Saeed Fathollahzadeh

Curriculum Vitae

I am a Research Assistant in Database Systems Research Group at the Faculty of Computer Science of the Free University of Bozen-Bolzano. Previously, I was a Research Staff Member in Distributed Systems Lab at Computer Engineering Department, Iran University of Science and Technology.
I received master degree in computer engineering specially software engineering from Iran University of Science and Technology[1] in 2014. I'm currently working on time series data processing applications. Also, I'm working on a novel distributed multi-steps stream processing approach that utilizes message passing and event processing engines deployed on Event Processing Network.

Contact Info

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Google Scholar: https://scholar.google.com/citations?user=zIODCOoAAAAJ&hl=en

Education

- **M.Sc.** in **Software Engineering, Iran University of Science and Technology** — Tehran, Iran
  Thesis: *A Middleware for Distributed Processing of Complex Events* — *2012–2014*
  Major: Operations research — **Supervisor**: Prof. Mohsen Sharifi
  Gpa: *16.5/20*
- **B.Sc.** in **Software Engineering, University College of Daneshvaran** — Tabriz, Iran
  Project: *Design and Implementation a Hospital Software with BPM Approach* — *2007–2009*
  Major: Operations research — **Advisors**: Prof. Ayaz Isazadeh and Dr. Javad Mehri
  Gpa: *17.66/20*
- **A.Sc.** in **Software Engineering, Islamic Azad University of Malekan** — Malekan, Iran
  Project: *Design and Implementation an Agency Software with BPM Approach* — *2005–2007*
  Major: Operations research — **Advisor**: Dr. Babak Nariman Jahan
  Gpa: *18.95/20*

Work Experience

- **Free University of Bolzano, Faculty of Computer Science** — Bolzano, Italy
  Research Assistant at Database Systems Research Group (https://dbs.inf.unibz.it/) — *March 2020–Present*
  - Working on *"Efficient and Scalable Solutions for Time Series Analysis"*
- **Bimito (https://bimito.com)** — Tehran, Iran
  Director of Web Applications — *August 2017–March 2020*
  - Working with my team on making the Web Applications of Bimito faster, smaller, smarter, and more powerful!
- **Bimito (https://bimito.com)** — Tehran Iran
  Lead Software Engineer — *2016–2017*

[1] http://iust.ac.ir

- Led a team of up to 8 developers in Web Enviroment (JAVA back-end, JSP, HTML, and CSS) and Growth (Full Stack) teams and managed to build tens of features at Bimito.
- Designed and implemented a system to reduce the load of Web client on back-end by 40+ % via implement a special Cache through a server side processing.
- Ran planning, scheduling, resourcing, and deploying codes for 20+ Agile sprints of 2 weeks each.
- Delivered tens of new features, technical projects, and winning improvements with the team, and collectively worked with the management to refine our processes and systems.
- As the hiring manager conducted more than 20 phone and onsite interviews to grow the team to double and shrink when required.

- **Informatics Services Corporation (http://en.isc.co.ir)** Tehran, Iran
  Software Engineer Intern *2015–2016*
  - Industrial research in affiliation with central banking of Iran, where I started to research on the state-of-the-art solution for online fraud detection and integrated **Complex Event Processing** with Debit card transactions over different monitoring software systems produced by different vendors and distributed over the network.
  - Worked on "Esper event processing language". Implemented a CEP engine to collect and process fraud detection patterns on financial debit card transactions.

- **Ministry of Economy and Affair Finance (http://mefa.ir)** Tehran, Iran
  Project Manager *2014–2015*
  - Managed government finances(immovable) resource, and utilized process mining techniques for finding control flow.

- **Ministry of Economy and Affair Finance (http://mefa.ir)** Tehran, Iran
  Software Engineer *2013–2014*
  - As a member of Web team worked on a huge codebase of C#.Net, Asp.Net, HTML, and CSS integrated with MS SQL Server.

- **Ministry of Education (http://www.medu.ir)** East Azarbijan, Iran
  Teacher of Computer Courses *2012–2013*
  - Teach some fundamental courses include C, C++, Pascal, and Computer Networks.

Projects

- **Ongoing Project**: Working on *"Efficient and Scalable Solutions for Time Series Analysis"* The time series are ubiquitous and rapidly growing in almost all application areas. In the academic setting over the last decade, there has been significant progress in time series classification, similarity/motif search, outlier detection, missing value imputation, predictive maintenance. However, much of this work makes assumptions that are simply unrealistic for developed industrial applications. The lack of progress probably stems from the daunting nature of the problem. One of my main aspect is working on a system that will allow users represent huge amount of time series data into current RDBMS systems. Furthermore, Time series data is often incomplete, e.g., due to sensor failures and transmission errors. Since many applications require complete data, missing values must be imputed before further data processing is possible. I would be interested to work on a machine learning technique to solve this problem.
- **Masters Project**: Development of a *"Middleware for Distributed Processing of Complex Events"*. The main focus of this project is to provide a middleware that can get use of complex event processing nodes so that the order of events in them is the same as the order of events in central systems and the time delay between CEP engines is minimum. In addition, in provides approaches to perform event processing related operations in distributed systems. The results indicate that our middleware is able to operate in distributed systems to increase the high processing throughput in CEP engines. Moreover, our middleware can use the maximum amount of system resource.
- **Analysis of Taxi Location Data**: Development of a *"Parallel Event Processing on Unbound Streams"*. In this project I describe an approach for a custom complex event processing engine using Message Passing Interface (MPI) in C++ programming language. Our approach utilizes a multi-processor infrastructure and distributes its load on multiple processes, expecting each process to run on one processor. A dispatching process receives events and distributes them on several query processes which are responsible for updating the actual queries. Query processes forwards any updates to a presentation process that output the results in an appropriate format. The distribution of roles among processes allows better scalability since further query processes can be added dynamically to handle more queries. In our evaluation we measured event processing up to a throughput of 12k events/sec using 4 processor cores.

- **Analysis Metrics for a Dynamic (Evolving) Social-Network Graph**: Development of a *"Stateful Complex Event Detection on Event Streams"*. Detection of stateful complex event patterns using parallel programming features is a challenging task because of statefulness of event detection operators. Parallelization of event detection tasks needs to be implemented in a way that keeps track of state changes by new arriving events. In this paper, we describe our implementation for a customized complex event detection engine by using Open Multi-Processing (OpenMP), a shared memory programming model. In our system event detection is implemented using Deterministic Finite Automata (DFAs). We implemented a data stream aggregator that merges 4 given event streams into a sequence of C++ objects in a buffer used as source event stream for event detection in a next processing step. We describe implementation details and 3 architectural variations for stream aggregation and parallelized of event processing. We conducted performance experiments with each of the variations and report some of our experimental results. A comparison of our performance results shows that for event processing on single machine with multi cores and limited memory, using mutli-threads with shared buffer has better stream processing performance than an implementation with multi-processes and shared memory.
- **Real-Time Object Recognition from Streaming LiDAR Point Cloud Data**: In many robotic applications, LiDAR (Light Detection and Ranging) scanner is used to gather data about the environment. Applications like autonomous vehicles require real-time processing of LiDAR point cloud data with high accuracy. We developed an object recognition system from high-speed LiDAR data stream. Our system includes a data processing pipeline with 3 main stages, 1. LiDAR data filtering 2. Object segmentation and noise reduction 3. Multi-class object classification using Convolutional Neural Network (CNN).

Honors and Awards

- **1nd Rank**, Achieving first in the ranking list of research assistant procedure among all applications, Faculty of Computer Science at the Free University of Bozen-Bolzano, (2019).
- **2nd Rank**, Nationwide M.Sc. entrance exam in Computer Engineering of Iranian Universities (Islamic Azad University of Qazvin), (2012).
- **1st Rank**, Achieving the highest GPA among all university Computer Engineering Bachelor students, (2009).
- **1st Rank**, Achieving the highest GPA among all university Computer Engineering Associate students, (2007).

Patents

1. **Saeed Fathollahzadeh**, Habib Vahidi. *"Phones Positioning Systems,"*, Islamic Republic of Iran Patent 85761, 2014.

Research Interests

Distributed Systems, Large Scale Data Processing, Data Stream Processing, Data Analytics, Database Systems , Event-based Systems

Skills

- **Programming Languages**: JAVA(Java Core, Java EE(Servlets, JavaBeans, JSP, Spring Framework, Hibernate ORM, RMI Distribution)), C/C++, familiar with Python, Apache Storm, Apache Spark
- **Database Systems**: mySql, MS SQL Server, familiar with Oracle database
- **Operating Systems**: Linux(Ubuntu, CentOS), MS Windows
- **Tools**: SVN, Git

References

- Professor **Mohsen Sharifi**, Supervisor of my master study, School of Computer Engineering, Iran University of Science and Technology, Tehran, Iran. *Home*: http://webpages.iust.ac.ir/msharifi/, *Email*: msharifi@iust.ac.ir
- Dr. **Kia Teymourian**, Research Cooperator, Department of Computer Science, Metropolitan College, Boston University (BU), Boston, USA. *Home*: http://www.teymourian.de/, *Email*: kiat@bu.edu
- Professor **Ayaz Isazadeh**, Adviser of my bachelor study, Department of Computer Science, Tabriz University, Tabriz, Iran, *Home*: http://isazadeh.net, *Email*: isazadeh@tabrizu.ac.ir

Publications

- Sambasiva Rao Gangineni, Harshad Reddy Nalla, **Saeed Fathollahzadeh**, and Kia Teymourian. 2019. *Real-Time Object Recognition from Streaming LiDAR Point Cloud Data.* In Proceedings of the 13th ACM International Conference on Distributed and Event-based Systems (DEBS '19). ACM, New York, NY, USA, 214-219. DOI: https://doi.org/10.1145/3328905.3330297 (*The DEBS'19 Grand Challenge and Grand Challenge Audience Won Award*)

- **Saeed Fathollahzadeh**, Kia Teymourian, and Mohsen Sharifi. 2016. *Stateful complex event detection on event streams using parallelization of event stream aggregations and detection tasks.* In Proceedings of the 10th ACM International Conference on Distributed and Event-based Systems (DEBS '16). ACM, New York, NY, USA, 390-393. DOI: http://dx.doi.org/10.1145/2933267.2933518

- **Saeed Fathollahzadeh**, Reza Karimi, Mohsen Sharifi, Kia Teymourian, Ahmad Hasan, and Adrian Paschke. 2015. *Parallel event processing on unbound streams with multi-step windowing.* In Proceedings of the 9th ACM International Conference on Distributed Event-Based Systems (DEBS '15). ACM, New York, NY, USA, 328-329. DOI: http://dx.doi.org/10.1145/2675743.2776764