Han **Guo**

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Education

University of North Carolina at Chapel Hill — *Chapel Hill, NC*

B.S. in Computer Science and Statistics — *2016 - Exp. 2020*

- **GPA** 3.81
- **Advisor** *Prof. Mohit Bansal (UNC-NLP Lab)*
- **Notable UNC Coursework:** Natural Language Processing (graduate), Statistical Machine Learning, Algorithm Analysis, Advanced Data Analysis, Simulation For Analytics, Optimization, Probability, Linear Algebra, Data Structures, Web Programming.
- **Notable Independent Coursework:** Natural Language Processing (Stanford CS224), Computer Vision (Stanford CS231), Reinforcement Learning (UCL COMPM050), Deep Reinforcement Learning (Berkeley CS294).

Publications

Dynamic Multi-Level Multi-Task Learning for Sentence Simplification [pdf]

***Han Guo**, Ramakanth Pasunuru, and Mohit Bansal.*

*Proceedings of **COLING 2018**, Santa Fe, New Mexico, **("Area Chair Favorites" Paper Award)**.*

- Presented a strong pointer-copy mechanism based seq2seq sentence simplification model, and then improved its logic/rewriting capabilities via multi-task learning with entailment/paraphrase generation tasks.
- Proposed a "multi-level" (higher semantic vs. lower syntactic) layered soft sharing approach, and a multi-armed bandit based training approach that dynamically learns to switch across tasks during learning.
- Experiments on multiple popular datasets demonstrated that our model outperforms competitive simplification systems in SARI and FKGL automatic metrics, and human simplification evaluation.

Soft, Layer-Specific Multi-Task Summarization with Entailment and Question Generation [pdf]

Han Guo, Ramakanth Pasunuru*, and Mohit Bansal.*

*Proceedings of **ACL 2018**, Melbourne, Australia.*

- Improved saliency extraction and logic skills of summarization models via multi-task learning with question/entailment generation tasks.
- Proposed multi-task architectures with layer-specific sharing across tasks, as well as soft-sharing mechanisms.
- Achieved statistically significant improvements over the strong baseline on both the CNN/DailyMail and Gigaword datasets, as well as on the DUC-2002 transfer/generalization setup.

Interactive-Length Multi-Task Video Captioning with Cooperative Feedback [link]

***Han Guo**, Ramakanth Pasunuru, and Mohit Bansal.*

*Proceedings of **NIPS 2017**, Long Beach, CA (demo papers).*

- Presented a fast and accurate demo system for our state-of-the-art multi-task video captioning model, with additional interactive-length paragraph generation and cooperative user feedback techniques.

Towards Improving Abstractive Summarization via Entailment Generation [pdf]

*Ramakanth Pasunuru, **Han Guo**, and Mohit Bansal.*

*Proceedings of **Workshop on Summarization Frontiers, EMNLP 2017**, Copenhagen, Denmark.*

- Incorporated natural language inference knowledge into an abstractive summarization model via multi-task learning, where we share its decoder parameters with those of an entailment generation model.
- Achieved promising initial improvements based on multiple metrics and datasets (including a test-only setting).

Experience

Research Assistant — *Chapel Hill, NC*

UNC Department of Computer Science — *2017.4 - PRESENT*

- Advised by Professor Mohit Bansal on Natural Language Processing and Deep Learning.
- Developed deep learning systems for improving textual generation/classification models using multi-task learning and multi-armed bandit (Python, TensorFlow, Shell, Docker, Kubernetes, SLURM, Singularity).
- Developed interactive demonstrations of state-of-the-art NLP models exhibited at NIPS-2017 and various CS-department out-reach events (Python, TensorFlow, Javascript, HTML, CSS).

Research Assistant — *Chapel Hill, NC*

UNC Department of Mathematics — *2017.2 - 2017.6*

- Advised by Dr. Feng Shi on data analytics on Wikipedia Talk Dataset and Amazon Book Review.
- Parsed Wikipedia talk page dump (100GB+), and used TF-IDF, logistic regression and multi-layer perceptron for sentiment analysis, with computations parallelized across multiple machines (200+) (Python, TensorFlow, SLURM).
- Used fastText/GloVe word-vectors and t-SNE to visualize the evolution of conversation in Wikipedia Talk Page (Python, Tableau).

Undergraduate Learning Assistant — *Chapel Hill, NC*

UNC Department of Computer Science — *2017.2 - 2017.5*

- Held office hours and provided assistance to students taking COMP116 "Introduction to Scientific Computing" course (MATLAB).

Awards

2019 Computing Research Association Outstanding Undergraduate Researchers, Honorable Mentions
2019.1 This award program recognizes undergraduate students in North American colleges and universities who show outstanding research potential in an area of computing research.

2018.6 **Area Chair Favorites Paper Award, COLING 2018**

2018.5 **ACL Travel Award** Travel award from a National Science Foundation Grant, and the ACL Walker Fund, for presenting at Annual Meeting of the Association for Computational Linguistics (ACL 2018)

2017.11 **OUR Travel Award** Travel award from Office of Undergraduate Research for presenting at Neural Information Processing System (NIPS 2017)

Skills

Proficiency in Python, TensorFlow, Shell, R.
Familiarity in PyTorch, MATLAB, HTML, CSS, JavaScript, Java, SQL, C, Tex, Docker, Kubernetes, SLURM, Singularity, Git, Tableau.

Other Projects

tf-library [link]

- Developed a Python library (with more than 10K lines of Python code) that implements various deep learning models (Transformer, Pointer Network, DDPG, etc), flexible base modules (extensions of Deepmind's sonnet.modules, etc) and utility functions (simple multi-GPU grid-search hyper-parameter tuning, etc) in TensorFlow with unit-tests and Docker integration.

UNC-NLP Group Page [link]

- Developed the webpage for our UNC-NLP research group (Javascript, HTML, CSS, Bootstrap).

Image Captioning [link]

- Implemented the image captioning model "Show, Attend and Tell" using TensorFlow and matched the results of the original work.

Image Style Transfer Using Deep Learning [link]

- Used convolutional neural networks to stylize an image using the style of another image
- Wrote a *blog post* on the image style transfer.

Twitter Bot [link]

- Used Python and Twitter API to implement simple Twitter bot that reads tweet feeds from my personal account, and retweet relevant tweets based on various text classification tools from Google Cloud Engine.

Other Experience

Live Demonstrations and Outreach *2017 - 2018*

- Developed interactive demonstrations for our research projects, including video-to-text captioning system and sentence simplification system.
- Presented the demos at NIPS-2017 conference, UNC Science Expo, and UNC Middle/High School Demo Day.

Data Analytics *2015 - 2016*

- Worked in 10-member group, and collected over 1,800 data on performance indicators of high school student organizations in Shanghai, China.
- Performed basic data analytics, and visualized the results using Tableau and R.
- Presented the final work online and in high schools / events, and received 3,000+ page views (online) and 300 audience (offline).

Voluntary Experience *2014 - 2016*

- Chaired the student organization Tuck In from 2014.7 to 2015.12.
- Tuck In Initiated 9 events, achieved in total 1700 attendees, brought art education to approximately 200 kids, and made donation (5,000 RMB) to local education institution and NGO in Kenya. Tuck In was reported by Liberation Daily, Shanghai News, Shanghai Student Post, Eastday etc.
- Volunteered in Kenya, taught science to kids, built their school and houses, and carried water for local residents.

Public Speaker *2015 - 2016*

- Invited speaker as Tuck In chair at 6 middle schools, university, TEDx Weiyu, Citic Bank, Hugh O'Brian Youth Leadership China seminar, etc.
- Invited guest at Shanghai Media Group.