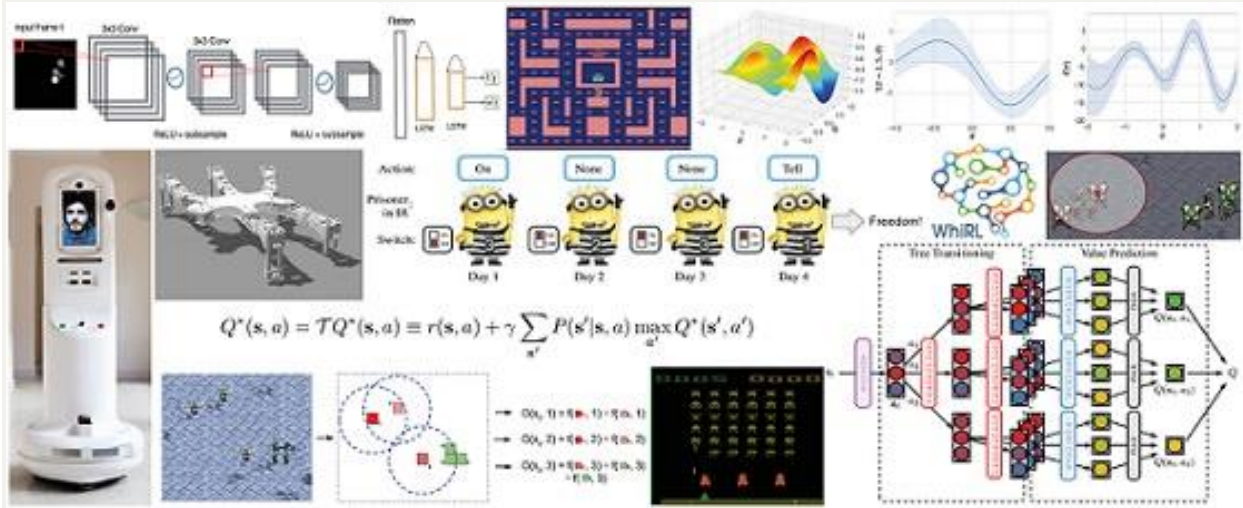


Deep Reinforcement Learning



Reinforcement learning is a field of machine learning, in which an agent learns to perform tasks by trial-and-error, while receiving feedback in form of reward signals. Solving such tasks involves dealing with high-dimensional state and action spaces, sparse reward signals, and uncertainties in the agent's observations. In recent years, much of the successes of scaling up reinforcement learning to more complex tasks has come from leveraging the successes of deep neural networks, coining the term *deep* reinforcement learning.

Research

Some of the main areas of research into deep reinforcement learning we focus on at the are the following:

- **Deep Model-Based Reinforcement Learning:** In model-based reinforcement learning, the agent learns a model of its environment and uses this to efficiently learn to act optimally, instead of directly learning optimal behaviour. We are developing methods to do model-based reinforcement with deep neural networks, using methods such as look-ahead tree planning.
- **Robust Reinforcement Learning:** We are developing new reinforcement learning methods that are robust to significant rare events, i.e., events with low probability that nonetheless significantly affect expected performance. For example, some rare wind conditions may increase the risk of crashing a helicopter. Since crashes are so catastrophic, avoiding them is key to maximising expected performance, even though the wind conditions contributing to the crash occur only rarely.
- **Active Perception:** We are developing decision-theoretic methods for helping perception systems, such as multi-camera tracking systems, to make efficient use of scarce resources such as computation and bandwidth. By exploiting submodularity, we can efficiently

determine which subset of cameras to use, or which subset of pixel boxes in an image to process, so as to maximise metrics such as information gain and expected coverage.

- Multi-Agent Deep Reinforcement Learning: Multi-agent systems can be naturally used to model many real world problems, such as network packet routing and the coordination of autonomous vehicles. We are developing new algorithms that enable teams of cooperating agents to learn control policies for solving complex tasks, including techniques for learning to communicate and stabilising multi-agent experience replay.

We work on applications such as:

- Simulating Complex Environments Using Reinforcement Learning: A Case Study of Multimedia Data Sharing
- Students Attention-aware Deep Reinforcement Learning Model Using Facial Expression and EEG Brain Signals
- Radiology Auto Report Generation for Chest X-ray Images using Transformers
- Fake News Detection Using Transformer based Learning
- Deep Reinforcement Learning approach-based Grammar Error Correction
- Qualitative Analysis of Visual Attention Using Affective Computing in Smart Learning: A Case Study of Students Attention
- Reinforcement Learning in Game Design and Integration
- Reinforcement Learning in Task Flow Design
- Reinforcement Learning and Task Flow Transformation

RESEARCH SUPERVISION – GRADUATE LEVEL

Supervised

1. Hassan Raza (2022), Deep Learning-Based Approach to Urdu Caption Generation on Imagery Data, CUI
2. Ahmad Raza (2022), A Stylometric Fingerprinting Method for Author Identification Using Machine Learning, CUI
3. Muneeb Aslam (2022), A Smart Model for Categorization of GitHub Repositories, CUI
4. Sana Yaseen (2022), A Deep Learning based Approach for Malware Classification using Machine Code to Image Conversion, CUI
5. Hira Shakeel (2022), ncRNADisease: A text mining approach to find role of lncRNAs in aging, CUI
6. Iqra Sabeen (2021), Predictive model for healthcare using deep learning, CUI
7. Attiq Muzaffar (2021), Facial emotion detection to enhance Employee Engagement, CUI
8. Beenish Zia (2021), Software Categorization Using Machine Learning Techniques, CUI
9. Basit Rafiq (2021), Hand signs and gestures recognition using Machine Learning, CUI
10. Muhammad Imran Sadiq (2021), Multimedia e-Learning Based Student interaction assessment model using Visual Context and EEG Brain Signals: An Enhanced Attention Scoring Model in e-Learning, CUI
11. Muhammad Jamil (2021), Counterintelligence profiling by Cybernated CoC Model for Forensic Analysis, CUI
12. Sarosh Abbas (2021), An analysis on approaches to improve Text Summarization, CUI
13. Rana Shahzad Haider Anjum (2021), Malware Classification using Deep Learning, CUI
14. Muhammad Usman Rafique (2021), Quantitative Analysis of Visual Attention using Facial Expressions of the Student in E-Learning Environment, CUI
15. Umar Farooq (2021), Attack and Danger Detection Using Facial Expression and Weapon Detection, CUI
16. Muhammad Umer (2020), A Smart Agriculture Land Suitability Detection Model Using Machine Learning with Google Earth Engine, CUI

17. Kinza Ibraheem (2020), Personalized Learning system using Evolutionary Optimization Algorithm, CUI
18. Maryam Mazher (2020), A novel Intrusion Detection system using ML/DM Method, CUI
19. Sania Maqsood (2020), Grammar Error Detection using Convolutional Neural Network (CNN), CUI
20. Shiza Afzal (2020), Grammar Error Detection for Natural Language Processing Using Recurrent Neural Network (RNN), CUI
21. Waqar Ahmad (2020), Online social Network Analysis with visualization algorithm's enhancement, CUI
22. Muhammad Yasir Bilal (2020), Qualitative Analysis of Visual Attention using Facial Expression of the Students in E-Learning Environment, CUI
23. Ghazanfar Ali (2020), Stock Market Performance Analytics using Deep Learning Approach, CUI
24. Farah Ijaz (2020), A Smart Methodology for Power Forecasting in Electricity Sector of Pakistan, CUI
25. Muhammad Salar Haider (2019), Qualitative Analysis of Visual attention of Students in E-learning, CUI
26. Muhammad Tayyab (2019), A Methodology for the Quantitative Visual Engagement Analysis of Pedagogical effectiveness in E-Learning, CUI
27. Laiqa Binte Imran (2019), An ensemble learning approach for frost event forecasting, CUI
28. Rana Muhammad Amir Latif (2019), A Smart Assessment Methodology to Measure and Analyze Google Play Store, CUI
29. Osama Rizwan (2019), A Methodology to forecast Pakistan stock market share-values using ensemble learning, CUI
30. Syed Umair Aslam Shah (2019), A Novel Routing Protocol Based on Congruent Gravity Value for Underwater Wireless Sensor Networks, CUI
31. Rahia Tallat (2018), Empirical Evaluation of Visual Graph Analytic Techniques, CUI

Co-Supervised

1. Tayyaba Tariq (2019), Data Science for Protein Structure Analysis: A case study using Python, CUI
2. Usman Akram (2015), URDU NASTALIQUE Optical Character Recognition for Mobile Platforms, CUI
3. Muhammad Manzoor Faisal (2022), Context-Aware Query Expansion for Question-Answering using Hybrid Approach

UNDERGRADUATE PROJECTS SUPERVISED

1. Smart Education Assistant: Machine learning based web application
2. Smart Dental App, Desktop and Android Application
3. JAM Movies: Movies' recommendation system based on facial expression
4. VR Shopping: Virtual reality-based application
5. Virtual Operation Theater: Leap motion-based application for the learning of medical students
6. Kids tutor: Augmented reality-based application for the learning of kids
7. Brain Race: A desktop game for the training of vehicle driving
8. Children Learning System in Augmented Reality
9. Online Blood Bank Management System
10. Assistive Hand Technology for Perceptual Disabilities
11. Sentence Level Lip Reading Software
12. Smart Home Automation with Android Application: Hardware based Solution
13. Doctors Online: Web Application
14. Automated Career Counseling: Machine learning based solution
15. Online Shopping Store: Web Application using C# and MVC 5
16. Online Job Portal: Web Application
17. Hotel Reviews Analyzing System
18. Android based Employee Tracking system: Web and Android Integrated Solution
19. Social Services Ranking: Web Application
20. Market Watch: Android Application
21. Smart Rescue (Saving World by Saving Lives): Web and Android Integrated Solution
22. Parental Control: Web and Android Integrated Solution
23. Tutor Finder: Web Application

24. City Road Construction Game (CRCG): Multi-platform Application
25. AL-SALAT: Android Scheduling Application
26. ANDROBOT: Android Based RC Robot
27. Auto Make-up: A systematic way of makeup (Research work + Desktop based Prototype)
28. Automated Biometric Vote Casting System: Android Application
29. Automated Price Control System: Web and Android Integrated Solution
30. Blind Teacher's Assistant (BTA): Desktop Application
31. Books Network for Library: Web Application
32. Campus Virtual 3D Tour: Multi-Platform Application
33. Cell Post: Ad Posting Web Application
34. COMSATS Independent Student: Web Application
35. Conference Calls & Chatting System: Web Application
36. Date Sheet Generator and Clash Removal System: Web Application
37. ECS Guard: Android Application
38. Furniture Visualization in Augmented Reality (FVAR): Android Application
39. Human Voice Controlled Home Automation: Hardware and Software Integrated Solution
40. iMagic: Computer Mouse Control using Webcam and a Small Ball: Desktop Application
41. Norani Qaida Virtual Teacher: Android Application
42. Online Career Counseling: Web Application
43. Online Nursery Management System: Web Application
44. ReCall: Android based Task Scheduling Application
45. Sahiwal City Explorer: Web Application
46. Sales and Inventory System for Domino Pizza Shop: Desktop application
47. School Management System: Desktop Application
48. Semantic Search Helper (An Intelligent Search Assistant): Web Application
49. Smart Classrooms (SCR): Web Application
50. User Crime Portal Management System: Web Application
51. Smart Health Diagnosis: Hardware and Software Integrated Solution using Microsoft wrist band
52. Socio Political Traitor: Android Application
53. Space Shooter (3D Video Game): Multi-Platform Application
54. Speech and Image Recognized Drone: Hardware and Software Integrated Solution
55. Tahir Shopping Center: Desktop based MIS
56. Task Manager: Class Management System for CRs and GRs: Web Application
57. Test Case Management System: Web Application
58. Unified Cloud Storage Drive: Web Application
59. Video Lectures Analysis Tool: Research based Prototype and Desktop Application
60. Virtual Android Application Generator
61. Virtual Wardrobe: Microsoft Kinect based Desktop Application
62. And many more...

Publications

- [1]. Sarah Mazhar, Guangmin Sun, Anas Bilal, Yu Li, **M. Farhan**, Hamid Hussain Awan (2022), Digital and Geographical Feature Detection by Machine Learning Techniques Using Google Earth Engine for CPEC Traffic Management, Wireless Communications and Mobile Computing, Volume 2022 | Article ID 1192752 | <https://doi.org/10.1155/2022/1192752> (IF **2.146**, HJRS **W**)
- [2]. Abid Ali Minhas, Sohail Jabbar, **M. Farhan**, Najam-ul-Islam (2022), A Smart Analysis of Driver Fatigue and Drowsiness Detection Using Convolutional Neural Networks, Multimedia Tools and Applications, 81 (2022), pages 26969–26986, DOI: <https://doi.org/10.1007/s11042-022-13193-4> (IF **2.757**, HJRS **W**)
- [3]. Jahanzaib Latif, Shanshan Tu, Chuangbai Xiao, Sadaqat Ur Rehman, Mazhar Sadiq and **M. Farhan** (2021), Digital Forensics Use Case for Glaucoma Detection using Transfer Learning Based on Deep Convolutional

- Neural Networks, Security and Communication Networks, Volume 2021, Article ID 4494447, DOI: <https://doi.org/10.1155/2021/4494447> (IF 1.791, HJRS W)
- [4]. Muhammad Aasem, Muhammad Munawar Iqbal, **M. Farhan**, Shehzad Khalid, Muhammad Al Ghamdi, Sardar Zafar Iqbal (2021), Classification of COVID-19 from Ultrasound Images using Deep Learning, Expert Systems (IF 1.546, HJRS X) (accepted)
- [5]. **M. Farhan**, Sohail Jabbar, Muhammad Aslam, Awais Ahmad, Muhammad Munwar Iqbal, Murad Khan, Martinez-Enriquez Ana Maria (2018), A Real-time Data Mining Approach for Interaction Analytics Assessment: IoT based Student Interaction Framework, International Journal of Parallel Programming, October 2018, Volume 46, Issue 5, pp 886–903, <https://doi.org/10.1007/s10766-017-0553-7> (IF 1.156, HJRS X)
- [6]. **M. Farhan**, Aslam, M., Jabbar, S., & Khalid, S. (2018). Multimedia based qualitative assessment methodology in eLearning: student teacher engagement analysis. Multimedia Tools and Applications, 77(4), 4909-4923. DOI: <https://doi.org/10.0.3.239/s11042-016-4212-6>, (IF 1.530, HJRS W)
- [7]. **M. Farhan**, Sohail Jabbar, Muhammad Aslam, Shehzad Khalid, Mohammad Hammoudeh, Mudassar Ahmad, Murad Khan, Kijun Han (2018). IoT-based Students Interaction Framework using Attention-Scoring Assessment in eLearning, Future Generation Computer Systems, Elsevier., 79(3), pp 909-919, <https://doi.org/10.1016/j.future.2017.09.037> (IF 4.639, HJRS W)
- [8]. **M. Farhan**, & Aslam, M. (2017). An Interactive Assessment Framework for Visual Engagement: Statistical Analysis of a TEDx Video. EURASIA Journal of Mathematics, Science and Technology Education, 13(4), 1107-1119., DOI: <https://doi.org/10.12973/eurasia.2017.00661a>, (IF 0.903, HJRS X)
- [9]. **M. Farhan**, Muhammad Aslam, Sohail Jabbar, Shehzad Khalid, Mucbeol Kim (2016), Real-Time Imaging based Assessment Model for Improving Teaching Performance and Student Experience in eLearning, Journal of Real-Time Image Processing, Springer, 13(3): 491–504, DOI: <https://doi.org/10.1007/s11554-016-0662-3> (IF2.010, HJRS X)
- [10]. Rana M. Amir Latif, **M. Farhan** (corresponding author), Osama Rizwan, Majid Hussain, Sohail Jabbar, Shahzad Khalid (2020), Retail Level Blockchain Transformation for Product Supply Chain using Truffle Development Platform, Cluster Computing, S.I.: Blockchain for IoT, <https://doi.org/10.1007/s10586-020-03165-4> (IF 3.458, HJRS W)
- [11]. Laiqa Binte Imran, Rana Muhammad Amir Latif, **M. Farhan** (corresponding author), Hamza Aldabbas (2020), Smart City based Autonomous Water Quality Monitoring System Using WSN, Wireless Personal Communications, <https://doi.org/10.1007/s11277-020-07655-x> (IF 1.200, HJRS W)
- [12]. R. M. A. Latif, S. B. Belhaouari, S. Saeed, L. B. Imran, M. Sadiq and **M. Farhan** (2020), Integration of Google Play Content and Frost Prediction Using CNN: Scalable IoT Framework for Big Data, in IEEE Access, vol. 8, pp. 6890-6900, 2020. DOI: <https://doi.org/10.1109/ACCESS.2019.2963590>, URL: <https://ieeexplore.ieee.org/document/8948043> (IF 4.098, HJRS W)
- [13]. Younas, Talha, Muluneh Mekonnen, Ghulam Farid, Sohaib Tahir, Osama Younas, Waqas Ahmad Wattoo, **M. Farhan**, and Mahrukh Liaqat, Investigation of LS-MIMO systems with channel aging effects, Physical Communication (2020): 101088. DOI: <https://doi.org/10.1016/j.phycom.2020.101088> (IF 1.451, HJRS X)
- [14]. Abid Ali Minhas, Sohail Jabbar, **M. Farhan**, Najam-ul-Islam (2019), Smart Methodology for Safe Life on Roads with Active Drivers based on Real-time Risk and Behavioral Monitoring, Journal of Ambient Intelligence and Humanized Computing, pp. 1-13, <https://doi.org/10.1007/s12652-019-01554-1> (IF 1.910, HJRS W)
- [15]. Muhammad Ramzan, Shahid Mahmood Awan, Hamza Aldabass, Adnan Abid, **M. Farhan** (corresponding author), Shehzad Khalid, Rana M. Amir Latif, Internet of Medical Things for Smart D3S to Enable Road Safety, International Journal of Distributed Sensor Networks, 2019, Vol. 15(8) <https://doi.org/10.1177/1550147719864883> (IF 1.787, HJRS X)
- [16]. Farhan Ullah, Junfeng Wang, **M. Farhan**, Sohail Jabbar, S. Sabahat H. Bukhari, Zhiming Wu, Shehzad Khalid (2018), An E-Assessment Methodology Based on Artificial Intelligence Techniques to Determine Students' Language Quality and Assignments' Plagiarism, Intelligent Automation and Soft Computing, 26(1), 169-180 <https://doi.org/10.31209/2019.100000138>, <https://www.techscience.com/iasc/v26n1/39852> (IF 0.652, HJRS X)

- [17]. Mirza Muhammad Waqar, Muhammad Aslam, **M. Farhan** (2019), An Intelligent and Interactive Interface to Support Collaborative Educational Writing between Visually Impaired and Sighted Users, *Symmetry* 2019, 11(2), 238; <https://doi.org/10.3390/sym11020238> (IF **2.143**, HJRS **W**)
- [18]. Farhan Ullah, Junfeng Wang, **M. Farhan**, Shehzad Khalid (2018), Software Plagiarism detection in Multiprogramming languages using Machine learning Approach, *Concurrency Computation Practice and Experience*, <http://dx.doi.org/10.1002/cpe.5000> 2018;e5000 (IF **1.114**, HJRS **X**)
- [19]. Farhan Ullah, Junfeng Wang, **M. Farhan**, Sohail Jabbar, Zhiming Wu, Shehzad Khalid (2018), Plagiarism Detection in Students' Programming Assignments based on Semantics: Multimedia e-Learning based Smart Assessment Methodology, *Multimedia Tools and Applications*, <https://doi.org/10.1007/s11042-018-5827-6> (IF **1.530**, HJRS **W**)
- [20]. Malik, K. R., **M. Farhan**, Habib, M. A., Khalid, S., Ahmad, M., & Ghafir, I (2018). Remote access capability embedded in linked data using bi-directional transformation: issues and simulation, *Sustainable Cities and Society*. 38 (2018) 662–674 DOI: <https://doi.org/10.1016/j.scs.2018.01.047> (IF **3.073**, HJRS **W**)
- [21]. Farhan Ullah, Junfeng Wang, **M. Farhan**, Sohail Jabbar, Muhammad Kashif Naseer, Muhammad Asif (2018), LSA based Smart Assessment Methodology for SDN Infrastructure in IoT Environment, *International Journal of Parallel Programming (IJPP)*, DOI: <https://doi.org/10.1007/s10766-018-0570-1> (IF **1.156**, HJRS **X**)
- [22]. Muhammad Munwar Iqbal, **M. Farhan**, Sohail Jabbar, Yasir Saleem, Shehzad Khalid (2019), Multimedia based IoT-Centric Smart Framework for eLearning Paradigm, *Multimedia Tools and Applications*, 78(3), pp 3087–3106, <https://doi.org/10.1007/s11042-018-5636-y> (IF **1.530**, HJRS **W**)
- [23]. Kaleem Razaq Malik, Tauqir Ahmad, **M. Farhan**, Mai Alfawair (2017), Enhancing SDN Performance by Enabling Reasoning Abilities in Data Traffic Control, *Peer-to-Peer Networking and Applications*, pp 392–404, Online 07 November 2017, <https://doi.org/10.1007/s12083-017-0613-1> (IF **1.262**, HJRS **W**)
- [24]. Usman, M., Iqbal, M. M., Iqbal, Z., Chaudhry, M. U., **M. Farhan**, & Ashraf, M. (2017). E-Assessment and Computer-Aided Prediction Methodology for Student Admission Test Score. *Eurasia Journal of Mathematics, Science and Technology Education*, 5499-5517. DOI: <https://doi.org/10.12973/eurasia.2017.00939a>, 13(8), pp 5499-5517 (IF **0.903**, HJRS **X**)
- [25]. Farhan Ullah, Muhammad Asif Habib, **M. Farhan**, Shehzad Khalid, Mehr Yahya Durrani, Sohail Jabbar, Semantic interoperability for big-data in heterogeneous IoT infrastructure for healthcare, *Sustainable Cities and Society*, Volume 34, October 2017, Pages 90-96, ISSN 2210-6707, <https://doi.org/10.1016/j.scs.2017.06.010> (IF **3.073**, HJRS **W**)
- [26]. Malik, K. R., Mir, R. R., **M. Farhan**, Rafiq, T., & Aslam, M. (2017). Student Query Trend Assessment with Semantical Annotation and Artificial Intelligent Multi-Agents. *EURASIA Journal of Mathematics, Science and Technology Education*, 13(7), 3893-3917, DOI: <https://doi.org/10.12973/eurasia.2017.00763a>, (IF **0.903**, HJRS **X**)
- [27]. Razaq Malik, K., Ahmad, T., **M. Farhan**, Ullah, F., Amjad, K., & Khalid, S. (2016). Multiagent Semantical Annotation Enhancement Model for IoT-Based Energy-Aware Data, *International Journal of Distributed Sensor Networks*, Volume 2016, Article ID 9103265, 13 pages, 2016, <http://dx.doi.org/10.1155/2016/9103265>, (IF **1.239**, HJRS **X**)
- [28]. Malik, K.R., Tauqir Ahmad, **M. Farhan** (corresponding author), Muhammad Aslam, Sohail Jabbar, Shehzad Khalid, Mucbeol Kim (2016), Big-data: transformation from heterogeneous data to semantically-enriched simplified data. *Multimedia Tools and Applications*, 75(16), 2016, pp. 12727–12747, DOI: <https://doi.org/10.1007/s11042-015-2918-5> (IF **1.530**, HJRS **W**)
- [29]. Yasir Saleem, Muhammad Munwar Iqbal, Muhammad Amjad, Muhammad Salman Bashir, Muhammad Faisal, **M. Farhan**, Amjad Farooq, Abad Ali Shah (2012), High Security and Privacy in Cloud Computing Paradigm through Single Sign On, *Life Sci J* 2012; 9(4):627-636, <http://www.lifesciencesite.com/ljsj/> (JCR2012 IF **0.158**)

ESCI Indexed and Other Journals' Publications

- [30]. **M. Farhan**, Muhammad, A., Muhammad, M., Iqbal, & Ali, A. (2016). Assessment Model to Measure the Performance and Behavior in eLearning based Universities. Technical Journal, University of Engineering and Technology Taxila, Pakistan, 21(3), 85-96. (HEC HJRS Y)
- [31]. Osama Rizwan, Rana M. Amir Latif, **M. Farhan**, Muhammad Shoaib, 23-June-2019, A Smart Technique to Forecast Karachi Stock Market Share-Values, International Journal of Space-Based and Situated Computing, ID: IJSSC_246981 <https://www.inderscience.com/jhome.php?jcode=ijssc> (HEC HJRS Y)
- [32]. Laiqa Binte Imran, Rana M. Amir Latif, **M. Farhan**, Tayyaba Tariq (2019), Real-Time Simulation of Smart Lightning System in Smart City, International Journal of Space-Based And Situated Computing by InderScience, 9(2), 2019, pp. 90-98, <https://doi.org/10.1504/ijssc.2019.104219> (HEC HJRS Y)
- [33]. Zill-e-Subhan, Robail Yasrab, **M. Farhan**, Abdul Qahhar Mohsin, Muhammad Munwar Iqbal (2013), Support for Goal Oriented Requirements Engineering in Elastic Cloud Applications, International Journal of Computer Science and Network Security (IJCSNS), VOL.13 No.4, April 2013, pp:74-81 (HEC HJRS Y)
- [34]. Farhan Ullah, **M. Farhan**, K. R. Malik, M. M. Iqbal, M. Ibrar, Z. Rahman (2017), Statistical analysis approach to determine language quality of students' responses using WorldNet similarity techniques, The Nucleus, 54, No. 4 (2017), pp: 258-265 (HEC HJRS Y)
- [35]. Raiha Tallat, **M. Farhan**, Muhammad Munwar Iqbal, Yasir Saleem, A Novel Evaluation of Motif Detection in Protein Sequences of p53 and DNA Sequences of RHAG Gene using Big Data Analytic Techniques, Technical Journal, University of Engineering and Technology Taxila, Pakistan, Vol. 25 No. 2-2020, pp. 110-120, <http://tj.uettaxila.edu.pk/index.php/technical-journal> (HEC HJRS Y)
- [36]. Rana M. Amir Latif, **M. Farhan**, Farah Ijaz, Muhammad Umer, Syed Umair Aslam Shah, A Smart Methodology for Analyzing Chronic Kidney Disease Detection, Journal of Natural & Applied Sciences Pakistan, Vol 1 (2), 2019 pp 206-216 <http://jnasp.kinnaird.edu.pk/> (HEC HJRS Y)
- [37]. **M. Farhan**, Adeel Ahmed, Muhammad Ramzan, Syed Raza Bashir, Muhammad Munwar Iqbal, Amjad Farooq (2012), Reusable Open Source Software Component's Life Cycle Management, International Journal of Multidisciplinary Sciences and Engineering (IJMSE), 3(4), April 2012, pp: 34-37
- [38]. **M. Farhan**, S. S. Muhammad, M. Anwar, A. Q. Mohsin (2011), CPECAEE: Collaboration Platform for Extra Curricular Activities in the E-learning Environment, International Journal of Multidisciplinary Sciences and Engineering (IJMSE), 2(6), September 2011, pp: 1-4
- [39]. **M. Farhan**, Kaleem Razzaq Malik, Amjad Farooq (2011), CCAMS: A Tool for Co-Curricular Activities Management, The Journal of Computing, Volume 3, Issue 8, August 2011, pp: 39-42
- [40]. M. Munwar Iqbal, **M. Farhan**, Yasir Saleem, Muhammad Aslam (2014), Automated Web-Bot Implementation using Machine Learning Techniques in eLearning Paradigm, J. Appl. Environ. Biol. Sci., 4(7S)90-98, 2014, TextRoad Publication (ISI Indexed)

Proceedings in the Conferences

- [1]. **M. Farhan**, Abdul Karim, **Rana M. Amir Latif**, Tausif Anjum, A Methodology for Software Cost Estimation Using UML Formulation, Academics World 525th International Conference on Management and Information Technology (ICMIT) at Medina, Saudi Arabia, <http://www.academicsworld.org/conference2019/saudi-arabia/1/icmit/>
- [2]. **M. Farhan**, Muhammad Aslam (2016), Student learning experience and teaching performance using machine prediction algorithms, 3rd e-Learning and Distance Education Conference: Evolution, Challenges & Solutions, 14-15 March 2016, Virtual University of Pakistan, Lahore, Pakistan
- [3]. **M. Farhan** (2015), A methodology to enrich student-teacher interaction in eLearning, The 30th ACM/SIGAPP Symposium on Applied Computing, April 13-17, 2015, University of Salamanca, Salamanca, Spain
- [4]. **M. Farhan**, M. Aslam, M. Munwar Iqbal, Muhammad Aslam, Ana Maria Martinez Enriquez, Amjad Farooq, Saad Tanveer, A Pedro Mejia (2012), Automated Reply to Students' Queries in e-Learning Environment using Web-BOT, 11th Mexican International Conference on Artificial Intelligence, October 27 - November 4, 2012, San Luis Potosí, Mexico, IEEE Computer Society's Conference Publishing Services

- [5]. **M. Farhan**, Rana M. Amir Latif, Muhammad Umer, Syed Umair Aslam Shah (2018), Chronic kidney disease detection by analyzing medical datasets with machine learning algorithms, ISER- 454th International Conference on Science, Health and Medicine (ICSHM-2018), Medina, Saudi Arabia 15th - 16th October, 2018.
- [6]. **M. Farhan**, Abdul Karim, Rana M. Amir Latif, Tausif Anjum (2018), Requirement Elicitation in Small and Medium-Sized Software Projects, International Conference on Science, Engineering & Technology – ICSET, Jeddah, Saudi Arabia 14th - 15th October 2018
- [7]. Rana M. Amir Latif, **M. Farhan**, Laiqa-Binte-Imran, Syed Umair Aslam Shah, Tayyaba Tariq and Hassan Raza, Real-Time Simulation of IOT Based Smart Home System and Services Using RFID, ICCIS 2019: International Conference on Computing & Information Sciences Main Campus, Korangi Creek, Near PAF-Base, Karachi, Pakistan Karachi, Pakistan, April 3-4, 2019 <http://iccis.pafkiet.edu.pk>
- [8]. Laiqa Binte Imran, **M. Farhan**, Rana M. Amir Latif, Ahsan Rafiq (2018), Design of an IoT based Warfare Car Robot using Sensor Network Connectivity, 2nd International Conference on Future Networks and Distributed Systems (ICFNDS 2018), June 26-27, 2018, Middle East University Amman Jordan, <https://doi.org/10.1145/3231053.3231121>
<https://dl.acm.org/citation.cfm?id=3231121>
- [9]. Rana M. Amir Latif, M. Talha Abdullah, Syed Umair Aslam Shah, **M. Farhan** and Farah Ijaz (2018), Data Scraping From Google Play Store and Visualization of Its Content for Analytics, Track Computing, 2nd International Conference On Communication, Computing, Mathematics & Engineering And Technology (ICOMET 19) on 30-31 January 2019 In Sukkur Institute of Business Administration, Airport Road Sukkur, Sindh Pakistan <http://icomet.iba-suk.edu.pk/>
- [10]. Muhammad Munwar Iqbal, **M. Farhan**, Rana M. Amir Latif, Taha Bhatti, Syed Umair Aslam Shah, Osama Rizwan, Blockchain Based Secure Academic Record Management Technique for Learners, Track Emerging Trends and Challenges in Educational Assessment, National Conference on Emerging Trends and Challenges in Educational Assessment (NCETCEA- 2018)
- [11]. Rana M. Amir Latif, Muhammad Umer, Tayyaba Tariq, **M. Farhan**, Osama Rizwan and Ghazanfar Ali (2018), A Smart Methodology for Analyzing Secure E-Banking and E-Commerce Websites, Track Cyber Security & Assurance Technologies, 16th International BHURBAN Conference on Applied Sciences and Technology (IBCAST) <http://www.ibcast.org.pk/>
- [12]. Rana M. Amir Latif, Osama Rizwan, Farah Ijaz, Syed Umair Aslam Shah and **M. Farhan** (2018), Blockchain Framework for Retail Level Industry by Using A Supply Chain Rules and Regulation, Track Information Security, 2nd International Conference on Communication, Computing and Digital Systems (C-CODE' 19) on 6 – 7 March 2019 in Islamabad. <https://ccode.bahria.edu.pk/>
- [13]. Raiha Tallat, Rana M. Amir Latif, **M. Farhan**, Ahmad Zaheer, Syed Umair Aslam Shah and Farah Ijaz (2018) Empirical Evaluation of Visual Graph Analytic Techniques, Track Computing, 2nd International Conference on Communication, Computing and Digital Systems (C-CODE' 19) on 6 – 7 March 2019 in Islamabad. <https://ccode.bahria.edu.pk/>
- [14]. Tayyaba Tariq, Rana M. Amir Latif, **M. Farhan**, Adil Abbas and Farah Ijaz (2018) A Smart Heartbeat Analytics System Using Wearable Device, Track Computing, 2nd International Conference on Communication, Computing and Digital Systems (C-CODE' 19) on 6 – 7 March 2019 in Islamabad. <https://ccode.bahria.edu.pk/>
- [15]. Abdul Karim, Rana M. Amir Latif, **M. Farhan** and Muhammad Iqbal Younis, Osama Rizwan and Yawar Abbas Abid, Software Quality Assurance Practices in Mobile Application Environment, ICCIS 2019: International Conference on Computing & Information Sciences Main Campus, Korangi Creek, Near PAF-Base, Karachi, Pakistan Karachi, Pakistan, April 3-4, 2019 <http://iccis.pafkiet.edu.pk>
- [16]. Syed Umair Aslam Shah, Rana M. Amir Latif, Osama Rizwan, **M. Farhan**, Yawar Abbas Abid and M. Imran Ashiq, A Blockchain Based Framework for Healthcare Transformation, KINNAIRD'S 1ST International Conference on Science, Technology and Innovation April 2nd-4th, 2019 <http://oric.kinnaird.edu.pk/coming-attractions/>

- [17]. Rana M. Amir Latif, Muhammad Umer, **M. Farhan**, Syed Umair Aslam Shah, and Farah Ijaz, A Smart Methodology for Analyzing Chronic Kidney Disease Detection, KINNAIRD'S 1ST International Conference on Science, Technology and Innovation April 2nd-4th, 2019 <http://oric.kinnaird.edu.pk/coming-attractions/>
- [18]. Khadija Khaliq, Ayesha Khaliq, Martinez Enriquez A. Muhammad Aslam, **M. Farhan** and Rana M. Amir Latif, Using Vessel's Location Map and Frangi Enhancement Filter an Efficient Retinal Vessel Segmentation, KINNAIRD'S 1ST International Conference on Science, Technology and Innovation April 2nd-4th, 2019 <http://oric.kinnaird.edu.pk/coming-attractions/>
- [19]. Rana M. Amir Latif, Abdul karim and **M. Farhan**, Requirement Elicitation in Small and Medium Sized Software Project, INTELLECT 2019: International Conference on Latest Trends in Electrical Engineering & Computing Technologies. 13-14 November 2019, Karachi, Pakistan <http://intellect.pafkiet.edu.pk/index.html>
- [20]. Rana M. Amir Latif, Raiha Tallat, **M. Farhan** and Ahmad Zaheer, Hospital-Scale Chest X-Ray Database Visualization Using Rawgraph Technique, INTELLECT 2019: International Conference on Latest Trends in Electrical Engineering & Computing Technologies. 13-14 November 2019, Karachi, Pakistan <http://intellect.pafkiet.edu.pk/index.html>
- [21]. Kashif Manzoor, Syed Umair Aslam Shah, Rana M. Amir Latif, **M. Farhan** and Mazhar Sadiq (2019), An Energy Efficient and Optimal Route Selection Protocol in Underwater Wireless Sensor Networks, Underwater Technologies, 17th International BHURBAN Conference on Applied Sciences and Technology (IBCAST)<http://www.ibcast.org.pk/>
- [22]. Syed Umair Aslam Shah, M. Kashif Manzoor, Rana M. Amir Latif, **M. Farhan** and M. Imran Ashiq (2019), Localization and Angle Based Distributed Routing Protocol in Underwater Sensor Networks, Underwater Technologies, 17th International BHURBAN Conference on Applied Sciences and Technology (IBCAST)<http://www.ibcast.org.pk/>
- [23]. Syed Umair Aslam Shah, M. Kashif Manzoor, Rana M. Amir Latif, **M. Farhan** and M. Imran Ashiq (2019), A Novel Routing Protocol Based on Congruent Gravity Value for Underwater Wireless Sensor Networks, Adaptive Systems, Networks, IOT & Cloud Computing, 17th International Conference on Frontiers of Information Technology (FIT'19) <http://fit.edu.pk/>
- [24]. Kashif Manzoor, Syed Umair Aslam Shah, Rana M. Amir Latif, **M. Farhan**, Mazhar Sadiq and Osama Rizwan (2019), An Energy Efficient Routing Protocol Via Angle Based Flooding Zone in Underwater Wireless Sensor Networks, IOT & Cloud Computing, 17th International Conference on Frontiers of Information Technology (FIT'19) <http://fit.edu.pk/>
- [25]. Rana M. Amir Latif, Laiqa-Binte-Imran, **M. Farhan**, Mohamed Jaward Bah, Ghazanfar Ali and Yawar Abbas Abid (2019), Real-Time Simulation of IOT Based Smart Home Live Mirror Using WSN, Adaptive Systems, Networks, IOT & Cloud Computing, 17th International Conference on Frontiers of Information Technology (FIT'19) <http://fit.edu.pk/>
- [26]. Osama Rizwan, Rana M. Amir Latif, M. Kashif Manzoor and **M. Farhan** (2019), Boosting Deep Learning Karachi Stock Predication with Generative Adversarial Networks, Control & Signal Processing, 17th International BHURBAN Conference on Applied Sciences and Technology (IBCAST)<http://www.ibcast.org.pk/>
- [27]. M. Munwar Iqbal, **M. Farhan**, Yasir Saleem, Muhammad Aslam (2014), Automated Web-Bot Implementation using Machine Learning Techniques in eLearning Paradigm, 2nd International Conference on Computational & Social Science, Recep Tayyip Erdogan University, Rize, Turkey, pp 1090-1098
- [28]. Raiha Tallat, Rana M. Amir Latif, Ghazanfar Ali, Ahmad Nawaz Zaheer, **M. Farhan** and Syed Umair Aslam Shah (2018), Visualization and Analytics of Biological Data by Using Different Tools and Techniques, Track: Biomedical Sciences, 16th International Bhurban Conference on Applied Sciences and Technology (IBCAST), Islamabad, Pakistan www.ibcast.org.pk

Books

- [1]. Rana M. Amir Latif, **Muhammad Farhan**, Khalid Hussain, Noor Zaman Jhanjhi, Mamoonah Humayun (2020), A Smart Assessment Methodology to Measure and Analyze Google Play Store, Eliva Press SRL Chisinau, Moldova, Europe, <https://www.elivapress.com/>
- [2]. Kaleem Razzaq Malik, **Muhammad Farhan**, Bi-Directional Data Transformation Methodology Emerging Research and Opportunities, Eliva Press SRL Chisinau, Moldova, Europe, <https://www.elivapress.com/>
- [3]. Muhammad Umer, Rana M. Amir Latif, **Muhammad Farhan**, Noor Zaman Jhanjhi, Mamoonah Humayun, Syed Jawad Hussain, A Smart Agriculture Land Suitability Detection Model Using Machine Learning with Google Earth Engine, Eliva Press (October 15, 2020) <https://www.amazon.com/dp/1636480128>

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