Ali Utkan Şahin

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RESEARCH INTERESTS

Distributed systems, fault-tolerance, networks, cryptography, security.

EDUCATION

Koç University – Istanbul, Turkey.   Sep 2017 – ongoing
- BSc in Computer Engineering
- Current GPA: 3.88/4.00
- Expected graduation: June 2021

Nanyang Technological University – Singapore.   Aug 2019 – Dec 2019
- Exchange semester as part of the Global Exchange mobility program.

American Robert College – Istanbul, Turkey.   2012 – 2017
- High school diploma.

RESEARCH EXPERIENCE

Secure Routing On DHTs – Koç University.   Jul 2020 – ongoing
- Surveyed the literature on Byzantine fault resistant routing protocols for DHTs.
- Currently collaborating on the write-up and supervising the implementation of the protocol.

Open-Source Skip Graph Middleware – Koç University.   Jul 2020 – Oct 2020
- Collaborated with other undergraduate research assistants.
- Implemented a concurrent insertion protocol with 2-round consensus.
- Implemented node-to-node communication with TCP, UDP, and Java RMI.

Universal Fog Proxy   Mar 2020 – Nov 2020
- Worked as an undergraduate research assistant at a joint research project with Prof. Öznur Özkasap (Koç University) and Prof. Ying-Dar Lin (National Chiao Tung University).
- Surveyed the authentication protocols used in fog networks and designed message flows.
- Implemented the solution, constructed the testbed, and performed experiments.
- Collaborated on the write-up.

Authenticated Lookups Over Skip Graphs – Koç University.   Aug 2019 – Jul 2020
- Studied digital signatures and the mathematical foundations of modern cryptography.
- Implemented an identity-based threshold digital signature scheme and a protocol that aims to provide fault-detection against routing attacks.
- Deployed my implementation to AWS (Amazon Web Services) and took measurements that relate to the overhead introduced by the protocol.

SkipSim Consensus Simulation – Koç University.   Mar 2019 – Jul 2019
- Studied blockchain consensus and skip graphs.
- Worked on the development of SkipSim, an open-source scalable skip graph simulator.
- Implemented the consensus layer of LightChain blockchain architecture on SkipSim.
- Took various measurements that relate to the safety, liveness, and replica availability that is provided by the protocol.

LightChain Skip List Simulation – Koç University.   Nov 2018 – Mar 2019
- Studied skip lists and churn.
- Implemented a lightweight skip list simulator that supports churn and replication.
- Conducted hypergeometric experiments and took various measurements regarding the safety, liveliness and replica availability under churn.

TEACHING EXPERIENCE

COMP416: Computer Networks – Koç University.   Oct 2020 – ongoing
- Working as an undergraduate teaching assistant for the course. Preparing and evaluating projects, conducting demo sessions, providing homework solutions and, giving one-to-one tutoring sessions to the students struggling with the material.

WORK EXPERIENCE

Internship (Remote) at DapperLabs – Vancouver, Canada   Jul 2019 – Nov 2019
- Worked on gossip protocols, their implementation, and their evaluation on a simulator that I have developed. The simulator supports custom topologies, malicious peers, static & dynamic fanout, pull & push protocols, custom latency functions, clusters, stateful scenarios that can be replayed, and custom experiments. The simulator is currently being used internally by the company.

PAPERS

A. Ali, A. U. Şahin, Ö. Özkasap and Y. Lin, **"The Universal Fog Proxy: A Third-party Authentication Solution for Federated Fog Systems with Multiple Protocols,"** *in IEEE Network.* (In submission)

S. Taheri-Boshrooyeh, A. U. Şahin, Y. Hassanzadeh-Nazarabadi and Ö. Özkasap, **"Demo: A Proof-of-Concept Implementation of Guard Secure Routing Protocol,"** *2020 International Symposium on Reliable Distributed Systems (SRDS)*, Shanghai, China, 2020, pp. 332-334, doi: 10.1109/SRDS51746.2020.00041.

Y. Hassanzadeh-Nazarabadi, N. Nayal, S. S. Hamdan, A. U. Şahin, Ö. Özkasap and A. Küpçü, **"Demo: Skip Graph Middleware Implementation,"** *2020 International Symposium on Reliable Distributed Systems (SRDS)*, Shanghai, China, 2020, pp. 335-337, doi: 10.1109/SRDS51746.2020.00042.

Y. Hassanzadeh-Nazarabadi, A. U. Şahin, Ö. Özkasap and A. Küpçü, **"SkipSim: Scalable Skip Graph Simulator,"** *2020 IEEE International Conference on Blockchain and Cryptocurrency (ICBC),* Toronto, ON, Canada, 2020, pp. 1-2, doi: 10.1109/ICBC48266.2020.9169426.

AWARDS / HONORS

DFINITY 2019 Scholarship – Zürich, Switzerland.   2019
- Received a scholarship in the context of the 2019 DFINITY Scholarship Program at the undergraduate level in which proposals are selected on their contribution to the goal of a public decentralized cloud.

Vehbi Koç Scholar – Istanbul, Turkey.
- Awarded in Fall 2017, Spring 2018, Fall 2018, Spring 2019, and Spring 2020 for maintaining high academic performance.