Mahsa Eftekhari

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GoogleScholar

Research Interests

Algorithms, AI, large language models, transformers, deep learning, distributed computing algorithms, randomized algorithms

Experience

Microsoft
Applied Scientist II at Microsoft — Aug. 2022 – Present

- Integration of LLM (GPT models) with Microsoft products
- Collaborated on LLM integration with various products, such as Copilot, Designer, Edge sidebar chat, and Enterprise Bing chat. I helped the team in design, development, prompt iteration, quality evaluations, quality improvement, and metric adjustments using Python, C#, TypeScript, and AML tools via Codex, GPT-3, GPT-4, GPT-4o model series.
  Played a key role in the introduction and launch of **Customizable GPTs** for both consumer and enterprise worlds.
  Quality Evaluation Designed and implemented different quality evaluation pipelines for LLM integration to Microsoft products.
  Fine-tuning the LLM based model using state-of-the-art techniques and evaluated its quality using Python, C#, and Azure ML tools.

Google
Software Engineering Intern at Google — Summer 2020

- Expanding Google's knowledge Graph
- Implement data cleaning and verification pipeline (using python and REST API) to address the messy datasets for Google Knowledge Graph. While an intern, I noticed and initiated an effort to also address the missing values in the existing data series used by the knowledge graph team. I designed and implemented this procedure from scratch (using Go) and provided the team with interfaces that fill the missing values of the data series.

University of California, Davis
Research Assistant — 2017 - Current

- Distributed computing algorithms
- I implemented (Java) simulations for a distributed computing model, population protocols, to study time and memory complexity of randomized real world physical systems. We implemented a dynamic network of agents and simulated the process of leader election, majority and size computation

Sharif University of Technology
Research Assistant — 2015 - 2017

- Online algorithms for fair allocation of goods
- I designed and analyzed a new online allocation algorithm. I also proved a lower bound on the competitive ratio of any proposed algorithms for the problem.

Education

University of California, Davis — Davis, CA
Ph.D. in Computer Science, Supervisor: David Doty — 2017–2022

- GPA: 3.95/4.0
- Thesis: ": Computation in Population Protocols: Exact Majority, Uniform Computation, and the Dynamic Model"

Sharif University of Technology Tehran, Iran
M.Sc. in Computer Engineering, Supervisor: H. Zarrabi-Zadeh 2015–2017

- GPA: 18.78/20 – equivalent to 4.0/4.0, ranked 3rd in class
- Thesis: "Online algorithms for fair allocation of goods"

Sharif University of Technology Tehran, Iran
B.Sc. in Computer Science 2010–2015

Publications

Author names are sorted in alphabetical order.

1. Dynamic size counting in population protocols. David Doty, Mahsa Eftekhari. In the 1st Symposium on Algorithmic Foundations of Dynamic Networks **(SAND 2022)**
2. A Time and Space Optimal Stable Population Protocol Solving Exact Majority. David Doty, Mahsa Eftekhari, Leszek Gąsieniec, Eric Severson, Grzegorz Stachowiak, and Przemysław Uznański.
   - Appears In the 62nd Annual of IEEE Symposium on Foundations of Computer Science **(FOCS 2021)**
   - Brief announcement: In the 40th ACM Symposium on Principles of Distributed Computing **(PODC 2021)**
3. A survey of size counting in population protocols. David Doty, Mahsa Eftekhari. Theoretical Computer Science Journal **(TCS 2021)**
4. Message complexity of population protocols. Talley Amir, James Aspnes, David Doty, Mahsa Eftekhari, and Eric Severson. In the 34th International Symposium on Distributed Computing **(DISC 2020)**
5. Efficient size estimation and impossibility of termination in uniform dense population protocols. David Doty, Mahsa Eftekhari. In the 38th ACM Symposium on Principles of Distributed Computing **(PODC 2019)**
6. Brief announcement: Exact size counting in uniform population protocols in nearly logarithmic time. David Doty, Mahsa Eftekhari, Othon Michail, Paul G. Spirakis, and Michail Theofilatos. In the 32nd International Symposium on Distributed Computing **(DISC 2018)**

Scholarships and Awards

- UC Davis GGCS Richard Walters scholarship recipient Summer 2021
- GHC scholarship recipient Summer 2020
- CRA-W scholarship recipient Spring 2019
- UC Davis graduate fellowship recipient Fall 2017
- Ranked 15th, National Scientific Olympiad in Computer Engineering. Summer 2015
- Ranked 3rd, National Graduate Entrance Exam in CS. (amongst more than 5000 students) Spring 2015
- Ranked 15th, National Graduate Entrance Exam in Computer Engineering, Software Engineering, Algorithms and Computations. (amongst more than 18000 students) Spring 2015

Mentoring Experience

- Mentored a female transfer student via MANRRS program — Fall 2021
  (Minorities in Agriculture, Natural Resources, and Related Sciences Mentorship Program)
- Mentoring a graduate student via GSoC program — Winter & Spring 2022
  (Graduate Students of Color Mentorship Program)

Service/Professional Involvement

Invited talks

- Theory of Efficient Algorithms seminar series at University of Hamburg — Summer 2022
  Dynamic size counting in population protocols
- The 7th Highlights of Algorithms (HALG 2022) — Summer 2022
  A time and space optimal stable population protocol solving exact majority
- CS theory seminar at Purdue University — Fall 2021
  Computation in population protocols with a focus on the majority problem
- Theory of Efficient Algorithms seminar series at University of Hamburg — Spring 2021
  A stable majority population protocol using logarithmic time and states

Program committee member

- 2nd Symposium on Algorithmic Foundations of Dynamic Networks IEEE Annual Symposium on Foundations of Computer Science (SAND) — 2023

Conference reviewer

- IEEE Annual Symposium on Foundations of Computer Science (FOCS) 2022
- International Symposium on Distributed Computing (DISC) 2022
- ACM Symposium on Principles of Distributed Computing (PODC) 2022
- International Colloquium on Automata, Languages, and Programming (ICALP) 2022
- Symposium on Algorithmic Foundations of Dynamic Networks (SAND) 2022
- International Symposium on Distributed Computing (DISC) 2020
- International Conference on DNA Computing and Molecular Programming (DNA) 2019
- Conference on Foundations of Software Technology and Theoretical Computer Science (FSTTCS) 2019
- Mathematical Foundations of Computer Science (MFCS) 2019

Journal referee

- Journal of Distributed Computing (DIST) 2021
- Journal of Computer and System Sciences (JCSS) 2021
- Journal of Natural Computing (NACO) 2021

Teaching Experience

Responsibilities: Leading discussion classes, designing homeworks, maintaining auto-grading homeworks, leading interactive Java programming labs, and holding office hours.

Undergraduate courses

University of California, Davis

- **Head Teaching Assistant** Fall 2021
  Theory of Computation (ECS 120)
- **Teaching Assistant** Winter'18, Spring 18, 20, 21
  Theory of Computation (ECS 120)

Sharif University of Technology

- **Teaching Assistant** Spring 2014,15
  Advanced Programming (Java)
- **Teaching Assistant** Spring 2015
  Principles of Computer System

Graduate courses

- **Teaching Assistant** at University of California, Davis Winter'19
  Theory of Computation (ECS 220)
- **Teaching Assistant** at Sharif University of Technology Spring 2017
  Approximation Algorithms
- **Teaching Assistant** at Sharif University of Technology Fall 2016
  Computational Geometry