Nafiz Imtiaz Khan

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Education

University of California, Davis — September 2023 - Present
PhD in Computer Science, GPA: 3.85/4.00 — *California, United States*

Military Institute of Science and Technology (MIST) — January 2017 - June 2021
B.Sc. Engg. in Computer Science and Engineering, CGPA: 3.84/4.00 — *Dhaka, Bangladesh*

Professional Experience

Graduate Research Fellow — September 2023 - Present
University of California, Davis — *California, United States*

- Developed **ReACT-GPT**, a **Retrieval-Augmented Generation (RAG)** framework utilizing **LangChain**, **ChromaDB**, and **Ollama** to synthesize actionable insights and key findings from scientific articles.
- Developed **EvidenceBot**, an open-source application using **Streamlit** and the **ReACT-GPT** framework, enabling users to query and extract information from various documents effectively.
- Enhanced the performance of foundational language models (**Llama**, and **Mixtral**) on targeted tasks through strategic fine-tuning techniques, including **PEFT** and **LoRA**.
- Engineered and optimized various LSTM-based models (**Dilated-LSTM**, **Bi-LSTM**, and **Stacked-LSTM**) to improve accuracy in forecasting the graduation status of **Open Source Software (OSS)** projects.
- Developed ReACTive, a visualization tool for ReACTs (Researched ACTionables) with **Pyvis** and **Bootstrap**
- Developing OSS Project Navigator using **Vue.js** and **MongoDB** to assess the health of open-source software projects and provide researched actionable recommendations aimed at enhancing their sustainability.

Lecturer — March 2021 - August 2023
Military Institute of Science and Technology (MIST) — *Dhaka, Bangladesh*

- Instructed six theory (**Data Structure**, **Software Engineering**, **Programming Language**, **Discrete Mathematics**, etc.) and eight sessional (**Integrated Design Project**, **System Design and Development**, etc) courses.
- Co-supervised **ten undergraduate** thesis teams, guiding students in their research and project development.
- Collaborated in **25 ML-based** research projects with students and faculty members.

Software Engineer — July 2022 – August 2023
Center for Advanced Computing Research (CACR) — *Dhaka, Bangladesh*

- Developed the **AFMC Admission Test** Module, a software solution for the AFMC Entrance exam, utilizing **Node.js**, **Bootstrap**, and **MongoDB** to generate unique randomized questions for 30,000 candidates and automate the evaluation and ranking process.
- Spearheaded a team to develop **C-Archive** using **PHP**, **MySQL**, and **Bootstrap** to store ongoing events/records for the department.
- Developed a **Digital Plot Distribution** system in collaboration with RAZUK, utilizing **Node.js**, **Bootstrap**, and **MongoDB**.
- Developed the **Website** of MIST Inter-University ICT Innovation Fest with **HTML**, **CSS**. and **Bootstrap**.

Software Engineer — August 2019 – February 2020
Guard Force Securities — *Dhaka, Bangladesh*

- Designed and Implemented an **Employee Management System (EMS)** using **JavaFX** and **MySQL** database with multiple levels of security authorizations. which is used to maintain over 3500 employees.

Technical Skills

Programming Languages: Python, C/C++, Java, PL/SQL, Assembly (Intel ×86, MIPS), JavaScript, Typescript, HTML / CSS, Bash
Frameworks/Libraries : Scikit-learn, Keras, Tensorflow, Pandas, PyTorch, NumPy, Matplotlib, BeautifulSoup, LangChain, Node, React, Vue
Tools: Git, Google Colab, GCP, Docker, Bootstrap, Flask, React, jQuery, Kubernetes, Grafana, Selenium, Postman, Microsoft Azure, JIRA
Database: MySQL, Oracle, SQLite, FireBase, MongoDB, ChromaDB

Patents

1. **Nafiz Imtiaz Khan**, Vladimir Filkov, “Using AI to Find Evidence-based Actions to Achieve Modelable Goals," (Submitted)

Award & Honors

- **Champion** in the the **Medical Robotics Challenge for Contagious Diseases**, organized by **Imperial College London** [ref]
- **Champion** in the Creative App Contest of the **Tri Robo Cup Championship** organized by the **MIST Robotics club** [ref]
- **3rd runner-up** at **COVID-19 Combatants Unification Competition**, organized by **IEEE Bangladesh Chapter** [ref]
- **Top Downloaded Article Award** - in the year 2021, and 2022; provided by **Engineering Reports Journal - Wiley**
- MIST **Dean’s** List of honor– in the years 2018, 2019, and 2020
- Received MIST **Merit Scholarship** at Level-2, Level-3 and level-4

Notable Projects

1. **UVC-PURGE V2.0**
   UVC-PURGE is an innovative **semi-autonomous UVC disinfection** robot developed to combat COVID-19. Equipped with six T5 UVC lamps, it can neutralize the **SARS-CoV-2** virus in a standard 12' x 16' room in just 2-3 minutes. The robot features real-time camera feedback for enhanced navigation and obstacle avoidance. I contributed to the development of the **controller app**, which allows users to intuitively manage the robot wirelessly. With a coverage area of 1600 square feet and a 2-hour battery life, UVC-PURGE is suitable for various indoor environments, including patient wards, ICUs, and office spaces. [ref]

Activities

- **Volunteer Co-Chair**, 39th IEEE/ACM International Conference on Automated Software Engineering (**ASE 2024**)
- **Reviewer**, CHI 2023
- **Program Committee Member and Reviewer**, 3rd International Conference on Computer Vision & Robotics (**CVR 2023**)
- **Program Committee Member and Reviewer**, 2022 IEEE World Conference on Applied Intelligence and Computing (**AIC 2022**)
- **Chief Technical Officer**, ICMAB 18th Council Election - 2022.
- **Chief Technical Officer**, BEPZA Recruitment Exam - 2022.
- **Chief Technical Officer**, AFMC Admission Test - 2022.
- **Chief Technical Officer**, AFMC Admission Test - 2021.
- **Event Coordinator**, Mobile App Contest, MIST Inter-University ICT Innovation Fest 2021.
- **Technical Member**, MIST Inter-University ICT Innovation Fest 2021.
- **Executive Member**, Event Management Team, MIST Computer Club.

Publications

Conference:

1. **Nafiz Imtiaz Khan**, and Vladimir Filkov, "From Models to Practice: Enhancing OSS Project Sustainability with Evidence-Based Advice," in European Software Engineering Conference and Symposium on the Foundations of Software Engineering **(ESEC/FSE-2024)**. July 15-19, 2024, Porto de Galinhas, Brazil.[HTML LINK]
2. **Nafiz Imtiaz Khan**, Arjun Ashok, Swati Singhvi, Ștefan Stănciulescu, and Vladimir Filkov, "Modeling Sustainability of OSS Projects Across and Outside of the Apache and Eclipse Foundations," (Submitted)
3. **Nafiz Imtiaz Khan**, and Vladimir Filkov, "Leveraging Language Models to Discover Evidence-Based Actions for OSS Sustainability," (Submitted)
4. **Nafiz Imtiaz Khan**, Tahasin Mahmud, Muhammad Nazrul Islam, and Sumaiya Nuha Mustafina, "Prediction of Cesarean Childbirth using Ensemble Machine Learning Methods", 22nd International Conference on Information Integration and Web-based Applications & Services (iiWAS2020), November 30-December 2, 2020, Chiang Mai, Thailand. [HTML LINK]
5. Tarannum Zaki, **Nafiz Imtiaz Khan**, and Muhammad Nazrul Islam, "Evaluation of User's Emotional Experience through Neurological and Physiological Measures in Playing Serious Games", 20th International Conference on Intelligent Systems Design and Applications (ISDA), December 12-15, 2020, ONLINE. [HTML LINK]
6. Anika Islam Aishwarja, Nusrat Jahan Eva, Shakira Mushtary, Zarin Tasnim, **Nafiz Imtiaz Khan**, and Muhammad Nazrul Islam, "Exploring the Machine Learning Algorithms to Find the Best Features for Predicting the Breast Cancer and its Recurrence", 3rd International Conference on Intelligent Computing and Optimization (ICO), April 22-23, 2021, Hua Hin, Thailand. [HTML LINK]
7. Deepon Deb Nath, **Nafiz Imtiaz Khan**, Jesmin Akhter and Abu Sayed Md. Mostafizur Rahaman, "Prediction of Android Malicious Software using boosting Algorithms", 4th International Conference on Emerging Technologies in Computing (iCETiC), August 18-19, 2021, London, United Kingdom. [HTML LINK]
8. Md. Rokonuzzaman Reza, Fabiha Mukarrama Binte Mannan, Dhrubo Barua, Shafayetul Islam, **Nafiz Imtiaz Khan**, and Sharifa Rania Mahmud, "Developing a Machine Learning Based Support System for Mitigating the Suppression Against Women and Children", 5th International Conference on Electrical Engineering and Information & Communication Technology (ICEEICT), Nov 18-20, 2021, Dhaka, Bangladesh. [HTML LINK]
9. Shutonu Mitra, Tasfia Tasnim, Arr Rafi Islam, **Nafiz Imtiaz Khan**, and Shajahan Majib, "A Framework to Detect and Prevent Cyberbullying from Social Media by Exploring Machine Learning Algorithms", 6th International Conference on Computer, Communication, Chemical, Materials and Electronic Engineering (IC4ME2), December 26-27, 2021, Rajshahi University, Rajshahi, Bangladesh. [HTML LINK]
10. Muhammad Rafsun Sheikh, Tarek Hasan Masud,**Nafiz Imtiaz Khan**, and Muhammad Nazrul Islam, "An Efficient Transfer Learning Model for Predicting Forged (Handwritten) Signature", In 2021 International Conference on Computer, Communication, Chemical, Materials, and Electronic Engineering (IC4ME2), December 26-27, 2021, Rajshahi University, Rajshahi, Bangladesh. [HTML LINK]

11. **Nafiz Imtiaz Khan**, Sumaiya Nuha Mustafina, Farzana Faruk Jhumu, A.H.M Zobyer, Masrur Hasan Mahin, Md. Ariful Islam Tarek, Raiyan Rahman, and Muhammad Nazrul Islam, "Towards Developing an Automated Attendance Management System using Fingerprint Sensor", International Conference on Emerging Technology in Computing, Communication and Electronics, December 21-22, 2020, Dhaka, Bangladesh. [HTML LINK]
12. Noor Nafiz Islam, **Nafiz Imtiaz Khan**, Md Abdur Razzak, and Muhammad Nazrul Islam, "Design, Development, and Evaluation of a Physical Exercise Monitoring and Managing System for Athletes, 23rd International Conference on Information Integration and Web Intelligence (iiWAS2021), November 29-December 1, 2021, Linz, Austria. [HTML LINK]
13. Muhammad Nazrul Islam, **Nafiz Imtiaz Khan**, Ayon Roy, Md Mahbubar Rahman, Md Saddam Hossain Mukta, A.K.M Najmul Islam, "Sentiment Analysis of Bangladesh-specific COVID-19 Tweets using Deep Neural Network", 62nd International Conference on Information Technology and Management Science (ITMS'21), October 14-15, 2021, RIGA, LATVIA. [HTML LINK]
14. Moumita Bhowmik, Naim Ibna Khadem Al Bhuyain, Md. Rokonuzzaman Reza, **Nafiz Imtiaz Khan**, and Muhammad Nazrul Islam, "Neurophysiological Feature Based Stress Classification Using Unsupervised Machine Learning Technique", In Proceedings of International Conference on Fourth Industrial Revolution and Beyond (IC4IR). December 2021, Dhaka, Bangladesh. [HTML LINK]
15. Ifath Ara, Tasneem Mubashshira, Fariha Fardina Amin, **Nafiz Imtiaz Khan,** and Muhammad Nazrul Islam, "Towards Developing a Mobile Application for Detecting Intoxicated People through Interactive UIs", International Joint Conference on Advances in Computational Intelligence (IJCACI), October 23–24, 2021, ONLINE. [HTML LINK]
16. Faria Habib, Tasfhia Fatema, Munswarim Khan, **Nafiz Imtiaz Khan**, and Muhammad Nazrul Islam, "Exploring Design Attributes and Development of an Acoustic VR Game to Improve Ethical Values of Visually Impaired People", In 2022 IEEE 7th International Conference for Convergence in Technology (I2CT), Apr 7, 2022, Mumbai, India. [HTML LINK]
17. Raiyan Jahangir, Md. Wasif-Ul-Islam, Nasif Shahriar Mohim, Anika Ashraf, **Nafiz Imtiaz Khan**, Muhammad Nazrul Islam, "Towards developing a voice-over-guided system for visually impaired people to learn writing the alphabets", in 25th International Conference on Computer and Information Technology (ICCIT), Dec 17-19, 2022, Cox's Bazar, Bangladesh. [HTML LINK]
18. Md. Muhtasim Fuad, B. M. Nishanul Alam Nishat, Mohian Islam, Tashfia Fatema, Faria Habib, Saba Ahmed Momo, Fahim Foysal, **Nafiz Imtiaz Khan**, Muhammad Nazrul Islam, "A Blockchain-based Framework to Develop a Sustainable Supply Chain Management System for Apparel Industry", in 9th International Women in Engineering (WIE) Conference on Electrical and Computer Engineering (WIECON-ECE), 25-26 Nov. 2023, Thiruvananthapuram, India. [HTML LINK]

Journal:

1. **Nafiz Imtiaz Khan**, Muhammad Nazrul Islam, and Tahasin Mahmud, "COVID-19 and Black Fungus: Analysis of Public Perceptions through Machine Learning", Engineering Reports. 2022 Apr;4(4):e12475. **(IF = 2 and SJR Rank = Q2)** [HTML LINK]
2. Muhammad Nazrul Islam, Tahasin Mahmud, **Nafiz Imtiaz Khan**, Sumaiya Nuha Mustafina, and A. K. M. Nazmul Islam, "Exploring Machine Learning Algorithms to Find the Best Features for Predicting Modes of Childbirth", IEEE Access, vol. 9, pp. 1680-1692, 2021. **(IF = 3.367 and SJR Rank = Q1)**[HTML LINK]
3. Mohammad Shahjahan Majib, Md. Mahbubur Rahman, T. M. Shahriar Sazzad, **Nafiz Imtiaz Khan**, and Samrat Kumar Dey, "VGG-SCNet: A VGG Net-based Deep Learning Framework for Brain Tumor Detection on MRI Images", IEEE Access, vol. 9, pp. 1880-1892, 2021. **(IF = 3.367 and SJR Rank = Q1)**[HTML LINK]
4. Jesika Rahman, Khondaker Sakil Ahmed, **Nafiz Imtiaz Khan**, Kamrul Islam, and Sujith Mangalathu, "Data-Driven Shear Strength Prediction of Steel Fiber Reinforced Concrete Beams Using Machine Learning Algorithms", Engineering Structures. 2021 Apr 15;233:111743.**(IF = 5.582 and SJR Rank = Q1)** [HTML LINK]
5. Samia Zakir Sarothi, Khondaker Sakil Ahmed, **Nafiz Imtiaz Khan**, Aziz Ahmed, and Moncef Nehdi, "Predicting Bearing Capacity of Double Shear Bolted Connections Using Machine Learning", Engineering Structures, 2022 Jan 15;251:113497.**(IF = 5.582 and SJR Rank = Q1)**[HTML LINK]
6. Samia Zakir Sarothi, Khondaker Sakil Ahmed, **Nafiz Imtiaz Khan**, Aziz Ahmed, and Moncef Nehdi, "Machine Learning-Based Failure Mode Identification of Double Shear Bolted Connections in Structural Steel", Engineering Failure Analysis. 2022 May 23:106471. **(IF = 5.582 and SJR Rank = Q1)** [HTML LINK]
7. Md Mahbubar Rahman, **Nafiz Imtiaz Khan**, Iqbal H. Sarker, Mohiuddin Ahmed, and Muhammad Nazrul Islam, "Leveraging machine learning to analyze sentiment from COVID-19 tweets: A global perspective", Engineering Reports. 2022:e12572. **(IF = 2 and SJR Rank = Q2)** [HTML LINK]
8. Muhammad Nazrul Islam, Sumaiya Nuha Mustafina, Tahasin Mahmud, and **Nafiz Imtiaz Khan**, "Machine learning to predict pregnancy outcomes: a systematic review, synthesizing framework and future research agenda. BMC pregnancy and childbirth", 2022 Dec;22(1):1-9. **(IF = 3.09 and SJR Rank = Q1)** [HTML LINK]
9. Akib Zaman, Mohammad Shahjahan Majib, Shoeb Ahmed Tanjim, Shah Md. Ahasan Siddique, Shafayetul Islam, Md Shadman Aadeeb, **Nafiz Imtiaz Khan**, Riasat Haque, Md Rashid Ul Islam, M. Rayhan Ferdous Faisal, Siddharth Malik, and Muhammad Nazrul Islam, "UVC-PURGE: A Novel Cost-Effective Disinfection Robot for Combating COVID-19 Pandemic", IEEE Access. 2022 Mar 30;10:37613-34. **(IF = 3.367 and SJR Rank = Q1)** [HTML LINK]

10. Muhammad Nazrul Islam and **Nafiz Imtiaz Khan**, Toki Tahmid Inan, “Designing User Interfaces for Illiterate and Semi-literate Users: A Systematic Review", SAGE Open. 2023 May;13(2):21582440231172741. **(IF = 2.032 and SJR Rank = Q2)** [HTML LINK]
11. Muhammad Nazrul Islam and **Nafiz Imtiaz Khan**, Toki Tahmid Inan, “A Multilingual Handwriting Learning System for Visually Impaired People", SAGE Open. 2023 May;13(2):21582440231172741. **(IF = 2.032 and SJR Rank = Q2)** [HTML LINK]

    Muhammad Nazrul Islam, Raiyan Jahangir, Nasif Shahriar Mohim, Md. Wasif-ul-Islam, Anika Ashraf, **Nafiz Imtiaz Khan**, Mohammad Ratul Mahjabin, Abu Saleh Musa Miah, Jungpil Shin, “A Multilingual Handwriting Learning System for Visually Impaired People," IEEE Access. 2024 Jan 15.

    [HTML LINK]
12. Md Saddam Hossain Mukta, Akib Zaman, **Nafiz Imtiaz Khan**, Md. Adnanul Islam, Muhammad Nazrul Islam, Nafeez Zawad, and Mohammed Eunus Ali, “User Value based Group Recommendations from Tweets," Social Networks (Under Review)

Book Chapter:

1. Muhammad Nazrul Islam, Nafiz Imtiaz Khan, Nafiz Islam, Samuli Laato and A. K. M. Nazmul Islam. “Monitoring the Health and Movement of Quarantined COVID-19 Patients with Wearable Devices" Healthcare Technology Solutions for Pandemics - A Roadmap. [HTML LINK]

References

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