Dr. Sara Shahzad
Associate Professor

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Employment History

1997 – 2010 🔖 **Lecturer.** Department of Computer Science, University of Peshawar

2010 – 2015 🔖 **Assistant Professor.** Department of Computer Science, University of Peshawar, Pakistan.

2015 to date 🔖 **Associate Professor.** Department of Computer Science, University of Peshawar, Pakistan.

Education

2006 – 2010 🔖 **Ph.D. Computer Science, Technical University of Graz, Austria**
Honors: *Ph.D with Honours.* Awarded certificate of "New Innovation"
Specialization: *Software Engineering*

2013 🔖 **Ph.D Follow-up Research Visit**
Ernst Mach Follow-up Grant (EZA) awarded by the Austrian Agency for International Co-operation in Education & Research (OeAD-GmbH).

1994 – 1996 🔖 **M.Sc. Computer Science, University of Peshawar, Pakistan**

1991 – 1993 🔖 **B.Sc. University of Peshawar, Pakistan.**

Teaching and Research

Teaching

Teaching undergraduate foundation and postgraduate specialization courses of Software Engineering. Undergraduate final year projects and post graduate research supervision.

Research Interests

Green and sustainable Software Engineering, Software quality, Software Architecture, Intelligent systems, Empirical Software Engineering research.

Research Activities - Software Engineering Research Group

PhD students Supervised and Graduated Currently enrolled students = 5 Graduated = 1

MS students Supervised and Graduated Currently enrolled students = 5 Graduated = 15

Research Publications

Journal Articles

1. Hayat, S., Kun, S., **Shahzad, S.**, Suwansrikham, P., Mateen, M. & Yu, Y. (n.d.). Entropy information-based heterogeneous deep selective fused features using deep convolutional neural network for sketch recognition [**Impact Factor =1.516**]. *IET Computer Vision*, *n/a*(n/a), https://ietresearch.onlinelibrary.wiley.com/doi/pdf/10.1049/cvi2.12019. https://doi.org/https://doi.org/10.1049/cvi2.12019

2 Zheng, M., Zada, I., **Shahzad, S.**, Iqbal, J., Shafiq, M., Zeeshan, M. & Ali, A. (2021). Key performance indicators for the integration of the service-oriented architecture and scrum process model for iot [**Impact Factor = 0.963**]. *Scientific Programming*, *2021*, 6613579. https://doi.org/10.1155/2021/6613579

3 Cui, Y., Zada, I., **Shahzad, S.**, Nazir, S., Khan, S. U., Hussain, N. & Asshad, M. (2021). Analysis of service-oriented architecture and scrum software development approach for iiot [**Impact Factor = 0.963**]. *Scientific Programming*, *2021*, 6611407. https://doi.org/10.1155/2021/6611407

4 Li, M., Nazir, S., Khan, H. U., **Shahzad**, S. & Amin, R. (2020). Modelling features-based birthmarks for security of end-to-end communication system [**Impact Factor = 1.288**]. *Security and Communication Networks*, *2020*.

5 Nazir, S., **Shahzad, S.** & Mukhtar, N. (2019). Software birthmark design and estimation: A systematic literature review [**Impact Factor = 1.092**]. *Arabian Journal for Science and Engineering*. https://doi.org/10.1007/s13369-019-03718-9

6 Nazir, S., Nawaz Khan, M., Anwar, S., Adnan, A., Asadi, S., Shahzad, S. & Ali, S. (2019). Big data visualization in cardiology—a systematic review and future directions [**Impact Factor = 4.098**]. *IEEE Access*, *7*, 115945–115958. https://doi.org/10.1109/ACCESS.2019.2936133

7 Nazir, S., Nawaz, M., Adnan, A., Shahzad, S. & Asadi, S. (2019). Big data features, applications, and analytics in cardiology—a systematic literature review. *IEEE Access*, *7*, 143742–143771. https://doi.org/10.1109/ACCESS.2019.2941898

8 Nazir, S., **Shahzad, S.**, Wirza, R., Amin, R., Ahsan, M., Mukhtar, N., García-Magariño, I. & Lloret, J. (2019). Birthmark based identification of software piracy using haar wavelet [**Impact Factor = 1.476**]. *Mathematics and Computers in Simulation*, *166*, 144–154. https://doi.org/https://doi.org/10.1016/j.matcom.2019.04.010

9 Nazir, S., Hussain, A., **Shahzad, S.**, Rehman, H. U., Zada, I., Ahsan, M., Ahmad, Z. & Khan, A. (2018). Determination of awareness of piracy level on educational institutions- a questionnaire based study. *EAI Endorsed Transactions on Energy Web and Information Technologies*, *18*(17). https://doi.org/10.4108/eai.10-4-2018.154450

10 Waqas, M., Iram, M., **Shahzad**, S., Arshad, S. & Nawaz, T. (2018). Knowledge extraction using web usage mining. *EAI Endorsed Transactions on Scalable Information Systems*, *18*(16). https://doi.org/10.4108/eai.13-4-2018.154551

11 Nazir, S., **Shahzad, S.**, Mahfooz, S. & Nazir, M. (2018). Fuzzy logic based decision support system for component security evaluation [**Impact Factor=0.724**]. *Int. Arab J. Inf. Technol.*, *15*(2), 224–231. http://ccis2k.org/iajit/?option=com_content&task=blogcategory&id=127&Itemid=453

12 Shahzad, S., Keerio, A. & Nazir, S. (2018). Training for agile transformation at universities: A case study analysis [**Y category**]. *Sindh University Research Journal-SURJ (Science Series)*, *50*(4), 575–582.

13 Naseem, R., Deris, M. M., Maqbool, O. & **Shahzad**, S. (2017). Euclidean space based hierarchical clusterers combinations: An application to software clustering [**Impact Factor = 1.601**]. *Cluster Computing*. https://doi.org/10.1007/s10586-017-1408-0

14 Naseem, R., Deris, M. M., Maqbool, O., Li, J., **Shahzad**, S. & Shah, H. (2017). Improved binary similarity measures for software modularization [**Impact Factor = 0.910**]. *Frontiers of IT & EE*, *18*(8), 1082–1107. https://doi.org/10.1631/FITEE.1500373

15 Nazir, S., **Shahzad, S.**, Atan, R. B. & Farman, H. (2017). Estimation of software features based birthmark [**Impact factor = 1.601**]. *Cluster Computing*, 1–14. https://doi.org/10.1007/s10586-017-0842-3

16 Nazir, S., **Shahzad, S.** & Riza, L. S. (2017). Birthmark-based software classification using rough sets [**Impact factor = 1.092**]. *Arabian Journal for Science and Engineering*, *42*(2), 859–871. https://doi.org/10.1007/s13369-016-2371-4

17 Nazir, S., Shahzad, S., Hussain, Z., Iqbal, M. & Keerio, A. (2016). Evaluating student grades using analytic network process [**X category**]. *Sindh University Research Journal-SURJ (Science Series)*, *47*(1).

18 Nazir, S., Shahzad, S., Nizamani, Q., Amin, R., Shah, M. A. & Keerio, A. (2015). Identifying software features as birthmark [**X category**]. *Sindh Univ. Res. Jour. (Sci. Ser.)*, *47*(3), 535–540. http://sujo.usindh.edu.pk/index.php/SURJ/article/view/1222/1129

19 Hussain, S. I., Javed, H., Khan, T., Shazad, S. & Khalil, F. N. (2015). Native process migration in wireless sensor networks [**Impact factor = 1.787**]. *International Journal of Distributed Sensor Networks*, *2015*, 1–9. https://doi.org/10.1155/2015/607143

20 Nazir, S., **Shahzad, S.**, Khan, S. A., Ilyas, N. B. & Anwar, S. (2015). A novel rules based approach for estimating software birthmark [**Impact Factor=1.21**]. *The Scientific World Journal*, *2015*.

21 Zada, I., **Shahzad, S.** & Nazir, S. (2015). Issues and implications of scrum on global software development [**Y Category**]. *Bahria University Journal of Information & Communication Technology*, *8*(1), 81.

22 Khan, H., Shah Nazir, S. S., Iqbal, M., Dawood, M., Ali, F., Zaman, Q. & Ilyas, M. (2014). A comparative and spatial study of various areas of khyber pakhtunkhwa-an education perspective [**Impact Factor = 0.17**]. *Life Science Journal*, *11*(10s), 141–148.

23 Nazir, S., Anwar, S., Khan, S. A., **Shahzad, S.**, Ali, M., Amin, R., Nawaz, M., Lazaridis, P. & Cosmas, J. (2014). Software component selection based on quality criteria using the analytic network process [**Impact Factor = 1.27**]. *Abstract and Applied Analysis*, *2014*, 1–12. https://doi.org/10.1155/2014/535970

24 Nazir, S., **Shahzad, S.** & Abid, S. B. S. (2014). Selecting software design based on birthmark [**Impact Factor = 0.17**]. *Life Science Journal*, *11*(12s).

25 Nazir, S., **Shahzad, S.**, Mukhtar, N., Khan, H., Zada, I., Nazir, M. & Amin, R. (2014). Test case prioritization for components using fanp [**Impact Factor = 0.17**]. *Life Science Journal*, *11*(6s), 501–511.

26 **Shahzad, S.**, Hayat, S., Shah Nazir, H. J., Hayat, Y., Aamir, M. & Serat, A. M. (2014). Analyzing data for grounding a problem theory in software engineering [**Impact Factor = 0.17**]. *Life Science Journal*, *11*(10s).

27 **Shahzad, S.**, Nazir, S., Abid, S. B. S., Zada, I. & Amin, R. (2014). Software component project evaluation based on quality measure [**Impact Factor = 0.17**]. *Life Science Journal*, *11*(10), 98–107.

28 **Shahzad, S.** & Ali, S. (2013). Ucloud: Concept and design [**Y Category**]. *Sindh Univ. Res. Jour. (Sci. Ser.)*, *45*(3), 608–614.

29 Arshad, S., Muhammad, S. & **Shahzad, S.** (2013). Empirical analysis of traditional and agile requirement engineering process [**HEC recognized**]. *Journal of Science, Technology and Development*, *32*(1), 44–47. http://pcst.org.pk/journal/JN/2013/STD%20vol%2032(1)%202013/8.%20Empirical% 20analysis%20of%20traditional%20and%20agile%20requirement%20engineering% 20process.pdf

30 Hayat, Y., Ali, W., Hayat, S., Rahman, A., Shahzad, S. & Hussain., Z. (2013). Studying behavior attributes and student?s academic performance. [**X Category**]. *Sarhad Journal of Agriculture.*, *29(3)*, 461–467.

31 **Shahzad, S.**, Hussain, Z. & Chandio, A. A. (2012). Status of software engineering education in pakistan: A problem analysis [**Y Category**]. *Sindh Univ. Res. Jour. (Sci. Ser.)*, *44*(2), 1–6.

32 S.Shahzad, Keerio, A., Mahar, J. A. & Hussain, Z. (2012). Effective use of student projects in teaching software engineering [**Y category**]. *Sindh Univ. Res. Jour. (Sci. Ser.)*, *44*(2), 167–170. http://www.surj.usindh.edu.pk/volume_44_02.htm

33 Z.Hussain, A.A.Chandio, M.Leghari & S.Shahzad. (2012). An implementation and analysis of koha integrated library system, in sindhi [**Y Category**]. *Sindh Univ. Res. Jour. (Sci. Ser.)*, *44*(2), 81–86.

Conference Proceedings

1 Ullah, A., Nazir, S. & **Shahzad**, **S.** (2019). Trade-off analysis among elicitation techniques using simple additive weighting method (K. Arai, S. Kapoor & R. Bhatia, Eds.). In K. Arai, S. Kapoor & R. Bhatia (Eds.), *Intelligent computing*, Cham, Springer International Publishing.

2 us Saqib, N. & Shahzad, S. (2018). Functionality, performance, and compatibility testing: A model based approach, In *2018 international conference on frontiers of information technology (fit)*.
https://doi.org/10.1109/FIT.2018.00037

3 Nazir, S., Hussaain, A., Saleem, Y. & **Shahzad**, **S.** (2017). User modeling for domain-wise learning style variations, In *1st national graduate conference*. Allama Iqbal Open University.

4 Nazir, S., **Shahzad**, **S.**, Ullah, A. & Hussaain, A. (2017). Identification and analysis of project attributes affecting the decision of requirement elicitation technique, In *1st national graduate conference*. Allama Iqbal Open University.

5 Shahzad, S., Hussain, A. & Nazir, S. (2017). A clone management framework to improve code quality of foss projects, In *2017 international conference on communication, computing and digital systems (c-code)*.
https://doi.org/10.1109/C-CODE.2017.7918938

6 Gul, N., Siddiqi, M.-U.-M., Rehman, S., Jehan, A., Jabeen, S., Ali, S., Tunnisa, H. & **Shahzad**, **S.** (2013). A statistical approach to study ms (cs) research students research process and design, In *Proceedings of iccss-13*.

7 Mukhtar, N., **Shahzad**, **S.**, Khan, M. A. & Nazir, S. (2013). Ontology for feature based selection of web development tools, In *Digital information management (icdim), 2013 eighth international conference on*.
https://doi.org/10.1109/ICDIM.2013.6693980

8 Nazir, S., **Shahzad**, **S.**, Nazir, M. & Rehman, H. u. (2013). Evaluating security of software components using analytic network process, In *11th international conference on frontiers of information technology (fit)*.
https://doi.org/10.1109/FIT.2013.41

9 Suleman Sarwar, M. M., **Shahzad**, **S.** & Ahmad, I. (2013). Cyclomatic complexity: The nesting problem, In *Digital information management (icdim), 2013 eighth international conference on*.
https://doi.org/10.1109/ICDIM.2013.6693981

10 Suleman, S. M. M., Ahmad, I. & **Shahzad**, **S.** (2012). Cyclomatic complexity for wcf: A service oriented architecture, In *Frontiers of information technology (fit), 2012 10th international conference on*.
https://doi.org/10.1109/FIT.2012.39

11 Hussain, Z., Lechner, M., Milchrahm, H., **Shahzad**, **S.**, Slany, W., Umgeher, M., Vlk, T., Koeffel, C., Tscheligi, M. & Wolkerstorfer, P. (2012). Practical usability in xp software development processes, In *Proceedings of achi 2012, the fifth international conference on advances in computer-human interactions*, ThinkMind.
http://www.thinkmind.org/index.php?view=article&articleid=achi_2012_8_50_20217

12 **Shahzad**, **S.** & Slany, W. (2009). Knowledge management issues in teaching extreme programming (K. Tochtermann & H. Maurer, Eds.). In K. Tochtermann & H. Maurer (Eds.), *Journal of universal computer science*.

13 Hussain, Z., Lechner, M., Milchrahm, H., **Shahzad**, **S.**, Slany, W., Umgeher, M. & Wolkerstorfer, P. (2009). Concept and design of a contextual mobile multimedia content usability study., In *Achi*, IEEE.

14 **Shahzad**, **S.** (2009). Learning from experience: The analysis of an extreme programming process (S. Latifi, Ed.). In S. Latifi (Ed.), *Itng*, IEEE Computer Society.

15 Hussain, Z., Lechner, M., Milchrahm, H., **Shahzad**, **S.**, Slany, W., Umgeher, M. & Wolkerstorfer, P. (2008a). Agile User-Centered Design Applied to a Mobile Multimedia Streaming Application, In *Usab 2008*, Springer Berlin / Heidelberg.

16 Hussain, Z., Lechner, M., Milchrahm, H., **Shahzad, S.**, Slany, W., Umgeher, M., Vlk, T. & Wolkerstorfer, P. (2008). User interface design for a mobile multimedia application: An iterative approach, In *Proc. ieee int. conf. on advances in computer-human interaction (achi 2008)*.

17 Hussain, Z., Lechner, M., Milchrahm, H., **Shahzad, S.**, Slany, W., Umgeher, M. & Vlk, T. (2008). Optimizing Extreme Programming, In *Iccce 2008: Proceedings of the international conference on computer and communication engineering, kuala lumpur, malaysia*, IEEE.

18 Hussain, Z., Lechner, M., Milchrahm, H., **Shahzad, S.**, Slany, W., Umgeher, M. & Wolkerstorfer, P. (2008b). Integrating Extreme Programming and User-Centered Design, In *Ppig 2008, the 20th annual psychology of programming interest group conference, lancaster university, uk. 10th - 12th september 2008*.

19 Hussain, Z., Lechner, M., **Shahzad, S.** & Slany, W. (2008). Inside view of an extreme process [9th International Conference, XP 2008, Limerick, Ireland], In *Agile processes in software engineering and extreme programming*, Springer Verlag. 9th International Conference, XP 2008, Limerick, Ireland.

20 Wolkerstorfer, P., Tscheligi, M., Sefelin, R., Milchrahm, H., Hussain, Z., Lechner, M. & **Shahzad, S.** (2008). Probing an agile usability process (M. Czerwinski, A. M. Lund & D. S. Tan, Eds.). In M. Czerwinski, A. M. Lund & D. S. Tan (Eds.), *Chi extended abstracts*, ACM.

21 Hussain, Z., Lechner, M., Milchrahm, H., **Shahzad, S.**, Slany, W., Umgeher, M. & Vlk, T. (2007). The sustainable application of leadership and teaming in hrm - models for the today??s organisation??s needs ?? a meta-level perspective, In *Technology transfer society conference 2007 (t2s)*.

22 Hussain, Z., Lechner, M., Milchrahm, H., **Shahzad, S.**, Slany, W., Umgeher, M., Vlk, T. & Wolkerstorfer, P. (2007). User interface design for a content-aware mobile multimedia application: An iterative approach [ISBN : 978-3-85403-231-1], In *Frontiers in mobile and web computing: Proceedings of momm2007 & iiwas2007 workshops*, Jakarta, Indonesia. ISBN : 978-3-85403-231-1.