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ROSHANAK MIRZAEE

Research Scientist / NLP

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Education

Ph.D. Computer Science (NLP) (GPA 4.0) — **Michigan State University** 2019 — present
Research Assistant: Spatial Reasoning and Language Understanding, Question Answering, Language Models, Transfer Learning.
Teacher Assistant: Data structure and Algorithm, Introduction to Python.

Projects:

- **Spatial Reasoning in Large Language Models and Evaluation Methods**(2023)
- **Spatial relation extraction**(2022): Propose a model to extract implicit and explicit spatial relations between entities.
- **Coreference resolution**(2022): Implement coreference resolution model including plural antecedents.
- **Pipeline model to do multi-hop spatial reasoning**(2022): Propose a model including spatial information extraction and spatial reasoner modules for spatial question answering.
- **Transfer Learning on Spatial Tasks**(2022): Propose a method to generate data with broad coverage of expressions and relations to enhance the generalizability of transfer learning method.
- **Spatial Reasoner**(2021): A prolog model for complex spatial reasoning using the combination between spatial rules relations.
- **Spatial Information Extraction**(2021): Probe language models on spatial information extraction by manipulating the input text.
- **Evaluate and Enhance language models' spatial reasoning capability**(202): Use Context-free grammar, context-sensitive rules, and spatial rules to generate automatic text and questions. Propose different experiments to evaluate Language models' spatial reasoning capability using the generated distant supervision in transfer learning.
- **Find incoherent images**(2020): Use BERT, Bi-LSTM, and attention model to find the image with no related text description.
- **Rule-based spatial reasoning**(2019): Implement a rule-based spatial information extraction and solves bAbI (task 17) questions.

M.Sc. CE (Algorithm and Computation) (GPA 4.0) — **University of Tehran** (2nd top University in Iran) 2016 — 2018

- **A Case-based Reasoning Approach for recommender system of interior design**: Improve CBR by compositional adaptation and fuzzy ontology on semantics relationships of objects to recommend interior design sets.

B.Sc. Computer Science (GPA 3.7) — **Amirkabir University of Technology** (3rd top University in Iran) 2012 — 2016

Experience

Conference Reviewer *(EMNLP, ACL, SpLU-RoboNLP (ACL workshop))* 2021 — present

Research Intern Summer 2022
Qualtrics-XM *Seattle, WA*

- Improve the generalizability of models considering the result of interpretation
- Method and Metrics for Models Interpretation: Define a saliency score to check the influence of highlighted keywords extracted by saliency map methods (Use AllenAI packages for interpretation .)

Research Intern Summer 2021
Robert Bosch LLC - CR/RS1-NA *Pittsburgh, PA*

- Augmenting Language Models with Spatial CommonSense Through Synthetic Question Answering

Project Manager (Web Design) 2016 — 2019
Vestaak *Tehran, Iran*

Publications

- **Disentangling Extraction and Reasoning in Multi-hop Spatial Reasoning**, R Mirzaee, et. al. *(EMNLP-Finding, ICML-KLR 2023)*
- **Dual-Phase Models for Extracting Information and Symbolic Reasoning: A Case-Study in Spatial Reasoning**, R Mirzaee, et. al. *(IJCAI-STRL 2023)*
- **GLUECons: A Generic Benchmark for Learning Under Constraints** , H Faghihi, R Mirzaee, et al. *(AAAI-2023)*
- **Transfer Learning with Synthetic Corpora for Spatial Semantic Role Labeling and Reasoning**, R Mirzaee, et al. *(EMNLP-2022)*
- **Generalizable Neuro-symbolic Systems for Commonsense Question Answering**, A Oltramari, R Mirzaee, et al. (IOS press-2022) Chapter 3, *(Neuro-Symbolic Artificial Intelligence:The State of the Art)*
- **SPARTQA: A Textual Question Answering Benchmark for Spatial Reasoning**, R Mirzaee, et al. *(NAACL-2021)* (non-archival acceptance in *SpLU Workshop (EMNLP-2020)*)
  The Best Poster of Michigan AI Symposium 2020. Best poster award Grad symposium MSU 2022.
- **Latent Alignment of Procedural Concepts in Multimodal Recipes**, H Faghihi, R Mirzaee, et al. *(ALVR Workshop ACL-2020)*

Skills

Technical	**Python**, **PyTorch**, Prolog, Problog, C/C++, Java, Git. HTML, CSS, Bootstrap, Javascript, SQL, PHP. Transformers, Language Models, HugginFace Repo, AllenAI package.
Scientific	Machine and Deep Learning, Neural Network, NLP, Graph and Networks, Matrix, Algebra, Probability. Case-based and Rule-based Reasoning, Compositional Adaptation, Semantic similarity, and ontology.