Muhammad Usman Iftikhar

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Career Objective

With a double Doctoral degree in Computer Sciences and a deep interest in Big data and cloud based technologies, I am seeking to secure a challenging position that utilizes my academic knowledge and work experiences, while allowing me the opportunity to grow professionally.

Work Experience

Sep 2018-Present **Data Engineer**, Viaplay AB, Stockholm, Sweden
Responsibilities: Currently I am working as a Big data engineer. My responsibilities are the following: 1) build large-scale ETL pipelines for batch data of various projects, 2) test, maintain, optimize, scale, and iteratively improve such pipelines, and 3) work together with product intelligence and reporting teams, enable them to make the most out of the available data.
Language & Tools: Java Spark, Scala, Python, Amazon AWS & EMR, Airflow, Jenkins, Exasol, Tableau, Databricks, Google Cloud API, Apache Hive, Livy, & Hue

Jan 2018-July 2018 **Postdoctoral Researcher**, Linnaeus University, Växjö, Sweden
Responsibilities: I researched on using machine learning and formal methods at runtime in self-adaptive systems to achieve their quality goals. Furthermore, I taught and supervised students for their projects.
Language & Tools: Java, Scikit-learn, Python, and R

Sep 09-Jan 11 **Senior Developer** (Online), Net3000.ca, Canada
Responsibilities: I was hired as an online web developer (full-time) at Net3000.ca. While doing this job, I also continued my Master studies at Linnaeus University, Sweden. I was responsible for design, development, and maintenance of many web applications.
Language & Tools: VB.Net, ASP.Net, Ajax, JQuery, HTML and SQL

May 08-Aug 09 **Software Engineer**, Ayesoft (Pvt.) Limited, Pakistan
Responsibilities: At Ayesoft Pvt. Ltd., I worked on many projects. One of the main projects was to work on Nero Backit Up 5.0 in which I was involved in implementing graphical user interface with Windows Presentation Foundation (WPF). Other Projects were the following:
Ayesoft ERP - Web Invoicing System - Ayesoft Time and Attendance System
Language & Tools: C.Net, ASP.Net, WPF, SilverLight, SVN, Perforce, Ajax, JQuery, HTML and SQL

Sep 07-Apr 08 **Jr. Software Engineer**, Ayesoft (Pvt.) Limited, Pakistan
Responsibilities: As a Junior Software Engineer at Airsoft Pvt. Ltd., I worked on Entertainment Center project. The Entertainment Center was a Universal Plug and Play (UPnP) media server, which could easily share media content such as movies and pictures from a computer to home devices that support UPnP, such as Smart TVs, Play Station, etc. I design and develop this project since it was my Master's project as well in Quaid-i-Azam University, Islamabad.
Language & Tools: ANSI C was used to make the project cross-platform

Education

Feb 2012-Dec 2017 **PhD in Computer Science**, Linnaeus University, Sweden & KU Leuven, Belgium
Description: I received a double doctoral degree from KU Leuven, Belgium and Linnaeus University, Sweden. My research focused on providing quality guarantees in self-adaptive systems using formal methods. I contributed with an approach called ActivFORMS that use executable formal

models and statistical model checking to provide formal guarantees in self-adaptive systems. During Ph.D. I worked on many applications. I created a model interpreter that can execute a formal model of timed automata according to its formal semantics. Also built many simulators such as a simple warehouse robotic system, a service-based Tele-assistance system, and an Internet of Things based simulator. I also worked with a company VersaSense on an Internet of Things security application deployed at KU Leuven, Belgium.
Language & Tools: Java, Python, R, JavaFX and MySQL

2009-2011 **MS in Software Technology**, Linnaeus University, Sweden
Description: During my Master studies at Linnaeus University, I did a full-time job at Net3000.ca as well. I got VG (very good) grade in all courses. The important courses were the following: Compiler Construction, Programming Language Constructs, Software from Components, Applied Program Analysis, and Object Oriented Programming (C). My thesis title was "Java Code Transformation for Parallelization", in which I contributed with a comparison of existing Java parallelization APIs like JOMP, Parallel Java, Deterministic Parallel Java, JConqurr, and JaMP. Furthermore, I contributed to JaMP API with adding an option in the compiler to get the parallel source code. I also have created an eclipse plug-in to support design-time syntax checking of JaMP directives too.
Language & Tools: Java, C.Net, Antlr, and Eclipse SDK

2006-2008 **MSc in Computer Science**, Quaid-I-Azam University, Pakistan
Description: Quaid-i-Azam university is one of the top-ranked university in Pakistan. Major courses which I studied during this degree are the following: Software Engineering, Database Design, Data Structures and Algorithms, Analysis and Design of Algorithms, and Operating Systems. I got 3.5/4 CGPA and received 8 A-grades, 8 B-grades, and 2 C-grades out of the 18 courses I studied here. My thesis project was Entertainment Center, which was funded by Ayesoft Pvt. Ltd.
Language & Tools: C, C++, and Java

PhD Thesis

Title: A Model-Based Approach to Engineer Self-Adaptive Systems with Guarantees
Description: Self-adaptation is typically realized with a feedback loop that consists of monitor, analysis, plan, and execution functions. To guarantee that the adaptation goals are met at runtime, this thesis presents an approach called ActivFORMS (Active FORmal Models for Self-adaptation). ActivFORMS is a formally founded model-driven approach for engineering self-adaptive systems that focus on two types of guarantees: (1) functional correctness of the feedback loop, and (2) guaranteeing the adaptation goals in an efficient manner. ActivFORMS achieves functional correctness by direct execution of formal models of the feedback loop using a model interpreter. To efficiently provide guarantees for the adaptation goals (with a required level of confidence) ActivFORMS applies statistical model checking at runtime. ActivFORMS supports on the fly changes of adaptation goals and updates of the feedback loop models that meet the changed goals. To demonstrate the applicability and effectiveness of the approach, we applied ActivFORMS in several domains: warehouse transportation, oceanic surveillance, tele assistance, and IoT building security monitoring.

Specialized Courses

2018 Programming and Software Systems: Logic and Learning, Oxford University, UK
2014a Rapid Robotics: Autonomous Systems with Open Source Software, MIT Professional Education Short Programs, Massachusetts Institute of Technology, USA
2014b Executable Software Models. 14th International School on Formal Methods for the Design of Computer, Communication and Software Systems. Centro Residenziale Universitario di Bertinoro, Italy.
2014c Case Studies in Software Engineering, Lund University, Sweden
2013 Engineering Adaptive Software Systems (EASSy), Shonan Village Center, Japan
2012 Quantitative Model Checking, ARTIST Winter School, IT University, Copenhagen

List of Publications

[Google scholar citations until 20th of March, 2019: 481]

2018 Calinescu, R., Weyns, D., Gerasimou, S., Iftikhar, M. U., et al. Entrust: Engineering trustworthy self-adaptive software with dynamic assurance cases. In *Int. Conf. on Soft. Eng. (ICSE)*

2018 Van Der Donckt, M. J., Weyns, D., Iftikhar, M. U., and Singh, R. K. Cost-benefit analysis at runtime for self-adaptive systems applied to an internet of things application

2017 Algabroun, H., Iftikhar, M. U., et al. Maintenance 4.0 framework using self-adaptive software architecture. In *Proceedings of 2nd International Conference on Maintenance Engineering (IncoME)*

2017 Iftikhar, M. U. A model-based approach to engineer self-adaptive systems with guarantees

2017 Iftikhar, M. U., and Weyns, D. Activforms: A runtime environment for architecture-based adaptation with guarantees. In *Software Architecture Workshops (ICSAW)*

2017 Iftikhar, M. U. o. Deltaiot: a self-adaptive internet of things exemplar. In *Software Engineering for Adaptive and Self-Managing Systems (SEAMS)*

2017 Calinescu, R., Weyns, D., Gerasimou, S., Iftikhar, M. U., et al. Engineering trustworthy self-adaptive software with dynamic assurance cases. *IEEE Transactions on Software Engineering (TSE)*

2016 Iftikhar, M. U., et al. Towards runtime statistical model checking for self-adaptive systems

2016 Iftikhar, M. U., Lundberg, J., and Weyns, D. A model interpreter for timed automata. In *International Symposium on Leveraging Applications of Formal Methods (ISoLA)*

2016 Abbas, N., Andersson, J., Iftikhar, M. U., and Weyns, D. Rigorous architectural reasoning for self-adaptive software systems. In *Software Architectures (QRASA)*

2016 Weyns, D., and Iftikhar, M. U. Model-based simulation at runtime for self-adaptive systems. In *Autonomic Computing (ICAC)*

2015 Shevtsov, S., Iftikhar, M. U., et al. Simca vs activforms: comparing control-and architecture-based adaptation on the tas exemplar. In *1st Int. Workshop on Control Theory for Soft. Eng. (CTSE)*

2014 Iftikhar, M. U., and Weyns, D. Assuring system goals under uncertainty with active formal models of self-adaptation. In *36th International Conference on Software Engineering (ICSE)*

2014 Iftikhar, M. U., and Weyns, D. Activforms: Active formal models for self-adaptation. In *9th International Symposium on Software Engineering for Adaptive and Self-Managing Systems (SEAMS)*

2013 Weyns, D., Iftikhar, M. U., and Söderlund, J. Do external feedback loops improve the design of self-adaptive systems?: a controlled experiment. In *8th International Symposium on Software Engineering for Adaptive and Self-Managing Systems (SEAMS)*

2012 Iftikhar, M. U., and Weyns, D. Model checking of self-adaptive behaviors in a multi-agent system for traffic monitoring. In *European Workshop on Multi-Agent Systems (EUMAS)*

2012 Weyns, D., Iftikhar, M. U., et al. A survey of formal methods in self-adaptive systems. In *5th International C* Conference on Computer Science and Software Engineering (C3S2E)*

2012 Iftikhar, M. U., and Weyns, D. A case study on formal verification of self-adaptive behaviors in a decentralized system

2012 Weyns, D., Iftikhar, M. U., Malek, S., and Andersson, J. Claims and supporting evidence for self-adaptive systems: A literature study. In *7th International Symposium on Software Engineering for Adaptive and Self-Managing Systems (SEAMS)*

2011 Iftikhar, M. U. Java code transformation for parallelization, 2011