

Ehsan (Eric) Qasemi

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Website: ehsanqasemi.com

qasemi@usc.edu qasemi.ehs@gmail.com

Research Interest

Commonsense Reasoning

Natural Language Processing

Multi-Modal Inference

Education

Ph.D. in Computer Science

University of Southern California (2018-2023)

M.Sc. in Computer Science

University of Wisconsin-Madison (2015-18)

B.Sc. in Electrical Engineering

University of Tehran (2010-15)

Honors & Awards

- 4-Year Research **Scholarship Recipient** from University of Southern California 2018-2022
- 3'rd place in Semantic Web Challenge on Tabular Data to Knowledge Graph Matching (ISWC) 2019
- 1'st place in Hardware-Software Co-design Competition, CADS 2013
- Ranked as 57 among $\approx 500,000$ students in National Universities Entrance Exam, Iran 2010

Publication

1. **Qasemi E**, Ilievski F, Chen M, Szekely P. "PaCo: Preconditions Attributed to Commonsense Knowledge", EMNLP-Findings 2022.
2. **Qasemi E**, Khanna P, Ning Q, Chen M. "PiInKS: Preconditioned Inference with Weak Supervision", ACL-IJCNLP 2022.
3. [Under Review for EMNLP2023] **Qasemi E**, Maina-Kilaa A R, Dash D, Alsaggaf K, Chen M. "PRISM: Preconditioned Visual Language Inference and Rationalization using Weak Supervision" arXiv preprint arXiv:2306.01753.
4. **Qasemi E**, Oltramari A, Francis J. "Traffic-Domain Video Question Answering with Automatic Captioning", ITSC 2023.
5. [Under Review for EMNLP2023] Huang T, **Qasemi E**, Li B, Wang H, Brahman F, Chen M, Chaturvedi S, "Affective and Dynamic Beam Search for Story Generation".
6. [Under Review for EMNLP2023] Singh, Shikhar, **Ehsan Qasemi**, and Muhao Chen. "VIPHY: Probing" Visible" Physical Commonsense Knowledge." arXiv preprint arXiv:2209.07000 (2022).
7. **Qasemi E**, Oltramari A. "Intelligent Traffic Monitoring with Hybrid AI", Artificial Intelligence for Autonomous Driving workshop at IJCAI, 2022.
8. **Qasemi E**, Ilievski F, Chen M, Szekely P. "CoreQusite: Circumstantial Preconditions of Commonsense Knowledge". West Coast NLP, 2021.
9. Ilievski F, Szekely P, Cheng J, Zhang F, **Qasemi E**. "Consolidating Commonsense Knowledge". arXiv preprint arXiv:2006.06114. 2020 Jun 10.
10. Thawani A, Hu M, Hu E, Zafar H, Divvala NT, Singh A, **Qasemi E**, Szekely PA, Pujara J. "Entity Linking to Knowledge Graphs to Infer Column Types and Properties". InSemTab@ ISWC 2019 (pp. 25-32).
11. **Qasemi E**, Kezar L, Pujara J, Szekely P. Evaluating Machine Common Sense via Cloze Testing. arXiv preprint arXiv:2201.07902.
12. **Qasemi E**, Stan S, Yao K, Shao R, Liu J, Liang M, Ferrer LJ, Szekely P, "DSBox: Data Scientist in a Box", ISI Graduate Student Symposium (GSS '19), Marina Del Rey, California, USA.
13. Yu F, Thayer M, **Qasemi E**, Zhu K, Assadi A. "Deep Learning Features in Atmospheric Chemistry: Prediction of Cancer Morbidity Due to Air Pollution". 2017 International Conference on Computational Science and Computational Intelligence (CSCI) 2017 Dec 14 (pp. 1764-1766). IEEE.
14. Yuchen S, **Qasemi E**, Ardalan A, Gao H, Assadi AH. "Deep Learning Art History from Data: Baroque Intellectual Influence on the Romantic Era Painting". 2017 International Conference on Computational Science and Computational Intelligence (CSCI) 2017 Dec 14 (pp. 391-393). IEEE.
15. Han P, **Qasemi E**, Ardalan A, Gao H, Assadi AH. "Deep Learning Empirical Topology for Classical Music Style Decision Making". 2017 International Conference on Computational Science and Computational Intelligence (CSCI) 2017 Dec 14 (pp. 394-395). IEEE.

16. Biglari M, **Qasemi E**, Pourmohseni B. "Maestro: A high performance AES encryption/decryption system". In The 17th CSI International Symposium on Computer Architecture & Digital Systems (CADSD 2013) 2013 Oct 30 (pp. 145-148). IEEE.
17. **Qasemi E**, Samadi A, Shadmehr MH, Azizian B, Mozaffari S, Shirian A, Alizadeh B. "Highly scalable, shared-memory, Monte-Carlo tree search based Blokus Duo Solver on FPGA". In 2014 International Conference on Field-Programmable Technology (FPT) 2014 Dec 10 (pp. 370-373). IEEE.
18. Pasandi G, **Qasemi E**, Fakhraie SM. "A new low-leakage T-Gate based 8T SRAM cell with improved write-ability in 90nm CMOS technology". In 2014 22nd Iranian Conference on Electrical Engineering (ICEE) 2014 May 20 (pp. 382-386). IEEE.
19. Pasandi G, Fakhraie SM, **Qasemi E**. "A New Tri-State Based Static Random Access Memory (SRAM) with Improved Write-Ability and Read Stability". In 2014 JCSE Vol. 10, No.2 & 4, Summer 2012 & Winter 2013

Academic Research Experience

Center on Knowledge Graphs

INFORMATION SCIENCES INSTITUTE, USC

Research Assistant supervised by Muhao Chen & Pedro Szekely

Jun 2018 – present

- Instituted the problem of preconditioned inference to evaluate AGI's understanding of the *theory of affordance*
- Proposed a generative AI based on weak supervision principles that surpasses the SoTA in preconditioned inference.
- Conducted research on knowledge-guided multi-modal commonsense inference in various applications such as traffic management and urban map understanding, using generative weak supervision

Persepolis Research Group

University of Wisconsin-Madison

Research Assistant Supervised by Amir H. Assadi

2016-18

- Applications of Deep Learning for Discovery of Autism Spectrum Disorder (ASD)

Design, Verification, and Debug of Embedded Systems Lab

University of Tehran

Research Assistant Supervised by Bijan Alizadeh

2012-14

- Hardware Design & Implementation of Monte-Carlo Tree Search AI algorithm for High-level synthesis applications

System Intelligence Lab

University of Tehran

Research Assistant Supervised by Seyed Mahdi Fakhrai

Summer 2013

- Artificial intelligence applications in Sub-threshold Memory Design

Industry R&D Experience

Oracle

LOS ANGELES, USA

Research Intern

Fall 2022

- Intelligent Automation in Oracle Heatwave infrastructure
- Introduced and implemented **AutoUnload** feature in Oracle Heatwave, reducing memory footprint by up to 5x.
- Developed Unload Advisor (recommender) features in Oracle Heatwave, enhancing cluster performance by up to 10x.

Robert Bosch LLC.

PITTSBURGH, USA

Hybrid AI Intern Supervised by Alessandro Oltramari

Summer 2022

- Autonomous Driving and Traffic Monitoring with Hybrid AI
- Proposed a novel synthetic captioning method to incorporate traffic domain knowledge into video-language models, to improve Traffic question/answering performance of selective video-language models by 20%.

Robert Bosch LLC.

PITTSBURGH, USA

Hybrid AI Intern Supervised by Alessandro Oltramari

Summer 2021

- Developed and deployed neuro-symbolic approaches for intelligent traffic monitoring with hybrid AI.

Teaching and Mentoring

Mentoring:

- [PSU] Mihir Kulkarni, Undergraduate Student, Computer Science (NSF REU program) Summer 2023
- [HMC] Amani Maina-Kilaas, Undergraduate Student, Computer Science (NSF REU program) Summer 2022
- [IIT] Tanay Dixit, Undergraduate Student, Computer Science (NSF REU program) Summer 2022
- [IIT] Devadutta Dash, Undergraduate Student, Computer Science (IUSSTF Viterbi program) Summer 2022
- [UW-M] Khalid Alsaggaf, Undergraduate Student, Computer Science (KAUST-Viterbi Exchange) Summer 2022
- [USC] Piyush Khanna, Undergraduate Student, Computer Science Summer 2021
- [USC] Shikhar Singha, Master Student, Computer Science 2021, 2022
- [NYU] Zijan Jin, Master Student, Computer Science Fall 2021

Teaching:

- [U-Tehran] ICEEP: Embedded Linux Workshop Summer 2014
- [UW-Madison] LCA 601,563: Advanced Persian Language Fall '16, Spring '17

Teaching Assistant:

- [USC] CSCI 544: Applied Natural Language Processing (R. Artstein, M. Rostami) Fall 2022
- [USC] CSCI 544: Applied Natural Language Processing (M. Chen, R. Artstein) Spring 2022
- [UW-Madison] CS 354: Machine Organization and Programming (J. Skrentny) Spring 2018
- [UW-Madison] CS 552: Introduction to Computer Architecture (Y. H. Hu) Fall 2016
- [UW-Madison] CS 352: Digital System Fundamentals (K. Morrow, X. Zhang) Spring 2016
- [UW-Madison] CS 252: Introduction to Computer Engineering (K. Morrow, M. Morrow) Spring 2016
- [UW-Madison] ECE 344: Electrical Circuits (L. Shohet) Summer 2017
- [U-Tehran] ECE 615: Electronic System Level Design (B. Alizadeh) Spring 2015
- [U-Tehran] ECE 367: Digital Logic Design lab (Z. Navabi) Summer '14 '13, Fall '14 '13
- [U-Tehran] ECE 532: Object-Oriented Simulation of Electronic Systems (Z. Navabi) Spring '14 '13
- [U-Tehran] ECE 642: FPGA Base Embedded System Design (B. Alizadeh) Fall '14 '13

Professional Services

PC Member:

- Artificial Intelligence for Autonomous Driving, IJCAI 2022 Workshop (Top 16% of Reviewers) Spring 2022
- International Semantic Web Conference (ISWC 2022) Research Track Summer 2022
- Information and Knowledge Management (CIKM 2022) Summer 2022
- European Chapter of the ACL (EACL 2023) - Language Resources and Evaluation Fall 2022
- SIAM International Conference on Data Mining (SDM 2023) Fall 2022
- International Semantic Web Conference (ISWC 2023) Research Track Summer 2023

Journal/Conference Reviewer:

- Conference on Empirical Methods in Natural Language Processing (EMNLP) Summer 2023
- Association for Computational Linguistics (ACL) Summer 2023
- IEEE International Conference on Intelligent Transportation Systems (ITSC) Summer 2023
- International Conference on Natural Language Processing and Chinese Comp. (NLPCC2023) Summer 2023
- European Chapter of the Association for Computational Linguistics (EACL) Spring 2023
- SIAM International Conference on Data Mining (SDM) 2023
- ACL Rolling Review (ARR) Fall 2022
- ACL Rolling Review (ARR) Summer 2022
- Conference on Empirical Methods in Natural Language Processing (EMNLP) Summer 2022
- ACL Rolling Review (ARR) Spring 2022
- The 29th International Conference on Computational Linguistics (COLING 2022) Summer 2022
- ACL Rolling Review (ARR) Fall 2021
- TheWebConf 2019) Dec 2018

Other Voluntary Activity

- President of Persian Student's Society of UW-Madison (PSS) 2015-2017
- Board Member of the first Iranian film festival (WIFF) at UW-Madison March '17