Neeraj Varshney

Ph.D. Student (4^{th} Year)
Computer Science (NLP/NLU)
Arizona State University

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Research Interests

Efficient & Reliable NLU Systems
Open-Domain QA
Selective Prediction
Learning from Less Supervision
Multi-task Learning
Generalization
Reasoning
Learning from NL Instructions
Robustness

Collaborators

Chitta Baral (ASU)
Swaroop Mishra (ASU)
Pratyay Banerjee (ASU)
Tejas Gokhale (ASU)
Man Luo (ASU)
Arindam Mitra (Microsoft Research)
Daniel Khashabi (Allen AI)
Ashwin Kalyan (Allen AI)
Peter Clark (Allen AI)
Yizhong Wang (Allen AI)
Rik Koncel-Kedziorski (Alexa AI)

Coursework

Natural Language Processing
Statistical Machine Learning
Artificial Intelligence
NLP Methods in BioMedical
Knowledge Representation
Data Mining
Social Media Mining
Mobile Computing

Technical Skills

PyTorch, Transformers
Pytorch-lightning
Spacy, Huggingface
Data Analysis, Pandas, NumPy
Git, Mechanical Turk
Matplotlib, NLTK, word2vec

OTHERS

- Reviewer for EACL'23 (in QA).
- Published 15+ ML/NLP articles on medium with $70,000^{+}$ views.
- Worked with Dr. Ayush Choure and Dr. Prateek Jain (MSR, India).
- Coordinator of CS Association at BITS Pilani and organized Research Talks event.

Research Statement

I work in Natural Language Processing, primarily in the areas of Open-domain QA, NLI, improving Efficiency & Reliability of systems, and NLU in general. On the efficiency topic, I have worked on improving inference efficiency, training sample efficiency, open-domain QA reader efficiency, and evaluation efficiency. Furthermore, on the reliability topic, I have worked on selective prediction. I have published papers on these topics at premier AI and NLP conferences including ACL, EMNLP, NAACL, and AAAI.

Selected Projects

(1) Can Open-Domain QA Reader Utilize External Knowledge Efficiently like Humans? *KnowledgeNLP, AAAI, 2023*

(2) Unsupervised Natural Language Inference Using PHL Triplet Generation *ACL, 2022*

(3) On Efficiently Indexing External Knowledge for Open-Domain QA *Ongoing*

(4) Investigating Selective Prediction Approaches Across Several Tasks in IID, OOD, and Adversarial Settings *ACL, 2022*

(5) ILDAE: Instance-Level Difficulty Analysis of Evaluation Data *ACL, 2022*

(6) NumGLUE: A Suite of Mathematical Reasoning Tasks *ACL, 2022*

(7) Towards Improving Selective Prediction Ability of NLP Systems *Repl4NLP, ACL, 2022*

(8) Let the Model Decide its Curriculum for Multitask Learning *DeepLo, NAACL, 2022*

(9) Model Cascading: Towards Jointly Improving Inference Efficiency and Accuracy of NLP Systems *EMNLP, 2022*

(10) On Reliably Re-Attempting the Unanswered Instances of the Selective Prediction System *Under Review@EACL*

(11) Benchmarking Generalization via In-Context Instructions on 1,600+ Language Tasks *EMNLP, 2022*

(12) On Evaluating NLP Models' Understanding of Feasibility *Under Review@EACL*

(13) An Architecture for Novelty Handling in a Multi-Agent Stochastic Environment: Case Study in Open-World Monopoly *AAAI Sym. 2022*

Work Experience

Amazon Science *May 2022 - Aug 2022* **Applied Scientist Intern**

- Worked in the Web Question Answering team for Alexa AI.

Microsoft *Jan 2018 - July 2019* **Software Developer**

- Worked towards developing a machine learning driven chat recommendation system aimed at augmenting user engagement with the product Microsoft 'Teams'.

Education

Arizona State University *2019 - 2024 Expected* **Ph.D. in Computer Science**

- **Advisor** : Dr. Chitta Baral
- **CPGA** : 4/4
- **Awards** : GPSA Award (2 times), Graduate College Award (3 times), SCAI conference award (2 times), ACL 2022 registration award from Repl4NLP.

BITS Pilani, Pilani Campus, India *2014- 2018* **B.E (Hons) Computer Science**

- **CGPA** : 9.11/10
- **Experience** : 'Web Intelligence & Social Computing' research lab under Prof. Poonam Goyal, CEERI research lab under Dr. J.L. Raheja.
- **Internships** : Microsoft, Samsung R&D Institute, Valuefirst Digital Media.