

# Ke Shen

Email: keshen@isi.edu  
Mobile: +1-(213)-519-2711  
Github: github.com/kahy-shen

## EDUCATION

---

- **University of Southern California** Los Angeles, CA  
• *Ph.D. student, Department of Industrial and Systems Engineering* Sep. 2021 - current  
• *Master, Department of Computer Science* May 2019 - Dec. 2020
- **Chongqing University of Posts and Telecommunications** Chongqing, China  
• *Bachelor, Department of Computer Science* Sep. 2014 - Jun. 2018

## SKILLS

---

- **Languages:** Python, R, Stata, C++, JavaScript, Scala, JAVA
- **Frameworks:** Pytorch, HuggingFace, Neo4j, Scikit, Hadoop, Django, Flask, NodeJS
- **Systems & Tools:** Linux, Web, AWS, GCP, VMware; Docker, GIT, MySQL, Unity tools

## PROFESSIONAL EXPERIENCE

---

- **Leyan Technologies Ltd., Shanghai, China**  
• *Machine Learning Intern (Full-time)* Dec 2018 - Mar 2019
  - **Knowledge Graph Construction:** Create a knowledge graph of elementary education from textbooks to assist teachers in designing and grading exams and homework.
  - **Enhance Phrase Mining Algorithm:** Implement a semi-supervised learning model to extract high-quality phrases from customer shopping reviews on Taobao, leading to a 14% increase in customer satisfaction for the advanced AI customer service it supports.

## RESEARCH PROJECTS

---

- **The robustness study of linguistic phenomena and biases in language model:** **Design** and **conduct** an experimental prompt-centered study of language models' generalization issue in commonsense reasoning; **Present** four confusion probes, inspired by similar phenomena first identified in the behavioral science community, to test for problems such as prior bias and choice paralysis.
- **The formalism and approach for improving robustness of large language models:** **Define** and **formalize** two distinct types of risk: decision risk and composite risk; **Propose** a risk-centric evaluation framework, and four novel metrics, for assessing LLMs on these risks in both in-domain and out-of-domain settings; **Propose** a risk-adjusted calibration method called DwD for helping LLMs minimize these risks in an overall NLI architecture. It helps LLMs skip a further 19.8% of high-risk tasks, compared to baselines.
- **Theoretically grounded commonsense reasoning dataset:** **Propose** a few-shot Theoretically Grounded Commonsense Reasoning (TG-CSR) benchmark that presents instances grounded in semantic categories of commonsense. This benchmark poses a challenge even for billion-parameter statistical language models like GPT-3 (with F1-Scores of 0.6), which have achieved near-human performance on other datasets.
- **Unsupervised real-time induction and interactive visualization of taxonomies in e-commerce:** **Develop** an unsupervised, end-to-end taxonomy induction system to automatically induce a taxonomy for arbitrary concept-labels from the e-commerce domain. The approach is significantly more competitive than seven different baselines, including the state-of-the-art model "TAXI" by significantly reducing the average shortest path metric by 15%, bringing it closer to the ground truth.
- **Subjective well-being during the COVID-19 pandemic:** **Implement** traditional statistical methods, such as controlled correlations, fixed effects regressions, and a novel conditional inference tree (CIT) model to quantify the interactions and conditional effects of different COVID-19 pandemic era policies and socio-demographic correlates on individuals' mental health and subjective well-being.

## PUBLICATIONS

---

- **Shen, K., & Kejriwal, M.:** On the generalization abilities of fine-tuned commonsense language representation models. In Artificial Intelligence XXXVIII: 41st SGAI International Conference on Artificial Intelligence, AI 2021, Cambridge, UK, December 14–16, 2021, Proceedings 41 (pp. 3-16). Springer International Publishing.
- **Shen, K., & Kejriwal, M.:** Substructure Discovery in Commonsense Relations Using Graph Representation Learning, In Proceedings of the Intelligent Systems Conference (IntelliSys), 2023.
- **Shen, K., & Kejriwal, M. :** Using conditional inference to quantify interaction effects of socio-demographic covariates of US COVID-19 vaccine hesitancy. PLOS Global Public Health, 2023, 3(5), e0001151.
- **Shen, K., & Kejriwal, M.:** Quantifying Confidence Shifts in a BERT-based Question Answering System Evaluated on Perturbed Instances, PLOS ONE (Under Minor Revision).
- **Kejriwal, M., & Shen, K.:** Can Scale-free Network Growth with Triad Formation Capture Simplicial Complex Distributions in Real Communication Networks? In 2nd Workshop on Graphs and more Complex Structures for Learning and Reasoning, Colocated with AAAI 2022.
- **Kejriwal, M., Shen, K., Ni, C. C., & Torzec, N.:** Transfer-based taxonomy induction over concept labels. Engineering Applications of Artificial Intelligence, 108, 104548.

## AWARDS

---

- Best Technical Paper Award at the 41st SGAI International Conference on Artificial Intelligence - Dec, 2021