

FAHIM ANZUM

Researcher specializing in Responsible and Trustworthy AI, XAI, and Social Media Opinion Mining

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Education

PhD Candidate in Computer Science

University of Calgary, Calgary, Alberta

Sep 2021 – Aug 2025 (Expected)

Supervisor: Marina L Gavrilova

MSc in Computer Science

University of Calgary, Calgary, Alberta

Sep 2019 – Aug 2021

Supervisor: Mario Costa Sousa, Usman Alim

BSc in Computer Science & Engineering

Military Institute of Science & Technology, Bangladesh

Jan. 2013 – Jan 2018

Supervisor: Muhammad Nazrul Islam

Publications (Peer-Reviewed)

- **Fahim Anzum** and Marina L. Gavrilova. "Emotion Detection From Micro-Blogs Using Novel Input Representation." *IEEE Access* 11 (2023): 19512-19522. [pdf]
- Zaman Wahid, ASM Hossain Bari, **Fahim Anzum** and Marina. L. Gavrilova, "Human Micro-Expression: A Novel Social Behavioral Biometric for Person Identification," *IEEE Access* 11 (2023): 57481-57493. [pdf]
- **Fahim Anzum**, Hamidreza Hamdi, Usman Alim, and Mario Costa Sousa. "Exploring Convolutional Neural Networks and Machine Learning for Oil Sands Drill Core Image Analysis." In *Third EAGE Digitalization Conference and Exhibition*, vol. 2023, no. 1, pp. 1-5. European Association of Geoscientists & Engineers, 2023. [pdf]
- Marina L Gavrilova, **Fahim Anzum**, A. S. M. Hossain Bari, Yajurv Bhatia, Fariha Iffath, Quwsar Ohi, Md Shopon, and Zaman Wahid. "A multifaceted role of biometrics in online security, privacy, and trustworthy decision making." In *Breakthroughs in Digital Biometrics and Forensics*, pp. 303-324. Cham: Springer International Publishing, 2022. [pdf]
- **Fahim Anzum**, Ashratuz Zavin Asha, and Marina L. Gavrilova. "Biases, fairness, and implications of using AI in social media data mining." In *2022 International Conference on Cyberworlds (CW)*, pp. 251-254. IEEE, 2022. [pdf]
- Kaitlin De Chastelain Finnigan, **Fahim Anzum**, Jon Rokne, and Marina L. Gavrilova. "Weighted Lexicon-based Sentiment Analysis for Women Career Traits in Information Technology." In *2022 IEEE 21st International Conference on Cognitive Informatics & Cognitive Computing (ICCI*CC)*, pp. 91-98. IEEE, 2022. [pdf] **Best Paper Award*
- Ashratuz Zavin Asha, **Fahim Anzum**, Patrick Finn, Ehud Sharlin, and Mario Costa Sousa. "Designing external automotive displays: VR prototypes and analysis." In *12th International Conference on Automotive User Interfaces and Interactive Vehicular Applications (AutomotiveUI 2020)*, pp. 74-82. 2020. [pdf]
- Ashratuz Zavin Asha, **Fahim Anzum**, SM Faisal Rahman, Muhammad Nazrul Islam, and Mehreen Hoque. "Towards developing an intelligent fire exit guidance system using informed search technique." In *2018 21st International Conference of Computer and Information Technology (ICCIT)*, pp. 1-6. IEEE, 2018. [pdf]
- Adnan Sharif, **Fahim Anzum**, Ashratuz Zavin, Sayma Alam Suha, Anika Ibnat, and Muhammad Nazrul Islam. "Exploring the opportunities and challenges of adopting augmented reality in education in a developing country." In *2018 IEEE 18th International Conference on Advanced Learning Technologies (ICALT)*, pp. 364-366. IEEE, 2018. [pdf]
- Fahim Ahmed, **Fahim Anzum**, Muhammad Nazrul Islam, Wali Mohammad Abdullah, Sazid Al Ahsan, and Moneruzzaman Rana. "A new algorithm to compute single source shortest path in a real edge weighted graph to optimize time complexity." In *2018 IEEE/ACIS 17th International Conference on Computer and Information Science (ICIS)*, pp. 185-191. IEEE, 2018. [pdf]

- **Fahim Anzum**, Fahim Ahmed, M. Shariful Azim, Mosaddek Hossain, Shifat Zaman, Farhan Hasib, and Sazid Al Ahsan. "Smart self position aligning chair for a modern conference room." In *2018 IEEE/ACIS 17th International Conference on Computer and Information Science (ICIS)*, pp. 263-268. IEEE, 2018. [pdf]

Research Experience

Graduate Research Assistant

Sep 2021 – Present

The Biometric Technologies Lab (BT Lab), University of Calgary

Calgary, AB

- Researched and proposed a novel feature representation from Tweets, termed **SSEL**, and developed a weighted voting ensemble emotion classifier leveraging genetic algorithm optimization. Achieved 96.49% across all evaluation metrics and outperformed the recent state-of-the-art by 5%. [*IEEE Access, 2023*]
- Researched and mentored a master's student in developing an enhanced social behavioral biometric (SBB) system, "Human Micro-Expression," which surpassed the performance of all original SBB traits using rank-level weighted majority voting for person identification. [*IEEE Access, 2023*]
- Conducted a research synthesis of 50 peer-reviewed papers unveiling insights into limitations, biases, fairness, and risks in various social media data mining and AI model development stages. Highlighted three ethical concerns and proposed three bias mitigation strategies. [*IEEE CW, 2022*]
- Explored biometric systems through a systematic literature review of over 65 peer-revised papers, focusing on privacy and trustworthiness. Co-authored a book chapter integrating state-of-the-art approaches with online security and human psychological traits. [*Springer, Breakthroughs in Digital Biometrics and Forensics, 2022*]
- Designed an unsupervised sentiment analysis algorithm for women in IT using the Polarity Rank algorithm and sentence dependency graph. Supervised an undergrad student in implementing the algorithm and performed an exploratory data analysis to investigate the role of equity, diversity, and inclusion (EDI) on participants' emotional responses. [*IEEE ICCI*CC, 2022*] ****Best Paper Award**

Teaching Experience

Sessional Instructor

Fall 2023

Department of Computer Science, University of Calgary

Calgary, AB

- Taught a class size of 160 junior-level undergrads on the Introduction to Computer Science for Computer Science Majors I (CPSC 231) course. [*Github repository*]
- Mentored students during weekly office hours to effectively learn programming.
- Assessed the students' progress through regular in-class activities, exams, and assignments.
- Coordinated and supervised a team of teaching assistants, ensuring the smooth execution of instructional support.

Graduate Assistant - Teaching

Sep 2019 – Present

University of Calgary

Calgary, AB

- Tutored 600+ junior and senior-level undergrads and grads with an average class size of 50 students in Computer Science and Data Science courses.
- Courses taught: Introduction to Computer Science for Multidisciplinary Studies I (CPSC 217), Data Structures, Algorithms, and Their Application (CPSC 319), Thinking with Data (DATA 201), and Working with Data at Scale (DATA 604)
- Demonstrated efficient problem-solving strategies to the students during continuous tutorials.
- Evaluated exams and assignments and judged project presentations.

Lecturer, Department of Computer Science & Engineering

Jun 2018 – Aug 2019

United International University (UIU)

Dhaka, Bangladesh

- Taught 800+ senior-level undergrads with an average class size of 85 students in Computer Science and Engineering courses.

- Redesigned curriculum for two senior-level undergrad Computer Science and Engineering courses: Computer Graphics (CSE 421) and Computer Graphics Lab (CSE 422).
- Courses taught: Computer Graphics (CSE 421), Computer Graphics Lab (CSE 422), Graph Theory (CSE 427), Graph Theory Lab (CSE 428), Software Engineering (CSE 323).
- Evaluated students based on bi-weekly class tests, assignments, group works, presentations, project demos, and final exams.
- Evaluated and judged senior-level undergrad final research thesis.
- Completed workshops on Outcome Based Education (OOB) to enhance pedagogical skills.

Professional Experience

Mitacs-Accelerate Graduate Research Intern

Sep 2019 – Aug 2021

Suncor Energy Inc.

Calgary, AB

- Researched and developed a hybrid model using classical machine learning and convolutional neural network techniques to predict facies and grain size from oil sands drill core images.
- Achieved 20% performance improvement by the proposed model when compared with Suncor's existing system.
- Led a team of 10+ geoscientists and engineers for model deployment in Suncor's drill core image analysis pipeline.
- Communicated findings through presentations and publications. [*EAGE Digital, 2023*]

Awards, Honors, and Distinctions

- **IEEE ICCI*CC Best Paper Award**, (2022).
- **Alberta Innovates Graduate Student Scholarship** (2021 - 2025) amounting to CA\$31,000/year.
- **Eyes High International Doctoral Recruitment Scholarship** (2021 - 2025) amounting to CA\$15,000/year.
- **International Graduate Tuition Award** (2021 - 2025) amounting to CA\$3,000/year.
- **Department Research Award** (2020) amounting to CA\$11,000.
- **Mitacs-Accelerate Graduate Research Internship** (2019 - 2021) amounting to CA\$25,000/year.
- **International Graduate Recruitment Award** (2019) amounting to CA\$2,000.
- **Visa Differential Scholarship** (2019) amounting to CA\$4,1267.17.
- **MIST Commandant's List Award** (2015, 2016) for obtaining an annual cumulative GPA greater than 3.80 in junior and senior years.
- **National Higher Secondary School Merit Scholarship** (2012) by the Government of Bangladesh.
- **National High School Merit Scholarship** (2008) by the Government of Bangladesh.

Professional Service

Reviewer

2021 - Present

IEEE, Springer

Calgary, Bangladesh

- Reviewed 20+ papers published in peer-reviewed conferences, journals, and book chapters.
- Conferences and journals: IEEE Access, Springer Transaction on Computational Science (TCS), IEEE International Conference on Computational Science and its Applications (ICCSA).
- Recently reviewed a Springer Nature book proposal on "Biases and ethics in social intelligence".

Vice President - Communication

Apr 2023 – Present

Computer Science Graduate Society (CSGS)

University of Calgary

- Organized weekly networking events within different research groups of Computer Science graduate students.
- Planned and organized two events on multidisciplinary research talks.
- Facilitated communication between the department and graduate students.

Student Volunteer

Jul 2023

ACM Designing Interactive Systems (DIS)

CMU, Pittsburgh, PA

- Collaborated with the organizing committee to streamline conference logistics.
- Assisted in event coordination, ensuring smooth operation of various activities.
- Engaged with participants, addressing inquiries and providing information.

Judge

Feb 2022

Calgary Hacks 2022

University of Calgary

- Evaluated and critiqued over 25 innovative software and hardware projects.
- Provided constructive feedback to participants, encouraging continuous project improvement.

Conference Organizer

Dec 2018

IEEE ICCIT 2018

Dhaka, Bangladesh

- Served as an organizing committee member (logistic subcommittee) to host the 21st International Conference on Computer and Information Technology (ICCIT) at the United International University, Bangladesh.
- Arranged sponsorship from industries.
- Served as a neutral chair in 2 paper presentation sessions.

Invited Talks and Seminars

- **United International University, Dhaka, Bangladesh**, “Bias and Ethics in Online Social Media Data Mining”. **Jan, 2023**.
- **University of Calgary, Calgary, Alberta**, “AI in Social Media Data Mining: Viewing Through the Lens of Ethical Aspects”. **Sep, 2022**. [Poster]
- **Bournemouth University, England**, “Exploring Transfer Learning and Convolutional Neural Networks for Predicting Mean Grain Size from Oil Sands Drill Core Images”. **Sep, 2022**.
- **DATA 501 - Data Science Capstone, University of Calgary, Calgary, Alberta**, “Introduction to Deep Learning and Convolutional Neural Networks”. **Jul, 2022**.
- **Visualization and Graphics Group (VISAGG), University of Calgary, Calgary, Alberta**, “Drill Core Image Classification using Convolutional Neural Networks”. **Jul 2022**.

Technical Expertise

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|-------------------------------------|---|
| – Deep Learning (DL) | – ML/DL Frameworks: Scikit-Learn, PyTorch, |
| – Machine Learning (ML) | Tensorflow, Keras |
| – Large Language Models (LLMs) | – NLP Libraries: NLTK, Spacy |
| – Natural Language Processing (NLP) | – Programming Languages: Python, Java |
| – Long-Short Term Memory (LSTM) | – Python Libraries: NumPy, Pandas, Seaborn, |
| – Transformers | Matplotlib, Gensim |