Abu Jafar Md Muzahid | *PhD Candidate*

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 LinkedIn   ResearchGate   ⓘ ORCiD

Education

PhD Candidate in Systems & Controls   TN, USA

The University of Tennessee, Knoxville, Dept of Mechanical, Aerospace, and Biomedical Engineering.

Research Topic: Data-Driven Decision-Making Model for Optimal Control in Connected and Automated Vehicles (CAVs).

Master of Science in Soft Computing and Intelligent System *(By Research)*   Pahang, Malaysia

Universiti Malaysia Pahang

Research Topic: Reinforcement Learning Based Decision-Making Model in Autonomous Vehicle Control for Cooperation and Mitigation of Collision Among Multiple Vehicles.

Milestone: *The 1st Place Winner, Excellent Publication Award in Research & Postgraduate Award Ceremony.*

Bachelor of Science in Statistics   Sylhet, Bangladesh

Shahjalal University of Science and Technology

Research Interests

• Computational Guidance and Control (CG&C) • Data-Driven Decision-making • Intelligent Transportation Systems • Robotics

Publications

*Google Scholar statistics: Total of **304** citations as of September 2024, with h-index = 9, i10-index = 9*

*ResearchGate statistics: Total of **297** citations as of September 2024, with h-index = 9*

*Scopus statistics: Total of **199** citations as of September 2024, with h-index = 8*

Published Journal Articles

1. **Abu Jafar Md Muzahid**, Syafiq Fauzi Kamarulzaman, Md Arafatur Rahman, Saydul Akbar Murad, Md. Abdus Samad Kamal. Multiple Vehicle Cooperation and Collision Avoidance in Autonomous Driving: Survey and an AI-Enabled Conceptual Framework. ***Scientific Reports***(2023), **WoS**, **Q1**, **IF:4.6**, 🔗 NATURE

2. **Abu Jafar Md Muzahid**, Syafiq Fauzi Kamarulzaman, Md. Arafatur Rahman, Ali H Alenezi. Deep Reinforcement Learning based driving strategy for Avoidance of Chain Collision and its safety efficiency Analysis in Autonomous Vehicles. *IEEE Access* (2022), **WoS**, **Q1**, **IF:3.9**. 🔗 IEEE

3. Saydul Akbar Murad, Zafril Rizal M Azmi, **Abu Jafar Md Muzahid**, MD. Khairul Bashar Bhuiyan, Md Saib, Nick Rahimi, Nusrat Jahan Prottasha and Anupam Kumar Bairagi. SG-PBFS: Shortest Gap-Priority Based Fair Scheduling technique for job scheduling in cloud environment. *Future Generation Computer Systems*, **WoS**, **Q1**, **IF:7.5**, 🔗 ELSEVIER.

4. Saydul Akbar Murad, **Abu Jafar Md Muzahid**, Zafril Rizal M Azmi, Md Imdadul Hoque. A Review on Job Scheduling Technique in Cloud Computing and Priority Rule Based Intelligent Framework. *Journal of King Saud University - Computer and Information Sciences* (2022), **WoS**, **Q1**, **IF:6.9**. 🔗 ELSEVIER

5. Saydul Akbar Murad, **Abu Jafar Md Muzahid**, Zafril Rizal M Azmi, Md Imdadul Hoque. A Review on Job Scheduling Technique in Cloud Computing and Priority Rule Based Intelligent Framework.

Journal of King Saud University - Computer and Information Sciences (2022), **WoS**, **Q1**, **IF:6.9**. 🔗 ELSEVIER

6. Md Abdur Rahim, Md. Mustafizur Rahman, Md Shofiqul Islam, **Abu Jafar Md Muzahid**, Md. Arafatur Rahman, Devarajan Ramasamy. Deep Learning-based Vehicle Health Monitoring System utilising a Hybrid Convolutional Neural Network/Bidirectional Gated Recurrent Unit. *Expert Systems With Applications* (2024), **WoS**, **Q1**, **IF:7.50**, 🔗 ELSEVIER.

7. Saydul Akbar Murad, Zafril Rizal M Azmi, **Abu Jafar Md Muzahid**, Md. Murad Hossain Sarker, M. Saef Ullah Miah, MD. Khairul Bashar Bhuiyan, Nick Rahimi and Anupam Kumar Bairagi. Priority based job scheduling technique that utilizes gaps to increase the efficiency of job distribution in cloud computing. *Sustainable Computing: Informatics and Systems* (2024), **WoS**, **Q1**, **IF:4.5**. 🔗 ELSEVIER

8. Nusrat Jahan Prottasha, Saydul Akbar Murad, **Abu Jafar Md Muzahid**, Md. Kowsher, Apurba Adhikary, Sujit Biswas, Masud Rana, and Anupam Kumar Bairagi. Impact Learning: A Learning Method from Feature's Impact and Competition. *Journal of Computational Science*, **WoS**, **Q1**, **IF:3.3**, 🔗 ELSEVIER.

9. Jalal Uddin Md Akbar, Syafiq Fauzi Kamarulzaman, **Abu Jafar Md Muzahid**, Md. Arafatur Rahman, and Mueen Uddin. A Comprehensive Review on Deep Learning Assisted Computer Vision Techniques for Smart Greenhouse Agriculture. *IEEE Access* (2024), **WoS**, **Q1**, **IF:3.9**. 🔗 IEEE

10. Ahasanul Karim, M. Amirul Islam, Puranjan Mishra, **Abu Jafar Md Muzahid**, Abu Yousuf, Md. Maksudur Rahman Khan, and Che Ku Mohammad Faiza. Yeast and bacteria co-culture-based lipid production through bioremediation of palm oil mill effluent: a statistical optimization. *Biomass Conversion and Biorefinery* (2021), **WoS**, **Q2**, **IF:4.0**. 🔗 SPRINGER

11. Saydul Akbar Murad, Apurba Adhikary, **Abu Jafar Md Muzahid**, Md. Murad Hossain Sarker, Md. Ashikur Rahman Khan, Md. Bipul Hossain, Anupam Kumar Bairagi, Mehedi Masud, Md. Kowsher. AI Powered Asthma Prediction Towards Treatment Formulation: An Android App Approach. *Intelligent Automation & Soft Computing* (2022), **WoS**, **Q2**, **IF:3.54**. 🔗 TSC

12. Saydul Akbar Murad, Apurba Adhikary, Md. Bipul Hossain, Avi Deb Raha, Zafril Rizal M Azmil, Md. Shamim Ahsan, M. Saef Ullah Miah, and **Abu Jafar Md Muzahid**. An automated system to maintain the departmental activities over cloud: An android application approach. *Wireless Personal Communications* (2022), **WoS**, **Q2**, **IF:2.2**. 🔗 SPRINGER

Published Conference Proceedings

1. **Abu Jafar Md Muzahid**, Syafiq Fauzi Kamarulzaman, Md Abdur Rahim. Learning Based Conceptual framework for Threat Assessment of Multiple Vehicle Collision in Autonomous Driving, and applications. In IEEE sponsored conference on *2020 Emerging Technology in Computing, Communication & Electronics (ETCCE)*, Nov 2020. 🔗 IEEE

2. **Abu Jafar Md Muzahid**, Syafiq Fauzi Kamarulzaman, Md Arafatur Rahman. Comparison of PPO and SAC Algorithms Towards Decision Making Strategies for Collision Avoidance Among Multiple Autonomous Vehicles. In IEEE sponsored conference on *ICSECS-ICOCSIM-2021*, 24-26 Aug. 2021. 🔗 IEEE

3. **Abu Jafar Md Muzahid**, Md. Abdur Rahim, Saydul Akbar Murad, Syafiq Fauzi Bin Kamarulzaman and Md Arafatur Rahman. Optimal Safety Planning and driving Decision-Making for Multiple Autonomous Vehicles: A Learning Based Approach. In IEEE sponsored conference on *Emerging Technology in Computing, Communication and Electronics (ETCCE)*, Dec., 2021. 🔗 IEEE

4. Lai Chor Kiew, **Abu Jafar Md Muzahid**, Syafiq Fauzi Kamarulzaman. Vehicle Route Tracking System based on Vehicle Registration Number Recognition using Template Matching Algorithm. In IEEE sponsored conference on *ICSECS-ICOCSIM-2021*, 24-26 Aug. 2021. 🔗 IEEE

5. Arif Reza Anwary, Md Arafatur Rahman, **Abu Jafar Md Muzahid**, Akanda Wahid Ul Ashraf,

Mohammad Patwary, and Amir Hussain. Deep Learning enabled Fall Detection exploiting Gait Analysis. In *44th The IEEE Engineering in Medicine and Biology Society (EMBS)*, Glasgow, Scotland, UK, 11-15 July 2022. 🔗 IEEE

6. N H M Arafat, Md Ileas Pramanik, **Abu Jafar Md Muzahid**, Bibo Lu, Sumaiya Jahan, Saydul Akbar Murad. A Conceptual Anonymity Model to Ensure Privacy for Sensitive Network Data. In IEEE sponsored conference on *Emerging Technology in Computing, Communication & Electronics*, Dec 2021. 🔗 IEEE

7. Saydul Akbar Murad, Zafril Rizal M Azmi, **Abu Jafar Md Muzahid**, Md. Al-Imran. Comparative Study on Job Scheduling Using Priority Rule and Machine Learning. In IEEE sponsored conference on *Emerging Technology in Computing, Communication and Electronics, (ETCCE)*, Dec 2021. 🔗 IEEE

8. Md Abdur Rahim, Md Arafatur Rahman, M M Rahman, **Abu Jafar Md Muzahid**, Syafiq Fauzi Kamarulzaman. A framework of IoT-enabled vehicular noise intensity monitoring system for smart city. In International Conference on *Innovative Technology, Engineering and Science iCITES 2020*, Dec 2020, pp. 194–205. 🔗 SPRINGER

Symposium Presentation

1. **Abu Jafar Md Muzahid**, Syafiq Fauzi Kamarulzaman. Autonomous Driving threat assessment and its safety consequences for multiple vehicle collisions on mixed traffic stream. *IEEE Symposium on Acoustics, Speech and Signal Processing, Malaysia Chapter* , Nov 2020. 🔗 IEEE

Academic Funding, Appreciations & Awards

○ **Gold Medal**, Malaysia Technology Expo™- 2022   2022
○ **Special Award Winner**, EURO BUSINESS-HALLER (POLAND).   2022
○ **1st Place Winner, Excellent Publication Award**, Research and Postgraduate Award Ceremony. 2022
○ **FRGS GRANT**, supported by the Ministry of Higher Education, Malaysia. Amount: RM54000. 2020
○ **Master Research Scheme (MRS)**, funded by the MHE, Malaysia. Amount: RM21600.   2021

Research & Project Experience

■ **CAVs Chain Collision Avoidance**
• My 2.5 research project was required for my Master of Science degree. • I applied systematic inquiry and rigour to produce original results, demonstrating my competence in using research methodologies, analyzing complex data, and effectively communicating my findings. • I collaborated with interdisciplinary teams and international researchers from the UK, Japan, Spain, and Saudi Arabia alongside the Automotive Engineering Center at UMP. • The thesis was a volume of over 34,000 words, and from this thesis I received the **Excellent Publication Award**. • A copy of my thesis can be accessed via this 🔗 link.
🔗 GitHub

■ **Automated Palm Oil Supply Chain System**
• Successfully managed and negotiated with several palm oil industries to reach out to the exact chain systems like collection, manufacturing, supplying, and marketing strategy. • Evaluated challenges to facilitate strategy development. • Identified companies with necessary expertise and resources to bring technologies to market. • Assisted in lab maintenance and organization. • Owned *gold medal* and a *special award* in international exhibition.

■ **Statistical Optimization Project**
• Designed and executed a model using a statistical tool to optimize lipid accumulation capability and simultaneous treatment of wastewater using palm oil mill effluent (POME) as a carbon source. • Performed statistical analysis on data sets using Excel. • Assisted in lab maintenance and organization and published Q2 journal as a 4th author.

■ **Vehicle Route Tracking System**

• Contributed to the development and evaluation of novel Deep Learning models, part of an effort to improve a vehicle recognition system. • As a second author, we published conference proceedings at an IEEE sponsored conference. • Trained deep learning models with Tensorflow, wrote C++ nodes, and contributed to the Python robotics software stack. 🔗 GitHub

■ **Powered Asthma Prediction (Android App Dev)**

• Assisted and performed research to develop a socially intelligent app to make prediction and treatment formulation systems for asthma. • Researched, designed, and implemented a machine learning approach for error avoidance during task execution. 🔗 GitHub

■ **Job Scheduling Technique in Cloud Computing**

• Deep query understanding models are proposed to improve state-of-the-art job searching and distribution efficiency. • Published paper as second author (ELSEVIER 2022); designed concept, idea for new algorithm, and ran extensive simulations.

Job Experience

■ **August 2023 - Present | Graduate Research Assistant | The University of Tennessee, Knxville, TN, USA.**

I am a Graduate Research Assistant (GRA) in the Department of Mechanical, Aerospace, and Biomedical Engineering at the University of Tennessee, Knoxville. I am pursuing a degree in the Aerospace Engineering PhD: Systems and Controls (Knoxville) program. My research is part of a project at Oak Ridge National Laboratory (ORNL), concentrating on the collision avoidance and control optimization of Connected and Automated Vehicles (CAVs). The core objective of my research is to leverage *data-driven decision-making* processes to optimize vehicular control systems towards enhanced safety and efficiency.

■ **February 2020 – July 2023| Graduate Research Assistant | UMP, Pahang, Malaysia.**

I was employed as a Graduate Research Assistant at the Faculty of Computing, Universiti Malaysia Pahang, where I contributed to projects in an Intelligent Systems Lab. My research was primarily focused on developing a 'Reinforcement Learning Based Decision-Making Model in Autonomous Vehicle Control.' This project aimed at enhancing cooperation and mitigating *chain collision* risks among multiple vehicles. The core of my research revolved around the application of advanced *data-driven* (reinforcement learning) techniques to improve decision-making processes in the control systems of connected and automated vehicles, emphasizing collaborative behavior and safety.

■ **Nov 2019 - Jan 2020| Research Officer| SDI, Dhaka, Bangladesh.**

Develop research proposals and concept notes, Data collection, data analysis, report writing & presentation. Project methodologies development and carrying out qualitative or quantitative research.

■ **Jan 2016 - Oct 2019 | Lecturer, Statistics | Universal College, Sylhet, Bangladesh.**

I tutored students on secondary-level statistics topics. Prepared course material, including laboratory experiments, lectures, exams, homework, and practice problems.

■ **Jan 2012 - December 2015 | Science Teacher, Radium Varsity Admission Coaching, Sylhet, Bangladesh.**

I tutored students on secondary-level statistics, mathematics, and physics topics. Introduced weekly practical classes, monthly assessment tests, and initiated motivational sessions. Initiated the prize-giving ceremony and local guardian days. Mentored students in selections of their academic field and career prospective.

Computing Skills

○ **Simulator:** Unity3D Game Engine, CARLA, MATLAB Simulink.

○ I have professional experience of several major programming languages and databases, including Python, MATLAB, along with exposure to R, C++, and SQL. I have also used major libraries such as scikit-learn, NLTK, spaCy, GATE and tools including GitHub and AWS.
○ **Statistical Software:** R, SPSS, SAS, ATLAS.ti, FORTRAN.
○ **ML & Deep Learning Library:** TensorFlow, Keras, Pandas, NumPy, SciPy, OpenCV.
○ **GUI:** Tkinter
○ **IDE:** Spyder, Colab, Jupyter Notebook, Code Blocks, Dev- C++, PyCharm.
○ I have a strong hands-on advanced proficiency in handling and analyzing large data sets such as next-generation sequencing data and creating RL agents along with the RL environment.
○ Proficient in **Latex**, Mendeley, and EndNote.

Academic Services and Appointments

○ **Reviewer** of IEEE Transactions on Intelligent Vehicles
○ **Reviewer** of Automatika
○ **Reviewer** of Cloud Computing and Data Science (2)
○ **Reviewer** of International Conference on Emerging Technology in Computing, Communication and Electronics
○ Serves as **chairperson** of final year project presentation, UMP, Malaysia, 2021 and 2022
○ Autonomous Systems Laboratory, UTK, August 2023 - present 🔗 Link
○ Intelligent Systems and Decision Systems Laboratory, UMP, Malaysia, April 2022 - July 2022
○ Multi Robot Systems (Automotive Center) Lab, UMP, Malaysia, Sept 2021 - June 2022

Leadership and Teamwork Experience

Sept 2021 - Present || *Team leader*, Admin || RiTechs, UK.
○ Leading cluster-wise research clubs on RiTechs with the advisory and executive board.
○ Led organization of 3 panels, 5 online workshops, 23 employer performance sessions, 5 social events, and consulting career fair; increased total number of yearly events by 40 from the previous year.
Feb 2007 - December 2011 || *Vice-President* || STUDENT AID-SUST, SUST, Sylhet, Bangladesh.
○ Constructed a strategy for combining moral and academic tasks, including social networking, for getting better spiritual benefits.
○ Presented and executed project plan on humanitarian to on-campus and outside audiences.
Jan 2004 - November 2009 || *President* || ANGIKAR, Cultural org, SUST, Sylhet, Bangladesh.
○ Develop a cultural organization to perform stage drama and songs for on-campus audiences.
○ Implemented several events on voluntary activity to on-campus audiences.
Mar 2012 - Dec 2015 || *Vice-President* || Coastal Community Development (CCD), Khulna, Bangladesh.
○ Initiated 2 projects in the coastal regional (Mangrove Forest) woman development sector.

Professional Training & Workshops

○ **Advanced Training Course on Research Methodology**, Duration: 16 October- 24 November 2011, Venue: NAEM Auditorium, Organizing Institute: NAEM & BPDM.
○ **Introductory Course on Qualitative Research Methodology**, Duration: 13- 23 November, 2011 Venue: SASAKAWA International Training Centre, ICDDR, B, Dhaka Organizing Institute: ICDDR, B.
○ **Deep Learning with Python and Keras**, Daffodil Institute Of IT, Bangladesh, 2018.
○ **Python For Data Science**, IT ZONE, Dhaka, Bangladesh. 2017.
○ **Python Programming, Computer Academy of Bangladesh**, Dhaka, Bangladesh, 2019.

Referrers

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Dept of Mechanical, Aerospace and Biomedical Engr.
The University of Tennessee, Knoxville, TN, USA.
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