

# Neeraj Varshney

Ph.D. Student (4<sup>th</sup> 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 NLP systems, and NLU in general. On the efficiency topic, I have worked on improving inference efficiency, training sample efficiency, QA reader efficiency, knowledge indexing efficiency, and evaluation efficiency. On the reliability topic, I have worked on selective prediction. My work has been published at premier conferences including ACL, EMNLP, EACL, NAACL, AAMAS, 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-QA** *UNDER REVIEW@ACL*
- (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** *DEEPL0, 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** *EACL, 2023*
- (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 (4 times), SCAI conference award (2 times), ACL 2022 registration award from Repl4NLP, AAAI 2023 student scholarship.
- 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.