

Dr. Waheed Iqbal

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PUCIT, University of the Punjab,
Lahore, Pakistan

Current Position Assistant Professor, PUCIT, University of the Punjab, Lahore, Pakistan.

Research Interests Cloud Computing, Distributed Systems, Big Data, and Machine Learning.

Education **Asian Institute of Technology, Thailand**
Ph.D., Computer Science, June 2009 – December 2012.
Thesis: Minimalistic adaptive resource management for multi-tier Web applications hosted on cloud.

Asian Institute of Technology, Thailand and Technical University Catalonia, Spain

M.Eng., Computer Science, May 2009.
Thesis: Service level agreement driven adaptive resource management for Web applications on heterogeneous compute clouds.

Bahria University Karachi Campus, Pakistan

B.S., Software Engineering, 2005.
Final Year Project: Parallel analysis and interactive visualization of proteins.

Honors, Awards, Grants Best paper award at FiCloud, 2014.
IEEE TCPP student travel grant, 2012.
SOSP student scholarship, 2011.
Google Summer of Code student grant, 2010.
IEEE TCSC student travel grant, 2010.
CSIM, AIT department travel grant, 2010.
HEC Pakistan MS-leading to Ph.D scholarship, 2007–2012.
Bahria University silver medal with cum laude honors, 2005.
Bahria University first place in final year projects competition, 2005.

Experience **Assistant Professor** January 2014 – To Date
PUCIT, University of the Punjab, Lahore, Pakistan.

Postdoc Researcher September 2017 – October 2018
Qatar University, Doha, Qatar.
Conducted research activities for a project titled “Economic Models for QoS Optimization of Composite Cloud Services“ funded by Qatar National Research Fund.

Assistant Professor January 2013 – December 2013
Center for Advance Studies (CASE) Islamabad, Pakistan.

Technical Consultant April 2012 – Dec 2012
Regional Integrated Multi-Hazard Early Warning System for Africa and Asia (RIMES), Thailand.
Developed scalable agriculture expert advisory system and established infrastructure for high performance computing facility to run weather simulations.

Google Summer of Code May 2010 – August 2010
Developed a component named “oneservice” for OpenNebula that allows to deploy and manage the life-cycle of clustered services hosted on OpenNebula-based clouds.

Taught Courses
Cloud Computing and Big Data, MPhil and Ph.D.
Distributed Computing Systems, MPhil and Ph.D.
Design and Analysis of Algorithms, BS and MSc.
Data Structures, BS and MSc.
Operating System, BS and MSc.
Introduction to Computing, BS and MSc.

Technical Expertise **Cloud Middlewares and Services:** Eucalyptus, OpenNebula, Amazon Web Services, Microsoft Azure.

Big Data Tools: Hadoop, Prediction.IO, Kafka, Spark, HBase, Elastic-Search.

Virtualization: Xen hypervisor, Dockers, libvirt.

Programming Languages: C, Java, Python, SQL, MPI, OpenMP.

Database Management Systems: MySQL, PostgreSQL, SQL Server, HBase, Cassandra, MongoDB, AWS DynamoDB.

- Publications** **Iqbal, W.**, Abdullah, M., Erradi, A., and Mahmood, A.: Predictive Auto-scaling of Multi-tier Applications Hosted on Performance Varying Cloud Virtual Machines. In *IEEE Transaction on Cloud Computing*, 2019 ([Impact Factor: 5.9](#)).
- Baig, S., **Iqbal, W.**, Berral, J.L, Erradi, A., and Carrera, D.: Adaptive Prediction Models for Data Center Resource Utilization Estimation. In *IEEE Transactions on Network and Service Management*, 2019 ([Impact Factor: 4.6](#)).
- Erradi, A., **Iqbal, W.**, and Mahmood, A.: Web Application Resource Requirements Estimation based on the Workload Latent Features. In *IEEE Transaction on Service Computing*, 2019 ([Impact Factor: 4.4](#)).
- Baig, S, **Iqbal, W.**, Berral, J.L, and Carrera,D.:Adaptive sliding windows for improved estimation of data center resource utilization. In *Future Generation Computer Systems*, (2019) ([Impact Factor: 5.7](#)).
- Baig, S, **Iqbal, W.**, Berral, J.L, Erradi, A., and Carrera,D.: Real-time Data Center’s Telemetry Reduction and Reconstruction Using Markov Chain Models. In *IEEE Systems Journal*, 2019 ([Impact Factor: 4.3](#)).
- Iqbal, B., **Iqbal, W.**, Khan, N., Erradi, A., and Mahmood, A.: Canny Edge Detection and Hough Transform for High Resolution Video Streams Using Hadoop and Spark. In *Cluster Computing Journal*, 2019 ([Impact Factor: 1.6](#)).
- Abdullah, M., **Iqbal, W.**, and Erradi, A.: Unsupervised Learning Approach for Web Application Auto-Decomposition into Microservices. In *Journal of Systems and Software*, 151: 243–257, 2019 ([Impact Factor: 2.4](#)).
- Iqbal, W.**, Erradi, A., and Mahmood, A.: Dynamic Workload Patterns Prediction for Proactive Auto-scaling of Web Applications. In *Journal of Network and Computer Applications (JNCA)*, 124: 94–107, 2018 ([Impact Factor: 3.99](#)).
- Abdullah, M., **Iqbal, W.**, Erradi, A.: Efficient Learning of Predictive Autoscaling Policies for Cloud-hosted Microservices. Under Submission at *Journal of Network and Computer Applications (JNCA)* *27 Mar, 2019*.
- Iqbal, W.**, Malik, I.W., Nawaz, Z., and Bukhari, F.: Big Data Full-Text Search Index Minimization Using Text Summarization. Under Review at *Journal of Knowledge and Information System*, *24 Jun 2018*.

**Publications
(Cont.)**

Abdullah, M., Khan, S.A., Alenezi, M., Almustafa, K., and **Iqbal, W.**: Application Centric Virtual Machine Placements to Minimize Bandwidth Utilization in Datacenters. In *Intelligent Automation and Soft Computing Journal*, 1—14, (2018) ([Impact Factor: 0.65](#)).

Iqbal, W., Dailey, M.N., and Carrera, D.: Unsupervised Learning of Dynamic Resource Provisioning Policies for Multi-tier Web Applications in the Cloud. In *IEEE Systems Journal*, 10(4), 1435-1446, 2016 ([Impact Factor: 4.33](#)).

Khaliq, S., **Iqbal, W.**, Bukhari, F., and Malik, K.: Clustering Urdu News Using Headlines. In *Proceedings of 6th International Conference on Language and Technology 16 (CLT16)*, Lahore, Pakistan.

Ali, M., Khalid, S., Saleemi, H.M, **Iqbal, W.**, Ali, A. and Naqvi, G.: A Rule based Stemming Method for Multilingual Urdu Text. *International Journal of Computer Applications* 134(8):10-18, 2016.

Idrees, M., **Iqbal, W.**, Bazaz, S.A., and Bukhari, F.: An Efficient Greedy Approach for Online Patients to Doctors Assignment in a Telemedicine System. *International Journal of Computer Science and Network Security*, 16(4), 1–8, 2016.

Haider, W., **Iqbal, W.**, Bokhari, F., and Faisal, B.: On Providing Response Time Guarantees to a Cloud-hosted Telemedicine Web Service. In *Proceedings of 6th International Conference on Cloud Computing (CloudComp 2015)*, Daejeon, South Korea.

Nisar, A., **Iqbal, W.**, Bokhari, F., and Faisal, B.: Hybrid Auto-scaling of Multi-tier Web Applications: A Case of Using Amazon Public Cloud. In *Proceedings of 4th International Conference on Internet Applications, Protocols, and Services (NetApps 2015)*, Cyberjaya, Malaysia.

Khalid, S., Bokhari, F., **Iqbal, W.**, and Irshad, S.: Performance Evaluation of TCP Incast Protocols in Data Center Network. In *Proceedings of 4th International Conference on Internet Applications, Protocols, and Services (NetApps 2015)*, Cyberjaya, Malaysia.

Shahzad, F., **Iqbal, W.**, and Bokhari, F.: On the Use of CryptDB for Securing Electronic Health Data in the Cloud: A Performance Study. In *Proceedings of 18th International Conference on E-Health Networking, Application and Services (HealthCom 2015)*, Boston, USA.

**Publications
(Cont.)**

Iqbal, W., Dailey, M.N., and Carrera, D.: Low Cost Quality Aware Multi-tier Application Hosting on the Amazon Cloud. In International Conference on Future Internet of Things and Cloud (FiCloud 2014), Barcelona, Spain. [[Best Paper Awarded](#)]

Iqbal, W. (2012): Minimalistic Adaptive Resource Management for Multi-tier Applications Hosted on Clouds. Poster in IEEE 26th Parallel and Distributed Processing Symposium (IPDPS), pp.2546–2549.

Iqbal, W., Dailey, M.N., Carrera, D., and Janecek, P. (2011), Adaptive resource provisioning for read intensive multi-tier applications in the cloud. In Future Generation Computer Systems (FGCS), 27(6): 871–879, June 2011 ([Impact Factor: 4.63](#)).

Iqbal, W., Dailey, M.N., and Carrera, D. (2011): Policy Learning for Adaptive Allocation of Cloud Resources to Multi-tier Web Applications. Poster in Symposium on Operating Systems Principles (SOSP 2011), Portugal.

Iqbal, W., Dailey, M.N., and Carrera, D. (2011): Black-Box Approach to Capacity Identification for Multi-Tier Applications Hosted on Virtualized Platforms. In International Conference on Cloud and Service Computing (CSC 2011), Hongkong.

Iqbal, W., Dailey, M.N., Carrera, D., and Janecek, P. (2010), SLA-driven Automatic Bottleneck Detection and Resolution for Read Intensive Multi-tier Applications Hosted on a Cloud. In International Conference on Grid and Pervasive Computing (GPC 2010), Lecture Notes in Computer Science vol. 6104, Springer, pp. 37–46.

Iqbal, W., Dailey, M.N., and Carrera, D. (2010), SLA-driven Dynamic Resource Management for Multi-tier Web Applications. In 10th IEEE/ACM International Conference on Cluster, Cloud and Grid Computing (CCGrid 2010), pp. 832–837.

Iqbal, W., Dailey, M.N., Ali, I., Janecek, P., and Carrera, D. (2010), Adaptive Resource Allocation for Back-end Mashup Applications on a Heterogeneous Private Cloud. In International Conference on Electrical Engineering/Electronics Computer Telecommunications and Information Technology (ECTI-CON 2010), pp. 317–321.

Iqbal, W., Dailey, M.N., and Carrera, D. (2009), SLA-driven Adaptive Resource Management for Web Applications on a Heterogeneous Compute Cloud. In International Conference on Cloud Computing (CloudCom 2009), Lecture Notes in Computer Science vol. 5931, Springer, pp. 243–253.

Manuscripts Under Submission Abdullah, M., **Iqbal, W.**, Erradi, A.: Burst-Aware Predictive Autoscaling for Containerized Microservices. *Submitted at IEEE Transaction on Service Computing.*

Bahadori, K., Baig, S., Torre, A., **Iqbal, W.**, Vardanegg, T., Berral, J.L., Carrera, D.: Towards Modeling Traffic Data on Edge Infrastructures using Distributed Deep Learning. *Submitted at Future Generation Computer Systems.*

Abdullah, M., **Iqbal, W.**, Erradi, A.: Predictive Autoscaling for Microservices of Industrial Applications in Fog Computing. *Submitted at IEEE Systems Journal.*

Abdullah, M., **Iqbal, W.**, Bukhari, F.: Adaptive CPU Allocation for Minimizing Completion Time of Containerized Applications. *Submitted at NSDI 2020.*

Citations Count **281** Scopus citations as of 13 April 2019.

530 Google Scholar citations as of 28 October 2019.

Academic Grants 2014–2015, Microsoft Azure Educator Grant Award, **USD 42,400** for Cloud Computing and Big Data graduate course.

2014–2015, Amazon Web Services (AWS) Education Grant, **USD 4,700** for Cloud Computing and Big Data graduate course.