MUHAMMAD FAISAL

github.com/mfaisal97/Home

+1 (857) 245 8822 ⋄ mfaisal@bu.edu

SUMMARY

Third year PhD student working in systems design and applied cryptography systesms with previous experience in ML; looking for internship opportunities and also open for working in new fields.

EDUCATION

Boston University   2020 - expected 2024
Third year Graduate Student, Program: **PhD in Computer Science**
Coursework Includes: Distributed systems, Streaming systems, ML, AI, graduate algorithms, Cryptography, and Formal Methods.
Advisor: PhD. **Vasiliki Kalavri**

The American University in Cairo   2015 - 2020
Bachelor of Science (5 years program)
Major: **Computer Engineering**, Minor: **Mathematics**, GPA: **3.84**
Courses include: Object Oriented Programming, Software Engineering, Distributed Systems, Embedded Systems, Discrete Mathematics, Linear Algebra, Graph Theory.

University of Rochester   Spring 2018
Exchange Student Coursework: Computer Vision, Computer Security Foundations, Computations and Formal Systems, and Database Systems.

PUBLICATIONS

SECRECY: Secure collaborative analytics in untrusted clouds   USENIX NSDI 2023
pre-print available John Liagouris, Vasiliki Kalavri, Muhammad Faisal, Mayank Varia.
· Semi-honest relational framework for MPC.
· Supports operators such as predicates, aggregations, sorting, and joining.
· Introduces new logical and physical optimizations for query planning and implementation.

Privacy-preserving window analytics on time series data   Under submission(USENIX SEC 23)
Muhammad Faisal, Jerry Zhang, John Liagouris, Vasiliki Kalavri, and Mayank Varia.
· Supports semi-honest and malicious parties settings in MPC.
· Introduces new algorithms for processing time-series data (i.e. tumbling windows and session windows).

Towards a scalable generic MPC framework with configurable guarantees   ongoing paper
Poster @NSDI 2023 Muhammad Faisal, John Liagouris, Vasiliki Kalavri, and Mayank Varia.
· Generic multi-threaded MPC computation library with adjustable security guarantees.
· Supports secure operations such as multiplication, division, comparisons, and matrix multiplication.
· Includes also relational operators such as aggregation and sorting.
· Designed in a simple practical way that enables extension and industry adoption.

ACADEMIC PROJECTS

Undergraduate thesis   Fall 2019
Git of Truth: Decentralized Version Control System.
· Designed a system with temper-proof commits history, access control (private/public repositories), and efficient data transfer based on the Hyperledger blockchain and IPFS.
· Designed and implemented in GoLang a smart contract for hyperledger for managing users, repositeries, and access control.
· Designed and implemented a nodejs command line client package for communication with the smart contract and other nodes to use the system features.

EXPERIENCE

Co-Founder, envelope.network
Spring 2021
A start-up making online ads right for everyone.

· envelope.network is a **Boston University 2021 Summer Accelerator graduate**.
· Managed a team creating the core ML and secure multi-party computing (MPC) libraries.
· Architected the pipeline to create users profiles and ads matching.
· Architected and implemented the secure multi-party computing (MPC) protocols library necessary for processing users data, which can serve more than **250m ads using less than 1k$ cloud resources per month**.
· Shared in designing the business model, product requirements and major start up decisions.

Research Assistant, Complex Analytics & Scalable Processing systems (CASP)
Fall 2020 - present
Boston University

· Worked on Secrecy, a framework to execute queries in a privacy preserving setting using (MPC).
· A pre-print is available here.

Research Intern, Decentralized and Distributed Systems Lab
Summer 2019
The École polytechnique fédérale de Lausanne (EPFL)

· Designed and implemented a Go package for a secure decentralized protocol for group management including roles distribution for members and membership management.

Research Assistant, AUC Machine Intelligence Lab
Jan 2019
The American University in Cairo

· Worked on a 10 months research project sponsored by Valeo and supervised by Prof. Mohamed Moustafa.
· Investigated new potential street semantic segmentation models using LiDAR and 2D cameras.
· Studied the effect of introducing time locality at different stages of the inference (RAW level - features level).

Summer Intern, Microsoft Research
Summer 2018
Advanced Technology Lab in Cairo, LUIS.ai backend team

· Built an experiment pipeline to enhance one of the features used by the LUIS (Language Understanding Intelligent Service) Learner which predicts overall meaning and extracts structured data from users' conversational text.
· Designed the pipeline architecture in the object oriented paradigm.
· Used C# and F# Languages and git for version and source control.

SCHOLARSHIPS AND GRANTS

Boston University 2021 Summer Accelerator funding, BUild Lab, Boston University
Summer 2021
Non-equity funding for the envelope.network startup.

Dean's Fellowship, Graduate School of Arts and Sciences, Boston University
Summer 2021
A competitive non-service Fellowship to cover tuition and stipend for a semester during my PhD program.

Competition Grant, Undergraduate Research Office & CS Department, AUC
Fall 2019
Travel and registration fees coverage for the Africa and Arab Collegiate Programming Championship

Undergraduate Research Internship Grant, Undergraduate Research Office, AUC
Summer 2019
Grant to cover part of the living expenses during my Summer@EPFL research internship.

Center for Education Abroad Scholarship, University of Rochester
Spring 2018
Partial scholarship to cover my living expenses during my exchange semester in UoR

Abdallah Jum'ah Study Abroad Scholarship, Scholarships Office, AUC
Spring 2018
Partial scholarship to cover my living expenses during my exchange semester in University of Rochester.

Al Alfi Foundation Scholarship
Fall 2015
Full scholarship to study Computer Engineering in AUC

COMPETITIONS

Africa and Arab Collegiate Programming Championship (ACPC)   Fall 2019
Passed the local and Egyptian qualifications and participated in the regional ACPC

DandyHackathon, University of Rochester   Spring 2018
In a group of 2 and using Unity, Developed Gravity Miner which is a game to pick up collectibles without running out of fuel and fall in a black hole

Amazon Hackathon, American University in Cairo   Spring 2018
Using AWS services, Worked on developing a prototype for a karaoke app to detect the user's sung words and match them with the corresponding music in a list of songs.

The 12th Annual AUC Mathematics Competition, The American University in Cairo Spring 2017
Won the 1st place in the groups round and ranked 8th place in the individuals round among 150 participants.

Remotely Operated Vehicles (ROV) Competition   Spring 2017
Ranked 7th in the regional competition for Arab Countries and won the Best Poster Award.
Participated in the design, implementation, and assembly of ROV's electrical & control system.

ADDITIONAL INFORMATION

Interests: Computer Security and Privacy, Multi-Party computing
Decentralized Systems, Data Systems, Software Development,
Machine Learning, Natural Language Processing, Artificial Intelligence, Computer Vision
Languages: C++, Go, Python, C, C#, F#, Kotlin
Libraries: Numpy, TensorFlow, SFML