

Fazl Ullah
School of Computer Science
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Personal profile

Dr. Fazl Ullah Khan is an Assistant Professor of Computer Science in UNNC since 2023. Dr. Khan is the awardee of Australian Global Talent 2023 and senior member of the IEEE. He has more than 12 years of teaching and research experience in international universities. His teaching areas include computer networks, computer and network security, computer architecture, software engineering, and project management. His research areas cover security and privacy of data and networks, secured communication, intelligent networks, Internet of Things, and health informatics. Dr. Khan is the Associate Editor of IEEE, Springer, Frontier, and PLOS Journals.

Qualifications

PhD, Computer Science, Abdul Wali Khan University Mardan
Award Date: 6 Aug 2020

Master, Electrical Electronics and Information Engineering, Nagaoka University of Technology
Award Date: 30 Sept 2013

Master, Software Engineering, National University of Sciences and Technology Pakistan
Award Date: 26 Aug 2011

Bachelor, Information Technology, University of Peshawar
Award Date: 26 Mar 2008

Employment

School of Computer Science

Faculty of Science and Engineering
1 Nov 2023 → present

System Analyst

Business Technology Management Group USA
United States
1 Feb 2022 → 31 Oct 2023

Assistant Professor

Abdul Wali Khan University Mardan
Pakistan
21 Aug 2014 → 31 Oct 2023

Research outputs

- Cross-modal interaction and multi-source visual fusion for video generation in fetal cardiac screening**
Zhu, G., Deng, E., Qin, Z., Khan, F., Wei, W., Srivastava, G., Xiong, H. & Kumari, S., Nov 2024, In: Information Fusion. 111, 102510.
- Digital twin-assisted service function chaining in multi-domain computing power networks with multi-agent reinforcement learning**
Wang, K., Yuan, P., Jan, M. A., Khan, F., Gadekallu, T. R., Kumari, S., Pan, H. & Liu, L., Sept 2024, In: Future Generation Computer Systems. 158, p. 294-307 14 p.
- GASE: graph attention sampling with edges fusion for solving vehicle routing problems**
Wang, Z., Bai, R., Khan, F., Özcan, E. & Zhang, T., Sept 2024, In: Memetic Computing. 16, 3, p. 337-353 17 p.
- Causal effects of adversarial attacks on AI models in 6G consumer electronics**
Guo, D., Feng, Z., Zhang, Z., Khan, F., Chen, C.-M., Bai, R., Omar, M. & Kumari, S., 26 Aug 2024, In: IEEE Transactions on Consumer Electronics.
- Equality Test Public Key Encryption with Cryptographic Reverse Firewalls for Cloud-based E-commerce**
Elhabob, R., Eltayieb, N., Xiong, H., Khan, F. U., Bashir, A. K., Kumari, S., Alturki, R. & Kumar, S., 27 May 2024, (Published Online) In: IEEE Transactions on Consumer Electronics. 14 p.

6. **Audio-Visual Event Localization using Multi-task Hybrid Attention Networks for Smart Healthcare Systems**
Liang, H., Chen, J., Khan, F. U., Srivastava, G. & Zeng, J., 16 Mar 2024, (Published Online) In: ACM Transactions on Internet Technology.
7. **Lightweight and smart data fusion approaches for wearable devices of the Internet of Medical Things**
Jan, M. A., Zhang, W., Khan, F., Abbas, S. & Khan, R., Mar 2024, In: Information Fusion. 103, 102076.
8. **Sustainable Secure Communication in Consumer-Centric Electric Vehicle Charging in Industry 5.0 Environments**
Chen, C. M., Miao, Q., Khan, F., Srivastava, G. & Kumari, S., 1 Feb 2024, In: IEEE Transactions on Consumer Electronics. 70, 1, p. 1544-1555 12 p.
9. An effective machine learning-based model for the prediction of protein–protein interaction sites in health systems
Tahir, M., Khan, F., Hayat, M. & Alshehri, M. D., Jan 2024, In: Neural Computing and Applications. 36, 1, p. 65-75 11 p.
10. **A Blockchain-based Hybrid Model for IoMT-enabled Intelligent Healthcare System**
Rehman, A. U., Tariq, N., Jan, M. A., Khan, F., Song, H. & Ibrahim, M., 2024, In: IEEE Transactions on Network Science and Engineering. 11, 4, p. 1-9 9 p.
11. **Automatic Background Filtering for Cooperative Perception Using Roadside LiDAR**
Liu, J., Zhao, J., Guo, J., Zou, C., Yin, X., Cheng, X. & Khan, F., 2024, In: IEEE Transactions on Intelligent Transportation Systems. 25, 7, p. 1-14 14 p.
12. **Equality Test Public Key Encryption With Cryptographic Reverse Firewalls for Cloud-Based E-Commerce**
Elhabob, R., Eltayieb, N., Xiong, H., Khan, F., Bashir, A. K., Kumari, S., Alturki, R. & Kumar, S., 2024, (Accepted/In press) In: IEEE Transactions on Consumer Electronics. p. 1 1 p.
13. **Handwritten Odia Digit Recognition using Learning Systems: A Comparison of Neural Networks and Support Vector Machine Models**
Sharma, U., Bansal, R., Sarangi, P. K., Gupta, D., Rani, S., Khan, F. U. & Srivastava, G., 9 Oct 2023, (Published Online) In: ACM Transactions on Asian and Low-Resource Language Information Processing.
14. A Secure Ensemble Learning-Based Fog-Cloud Approach for Cyberattack Detection in IoMT
Khan, F., Jan, M. A., Alturki, R., Alshehri, M. D., Shah, S. T. & Rehman, A. U., 1 Oct 2023, In: IEEE Transactions on Industrial Informatics. 19, 10, p. 10125-10132 8 p.
15. An Adaptive Distributed Denial of Service Attack Prevention Technique in a Distributed Environment
Riskhan, B., Safuan, H. A. J., Hussain, K., Elnour, A. A. H., Abdelmaboud, A., Khan, F. & Kundi, M., Jul 2023, In: Sensors. 23, 14, 6574.
16. An Identity-Based Data Integrity Auditing Scheme for Cloud-Based Maritime Transportation Systems
Li, X., Shang, S., Liu, S., Gu, K., Jan, M. A., Zhang, X. & Khan, F., 1 Feb 2023, In: IEEE Transactions on Intelligent Transportation Systems. 24, 2, p. 2556-2567 12 p.
17. A Resource-Efficient Hybrid Proxy Mobile IPv6 Extension for Next-Generation IoT Networks
Hussain, A., Nazir, S., Khan, F., Nkenyereye, L., Ullah, A., Khan, S., Verma, S. & Kavita, 1 Feb 2023, In: IEEE Internet of Things Journal. 10, 3, p. 2095-2103 9 p.
18. Trustworthy and Reliable Deep-Learning-Based Cyberattack Detection in Industrial IoT
Khan, F., Alturki, R., Rahman, M. A., Mastorakis, S., Razzak, I. & Shah, S. T., 1 Jan 2023, In: IEEE Transactions on Industrial Informatics. 19, 1, p. 1030-1038 9 p.
19. Computational intelligence-enabled prediction and communication mechanism for IoT-based autonomous systems
Jin, B., Khan, F., Alturki, R. & Ikram, M. A., Jan 2023, In: ISA Transactions. 132, p. 146-154 9 p.
20. FedBlockHealth: A Synergistic Approach to Privacy and Security in IoT-Enabled Healthcare Through Federated Learning and Blockchain
Waheed, N., Ur Rehman, A., Nehra, A., Farooq, M., Tariq, N., Jan, M. A., Khan, F., Alalmaie, A. Z. & Nanda, P., 2023, *GLOBECOM 2023 - 2023 IEEE Global Communications Conference*. Institute of Electrical and Electronics Engineers Inc., p. 3855-3860 6 p. (Proceedings - IEEE Global Communications Conference, GLOBECOM).
21. Privacy-Enhanced Living: A Local Differential Privacy Approach to Secure Smart Home Data
Waheed, N., Khan, F., Mastorakis, S., Jan, M. A., Alalmaie, A. Z. & Nanda, P., 2023, *2023 IEEE International Conference on Omni-Layer Intelligent Systems, COINS 2023*. Institute of Electrical and Electronics Engineers Inc., (2023 IEEE International Conference on Omni-Layer Intelligent Systems, COINS 2023).
22. A reliable wireless communication mechanisms and decision support system for the IoT networks
Jin, B., Khan, F., Alturki, R. & Ikram, M. A., Oct 2022, In: Soft Computing.
23. AF Relaying Secrecy Performance Prediction for 6G Mobile Communication Networks in Industry 5.0
Xu, L., Zhou, X., Tao, Y., Yu, X., Yu, M. & Khan, F., 1 Aug 2022, In: IEEE Transactions on Industrial Informatics. 18, 8, p. 5485-5493 9 p.
24. Improving Physical Layer Security in Vehicles and Pedestrians Networks with Ambient Backscatter Communication
Li, M., Yang, X., Khan, F., Jan, M. A., Chen, W. & Han, Z., 1 Jul 2022, In: IEEE Transactions on Intelligent Transportation Systems. 23, 7, p. 9380-9390 11 p.

25. An Efficient and Secure Multimessage and Multireceiver Signcryption Scheme for Edge-Enabled Internet of Vehicles
Ullah, I., Khan, M. A., Khan, F., Jan, M. A., Srinivasan, R., Mastorakis, S., Hussain, S. & Khattak, H., 15 Feb 2022, In: IEEE Internet of Things Journal. 9, 4, p. 2688-2697 10 p.
26. Efficient and reliable hybrid deep learning-enabled model for congestion control in 5G/6G networks
Khan, S., Hussain, A., Nazir, S., Khan, F., Oad, A. & Alshehr, M. D., 15 Jan 2022, In: Computer Communications. 182, p. 31-40 10 p.
27. Internet of Things-Enabled Optimal Data Aggregation Approach for the Intelligent Surveillance Systems
Rahmani, M. K. I., Khan, F., Muzaffar, A. W. & Jan, M. A., 2022, In: Mobile Information Systems. 2022, 4681583.
28. Mutual Authentication Scheme for the Device-to-Server Communication in the Internet of Medical Things
Sun, J., Khan, F., Li, J., Alshehri, M. D., Alturki, R. & Wedyan, M., 1 Nov 2021, In: IEEE Internet of Things Journal. 8, 21, p. 15663-15671 9 p.
29. A Secured and Reliable Continuous Transmission Scheme in Cognitive HARQ-Aided Internet of Things
Khan, F., Rehman, A. U., Zhang, Y., Mastorakis, S., Song, H., Jan, M. A. & Dev, K., 1 Oct 2021, In: IEEE Internet of Things Journal. 8, 19, p. 14835-14844 10 p.
30. LightIoT: Lightweight and secure communication for energy-efficient IoT in health informatics
Jan, M. A., Khan, F., Mastorakis, S., Adil, M., Akbar, A. & Stergiou, N., Sept 2021, In: IEEE Transactions on Green Communications and Networking. 5, 3, p. 1202-1211 10 p., 9422780.
31. Lightweight Mutual Authentication and Privacy-Preservation Scheme for Intelligent Wearable Devices in Industrial-CPS
Jan, M. A., Khan, F., Khan, R., Mastorakis, S., Menon, V. G., Alazab, M. & Watters, P., Aug 2021, In: IEEE Transactions on Industrial Informatics. 17, 8, p. 5829-5839 11 p., 9290438.
32. A Secured and Intelligent Communication Scheme for IIoT-enabled Pervasive Edge Computing
Khan, F., Jan, M. A., Rehman, A. U., Mastorakis, S., Alazab, M. & Watters, P., Jul 2021, In: IEEE Transactions on Industrial Informatics. 17, 7, p. 5128-5137 10 p., 9259232.
33. Marginal and average weight-enabled data aggregation mechanism for the resource-constrained networks
Jan, S. R., Khan, R., Khan, F., Jan, M. A., Alshehri, M. D., Balasubramaniam, V. & Sehdev, P. S., 1 Jun 2021, In: Computer Communications. 174, p. 101-108 8 p.
34. A mutual authentication scheme for establishing secure device-to-device communication sessions in the edge-enabled smart cities
Zhang, Y., Cheng, K., Khan, F., Alturki, R., Khan, R. & Rehman, A. U., May 2021, In: Journal of Information Security and Applications. 58, 102683.
35. Intelligent Dynamic Malware Detection using Machine Learning in IP Reputation for Forensics Data Analytics
Usman, N., Usman, S., Khan, F., Jan, M. A., Sajid, A., Alazab, M. & Watters, P., May 2021, In: Future Generation Computer Systems. 118, p. 124-141 18 p.
36. Security and blockchain convergence with Internet of Multimedia Things: Current trends, research challenges and future directions
Jan, M. A., Cai, J., Gao, X. C., Khan, F., Mastorakis, S., Usman, M., Alazab, M. & Watters, P., 1 Feb 2021, In: Journal of Network and Computer Applications. 175, 102918.
37. A Comprehensive Survey on Machine Learning-Based Big Data Analytics for IoT-Enabled Smart Healthcare System
Li, W., Chai, Y., Khan, F., Jan, S. R. U., Verma, S., Menon, V. G., Kavita & Li, X., Feb 2021, In: Mobile Networks and Applications. 26, 1, p. 234-252 19 p.
38. Impact of residual hardware impairment on the IoT secrecy performance of RIS-assisted NOMA networks
Chen, Q., Li, M., Yang, X., Alturki, R., Alshehri, M. D. & Khan, F., 2021, In: IEEE Access. 9, p. 42583-42592 10 p., 3065760.
39. Modeling Dynamic Spatio-Temporal Correlations for Urban Traffic Flows Prediction
Awan, N., Ali, A., Khan, F., Zakarya, M., Alturki, R., Kundi, M., Alshehri, M. D. & Haleem, M., 2021, In: IEEE Access. 9, p. 26502-26511 10 p., 2005.
40. Sensor-Cloud Architecture: A Taxonomy of Security Issues in Cloud-Assisted Sensor Networks
Alturki, R., Alyamani, H. J., Ikram, M. A., Rahman, M. A., Alshehri, M. D., Khan, F. & Haleem, M., 2021, In: IEEE Access. 9, p. 89344-89359 16 p., 9451213.
41. Artificial intelligence-based load optimization in cognitive Internet of Things
Yao, W., Khan, F., Jan, M. A., Shah, N., ur Rahman, I., Yahya, A. & ur Rehman, A., 1 Oct 2020, In: Neural Computing and Applications. 32, 20, p. 16179-16189 11 p.
42. A secured and reliable communication scheme in cognitive hybrid ARQ-aided smart city
Khan, F., Rehman, A. U. & Jan, M. A., Jan 2020, In: Computers and Electrical Engineering. 81, 106502.
43. A Reliable Communication and Load Balancing Scheme for Resource-Limited Networks
Zheng, X., Idrees, A., Khan, F., Lashari, S. A., Khan, R., Li, M., Tahir, M. & Jan, M. A., 2020, In: IEEE Access. 8, p. 179921-179930 10 p., 9208717.

44. A Secured Framework for SDN-Based Edge Computing in IoT-Enabled Healthcare System
Li, J., Cai, J., Khan, F., Rehman, A. U., Balasubramaniam, V., Sun, J. & Venu, P., 2020, In: IEEE Access. 8, p. 135479-135490 12 p., 9146630.
45. Discrimination of golgi proteins through efficient exploitation of hybrid feature spaces coupled with smote and ensemble of support vector machine
Tahir, M., Khan, F., Rahmani, M. K. I. & Hoang, V. T., 2020, In: IEEE Access. 8, p. 206028-206038 11 p.
46. Mobile crowdsensing: A survey on privacy-preservation, task management, assignment models, and incentives mechanisms
Khan, F., Ur Rehman, A., Zheng, J., Jan, M. A. & Alam, M., Nov 2019, In: Future Generation Computer Systems. 100, p. 456-472 17 p.
47. A quality of service-aware secured communication scheme for internet of things-based networks
Khan, F., Ur Rehman, A., Yahya, A., Jan, M. A., Chuma, J., Tan, Z. & Hussain, K., 1 Oct 2019, In: Sensors. 19, 19, 4321.
48. Ontology-based dynamic and context-aware security assessment automation for critical applications
Aman, W. & Khan, F., Oct 2019, *2019 IEEE 8th Global Conference on Consumer Electronics, GCCE 2019*. Institute of Electrical and Electronics Engineers Inc., p. 644-647 4 p. 9015599. (2019 IEEE 8th Global Conference on Consumer Electronics, GCCE 2019).
49. SmartEdge: An end-to-end encryption framework for an edge-enabled smart city application
Jan, M. A., Zhang, W., Usman, M., Tan, Z., Khan, F. & Luo, E., 1 Jul 2019, In: Journal of Network and Computer Applications. 137, p. 1-10 10 p.
50. Efficient resource allocation for real time traffic in cognitive radio internet of things
Khan, F., Rehman, A. U., Jan, M. A. & Rahman, I. U., Jul 2019, *Proceedings - 2019 IEEE International Congress on Cybermatics: 12th IEEE International Conference on Internet of Things, 15th IEEE International Conference on Green Computing and Communications, 12th IEEE International Conference on Cyber, Physical and Social Computing and 5th IEEE International Conference on Smart Data, iThings/GreenCom/CPSCoM/SmartData 2019*. Institute of Electrical and Electronics Engineers Inc., p. 1143-1147 5 p. 8875419. (Proceedings - 2019 IEEE International Congress on Cybermatics: 12th IEEE International Conference on Internet of Things, 15th IEEE International Conference on Green Computing and Communications, 12th IEEE International Conference on Cyber, Physical and Social Computing and 5th IEEE International Conference on Smart Data, iThings/GreenCom/CPSCoM/SmartData 2019).
51. Urban data management system: Towards Big Data analytics for Internet of Things based smart urban environment using customized Hadoop
Babar, M., Arif, F., Jan, M. A., Tan, Z. & Khan, F., Jul 2019, In: Future Generation Computer Systems. 96, p. 398-409 12 p.
52. Performance investigation of SR-HARQ transmission scheme in realistic cognitive radio system
Ishtiaq, M., Rehman, A. U., Khan, F., Salam, A. & Shahzad, 12 Mar 2019, *2019 IEEE 9th Annual Computing and Communication Workshop and Conference, CCWC 2019*. Chakrabarti, S. & Saha, H. N. (eds.). Institute of Electrical and Electronics Engineers Inc., p. 258-263 6 p. 8666610. (2019 IEEE 9th Annual Computing and Communication Workshop and Conference, CCWC 2019).
53. A payload-based mutual authentication scheme for Internet of Things
Jan, M. A., Khan, F., Alam, M. & Usman, M., Mar 2019, In: Future Generation Computer Systems. 92, p. 1028-1039 12 p.
54. A Secured and Efficient Communication Scheme for Decentralized Cognitive Radio-Based Internet of Vehicles
Yao, W., Yahya, A., Khan, F., Tan, Z., Rehman, A. U., Chuma, J. M., Jan, M. A. & Babar, M., 2019, In: IEEE Access. 7, p. 160889-160900 12 p., 8859188.
55. A secured data management scheme for smart societies in industrial internet of things environment
Babar, M., Khan, F., Iqbal, W., Yahya, A., Arif, F., Tan, Z. & Chuma, J. M., 30 Jul 2018, In: IEEE Access. 6, p. 43088-43099 12 p., 8423621.
56. Performance of Cognitive Radio Sensor Networks Using Hybrid Automatic Repeat ReQuest: Stop-and-Wait
Khan, F., ur Rehman, A., Usman, M., Tan, Z. & Puthal, D., 1 Jun 2018, In: Mobile Networks and Applications. 23, 3, p. 479-488 10 p.
57. Performance analysis of transport protocols for multimedia traffic over mobile wi-max network under nakagami fading
Khan, F., Rahman, F., Khan, S. & Asif Kamal, S., 2018, *Information Technology – New Generations - 14th International Conference on Information Technology*. Latifi, S. (ed.). Springer Verlag, p. 101-110 10 p. (Advances in Intelligent Systems and Computing; vol. 558).
58. Wet Environmental conditions affecting narrow band on-body communication channel for WBANs
Khattak, M. I., Edwards, R. M., Shafi, M., Ahmed, S., Shaikh, R. & Khan, F., 2018, In: Ad-Hoc and Sensor Wireless Networks. 40, 3-4, p. 297-312 16 p.

59. Identification of anticancer peptides using optimal feature space of Chou's split amino acid composition and support vector machine
Khan, F., Akbar, S., Basit, A., Khan, I. & Akhlaq, H., 12 Nov 2017, *Proceedings of the 2017 4th International Conference on Biomedical and Bioinformatics Engineering, ICBBE 2017*. Association for Computing Machinery, p. 91-96 6 p. (ACM International Conference Proceeding Series).
60. CoAP-based request-response interaction model for the internet of things
Khan, F., ur Rahman, I., Khan, M., Iqbal, N. & Alam, M., 2017, *Future Intelligent Vehicular Technologies - 1st International Conference, Future 5V 2016, Revised Selected Papers*. Ferreira, J. & Alam, M. (eds.). Springer Verlag, p. 146-156 11 p. (Lecture Notes of the Institute for Computer Sciences, Social-Informatics and Telecommunications Engineering, LNICST; vol. 185).
61. Education and socio economic factors impact on earning for Pakistan - A bigdata analysis
Younas, N., Asghar, Z., Qayyum, M. & Khan, F., *Future Intelligent Vehicular Technologies - 1st International Conference, Future 5V 2016, Revised Selected Papers*. Ferreira, J. & Alam, M. (eds.). Springer Verlag, p. 215-223 9 p. (Lecture Notes of the Institute for Computer Sciences, Social-Informatics and Telecommunications Engineering, LNICST; vol. 185).
62. Performance analysis of vehicular adhoc network using different highway traffic scenarios in cloud computing
Fida, N., Khan, F., Jan, M. A. & Khan, Z., 2017, *Future Intelligent Vehicular Technologies - 1st International Conference, Future 5V 2016, Revised Selected Papers*. Ferreira, J. & Alam, M. (eds.). Springer Verlag, p. 157-166 10 p. (Lecture Notes of the Institute for Computer Sciences, Social-Informatics and Telecommunications Engineering, LNICST; vol. 185).
63. Secure and safe surveillance system using sensors networks - Internet of things
Khan, F., Khan, M., Iqbal, Z., ur Rahman, I. & Alam, M., 2017, *Future Intelligent Vehicular Technologies - 1st International Conference, Future 5V 2016, Revised Selected Papers*. Ferreira, J. & Alam, M. (eds.). Springer Verlag, p. 167-174 8 p. (Lecture Notes of the Institute for Computer Sciences, Social-Informatics and Telecommunications Engineering, LNICST; vol. 185).
64. Applications, limitations, and improvements in visible light communication systems
Khan, F., Jan, S. R., Tahir, M. & Khan, S., 4 Apr 2016, *2015 International Conference on Connected Vehicles and Expo, ICCVE 2015 - Proceedings*. Institute of Electrical and Electronics Engineers Inc., p. 259-262 4 p. 07447607. (2015 International Conference on Connected Vehicles and Expo, ICCVE 2015 - Proceedings).
65. Performance improvement in wireless sensor and actor networks based on actor repositioning
Khan, F., Khan, S. & Khan, S. A., 4 Apr 2016, *2015 International Conference on Connected Vehicles and Expo, ICCVE 2015 - Proceedings*. Institute of Electrical and Electronics Engineers Inc., p. 134-139 6 p. 07447581. (2015 International Conference on Connected Vehicles and Expo, ICCVE 2015 - Proceedings).
66. Delay and throughput performance improvement in wireless sensor and actor networks
Khan, S., Khan, F. & Khan, S. A., 3 Aug 2015, *2015 5th National Symposium on Information Technology: Towards New Smart World, NSITNSW 2015*. Institute of Electrical and Electronics Engineers Inc., 7176383. (2015 5th National Symposium on Information Technology: Towards New Smart World, NSITNSW 2015).
67. Fairness and throughput improvement in multihop wireless ad hoc networks
Khan, F., 17 Sept 2014, *Canadian Conference on Electrical and Computer Engineering*. Institute of Electrical and Electronics Engineers Inc., 6900980. (Canadian Conference on Electrical and Computer Engineering).
68. Secure communication and routing architecture in wireless sensor networks
Khan, F., 3 Feb 2014, *2014 IEEE 3rd Global Conference on Consumer Electronics, GCCE 2014*. Institute of Electrical and Electronics Engineers Inc., p. 647-650 4 p. 7031298. (2014 IEEE 3rd Global Conference on Consumer Electronics, GCCE 2014).
69. Comparative study of spectrum sensing techniques in cognitive radio networks
Khan, F. & Nakagawa, K., 2013, *2013 World Congress on Computer and Information Technology, WCCIT 2013*. 6618728. (2013 World Congress on Computer and Information Technology, WCCIT 2013).
70. Fairness improvement in long chain multihop wireless ad hoc networks
Khan, F., Kamal, S. A. & Arif, F., 2013, p. 556-561. 6 p.
71. Dual head clustering scheme in wireless sensor networks
Khan, F., Bashir, F. & Nakagawa, K., 2012, *Proceedings - 2012 International Conference on Emerging Technologies, ICET 2012*. p. 456-460 5 p. 6375471. (Proceedings - 2012 International Conference on Emerging Technologies, ICET 2012).

Press/Media

Awards

Projects

1. **Research on digital twin based key technologies for multi-AGV scheduling and cooperation in complex systems**
Bai, R. (PI), Ren, J. (Col), Yao, Y. (Col) & Ullah, F. (Col)
1/04/23 → 31/03/26
Project: Government Funded Projects › Vertical-Ningbo Municipal Government Funded Projects