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Mohammad Alaggan

Ph.D. in Computer Science

Education

2013

Ph.D. in Computer Science, *University of Rennes 1*, France, *Trés Honorable.*
Thesis: Private peer-to-peer similarity computation in personalized collaborative platforms
Team: ASAP (As Scalable As Possible)

2010

M.Sc. in Computer Science, *University of Rennes 1*, France.
Master's Program Specialty: Distributed Systems
Thesis: Privacy preservation in peer-to-peer gossiping networks in presence of a passive adversary

Skills

- C++03/11/14/17
- Java
- Understanding of storage systems and networking protocols
- Fundamentals of Machine Learning
- Linux and Bash Scripting
- Solid Theoretical Background
- Algorithm Design and Analysis
- Object Oriented Design and Analysis
- Bash Scripting
- x86 ASM and recent ISA updates (including SIMD vectorization)

Current Position

9/2017

Software Research and Development Engineer, *Antidot*, France.

- *Project: Search Engine/Information Retrieval Core Platform*: The back-end that manages workflow pipelines to process and index data and serve search queries.
- Designed and implemented the entire content repository storage sub-system from scratch. Features I implemented include:
  - Read/write atomicity and fault tolerance (consistency)
  - Versioned deployment allowing to query past versions as well as performing atomic rollbacks
  - Recovery routines to reconcile missing/corrupted data due to a soft/hard failure
- Redesigned major parts of the compound-splitting algorithm
- Designed and implemented C++ 14 wrappers for the MongoDB and Sqlite drivers
- Agile methodology: SCRUM
- Tools and concepts: C++ 14, Python, Java, Docker, MongoDB, Sqlite, Protocol buffers, GTest, Nosetests, CMake, GitLab, Jira, Test-driven development
- Team size: 5
- Duration: 1 year

Previous Positions

2016–17 **Postdoctoral Researcher** Inria CISCO, *Inria Lyon*, France, PRIVATICS Team.
Privacy-preserving sketches for mobility analytics of Wi-Fi and Cellular data
Duration: 1.5 years

2014–16 **Assistant Professor** حلوان, *Computer Science Department, Helwan University*, Egypt.
Teaching: Cryptography, Operating Systems, Software Engineering
Mentored Graduation Projects Include: A filesystem for a custom kernel
Duration: 2 years

2014-2015 **Software Team Lead (Part-time)** MESC, *MESC Labs*, Egypt.

- *Project: DVP: Data Visualization Platform*: An integrated data visualization tool to seamlessly transfer and visualize data from and to scientific computing platforms (MATLAB, Mathematica,. . .)
- Agile methodology: SCRUM
- Source control: Git
- Tools: C++, JavaScript, Chromium Embedded Framework
- Team size: 4 (The CEO, two advanced junior developers, and myself)
- Duration: 1 Year

3/2009–9/2009 **Research Assistant** PEERIALISM, *Peerialism AB*, Egypt.

- *Project: PeerTV*: A peer-to-peer scalable video-multicasting infrastructure
- *Project: MyP2PWorld*: A high-performance discrete-event simulator
- *Project:* Enhancing the ISP-locality of the bit-torrent torrents
- Role: Development and enhancement of the core peer-to-peer protocol
- Agile methodology: SCRUM
- Team size: 7 in total, 4 in Egypt and 3 in Sweden: 2 research assistants (including myself), 2 researchers, 2 engineer (one of which was PhD student), and 1 marketing
- Source control: Subversion
- Duration: 10 months (cumulative)
- Achievements
  - Designing (architecture) and Developing a high-performance discrete-event simulator (MyP2PWorld) from scratch with the novel algorithms of my invention to efficiently simulate network bandwidth constraints (for TCP or UDP streams) for thousands of simulated peers (Java). The design was published in a peer-reviewed workshop in 2008
  - Developing a cluster-management system to manage our distributed simulations (Bash)
  - Contribution of many ideas to the protocol (Research Activity)
  - Prepared a documentation tracing all decision decisions (many of which I was part)

Other Projects (solo or as part of a team)

- 2016: A C++ templates-based heavily-optimized data summarization (C++17. Solo)
- 2015: Heterogeneous Differential Privacy (C++14/Common Lisp. Solo)
- 2014: Mentoring a graduation project: A filesystem (C++14. Team)
- 2013: An dense/sparse linear algebra library (C++11. Solo)
- 2013: A stack tracer for crashing C++ programs (C/C++11. Solo)
- 2007: An operating system kernel (C/C++03. Solo)
- 2007: Spontaneous Remote Method Invocation framework (Java. Solo)
- 2007: Peer-to-peer dynamic self-load blanacer (Java. Solo)
- 2006: An LALR(1) parser generator (Java. Team)
- Other: My StackExchange profile: `http://stackoverflow.com/users/397405/m-alaggan`

Previous Positions

2009–2013 **Graduate Student** UNIVERSITÉ DE RENNES 1, *University of Rennes 1*, France.
Duration: 4 years

3/2008–3/2009 **Software Engineer**, *Egyptian Armed Forces*, Egypt, (Obligatory Service).

- Tools: Java, MySQL, Linux
- Team: 1
- Duration: 1 Year

9/2007–1/2008 **Research Assistant** PEERIALISM, *Peerialism AB*, Egypt.

Patents

2012 **EP2832074 - Anne-Marie Kermarrec, Sébastien Gambs, Mohammad Alaggan, Method of Masking Data Making Up a User Profile Associated With a Node of a Network**, *Inria/University of Rennes 1*, Europe.

Other Degrees

2007 **B.Sc. in Computer Science**, *Helwan University*, Egypt, *Top of Class with Honors. GPA 3.72/4.0.*
Thesis: Development of a massive multi-player online game with a highly-scalable peer-to-peer back-end
Advisor: Aliaa Yousef

Honors/Grants

2010 Bourse Ministérielle from the University of Rennes 1 for 3 years to pursue Ph.D.

2009 Grant from Fondation Michel Metivier to pursue masters at University of Rennes 1

2007 B.Sc. Graduation with Honors from Helwan University (in addition to being Top of Class)

Languages

English CEFR Level C1 (IELTS: 8.0, January/2016)

French CEFR Level B1

Arabic Native

Activities in Scientific Societies

2015–17 **Regular Referee for IEEE Transactions on Information Forensics and Security (IEEE TIFS)**.

2017 **Program Committee Member for the International Workshop on Big Data Analytics, Security and Privacy (BiDAS 2017)**.

2013 **Referee for IEEE Transactions on Parallel and Distributed Systems (IEEE TPDS)**.

Publications

Mohammad Alaggan, Mathieu Cunche, and Sébastien Gambs. Privacy-preserving wi-fi analytics. *PoPETs*, 2018(2):4–26, 2018.

Mohammad Alaggan, Mathieu Cunche, and Marine Minier. Non-interactive (t, n)-

Incidence Counting from Differentially Private Indicator Vectors. In *Proceedings of the 2017 ACM on International Workshop on Security And Privacy Analytics, IWSPA@CODASPY 2017*, Scottsdale, AZ, USA, March 2017. ACM.

Mohammad Alaggan, Sébastien Gambs, and Anne-Marie Kermarrec. Heterogeneous Differential Privacy. *Journal of Privacy and Confidentialy*, 7(2):127–158, 2017.

Mohammad Alaggan, Mathieu Cunche, and Marine Minier. Privacy-preserving t-incidence for wifi-based mobility analytics. In *7e Atelier sur la Protection de la Vie Privée (APVP'16)*, Toulouse, France, July 2016.

Mohammad Alaggan, Sébastien Gambs, and Anne-Marie Kermarrec. Heterogeneous Differential Privacy. In *1st workshop on the Theory and Practice of Differential Privacy, TPDP at ETAPS'15*, London, UK, April, 2015.

Mohammad Alaggan, Sébastien Gambs, Stan Matwin, and Mohammed Tuhin. Sanitization of Call Detail Records via Differentially-Private Bloom Filters. In P. Samarati, editor, *Proceedings of the 29th Annual IFIP WG 11.3 Working Conference on Data and Applications Security and Privacy (DBSec'15)*, volume 9149 of *Lecture Notes in Computer Science*, pages 1–8, Fairfaix, VA, USA, July, 2015. Springer.

Mohammad Alaggan, Sébastien Gambs, and Anne-Marie Kermarrec. BLIP: Non-Interactive Differentially-Private Similarity Computation on Bloom Filters. In Andréa W. Richa and Christian Scheideler, editors, *Proceedings of the 14th International Symposium on Stabilization, Safety, and Security of Distributed Systems (SSS'12)*, volume 7596 of *Lecture Notes in Computer Science*, pages 202–216, Toronto, Canada, 1–4 October 2012. Springer.

Mohammad Alaggan, Sébastien Gambs, and Anne-Marie Kermarrec. Private Similarity Computation in Distributed Systems: From Cryptography to Differential Privacy. In Antonio Fernández Anta, Giuseppe Lipari, and Matthieu Roy, editors, *Proceedings of the 15th International Conference on the Principles of Distributed Systems (OPODIS'11)*, volume 7109 of *Lecture Notes in Computer Science*, pages 357–377, Toulouse, France, 13–16 December, 2011. Springer.

Roberto Roverso, Mohammed Al-Aggan, Amgad Naiem, Andreas Dahlstrom, Sameh El-Ansary, Mohammed El-Beltagy, and Seif Haridi. MyP2PWorld: Highly Reproducible Application-level Emulation of P2P Systems. In *Workshops Proceedings of the 2nd IEEE International Conference on Self-Adaptive and Self-Organizing Systems (SASOW'08)*, pages 272–277, Venice, Italy, 20–24 October, 2008. IEEE Computer Society.