 'Worth of Water'

📅 March 2017 – August 2017

- New South Wales Department of Primary Industries (Water) project in Collaboration with Advanced Analytics Institute, UTS, Sydney
- Applied visualization techniques to identify useful insights on water quality of Australia using Javascript

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Kinect Based Fruit Names and Etiquette Learning app

📅 July 2015

- Windows application built using C# and Kinect V2 sensors
- Conducted observation, interviews and paper prototype testing to gather requirements to build educational applications for children with autism

PUBLICATIONS

- Rahman, Jessica Sharmin et al. (2022). "Brain Melody Interaction: Understanding Effects of Music on Cerebral Hemodynamic Responses". In: *Multimodal Technologies and Interaction* 6.5, p. 35.

- Rahman, J. S., T. Gedeon, S. Caldwell, and R. Jones (2021). "Can Binaural Beats Increase Your Focus? Exploring the Effects of Music in Participants' Conscious and Brain Activity Responses". In: *Extended Abstracts of the 2021 CHI Conference on Human Factors in Computing Systems*. CHI'21. Online.

- Rahman, J. S., T. Gedeon, S. Caldwell, R. Jones, and Z.Jin (2021). "Towards Effective Music Therapy for Mental Health Care Using Machine Learning Tools: Human Affective Reasoning and Music Genres". In: *Journal of Artificial Intelligence and Soft Computing Research* 11.1, pp. 5–20.

- Pan, Eric and Jessica Sharmin Rahman (2021). "Stress Recognition with EEG Signals Using Explainable Neural Networks and a Genetic Algorithm for Feature Selection". In: *International Conference on Neural Information Processing*. Springer, pp. 136–143.

- Rostov, M., M. Z. Hossain, and J. S. Rahman (2021). "Robotic Emotion Monitoring for Mental Health Applications: Preliminary Outcomes of a Survey". In: *18th IFIP TC13 International Conference on Human-Computer Interaction*. INTERACT'21. Bari, Italy.

OUTREACH ACTIVITIES

- Mentor (Senior tutor) at ANU Centre for Teaching and Learning tutor training program 2021
- Mentor at ANU 3-Minute Thesis College Final 2021
- Volunteer at Canberra Street Dance Fest 2021, 2022
- Vice President at CSEDU Students' Club 2015

REFEREES

Prof. Tom Gedeon
@ Curtin University
✉ tom.gedeon@curtin.edu.au

Dr. Sabrina Caldwell
@ The Australian National University
✉ sabrina.caldwell@anu.edu.au

Dr. Duncan Stevenson
@ The Australian National University
✉ duncan.stevenson@anu.edu.au

- Li, Xiaolin, Md Zakir Hossain, and Jessica S Rahman (2021). "Distinguishing Between Real and Posed Smiles from Observers' Accelerometer Data". In: *2021 5th International Conference on Electrical Information and Communication Technology (EICT)*. IEEE, pp. 1–5.

- R.Chu et al. (2021). "Detecting Lies: Finding the Degree of Falsehood from Observers' Physiological Responses". In: *2021 IEEE International Conference on Systems, Man, and Cybernetics (SMC)*.

- Rahman, J. S., T. Gedeon, S. Caldwell, and R. Jones (2020). "Brain Melody Informatics: Analysing Effects of Music on Brainwave Patterns". In: *2020 International Joint Conference on Neural Networks (IJCNN)*, pp. 1–8.

- Rahman, J. S., M. Z. Hossain, and T. Gedeon (2020). "Are paired or single stimuli better to recognize genuine and posed smiles from observers' GSR". in: *Proceedings of the 32nd Australian Conference on Human-Computer-Interaction*. OZCHI'20. Online.

- Brewer, M. and J. S. Rahman (2020). "Pruning Long Short Term Memory Networks and Convolutional Neural Networks for Music Emotion Recognition". In: *International Conference on Neural Information Processing*. Springer, pp. 343–352.

- Renkin, M. and J. S. Rahman (2020). "Improving the Stability of a Convolutional Neural Network Time-Series Classifier Using SeLU and Tanh". In: *International Conference on Neural Information Processing*. Springer, pp. 788–795.

- Rahman, J. S., M. Z. Hossain, and T. Gedeon (2019). "Measuring Observers' EDA Responses to Emotional Videos". In: *Proceedings of the 31st Australian Conference on Human-Computer-Interaction*. OZCHI'19. Fremantle, WA, Australia, pp. 457–461.

- Rahman, J. S., T. Gedeon, S. Caldwell, R. Jones, M. Z. Hossain, et al. (2019). "Melodious Micro-frissons: Detecting Music Genres From Skin Response". In: *2019 International Joint Conference on Neural Networks (IJCNN)*, pp. 1–8.

- Rahman, J. S., J. Li, et al. (2018). "Connectivity Based Method for Clustering Microbial Communities from Metagenomics Data of Water and Soil Samples". In: *2018 International Joint Conference on Neural Networks (IJCNN)*. IEEE, pp. 1–8.

- Chowdhury, A., J. S. Rahman, and M.S. Hawlader (2016). "Well-connectedness-a novel measure for improving protein complex detection from PPI network". In: *2016 IEEE Conference on Computational Intelligence in Bioinformatics and Computational Biology (CIBCB)*. IEEE, pp. 1–6.