MD REDWAN KARIM SONY

31 Middlevale Rd, Apt: 1576-J, East Lansing, Michigan 48823
Phone: +1 (517)-580-1034 ⋄ **Email:** sonymd@msu.edu
GoogleScholar Profile

PROFESSIONAL EXPERIENCE

- **Graduate Research Assistant**
  Department of Computer Science and Engineering (CSE) *May, 2022 - Today*
  Michigan State University (MSU), MI, USA
- **Graduate Teaching Assistant**
  Department of Computer Science and Engineering (CSE) *August 2021 - April, 2022*
  Michigan State University (MSU), MI, USA
  Courses Taught: CSE-102: Algorithmic Thinking and Programming
- **Lecturer**
  Department of Computer Science and Engineering (CSE) *February, 2017 - August, 2021*
  Islamic University of Technology (IUT), Bangladesh
  Courses Taught: Computing for Engineers, Numerical Methods, Linear Algebra, Data and Telecommunication, Computer Architecture and Organization, E-commerce and Internet Security
- **Remote Machine Learning Engineer**
  MegaMind - An Startup of Simply Retrofits, Canada *Januray, 2021 - July, 2021*
  Projects Worked On:
  - **Mask Detector:** Automatic Face-mask Detection system deployed in NVIDIA Jetson Nano device for stores. YouTube Demo
  - **People Counter:** Automatic people counter in a store entrance with Object Detection Model deployed on a NVIDIA Jetson Nano.

PUBLICATIONS (CITATIONS COUNT: 43)

- Mottalib, M. A., Arnob, R. I., **Sony, M. R. K**., & Akter, L. (2017). *Advanced Agglomerative Clustering Technique for Phylogenetic Classification Using Manhattan Distance.* International Conference of Bioinformatics and Computational Biology BIOCOMP'17 (pp. 9-13). [read]
- ABMA Rahman, **Sony, M. R. K**, R Kushol, MH Kabir. (2018) *Performance Comparison of Feature Descriptors in Offline Signature Verification.* IUT JOURNAL OF ENGINEERING AND TECHNOLOGY (JET), VOL. 14, NO. 1, DECEMBER 2018.[read]
- Sabbir Ahmed, Md. B. Hasan, T. Ahmed, **Sony, M. R. K** and MH Kabir. (2021) *Less is More: Lighter and Faster Deep Neural Architecture for Tomato Leaf Disease Classification*, IEEE Access 2022
- Renu Sharma, **Redwan Sony**, Arun Ross (2024) *Investigating Weight-Perturbed Deep Neural Networks With Application in Iris Presentation Attack Detection*, IEEE/CVF Winter Conference on Applications of Computer Vision (WACV). Pages, 1082-1091

PUBLICATIONS UNDER REVIEW

- Carolyn V. Isaac, **Redwan Sony**, Clara J. Devota, Alexis VanVaarle, Todd W. Fenton, Joseph T. Hefner, Arun Ross (2023) *Automated Comparative Chest Radiography Using Deep Neural Networks*. Submitted to: Annual Conference of American Academy of Forensic Sciences-2024.

- Carolyn V. Isaac, Clara J. Devota, Alexis VanBaarle, **Redwan Sony**, Ross Arun (2023), *Deep Learning Models for Fracture Detection and Segmentation in Bone Histology*, Submitted to: Annural Conference of American Academy of Forensic Sciences-2024.

EDUCATION

- **Ph.D. in Computer Science and Engineering**, *Aug. 2021- Present*
  Michigan State University, MSU
- **M.Sc. in Computer Science and Engineering**, *Aug. 2021- Sept.2023*
  Michigan State University, MSU CGPA: **3.81/4.00**
- **B.Sc. in Computer Science and Engineering** *Dece. 2013 - Nov. 2016*
  Islamic University of Technology (IUT), Bangladesh **3.95/4.00** (**3rd** in class of **48**)

PROFESSIONAL MEMBERSHIP

- IEEE Student Membership (**ID: 97861483**)

ONGOING RESEARCH PROJECTS

- **Fracture Age Prediction from Histology Slides:** In a collaboration between the Computer Science and Engineering (CSE) and Forensic Anthropology Departments at Michigan State University, research is being **funded by National Institute of Justice (NIJ)**. The primary focus is on predicting the age of fractures in human skulls based on their histopathology slides. Advanced algorithms have been crafted for the meticulous segmentation and classification of these slides, laying the groundwork for precise estimations of fracture age.
- **Biometric Identification with Chest Xrays:** I am currently engaged in a research project between the Computer Science and Engineering (CSE) and Anthropology departments at Michigan State University, in partnership with Michigan Police. We're leveraging advanced deep learning models to determine the identity of unidentified bodies using chest X-ray images. This practical and impactful work is **funded by National Institute of Justice (NIJ)**.
- **Explainability and Interpretability of Biometric Models: Funded by Department of Homeland Security (DHS)** through Center for Identification Technology Research (CITeR), this project aims to investigate how modern day deep learning based biometric face recognition model make the decisions.

UNDERGRADUATE THESIS

Advanced Agglomerative Clustering Technique (AACT) for Phylogenetic Classification using Manhattan Distance.
Reducing trivial agglomerative hierarchical clustering technique's complexity $O(n^3)$. The proposed AACT method uses Manhattan distance instead of Euclidean for distance calculation among many improvements. [GitHub Repo]

TECHNICAL STRENGTHS

- **Programming Languages:** Python, C/C++, Java, Matlab, Perl, Linux Shell Scripting, PL-SQL
- **Cloud Environments:** Google Colab, Kaggle, Google Cloud Platform
- **ML Frameworks:** Pytorch, Tensorflow, Kears

CERTIFICATIONS

- Completed Machine Learning course offered by Stamford University in COURSERA. 2015. Certificate
- Completed five Deep Learning courses offered by deeplearning.ai in COURSERA. Certificates. 1 2 3 4 5

SCHOLARSHIPS AND AWARDS

- **Full Tuition Waiver and Research Assistantship** Michigan State University, *May 2022 - Present*
- **Full Tuition Waiver and Teaching Assistantship**
  Michigan State University, *Aug. 2021 - April 2022*
- Travel Grant by CiTER for FedID Conference-2022, Atlanta, GA. *September, 2022*
- **Full Tuition Waiver and OIC Scholarship**
  Islamic University of Technology (IUT), Bangladesh. *Dec. 2012 - Nov. 2016*
- Runner-up in 15th IUT Programming Contest 2015. Certificate *September, 2015*
- Runner-up in Project Showcasing of Automatic Home Management System in IUT ICT Fest 2015. . *June, 2015*
- **Bangladesh Government Education Board Scholarship**
  Higher Secondary Certificate Exam, **Merit Position:** 34 *July 2012- July 2013*
- **Bangladesh Government Education Board Scholarship**
  Secondary Certificate Exam, **Merit Position:** 23 *May 2010- May 2012*

MACHINE LEARNING COMPETITIONS

- **OSIC Pulmonary Fibrosis Progression on Kaggle**
  Predicting lung function decline from CT Scans (3D volumetric data).
  Result: Solo Bronze Medal (**198th out of 2097 teams, Top 10%**), **Solution:** GitHub Repo.
- **SIIM-ISIC Melanoma Classification on Kaggle**
  Identifying melanoma in lesion images.
  Result: (**Solo 386th out of 3314 teams, Top 12%**), **Solution:** GitHub Repo.
- **Flower Classification with TPUs on Kaggle**
  Classifying 104 types of flowers using Tensor Processing Units (TPU) on Kaggle Cloud Platform.
  Result: (**Solo 84th out of 848 teams, Top 10%**), **Solution:** GitHub Repo.
- **Plant Pathology 2020 - FGVC7 on Kaggle**
  Identifying the category of foliar diseases in apple trees from leaf images.
  Result: (**103rd out of 1317 teams, Top 8%**), **Solution:** GitHub Repo.
- **RSNA STR Pulmonary Embolism Detection on Kaggle**
  Classifying Pulmonary Embolism cases in chest CT scans (3D volumetric Data).
  Result: (**Solo 288th out of 784 teams, Top 37%**), **Solution:** GitHub Repo.
- **Jigsaw Multilingual Toxic Comment Classification on Kaggle**
  Identifying toxicity of the comments across multiple languages using TPUs on Kaggle.
  Result: (**Solo 330th out of 1621 teams, Top 21%**), **Solution:** GitHub Repo.
- **Global Wheat Detection on Kaggle**
  Detection and localization of wheat heads using image analysis.
  Result: (**Solo 779th out of 2245 teams, Top 21%**), **Solution:** GitHub Repo.

- **HackerEarth Machine Learning Challenge: Carnival Wars!**
  Predicting the selling price of items in an inventory.
  Result: (**Solo 310th out of 2144 teams, Top 14%**), **Solution:** GitHub Repo.
- **HackerEarth Machine Learning Challenge: Are your employees burning out?**
  Predicting the fatigue rate of the employees given relevant information.
  Result: (**Solo 40th out of 560 teams, Top 7%**), **Solution:** GitHub Repo.
- **HackerEarth Machine Learning Challenge: Snakes in the Hood**
  Classifying the snake species from a photo in the wild.
  Result: (**Solo 3rd out of 3889 teams, Top 1%**), **Solution:** GitHub Repo.

REFERENCES

Dr. Arun Ross
Martin J. Vanderpoleg Endowed Professor
Michigan State University
College of Engineering, Dept. of CSE
Site Director, CITeR NSF Research Center
Director, iPRoBe Lab
Advisor, IAPR TC4 on Biometrics
428 S. Shaw Lane, EB-3142, East Lansing, MI
Phone: (517) 353-9731
Email: rossarun@cse.msu.edu
Homepage: http://iprobe.cse.msu.edu/

Dr. Sandeep Kulkarni
Professor and Graduate Director
Dept. of Computer Science and Engineering
Michigan State University
428 S. Shaw Lane, EB-1135
East Lansing, MI -48823
Email: sandeep@msu.edu
Homepage: http://www.cse.msu.edu/sandeep
Phone: (517) 355 2387