Fariha Iffath
Machine Learning Researcher

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SUMMARY

As a dedicated and enthusiastic researcher, I have always been interested in exploring new and exciting facets of technology. Consequently, I've chosen to devote more focus to Artificial Intelligence and Biometrics research. My primary research interests are deep learning, machine learning, computer vision, and data analysis. I intend to use my AI research to make lives easier and safer for humans.

PROFESSIONAL EXPERIENCE

GRADUATE RESEARCH AND TEACHING ASSISTANT — **Calgary, Alberta**
University of Calgary — **May, 2022-Nov, 2024**

- Conducted the following course:
  - Data 201 - Thinking with Data (Fall '22, Winter '23, Fall '23, Winter '24)
- Designed and developed a hybrid Deep learning and Machine learning based person identification system using Audio Aesthetic.
- Proposed a new deep learning fusion method for the fusing multiple aesthetic modality.
- Developed a novel deep learning-based multi-modal aesthetic system for person identification.
- Conducting a case study to collect aesthetic biometric data.
- Published 2 book chapters, 2 journals, and 3 conference papers.

INSTRUCTOR — **Calgary, Alberta**
Alison College — **June, 2022-April 2023**

- Conducted the following courses:
  - Fundamental of Information Security.
  - Malware Analysis and Response.
  - Operating System Security.
  - Database Management.
- Also served as a member of the "Content Development Team".

LECTURER — **Chittagong, Bangladesh**
BGC Trust University — **feb, 2020-Aug, 2021**

- Conducted the following course:
  - Computer Fundamentals.
  - Structured Programming Language.
  - Data Structures and Algorithms.
  - Computer Architecture.
- Served as a member of summer school '20, winter school '20..
- Served as a convener of the programming club.

RESEARCH ASSISTANT — **Chittagong, Bangladesh**
Chittagong University of Engineering and Technology — **Nov, 2019- Feb, 2020**

- **Research Work:** Development of an Online Judge Platform.
- Aim to develop an online platform for conducting programming labs which is based on online judge systems.
- **Platform**: Ubuntu.
- **Frontend**: HTML, CSS, Javascript, JQuery, Bootstrap.
- **Backend**: Go Programming Language, MySQL Database, Go-Macaron, Web- Framework, Go-Xorm ORM, Docker, Redis

EDUCATION

M.Sc IN COMPUTER SCIENCE (Thesis Based) — **Calgary, Alberta, Canada**
University of Calgary — **May, 2022- Nov, 2024**

B.Sc IN COMPUTER SCIENCE — **Chittagong, Bangladesh**

Chittagong University of Engineering and Technology **MARCH, 2015-July, 2019**

TECHNICAL SKILLS

- **Machine Learning:** Linear and Logistic Regression, Decision Tree, Support Vector Machine, Neural Network, Bayesian Network, Clustering Algorithms etc.
- **Deep Learning:** Convolutional Neural Network, Recurrent Neural Network, Predictive modeling, Decision analysis, Data Analysis, and Statistical Analysis.
- **Packages:** Pytorch**,** Keras, Tensorflow, Sci-kit learn, OpenCV.
- **Operating System:** UNIX-based operating systems, and Windows Operating Systems.
- **Programming Language:** C, C++, Java, Python, Matlab, .
- **Other Technical Skills:** Android OS, Latex, Git, AutoCAD, Arduino, Adobe Photoshop.

PROJECTS

Cuet Online Judge Platform (COJ):
- Cuet Online Judge Platform (COJ) is a Bangladeshi Govt. funded project to develop an online platform for conducting programming labs which is based on online judge systems.
- It includes Dynamic Plagiarism Detection Facilities.

Musical Cognitive Biometric System:
- A robust framework for person identification was developed that was capable of recognizing people from their preferred music.
- A three stage framework based on deep learning was employed to develop this system.

Multi-modal Aesthetic Biometric System:
- A novel deep learning fusion method was developed to fuse multiple aesthetic modality for a robust biometric identification system.
- A CNN-based Residual Aided Intermediate Fusion (RAIF) architecture was employed to develop the system.

Keystroke Dynamic-based User Recognition System:
- A novel deep learning-based two-factor user authentication method for analyzing users' writing behaviors from free texts instead of fixed texts.
- An LSTM-based Siamese Network was used to develop the system.

MRI Image Classification System:
- An advanced deep learning-based brain MRI image detection and classification system was developed..
- Developed model exhibits adaptability for a diverse range of medical images, showcasing its versatility in medical imaging applications.

Question-Pair Semantic Similarity Prediction System:
- A deep learning-based question pair semantic similarity prediction system was developed.
- Explored various Siamese LSTM-based Neural Network to develop the system.

Crime Prediction Model using Machine Learning:
- Developed a system that was capable of predicting crime by analyzing patterns in crime data.
- Traditional machine learning model was utilized to develop the system.

Tourism Management System:
- Developed a website that will help tourists to find out tourist spots in different divisions around Bangladesh.
- It was developed based on HTML, CSS, Javascript and Python.

Inventory Management System:
- The aim of this project is to develop System to manage the inventory system of any organization.
- It was developed based on HTML, CSS, Javascript and PHP.

Wind Turbine Simulation:
- Designed the simulation of a windmill using C++ & OpenGL.

PUBLICATIONS

Journals:

1. **Iffath, F.**, Kayes, A. S. M., Rahman, M. T., Ferdows, J., Arefin, M. S., & Hossain, M. S. (2021). Online Judging Platform Utilizing Dynamic Plagiarism Detection Facilities. *Computers, 10(4), 47*.
2. **Iffath, F.**, & Gavrilova, M. L. (2022). A Novel Three Stage Framework for Person Identification From Audio Aesthetic. *IEEE Access, 10, 90229-90243.*
3. **Iffath, F**, Gavrilova, M (2023). RAIF: A Deep Learning-Based Architecture for Multi-modal Aesthetic Biometric System. *Comput Anim Virtual Worlds*. 2023;e2163. https://doi.org/10.1002/cav.2163

Conferences:

1. **Iffath, F.**, Maisha, S. J., & Rashida, M. (2022). Comparative Analysis of Machine Learning Techniques in Classification Cervical Cancer Using Isolation Forest with ADASYN. In Proceedings of the International Conference on Big Data, IoT, and Machine Learning (pp. 15-26). Springer, Singapore.
2. Rashida, M., **Iffath, F**., Karim, R., & Arefin, M. S. (2021, December). Trends and Techniques of Biomedical Text Mining: A Review. In *International Conference on Intelligent Computing & Optimization* (pp. 968-980). Springer, Cham.
3. Sultana, N., Mridula, D. T., Sheikh, Z., **Iffath, F.**, & Shopon, M. (2022). Dense Optical Flow and Residual Network-Based Human Activity Recognition. *In New Approaches for Multidimensional Signal Processing (pp. 163-173). Springer.*
4. **Iffath, F**., Shopon, M., Ovens, K., & Gavrilova, M. L. (2024, April). A Deep Learning Approach for Semantic Similarity Prediction Between Question Pairs Using Siamese Network and Word Embedding Techniques. *In 2024 IEEE 3rd International Conference on Computing and Machine Intelligence (ICMI) (pp. 1-6). IEEE.*
5. **Iffath, F.**, Dey, L., & Gavrilova, M. L. (2024, August). Enhancing Brain Tumor Diagnosis through Adaptive Feature Aggregation based Transfer Learning. *In 2024 IEEE 19th Conference on Industrial Electronics and Applications (ICIEA) (pp. 1-6). IEEE.*

Book Chapters:

1. Gavrilova, M.L., Anzum, F., Hossain Bari, A.S.M., Bhatia, Y., **Iffath, F**., Ohi, Q., Shopon, M. and Wahid, Z., 2022. A Multifaceted Role of Biometrics in Online Security, Privacy, and Trustworthy Decision Making. *In Breakthroughs in Digital Biometrics and Forensics (pp. 303-324). Springer, Cham*.
2. Anzum, F., Asha, A. Z., Dey, L., Gavrilov, A., **Iffath, F**., Ohi, A. Q., ... & Gavrilova, M. L. (2024). A Comprehensive Review of Trustworthy, Ethical, and Explainable Computer Vision Advancements in Online Social Media. *Global Perspectives on the Applications of Computer Vision in Cybersecurity*, 1-46.

Posters:

1. **Iffath, F.**, & Gavrilova, M. L. (2022). User Identification Based on Musical Cognitive Preferences. *CPSC Showcase, University of Calgary, Alberta.*
2. **Iffath, F.**, & Gavrilova, M. L. (2022). Analysis of Human Musical Cognitive Preferences. *Alberta Biomedical Engineering Conference.*
3. **Iffath, F.**, & Gavrilova, M. L. (2024). Aesthetic Biometric Fusion: Residual Connection-based Deep Attention Mechanism in Multi-modal Systems. *WiDS University of Calgary.*

Leadership

Biometric Lab Representative — **Calgary, Alberta**
Get Science Done Strategic Plan Launch — **May, 2024**

- **Purpose**: To represent the Biometric Lab, promoting its research and engaging audiences with innovative demonstrations.
- **Responsibility:** Organized and managed the lab's booth, presented research highlights, and facilitated interactive simulations to showcase advancements in biometric research.

Member — **Calgary, Alberta**
GSA Newcomers and International Student Subcommittee (NISS) — **Sep, 2023-April, 2024**

- **Purpose**: To welcome newcomers and international students and support them to settle into the University of Calgary community and integrate into the larger Calgary community. The subcommittee works to nurture an inclusive environment for all newcomers and international students through events, programs, and initiatives.
- **Responsibility:** Organizing and contributing to events, programs, and initiatives that welcome and support international students.

Mentor — **Calgary, Alberta**
Coding Workshop, Bioengineering Summer Institute Program — **Aug, 2023**

- **Purpose**: Impart coding skills while fostering creativity by guiding participants in developing simple games through hands-on learning.
- **Responsibility:** Offering expert assistance to participants, helping them troubleshoot and overcome programming challenges effectively.

Mentor **Calgary, Alberta**
Schulich Ignite (Fall '22, Winter '23) **Sep, 2022-April, 2023**

- **Purpose**: Free computer coding courses led by University of Calgary student mentors.
- **Responsibility:** Mentoring programming enthusiast students about programming and debugging

Graduate Student Representative (Fall '22, Winter '23) **Calgary, Alberta**
TLSE Committee, CPSC Department, University of Calgary **Sep, 2022-April, 2023**

- **Purpose**: To improve students' teaching and learning experience.
- **Responsibility:** Organize different events and activities.

Biometric Lab Representative **Calgary, Alberta**
WISE Research Night, University of Calgary **Aug,2022**

- **Purpose**: Organized by Women in Science and Engineering (WISE) club on campus. A symposium for students to interact with and learn more about the wonderful research conducted by professors on campus.
- **Responsibility:** Represent my lab (Biometric Technologies Lab) by exhibiting previous and ongoing research to the audiences.

HONORS AND AWARDS

- **Participation Scholarship** - International Summer School on "Biometrics - intelligent solutions 2023" (Bialystok University of Technology)
- **Honorable Mention** - CPSC Showcase, 2022 (University of Calgary, Alberta).
- **International Graduate Tution Award**- 2022-2023.
- **International Graduate Tution Award**- 2023-2024.
- **Graduate Award Competition**- Fall '24
- **Best Thesis Award Nomination**

REFERENCES

1. **Marina L. Gavrilova, Ph.D:**
    - **Professor and Associate Head, Department of Computer Science, University of Calgary**
    - **Email:** mgavrilo@ucalgary.ca
2. **Nelson Wong**
    - **Associate Head - Teaching - Learning and Student Engagement Associate Professor (Teaching), Department of Computer Science, University of Calgary.**
    - **Email:** nelsonwong@ucalgary.ca