Neeraj Varshney

Ph.D. Student (Third Year)
Computer Science (NLP/NLU)
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Research Interests

Question Answering
Selective Prediction
Learning for Less Supervision
Multi-task Learning
Robustness
Generalization
Natural Language Inference
Reasoning

Collaborators

Chitta Baral
Swaroop Mishra
Pratyay Banerjee
Tejas Gokhale
Daniel Khashabi
Ashwin Kalyan
Peter Clark
Yizhong Wang

Coursework

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

Technical Skills

PyTorch
Transformers
Pytorch-lightning
Jupyter, Pandas
Git, Google Colab
Spacy, Huggingface
NumPy, Matplotlib
NLTK, word2vec
Linux

OTHERS

- Worked with Dr. Ayush Choure (MSR) in a project lead by Dr. Prateek Jain (MSR).
- Published 15+ ML/NLP articles on medium with 45000+ views.
- Organized 6^{th} edition of Alumni Research Talks being the Campus Coordinator of Computer Science Association at BITS.
- Worked at "Web Intelligence & Social Computing" lab under Prof. Poonam Goyal at BITS.

Publications

- **Unsupervised Natural Language Inference Using PHL Triplet Generation** *ACL, 2022*

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

- **ILDAE: Instance-Level Difficulty Analysis of Evaluation Data** *ACL, 2022*
  Conducted instance-level difficulty analysis in a large-scale setup of 23 datasets with 27 models and demonstrated its five novel applications such as:
  - Efficient Evaluations: Proposed instance selection technique achieves up to 0.93 kendall correlation with full dataset evaluation using just 5% instances.
  - OOD Correlation: Proposed method to compute weighted accuracy using the difficulty scores leads to 5.2% higher correlation with OOD performance.

- **NumGLUE: A Suite of Mathematical Reasoning Tasks** *ACL, 2022*

- **Towards Improving Selective Prediction Ability of NLP Systems** *ACL, RepL4NLP 2022*

- **Let the Model Decide its Curriculum for Multitask Learning** *NAACL, DeepLo 2022*
  - Proposed dataset and instance-level techniques to arrange training instances into a learning curriculum based on model's own interpretation of difficulty.
  - Achieved 4% accuracy improvement over other methods on experiments conducted for 12 datasets covering a variety of NLU tasks.

- **Benchmarking Generalization via In-Context Instructions on 1,600+ Language Tasks** *Preprint, 2022*

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

- **Interviewer-Candidate Role Play: Towards Real-World NLP Systems** *Preprint, 2021*

Work Experience

Amazon Science *May 2022 - Ongoing* **Applied Scientist Intern**
- Alexa AI - Web Information team

Microsoft *Jan 2018 - July 2019* **Software Developer**
- Contributed towards development of a Machine Learning driven chat recommendation system aimed at augmenting user engagement with Microsoft 'Teams'.
- Collaborated with MSR researchers for a feature titled 'Intelligent Feeds' that finds relevant messages for users based on their prior activities and message text features.

Education

Arizona State University *2019 - 2024 Expected* **Ph.D. in Computer Science**
- **Advisor** : Dr. Chitta Baral
- **CPGA** : 4/4
- **Awards** : Spring 2022 ASU GPSA Travel Award, Graduate College Travel Award, SCAI conference award, ACL 2022 registration award from RepI4NLP workshop.

BITS Pilani, Pilani Campus, India *2014- 2018* **B.E (Hons) Computer Science**
- **CGPA** : 9.11/10
- Member of 'Web Intelligence & Social Computing' research lab headed by Prof. Poonam Goyal.
- Accomplished research projects in CEERI under the guidance of Dr. J.L. Raheja.
- **Internships** : Microsoft, Samsung R&D Institute, Valuefirst Digital Media.