AKHILA YERUKOLA

Natural Language Processing · Machine Learning
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EDUCATION

Stanford University *Sept 2017 - June 2019*
M.S in Computer Science
Specialization: Artificial Intelligence, Information Management Analytics
Research Interests: Deep Learning for Natural Language Processing, with a focus on Language Generation and Semi/Weakly-Supervised Learning
Relevant Coursework: CS229 (Machine Learning), CS224n (NLP with Deep Learning), CS236 (Deep Generative Models), CS228 (Probabilistic Graphical Models), CS276 (Info. Retrieval, Web Search), STATS 315b (Modern Applied Statistics, Data Mining)

National Institute of Technology Trichy (NITT), Tamil Nadu, India *2012 - 2016*
B.Tech. in Computer Science and Engineering

EXPERIENCE

AI Research Engineer Aug 2019 - now
Samsung Research America (SRA), Mountain View, CA, USA
Supervisors: Hongxia Jin, Mason Bretan
- Working on data augmentation to generate diverse rephrases of utterances for voice-assistant NLU
- Proposed an architecture for unsupervised *fine grained aspect extraction* and *sentiment analysis* scalable across domains

Graduate Research Assistant Sept 2018 - July 2019
Stanford University, Department of Computer Science
Advisor: Christopher Manning
- Studied if and how *RNN language models* can "think ahead" and proposed a multi-task learning architecture to use this "future" information to improve language modeling
- Analyzed how large pretrained models do, and do not, improve *neural story generation*

Sr. Machine Learning Intern June 2018 - Sept 2018
IBM Watson, San Jose, CA, USA
Supervisors: Hau-wen Chang, Rama Akkiraju
- Improved Watson's NLU services for English *Named Entity Recognition* model using semi-supervised learning

Graduate Research Assistant March 2018 - June 2018
Stanford University, Biomedical Data Science and Medicine
Advisor: Teri Klein
- Worked on dependency parsing of PubMed article abstracts to extract bio-medical relationships between Chemical-Gene and Chemical-Disease pairs

Software Engineer June 2016 - Aug 2017
Microsoft R&D, Hyderabad, India
- Built a *sentiment analysis* model on social media posts for the 'Microsoft Social Engagement' product, which improves social selling by leveraging social insights

- Developed an orchestration engine library for implementing a reliable actor-message pattern in publisher-subscriber applications for a high degree of concurrency crucial in modern day dense cloud deployments

PUBLICATIONS

- **Akhila Yerukola***, Mason Bretan*, Hongxia Jin. **Data Augmentation for Voice-Assistant NLU using BERT-based Interchangeable Rephrase** *European Chapter of the Association for Computational Linguistics (EACL)*, 2021
- Abigail See, Aneesh Pappu*, Rohun Saxena*, **Akhila Yerukola***, Christopher D. Manning. **Do Massively Pretrained Language Models Make Better Storytellers?** *Computational Natural Language Learning (CoNLL)*, 2019.

(*** equal contribution**)

RESEARCH PROJECTS

Data Augmentation for Voice-Assistant NLU using BERT-based Interchangeable Rephrase

Akhila Yerukola, Mason Bretan*, Hongxia Jin* *Jan 2020 - Present*

· Introduced a data augmentation method based on byte pair encoding and BERT-like self attention model to rephrase existing spoken utterances whilst maintaining the original intent.
· Compared and evaluated this method with numerous augmentation techniques encompassing generative models such as VAEs and performance boosting techniques such as synonym replacement and back-translation.
· Performs strongly on downstream NLU tasks and in a user-study focused on utterance naturalness and semantic similarity [**Accepted at EACL 2021**].

Do Massively Pretrained Language Models Make Better Storytellers?
Abigail See, Aneesh Pappu, Rohun Saxena*, Akhila Yerukola*, Christopher Manning* *Spring 2019 - Summer 2019*

· Compared the performance of large pretrained model GPT-2 to a state-of-the-art story generation Fusion model (Fan et al.,2018) using several automatic metrics to evaluate stories.
· Showed that GPT-2 conditions more strongly on context, is more sensitive to event ordering and generates more concrete words and named entities (compared to Fusion model).
· Demonstrated that repetition and genericness of models is mainly caused mainly by choice of decoding algorithm, not a lack of training data [**Accepted at CoNLL 2019**].

How much do RNNs "think ahead"?
Akhila Yerukola, Joyce Xu, Abigail See, John Hewitt, Christopher Manning *Autumn 2018 - Winter 2019*

· Proposed a framework to probe RNNs to study where *future content* information is encoded, if any.
· Our analysis revealed that certain layers of a stacked-RNN contain more long-term information, RNNs form a general syntactic "plan" for at least a few upcoming tokens and can predict structures as lists and date formats.
· Explored the effect of multitask learning with this "future" information on language modeling behaviour.

Collaborative Filtering based Recommender Systems Undergraduate Thesis
Akhila Yerukola, Lakshmi Manoharan, Sushma Kodati, Leela Velusamy *Winter 2016 - Spring 2016*

· Tackled the sparsity problem in memory-based recommender systems caused due to insufficient transaction and feedback data.

· Proposed an algorithm which effectively utilized the unused singular ratings to reduce RMSE by 11.5% on MovieLens dataset and 17.36% on FilmTrust dataset.

TEACHING EXPERIENCE

- Course Assistant for CS224U (Natural Language Understanding), Spring 2019, with Professor Christopher Potts and Professor Bill MacCartney. Worked with a team of 10 CAs for 250+ students to refine and grade course assignments. Mentored 10+ student teams for the course project. Taught a lecture on "Probing black box models."
- Course Assistant for CS229 (Machine Learning), Autumn 2018, with Professor Andrew Ng. Worked with a team of 30+ CAs for 850+ students to develop new assignments, refine and grade course assignments. Mentored 30 student teams for the course project.
- Volunteer Instructor for Delta, the web development club of NITT (undergraduate). Taught basics of C++, Java and Android application development for the first semester in 2015 and 2016.

DEPARTMENTAL SERVICE

- Member of the Stanford MSCS Admissions Committee, 2019. Reviewed student applications with faculty to select the incoming MS students for 2020.
- [Undergraduate] Editor of Bits and Bytes, the official newsletter of the Department of Computer Science and Engineering, NITT, 2016. Managed a team of 10 people to release a newsletter twice a month.
- [Undergraduate] Head of Public Relations, Vortex, Department of Computer Science and Engineering Symposium, NITT, 2016.

AWARDS

- Top 3 Projects Award, CS231n (Convolutional Neural Networks for Visual Recognition) 2018. We implemented an image classification model that is robust to black-box adversarial attacks. Awarded 2nd best project out of 200+ projects.
- Top 3 Projects Award, CS224n (NLP with Deep Learning) 2018. We studied adversarial attacks on Question Answering systems and devised methods to improve robustness. Awarded 2nd best project out of 145+ projects.
- Third Highest GPA Award, 2015. Awarded by the Department of Computer Science, NITT to the student with the 3rd highest cumulative GPA.
- Full undergraduate scholarship by Ministry of Human Resource Development (MHRD), India 2012-2016. The scholarship is awarded to the top 0.01 % of students in the All India Engineering Exam, 2012.
- International Award for Young People (Duke of Edinburgh Award) 2010. Awarded to participants satisfying tasks in categories of Community Service, Adventure, Skill and Physical Recreation.

SKILLS

Software	Python, PyTorch, Tensorflow, C++, C#, JavaScript, NodeJS (proficient) Java, MATLAB, Android SDK, HTML (intermediate)
Languages	English, Telugu (native) Hindi, Kannada, Tamil (basic)
Extra-curricular	Publicity team member, inter-college fest team organizers 2013-2016 Core Member, Delta, the web development club of NITT First place, volleyball at the annual inter collegiate sports meet, India 2013 Taekwondo red belt certified 2010