## MUHAMMAD UMAIR HASSAN


**CONTACT INFORMATION**

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**RESEARCH INTERESTS**

Computer vision and image processing, including image retrieval, shape matching, salient object detection, and machine learning. My doctoral thesis title is **Towards Creating Digital Twins Authoring Tool based on 3D Reconstruction and 3D Object Retrieval**. Previously, I have worked on information retrieval, wireless networking, and cloud computing and security.

**EDUCATION**

**Norwegian University of Science and Technology, Norway** — **Nov 2020 - Present**
PhD in Computer Science (**Scholar**)
**Advisor:** Ibrahim A. Hameed

**University of Jinan, China** — **Sep 2017 – Jun 2020**
Master in Computer Science (**Completed**)
**CGPA:** 4.19/5.00 | **Percentage:** 87 %
**Advisor:** Prof. Xiuyang Zhao

**University of the Punjab, Pakistan** — **Oct 2013 – Jul 2017**
Bachelors of Science in Computer Science (**Completed**)
**CGPA:** 3.32/4.00

**PUBLICATIONS**

[1] **Hassan, M. U.,** Alaliyat, S., & Hameed, I. A. "Image Generation from Scene Graphs and Layouts: A Comparative Analysis," Applied Intelligence. (**IF: 5.08**) (**Under Review**)

[2] **Hassan, M. U.,** Sarwar, R., & Hassan, S. U. "SODRet: Instance Retrieval Using Salient Object Detection for Self-service Shopping," Annals of Operations Research. (**IF: 4.85**) (**Under Review**)

[3] Zhang, M., **Hassan, M. U.,** Niu, D., Zhao, X., Hameed, I. A. & Hassan, S. U. "A Methodology for Shape Matching of Non-rigid Structures Based on Integrated Graphical Information," Displays. (**IF: 2.16**) (**Under Review**)

[4] Yaqoob, I., **Hassan M. U.**, Niu, D., Zhao, X., Hameed, I. A., & Hassan, S. U. "A Novel Person Re-identification Network to Address Low-Resolution Problem in Smart City Context," ICT Express. (**IF: 4.31**) (**Under Review**)

[5] **Hassan, M. U.,** Steinnes, O. M., & Hameed, I. A. "A Novel Deep Learning-based Framework for the Predictive Maintenance of Norwegian Roads," 8th International Conference on Advanced Intelligent Systems and Informatics. (**Accepted**)

[6] **Hassan, M. U.,** Niu, D., Zhang, M., & Zhao, X. "Asymmetric Hashing Based on Generative Adversarial Network," Multimedia Tools Applications (2022). https://doi.org/10.1007/s11042-022-13141-2. (**IF: 2.75**)

[7] **Hassan, M. U.,** Stavroula, A, Hameed, I. A., & Torres, R. d. S. "Digital Twins for Lighting Analysis: Literature Review, Challenges, and Research Opportunities," 36th ECMS Conference on Modelling and Simulation, Ålesund, Norway, 2022, pp. 226-235.

[8] **Hassan, M. U.**, Yaqoob, I., Zulfiaqr, S., & Hameed, I. A. "A Comprehensive Study of HBase Storage Architecture—A Systematic Literature Review," Symmetry 2021, 13, 109. https://doi.org/10.3390/sym13010109. (**IF: 2.71**)

[9] Gribbestad, M., **Hassan, M. U.,** Hameed, I. A., & Sundli, K. "Health Monitoring of Air Compressors Using Reconstruction-Based Deep Learning for Anomaly Detection with Increased Transparency," Entropy 2021, 23, 83. https://doi.org/10.3390/e23010083. (**IF: 2.52**)

[10] Gribbestad, M., **Hassan, M. U.,** & Hameed, I. A. "Transfer Learning for Prognostics and Health Management (PHM) of Marine Air Compressors," Journal of Marine Science and Engineering. 2021, 9, 47. doi: https://doi.org/10.3390/jmse9010047. (**IF: 2.45**)

[11] Yan, A., Chen, Z., Zhang, H., Peng, L., Yan, Q., **Hassan, M. U.,** Zhao, C., & Yang, B. "Effective Detection of Mobile Malware Behavior based on Explainable Deep Neural Network," Neurocomputing. doi: 10.1016/j.neucom.2020.09.082. (**IF: 5.71**).

[12] **Hassan, M. U.,** Zafar, N., Ali, H., Yaqoob, I., Alaliyat, S. A. A., & Hameed, I. A. "Collaborative filtering based hybrid music recommendation system," Proceedings of International Conference

on Information Technology and Applications. Lecture Notes in Networks and Systems, vol 350. Springer, Singapore. https://doi.org/10.1007/978-981-16-7618-5_21.

[13] Li, M., Zhang, M., Niu, D., **Hassan, M. U.,** Zhao, X., & Li, N. "Point Set Registration Based on Feature Point Constraints," The Visual Computer, pp.1-14. https://doi.org/10.1007/s00371-019-01771-x. (**IF:2.60**).

[14] **Hassan, M. U.,** Niu, D., Zhao, X., Shohag, M. S. A., Ma, Y., & Zhang, M. "Salient Object Detection based on CNN Fusion of Two Types of Saliency Models," 2019 34th International Conference on Image and Vision Computing New Zealand (IVCNZ). doi:10.1109/ivcnz48456.2019.8960994.

[15] **Hassan, M. U.,** Shohag, M. S. A., Niu, D., Shaukat, K., Zhang, M., Zhao, W., & Zhao, X. "A framework for the revision of large-scale image retrieval benchmarks," Proc. SPIE 11179, Eleventh International Conference on Digital Image Processing (ICDIP 2019), 111794D (14 August 2019); https://doi.org/10.1117/12.2539640.

[16] Zhang, M., **Hassan, M. U.,** Niu, D., Li, N., Liu, M., Zhou, J., & Zhao, X. "Shape Correspondence based Effective Combination of Linear and Quadratic Assignment Matrices," Proc. SPIE 11179, Eleventh International Conference on Digital Image Processing (ICDIP 2019), 111794E (14 August 2019); doi: https://doi.org/10.1117/12.2539652.

[17] Yaqoob, I., **Hassan M. U.**, Niu, D., & Zhao, X. "Efficient Deep Learning Approach to Address Low-Resolution Person Re-Identification," In Proceedings of the 2020 4th International Conference on Vision, Image and Signal Processing (ICVISP 2020). Article 22, pp.1–5. doi: https://doi.org/10.1145/3448823.3448848.

[18] Cui, L., Zhao, W., **Hassan, M. U.**, & Yaqoob, I. "Shape Matching Based on the Enhancement of Riemannian Structure Information," In Proceedings of the 2020 4th International Conference on Vision, Image and Signal Processing (ICVISP 2020). Article 9, pp.1–5. doi: https://doi.org/10.1145/3448823.3448846.

[19] Shohag, M. S. A., **Hassan, M. U.,** Niu, D., Kong, X., Zhao, X., & Rahman, F. "Graph Based Image Matching Using the Fusion of Several Kinds of Features," In Proceedings of the 2019 4th International Conference on Multimedia Systems and Signal Processing (ICMSSP 2019). ACM, New York, NY, USA, 188-193. doi: https://doi.org/10.1145/3330393.3330421.

[20] Shabir, M. A., **Hassan, M. U.,** Yu, X., & Li, J. "Tyre Defect Detection Based on GLCM and Gabor Filter," 2019 22nd International Multitopic Conference (INMIC), Islamabad, Pakistan, 2019, pp. 1-6. doi: 10.1109/INMIC48123.2019.9022777.

[21] Shabir, M. A., **Hassan, M. U.,** Yu, X., & Li, J. "Extensive Techniques to Detect Defects in Tyres through Radiography," 2019 22nd International Multitopic Conference (INMIC), Islamabad, Pakistan, 2019, pp. 1-4. doi: 10.1109/INMIC48123.2019.9022797.

[22] **Hassan, M. U.,** Shaukat, K., Niu, D., Mahreen, S., Ma, Y., Haider, F., & Zhao, X. "An Overview of Schema Extraction and Matching Techniques," 2018 2nd IEEE Advanced Information Management, Communicates, Electronic and Automation Control Conference (IMCEC 2018), Xi'an, China, 2018, pp. 1290-1294. doi: 10.1109/IMCEC.2018.8469502.

[23] **Hassan, M. U.,** Shaukat, K., Niu, D., Mahreen, S., Ma, Y., Zhao, X., & Shabir, M. A. "Web-Logs Prediction with Web Mining," 2018 2nd IEEE Advanced Information Management, Communicates, Electronic and Automation Control Conference (IMCEC 2018), Xi'an, China, 2018, pp. 1295-1299. doi: 10.1109/IMCEC.2018.8469256.

[24] Ma, Y., Niu, D., Zhang, J., **Hassan, M. U.,** & Zhao, X. "An Unsupervised Approach for 3D Medical Image Registration," In Proceedings of the 2019 7th International Conference on Information Technology: IoT and Smart City (ICIT 2019). ACM, New York, NY, USA, 259–263. doi: https://doi.org/10.1145/3377170.3377273.

[25] Ma, Y., **Hassan, M. U.,** Niu, D., & Wang, L. "Glandular cavity segmentation based on local correntropy-based K-means (LCK) clustering and morphological operations," In Third International Workshop on Pattern Recognition, vol. 10828, p. 108280H. International Society for Optics and Photonics, 2018. doi: 10.1117/12.2502002.

[26] Ma, Y., **Hassan, M. U.,** Niu, D., & Wang, L. "The Segmentation of Glandular Cavity based on K-means and Mathematical Morphology," The 4th IEEE International Conference on Systems and Informatics (ICSAI 2017), Hangzhou, China, 2017. doi: 10.1109/ICSAI.2017.8248484.

[27] Shen, J., Chen, Z., Wang, S., Zhu, Y., & **Hassan, M. U.** "DroidDetector: a traffic-based platform to detect android malware using machine learning," In Third International Workshop on Pattern Recognition, vol. 10828, p. 108280N. International Society for Optics and Photonics, 2018. doi: 10.1117/12.2501923.

[28] Yan, A., Chen, Z., Wang, L., Peng, L., **Hassan, M. U.,** & Zhao, C. "Neural Network Rule Extraction for Real Time Traffic Behavior Identification," 2018 International Conference on Security, Pattern Analysis, and Cybernetics (SPAC), Jinan, China, 2018, pp. 146-151. doi: 10.1109/SPAC46244.2018.8965635.

[29] Shaukat, K., Iqbal, F., Hameed, I. A., **Hassan, M. U.**, Luo, S., Hassan, R., ... & Iqbal, R. "MAC Protocols 802.11: A Comparative Study of Throughput Analysis and Improved LEACH." 2020 17th International Conference on Electrical Engineering/Electronics, Computer, Telecommunications and Information Technology (ECTI-CON) (pp. 421-426). IEEE. doi: 10.1109/ECTI-CON49241.2020.9158097.

[30] **Hassan, M. U.,** Shahzaib, M., Shaukat, K., Hussain, S. N., Mubashir, M., Karim, S., & Shabir, M. A. "DEAR-2: An Energy-Aware Routing Protocol with Guaranteed Delivery in Wireless Ad-hoc Networks," In: Jan M., Khan F., Alam M. (eds) Recent Trends and Advances in Wireless and IoT-enabled Networks. EAI/Springer Innovations in Communication and Computing. Springer, Cham. doi: 10.1007/978-3-319-99966-1_20.

[31] **Hassan, M. U.,** Karim, S., Shah, S. K., Abbas, S., Yasin, M., Shahzaib, M., & Umair, M. "A Comparative Study on Frequent Link Disconnection problems in VANETs," EAI Endorsed Transactions on Energy Web and Information Technologies, Vol. 18, No. 17, April 2018. doi: 10.4108/eai.10-4-2018.154444.

[32] **Hassan, M. U.,** Umair, M., & Ali, H. "Novel Approaches to Improve Software Quality," International Journal of Software Engineering and Its Applications, Vol. 11, No. 6, June 2017, pp. 15-24. http://dx.doi.org/10.14257/ijseia.2017.11.6.02.

[33] **Hassan, M. U.,** Mubashir, M., Shabir, M. A., & Ullah, M. M. "Software Quality Assurance Techniques: A Review," International Journal of Information, Business and Management, Vol.10, No.4, 2018. ISSN: 2218-046X.

[34] Shaukat, K., **Hassan, M. U.,** Masood, N., & Shafat, A. B. "Stop Words Elimination in Urdu Language using Finite State Automaton," International Journal of Asian Language Processing, Vol. 27, No. 2, 2017. ISSN: 0219-5968. pp. 21-32.

[35] Shaukat, K., & **Hassan, M. U.** "Cloud Security through Encryption Techniques", Transylvanian Review, Vol. XXV, No. 15, March 2017. ISSN: 1221-1249. pp. 4037-4042.

[36] Dar, K. S., Shafat, A. B., & **Hassan, M. U.** "An Efficient Stop Word Elimination Algorithm for Urdu Language," 2017 14th IEEE International Conference on Electrical Engineering/Electronics, Computer, Telecommunications and Information Technology (ECTI-CON), Phuket, Thailand. doi: 10.1109/ECTICon.2017.8096386.

[37] **Hassan, M. U.,** & Mumtaz, N. "AI in Assisting the Elderly and People with Disabilities," International Journal of Research and Engineering, [S.l.], Vol. 3, No. 8, Aug. 2016. ISSN 2348-7860. Available at: <http://digital.ijre.org/index.php/int_j_res_eng/article/view/201>.

[38] Shaukat, K., **Hassan, M. U.,** Ali, H., Shah Zaib, M. & Ullah, M. M. "An Overview of Service Oriented Architecture, Cloud Computing and Azure Platform," International Journal of Computer Science and Information Security, Vol. 14 No. 7, July 2016, pp. 891-896.

## WORK EXPERIENCE

**Shandong Provincial Key Laboratory of Network-Based Intelligent Computing, University of Jinan, China** — **Sep 2018 – Jun 2020**

Research Assistant, Computer Vision and Deep Learning

- Image and Object Retrieval
- Machine Learning and Medical Imaging

## MUHAMMAD UMAIR HASSAN

**Department of Information Technology, University of the Punjab, Pakistan** — **Mar 2015 – Aug 2016**
Teacher Assistant, Database Systems & Object-Oriented Programming

**PROJECTS**

**Android:** Book Corner App (Final Year Project at Undergraduate Level)
**ASP.Net:** Student Web Portal System (Semester Project at Undergraduate Level)
**ASP.Net:** Online Shopping & Cart System (Semester Project at Undergraduate Level)

**ONLINE COURSES**

- **IBM Cognitive Class** – Python for Data Science
- **IBM Cognitive Class** – Machine Learning with Python
- **IBM Cognitive Class** – Deep Learning Fundamentals
- **IBM Cognitive Class** – Deep Learning with TensorFlow

**ACHIEVEMENTS & AWARDS**

- Fully Funded Chinese Government Scholarship for Master Studies (2017-2020)
- Fully Funded Scholarship by VISTEC to participate in Machine Learning Research School (MLRS 2019), Bangkok, Thailand
- Student Best Paper Award at IEEE IMCEC 2018, Xian, China
- 3rd Position in SISE Graduate Academic Research Competition, Jinan, China

**CONFERENCE PRESENTATIONS**

- Delivered Oral Presentation at 36th ECMS Conference on Modelling and Simulation, Norway
- Delivered Oral Presentation at 34th Image and Vision Computing, New Zealand
- Poster Presentation at Machine Learning Research School, Bangkok, Thailand
- Delivered Oral Presentation at 22nd INMIC 2019, Islamabad, Pakistan
- Delivered Oral Presentation at 11th ICDIP 2019, Guangzhou, China
- Delivered Oral Presentation at IEEE IMCEC 2018, Xian, China
- Delivered Oral Presentation at EAI FUTURE5V 2017, Islamabad, Pakistan

**SKILLS**

**Programming:** Python, C/C++, C#, MATLAB, Java
**Public Library:** PyTorch, Tensorflow, Keras, Caffe, OpenCV
**Environments & IDE:** Linux, Windows, Visual Studio 2015, NetBeans
**Languages:** English (fluent), Bokmål (basic), Mandarin (basic), Urdu (native)