Muhammad Aslam Jarwar, FHEA, BS (Hons), MS, Ph.D.

Sr. Lecturer (Assistant Professor) in Smart Computing, Department of Computing, Sheffield Hallam University, Sheffield, UK. a.jarwar@shu.ac.uk +44 114 225 6630
https://aslamjarwar.github.io/
https://scholar.google.co.kr/citations?user=nQTE0W8AAAAJ&hl=en
Citations **382** · H-Index **12**

Education

2016.08 - 2020.02 **Ph.D. in Information and Communications Engineering** from Hankuk University of Foreign Studies, Seoul, South Korea.

2012.08 - 2016.02 **M.S. in Information Science and Technology** from Quaid-i-Azam University, Islamabad, Pakistan.

2000.08 - 2004.12 **B.S (Hons). in Computer Science** from University of Sindh, Jamshoro, Pakistan.

Employment

2022-06 - to date **Sr. Lecturer (Assistant Professor)** , Department of Computing, Sheffield Hallam University, Sheffield, UK.

2021.11 - 2022-06 **Research Fellow**, PETRAS National Centre of Excellence for IoT Systems Cybersecurity, Department of Science, Technology, Engineering and Public Policy (STEaPP) University College London (UCL), WC1E 6JA, UK.

2020.09 - 2021.10 **Research Associate** , University of Manchester, Manchester, UK.

2016.08 - 2020.02 **Research and Teaching Assistant**, Advanced Network and Multimedia Laboratory, Hankuk University of Foreign Studies, Seoul, South Korea.

2005.08 - 2016.07 **Assistant Director of Software Development,** Research and Development Division, National Database and Registration Authority, Islamabad, Pakistan.

Funded research projects

SOfIoTS (Current) This innovative initiative is dedicated to developing cybersecurity attributes for existing Industrial Internet of Things (IIoT) network ontologies. The ultimate objective is to integrate machine learning at the Edge, which will be a monumental leap forward in terms of data security and assurance in Building Management Systems (BMS) in sensitive public buildings. It incredibly impressive that this project will culminate in publications that will significantly contribute to the comprehension and methodologies of data security and assurance in BMS. [2021.11 – 2023.08] ***URL*** *https://petras-iot.org/project/secure-ontologies-for-iot-systems-sofiots/*

PROVANON In this project, we investigate the use of provenance formalisms for capturing the necessary features of the complex dynamic data situations to allow more principled analysis of risk, the requirements of anonymisation and related topics such as Cybersecurity, privacy and data utility. [2020.09 – 2021.10] ***URL*** *https://www.turing.ac.uk/research/research-projects/anonymisation-and-provenance*

EmoSpaces The innovative aspect of this research lies in considering emotion and sentiments as a context source for improving intelligent services in the IoT environment. In this project, our research focus was to develop an IoT data analytics and service provisioning platform that recognize the context and situation of user. The significance of this research is that the situation recognition and adaption based on the emotions leads to improving the service quality, users (such as elderly, teenager, etc) protection and privacy. [2016.05 - 2019.09] ***URL*** *https://itea3.org/project/emospaces.html*

Funded research projects (continued)

WoO-SAS

Through our WoO-SAS project, we successfully enhanced the lives of the elderly by leveraging cutting-edge technologies and mechanisms. Our team delved into various topics, including the development of self-learning smart aging service objects and the design of healthcare infrastructure tailored to support the elderly. Furthermore, we collected and analyzed data from both wearable and non-wearable sensors to monitor vital health conditions. As a result, we created an IoT data analytics and services platform that delivers invaluable services to the elderly community.[2016.05 – 2019.12]

Peer reviewed Publications (selected)

Journal Articles

1. Mujtaba, G., Khowaja, S., **Jarwar**, **M. A.**, Choi, J., & Ryu, E. (5555). FRC-GIF: Frame Ranking-Based Personalized Artistic Media Generation Method for Resource Constrained Devices. *IEEE Transactions on Big Data*, (01), 1–14. doi:10.1109/TBDATA.2023.3338012

2. Phani Praveen, S., Ali, M. H., **Jarwar**, **M. A.**, Prakash, C., Reddy, C. R. K., Malliga, L., & Chandru Vignesh, C. (2023). 6G assisted federated learning for continuous monitoring in wireless sensor network using game theory. *Wireless Networks*. doi:10.1007/s11276-023-03249-0

3. Guo, W., Qureshi, N. M. F., **Jarwar**, **M. A.**, Kim, J., & Shin, D. R. (2023). AI-oriented Smart Power System Transient Stability: The Rationality, Applications, Challenges and Future Opportunities. *Sustainable Energy Technologies and Assessments*, *56*, 102990. doi:https://doi.org/10.1016/j.seta.2022.102990

4. Khowaja, S. A., Dahri, K., **Jarwar**, **M. A.**, & Lee, I. H. (2023). Spike learning based Privacy Preservation of Internet of Medical Things in Metaverse. *IEEE Journal of Biomedical and Health Informatics*, 1–8. doi:10.1109/JBHI.2023.3306704

5. Khowaja, S. A., Khuwaja, P., Dev, K., & **Jarwar**, **M. A.** (2023). PROMPT: Process Mining and Paravector Tensor-Based Physical Health Monitoring Framework. *IEEE Sensors Journal*, *23*(2), 989–996. doi:10.1109/JSEN.2022.3195613

6. Vivekananda, G. N., **Jarwar**, **M. A.**, Jaber, M. M., Prakash, C., Buddhi, D., Gnanasigamani, L. J., & Sanz-Prieto, I. (2022). Effective two-tier tokenization for intelligent transportation supply chain systems using hybrid optimized query expansion. *Multimedia Tools and Applications*. doi:10.1007/s11042-022-14317-6

7. Gokulakrishnan, S., **Jarwar**, **M. A.**, Ali, M. H., Kamruzzaman, M. M., Meenakshisundaram, I., Jaber, M. M., & Kumar, R. L. (2022). Maliciously roaming person's detection around hospital surface using intelligent cloud-edge based federated learning. *Journal of Combinatorial Optimization*, *45*(1), 13. doi:10.1007/s10878-022-00939-x

8. Khowaja, S. A., Lee, I. H., Dev, K., **Jarwar**, **M. A.**, & Qureshi, N. M. F. (2022). Get Your Foes Fooled: Proximal Gradient Split Learning for Defense Against Model Inversion Attacks on IoMT Data. *IEEE Transactions on Network Science and Engineering*, 1–10. doi:10.1109/TNSE.2022.3188575

9. **Jarwar**, **M. A.**, Khowaja, S. A., Dev, K., Adhikari, M., & Hakak, S. (2021). NEAT: A Resilient Deep Representational Learning for Fault Detection using Acoustic Signals in IIoT Environment. *IEEE Internet of Things Journal*, 1–1. doi:10.1109/JIOT.2021.3109668

10. **Jarwar**, **M. A.**, & Chong, I. (2020). Web Objects Based Contextual Data Quality Assessment Model for Semantic Data Application. *Applied Sciences*, *10*(6), 2181. doi:10.3390/app10062181

11. **Jarwar**, **M. A.**, Ali, S., & Chong, I. (2019a). A Microservices Model to Enhance the Availability of Data for Buildings Energy Efficiency Management Services. *Energies*, *12*(3), 360. doi:10.3390/en12030360

12. Ali, S., **Jarwar**, **M. A.**, & Chong, I. (2018). Design Methodology of Microservices to Support Predictive Analytics for IoT Applications. *Sensors*, *18*(12), 4226. doi:10.3390/s18124226

13. Ali, S., Kibria, M. G., **Jarwar**, **M. A.**, Lee, H. K., & Chong, I. (2018). A Model of Socially Connected Web Objects for IoT Applications. *Wireless Communications and Mobile Computing*, *2018*. doi:10.1155/2018/6309509

14. **Jarwar**, **M. A.**, Kibria, M. G., Ali, S., & Chong, I. (2018). Microservices in Web Objects Enabled IoT Environment for Enhancing Reusability. *Sensors*, *18*(2), 352. doi:10.3390/s18020352

15. Kibria, M., Ali, S., **Jarwar**, **M. A.**, Kumar, S., & Chong, I. (2017). Logistic Model to Support Service Modularity for the Promotion of Reusability in a Web Objects-Enabled IoT Environment. *Sensors*, *17*(10), 2180. doi:10.3390/s17102180

16. **Jarwar**, **M. A.**, Abbasi, R. A., Mushtaq, M., Maqbool, O., Aljohani, N. R., Daud, A., … Chong, I. (2017). CommuniMents: A Framework for Detecting Community Based Sentiments for Events. *International Journal on Semantic Web and Information Systems (IJSWIS)*, *13*(2), 87–108. doi:10.4018/IJSWIS.2017040106

Conference Proceedings

1. **Jarwar**, **M. A.**, Ali, S., & Inayatullah, I. (2023). Taking IoT Security to the Next Level: Hyperledger Fabric Private Blockchain enabled IoT Middleware. In *2023 IEEE Globecom Workshops (GC Wkshps): 3rd Workshop on Sustainable and Resilient Industrial Networks (GC 2023 Workshop - SRINetworks)* (p. 5.55). Kuala Lumpur, Malaysia.

2. **Jarwar**, **M. A.**, Watson CBE FREng, J., Ani, U. P. D., & Chalmers, S. (2023). Industrial Internet of Things Security Modelling Using Ontological Methods. In *Proceedings of the 12th International Conference on the Internet of Things* (pp. 163–170). doi:10.1145/3567445.3571103

3. Kumar, S., Jeong, S., Ahn, I. Y., & **Jarwar**, **M. A.** (2022). Things Data Interoperability Through Annotating oneM2M resources for NGSI-LD Entities. In *2022 IEEE International Conferences on Internet of Things (iThings) and IEEE Green Computing & Communications (GreenCom) and IEEE Cyber, Physical & Social Computing (CPSCom) and IEEE Smart Data (SmartData) and IEEE Congress on Cybermatics (Cybermatics)* (pp. 119–124). doi:10.1109/iThings-GreenCom-CPSCom-SmartData-Cybermatics55523.2022.00056

4. **Jarwar**, **M. A.**, Chapman, A., Elliot, M., & Raji, F. (2021). Modelling data environments within PROV to assist anonymisation decision-making. In *Conference of European Statisticians and Expert Meeting on Data Confidentiality*. United Nations Economic Commission for Europe (UNECE). doi:https://unece.org/sites/default/files/2021-12/SDC2021_Day3_Elliot_AD.pdf

5. Ali, S., **Jarwar**, **M. A.**, & Chong, I. (2019). Microservices based Framework to Support Interoperable IoT Applications for Enhanced Data Analytics. In *Proceedings of the 2019 Winter Conference of the Korean Communication Society*. the Korean Institute of Communications and Information Sciences (KICS). doi:abs/1910.08713

6. **Jarwar**, **M. A.**, Ali, S., & Chong, I. (2019b). Microservices based Linked Data Quality Model for Buildings Energy Management Services. In *Proceedings of the 2019 Winter Conference of the Korean Communication Society*. the Korean Institute of Communications and Information Sciences (KICS). doi:abs/1910.06115v1

7. **Jarwar**, **M. A.**, Ali, S., & Chong, I. (2018). Exploring Web Objects enabled Data-Driven Microservices for E-Health Service Provision in IoT Environment. In *2018 International Conference on Information and Communication Technology Convergence (ICTC)* (pp. 112–117). IEEE. doi:10.1109/ICTC.2018.8539684

8. Ali, S., Kibria, M. G., **Jarwar**, **M. A.**, Kumar, S., & Chong, I. (2017). Microservices model in WoO based IoT platform for depressive disorder assistance. In *2017 International Conference on Information and*

Communication Technology Convergence (ICTC) (pp. 864–866). IEEE. doi:10.1109/ICTC.2017.8190800

9. **Jarwar, M. A.**, Ali, S., Kibria, M. G., Kumar, S., & Chong, I. (2017). Exploiting interoperable microservices in web objects enabled Internet of Things. In *2017 Ninth International Conference on Ubiquitous and Future Networks (ICUFN)* (pp. 49–54). IEEE. doi:10.1109/ICUFN.2017.7993746

10. Kibria, M. G., Ali, S., **Jarwar, M. A.**, & Chong, I. (2017). A Framework to Support Data Interoperability in Web Objects Based IoT Environments. In *2017 International Conference on Information and Communication Technology Convergence (ICTC)* (pp. 29–31). IEEE. doi:10.1109/ICTC.2017.8190935

11. Kibria, M. G., **Jarwar, M. A.**, Ali, S., Kumar, S., & Chong, I. (2017). Web objects based energy efficiency for smart home IoT service provisioning. In *2017 Ninth International Conference on Ubiquitous and Future Networks (ICUFN)* (pp. 55–60). IEEE. doi:10.1109/ICUFN.2017.7993747

12. Kumar, S., Kibria, M. G., Ali, S., **Jarwar, M. A.**, & Chong, I. (2017). Smart spaces recommending service provisioning in WoO platform. In *2017 International Conference on Information and Communications (ICIC)* (pp. 311–313). IEEE. doi:10.1109/INFOC.2017.8001686

Project reports and recommendations)

1. Ani, U. D., Watson, J. M., Tuptuk, N., Hailes, S., & Jawar, A. (2023). *Socio-Technical Security Modelling: Analysis of State-of-the-Art, Application, and Maturity in Critical Industrial Infrastructure Environments/Domains*. arXiv: 2305.05108 [cs.CR]

2. **Jarwar, M. A.**, & FREng, J. W. C. (2023). *Secure ontologies for IoT Devices: a Review and Gap Analysis*.

3. Smart, P., Boniface, M., **Jarwar, M. A.**, & Watson, J. (2023a). *Secure ontologies for the Internet of Things: representing risk and security concepts using basic formal ontology*. Retrieved from https://github.com/ps02v/SOfIoTS/blob/main/Documentation/SOfIoTS%20Ontology%20Documentation.pdf

4. Smart, P., Boniface, M., **Jarwar, M. A.**, & Watson, J. (2023b). *SOfIoTS: Ontological Framework, Demonstration Outcomes, and Recommendations for Further Work (D3/D4)*. Retrieved from https://github.com/ps02v/SOfIoTS/blob/main/Documentation/SOfIoTS%20D4%20Reportv2.pdf

5. **Jarwar, M. A.**, & FREng, J. W. C. (2022). *Anonymisation and Provenance Expressing Data Environments with PROV - Turing Pilot Project Final Report*. Retrieved from https://hummedia.manchester.ac.uk/institutes/cmist/archive-publications/reports/2022-01-PROVANON-report.pdf

6. **Jarwar, M. A.**, Chong, I., Feingold, N., An, X., & Lee, G. M. (2019). *Technical Specification D4.4 - Framework to support data quality management in IoT*. ITU-T. Retrieved from https://www.itu.int/pub/T-FG-DPM-2019-4.4

Teaching/Mentoring/Supervising

Modules

- **Integrated IoT Systems**, (undergraduate)
- **Introduction to Artificial Intelligence**, (undergraduate)
- **Professional Computer Projects**, (undergraduate)
- **System Desing and Development Project**, (Postgraduate)
- **Computer Programming**, (Postgraduate)
- **Research skills for computing**, (Postgraduate)

Teaching/Mentoring/Supervising (continued)

Supervising

2022- to 2023

- **Master Student** Inayutallah; Securing Sensor Data Using Private Blockchain Hyperledger Fabric Network; Department Computing, Sheffield Hallam University, UK.
- **Master Student** Muhammad Junaid Minhas; Crimes Predictions using Machine Learning approaches for London Streets; Department Computing, Sheffield Hallam University, UK.

Mentoring

2021- to 2022

- **PhD Student** Jamie Tooth; Industrial Internet of things and Digital Twins; Department of Science, Technology, Engineering and Public Policy (STEaPP), University College London, UK.

2020- to date

- **PhD Student** Junaid Abdul Wahid; Crisis related Data Analytics: New Models using Topic Modelling Variants and Supervised Learning Approaches; School of Information Engineering, Zhengzhou University, Zhengzhou, China.

2017-2020

- **Master Student** Hassam Mughal; Efficient Allocation of Resource Intensive Mobile Cyber-Physical Social System Applications on a Heterogeneous Mobile Ad Hoc Cloud; Hankuk University of Foreign Studies, South Korea.

Academic Services

Editorial activities

- **Editorial Board Member** IASC - Intelligent Automation & Soft Computing Journal, USA. (October 2022 -todate) ***URL*** *https://www.techscience.com/iasc/editors*
- **Managing Guest Editor** for special issue on "Role of Disruptive Technologies in Modern Distribution Grid Automation" in Sustainable Energy Technologies and Assessments Journal. (December 2021 -todate) ***URL*** *https://bit.ly/3yAYpGF*
- **Guest Editor** for special issue on "Role of Big Data Management, Machine Learning, and Deep Learning Techniques for Ubiquitous Computing" in CSSE - Computer Systems Science and Engineering. (November 2022 -todate) ***URL*** *https://www.techscience.com/csse/special_detail/ubiquitous-computing*
- **Guest Editor** for special issue on "AI-Driven Vehicle Platooning for Intelligent Transportation Systems" in SAE International Journal of Connected and Automated Vehicles Journal. (November 2022 -todate) ***URL*** *https://www.sae.org/publications/journals/calls-for-papers-connected-and-automated-vehicles/AIDrivenVehiclePlatooning*
- **Managing Guest Editor** for special issue on "Role of Disruptive Technologies in Modern Distribution Grid Automation" in Sustainable Energy Technologies and Assessments Journal. (December 2021 -2023) ***URL*** *https://bit.ly/3yAYpGF*

Thesis Examiner

- **Ph.D. thesis External Examiner** for School of Engineering, Electrical and Computer Engineering RMIT University, Australia.

Academic Services (continued)

Member of Reviewer Board

- IEEE Transactions on Network Science and Engineering
- IEEE Transactions on Computational Social Systems
- IEEE Internet of Things Journal
- IEEE Sensors Journal
- Computer Networks (Elsevier)
- Future Generation Computer Systems (Elsevier)
- Neural Computing and Applications (Springer)
- And many other Q1 journals

Member

- Senior Member: IEEE (94189930)
- Member: ACM (4513194)
- Associate Fellow of the Higher Education Academy - AFHEA
- Member: The Korean Institute of Communications and Information (2016 - to date)
- Member: HUFS International Alumni Association, South Korea (2016 - to date)
- Member: Digital Trust and Security Group University of Manchester, UK (2020 - 2021)
- University of Manchester: Representatives: National Postdoc, Steering Committee, UK (2020 - 2021)

Conferences and Invited Talks

2019
- The Korean Institutes of Communications and Information Sciences (KICS) Winter Conference 2019, Yong Pyong Resort Pyeongchang-gun, Gangwon-do, Korea 23 to 25 January 2019.
- The 6th Focus Group on Data Processing and Management to support IoT and Smart Cities & Communities 18 January 2019, Seoul, Korea (Rep.of).

2018
- The 9th International Conference on Information and Communication Technology Convergence, Jeju Island,(17 to 19 October 2018), Korea (Rep.of).
- Summer Workshop on Computer Communications (SWCC 2018); (20 to 21 August 2018), Hongcheon, Gangwon-do, Korea (Rep.of).

2017
- The 8th International Conference on Information and Communication Technology Convergence, Jeju Island, (18 to 20 October 2017), Korea (Rep.of).
- The 31st International Conference on Information Networking (ICOIN) (11 to 13 January 2017) Dan Nang, Vietnam.

2016
- Summer Workshop on Computer Communications (SWCC 2016); (22 to 23 August 2016), Hongcheon, Gangwon-do, Korea (Rep.of)

Honors and Awards (selected)

- **Research travel grant** supported by the UK EPSRC as part of the PETRAS National Centre of Excellence for IoT Systems Cybersecurity under Grant Number EP/S035362/1 for presenting research paper in Proceedings of the 12th International Conference on the Internet of Things (7 to 10 November 2022) Technical University Delft, The Netherlands.
- **Research and Networking Grant**, A seed grant for the research collaboration and networking from the University of Manchester, United Kingdom.

Honors and Awards (selected) (continued)

- **Research travel grant** from the the Hankuk University of Foreign Studies for attending the 31st International Conference on Information Networking (ICOIN) (11 to 13 January2017) Dan Nang, Vietnam.
- **Scholarship**, Fully funded foreign scholarship for graduate studies by the Hankuk University of Foreign Studies, South Korea.