Varun Gangal

PhD Candidate, CMU LTI

vgangal@andrew.cmu.edu
vgtomahawk.github.io

RESEARCH AREAS

Primary Interest: Natural Language Generation (NLG), with specific interests in style transfer, low-resource & creative NLG, narrative generation and data-to-text generation.
Secondary Interest: Data Augmentation (DA), with specific interests in DA for generation, DA for better evaluating models and assessing their robustness to domain shift.

EDUCATION

- **Language Technologies Institute, CMU** — Pittsburgh, Pennsylvania
  PhD in Language Technologies; **GPA**: 3.97/4.33 — Sep. 2016 – Ongoing
  - **Advisor: Eduard Hovy**
  - **Key Courses**: *Grammars & Lexicons, Machine Translation, Language Grounding For Vision & Control, Neural Networks For NLP, Algorithms for NLP, Deep Reinforcement Learning, Structured Prediction for NLP*
- **Indian Institute of Technology, Madras (IIT-M)** — Chennai, India
  B.Tech/M.Tech. in Computer Science and Engineering; **CGPA**: 9.27/10 — Aug. 2011 – May. 2016
  - **Advisor: Balaraman Ravindran**
  - **Key Electives**: *Machine Learning, NLP, Reinforcement Learning, Memory Based Reasoning, Searching & Indexing, Knowledge Representation, Distributed Algorithms, Ontologies, Graph Theory*
  - **GRE**: 337/340 (**Quant**: 170/170 **Verbal**: 167/170 **Analytical Writing**: 5.5/6)
  - **TOEFL**: 118/120 (**Reading**: 30/30 **Writing**: 30/30 **Listening**: 30/30 **Speaking**: 28/30)

PUBLICATIONS

[**C.19**] NAREOR: The Narrative Reordering Problem [ArXiv]
Varun Gangal*, *Steven Y Feng**, *Malihe Alikhani, Teruko Mitamura, Eduard Hovy*
Accepted for **AAAI 2022**

[**C.18**] Retrieve, Caption, Generate: Visual Grounding for Enhancing Commonsense in Text Generators [ArXiv] [Slides]
Steven Feng, Kevin Lu, Zhuofu Tao, Malihe Alikhani, Teruko Mitamura, Eduard Hovy, ***Varun Gangal***
Accepted for **AAAI 2022**

[**C.17**] Investigating Robustness of Dialog Models to Popular Figurative Language Constructs [PDF]
*Harsh Jhamtani**, ***Varun Gangal****, *Eduard Hovy, Taylor Berg-Kirkpatrick*
Accepted for **EMNLP 2021**

[**C.16**] Coarse2Fine: Fine-grained Text Classification on Coarsely-grained Annotated Data [PDF] [ArXiv]
Dheeraj Mekala, ***Varun Gangal****, Jingbo Shang*
Accepted for **EMNLP 2021**

[**C.15**] SAPPHIRE: Approaches for Enhanced Concept-to-Text Generation [PDF] [ArXiv] [CODE] [POSTER]
Steven Feng, Jessica Huynh, Chaitanya Narisetty, Eduard Hovy, ***Varun Gangal***
Accepted for **INLG 2021** [🏆 **Best Long Paper**]

[**C.14**] Automatic Construction of Evaluation Suites for Natural Language Generation Datasets [PDF] [ArXiv] [CODE] [POSTER]
Simon Mille, Kaustubh D Dhole, Saad Mahamood, Laura Perez, ***Varun Gangal****, Mihir Kale, Emiel van Miltenburg, Sebastian Gehrmann*
Accepted for **NeurIPS 2021 Datasets and Benchmarks Track**

[**C.13**] Improving Automated Evaluation of Open Domain Dialog via Diverse Reference Augmentation [PDF] [ArXiv] [CODE] [POSTER]
Varun Gangal*, *Harsh Jhamtani**, *Eduard Hovy, Taylor Berg-Kirkpatrick*
Accepted for **Findings of ACL 2021**

[**C.12**] A Survey of Data Augmentation Approaches for NLP [PDF] [ArXiv] [REPO] [TALK (for Google Research)]
*Steven Feng**, ***Varun Gangal****, *Jason Wei, Sarath Chandar, Soroush Vosoughi, Teruko Mitamura, Eduard Hovy*
Accepted for **Findings of ACL 2021**

[C.11] BERTering RAMS: What and How Much does BERT Already Know About Event Arguments? – A Study on the RAMS Dataset [ArXiv][PDF]
Varun Gangal, *Eduard Hovy*
Accepted for **BlackBoxNLP 2020 Workshop, EMNLP 2020**

[C.10] GenAug: Data Augmentation for Finetuning Text Generators [ArXiv] [PDF] [CODE] [TALK]
*Steven Feng**, ***Varun Gangal****, *Dongyeop Kang, Teruko Mitamura, Eduard Hovy*
Accepted for **Deep Learning Inside Out Workshop, EMNLP 2020**

[C.9] SCDE: Sentence Cloze Dataset with High Quality Distractors From Examinations [PDF] [DATA] [CODE]
*Xiang Kong**, ***Varun Gangal****, *Eduard Hovy*
Accepted for **ACL 2020**

[C.8] Likelihood Ratios and Generative Classifiers For Unsupervised OOD Detection In Task-Based Dialog [PDF] [DATA]
Varun Gangal, *Abhinav Arora, Arash Einolghozati, Sonal Gupta*
Accepted for **AAAI 2020**

[C.7] (Male, Bachelor) and (Female, Ph.D) have different connotations: Parallelly Annotated Stylistic Language Dataset with Multiple Personas [PDF] [CODE+DATA] [PRESENTATION]
Dongyeop Kang, ***Varun Gangal***, *Eduard Hovy*
Accepted for **EMNLP 2019**

[C.6] Learning to Generate Move-by-Move Commentary for Chess Games [PDF] [POSTER]
*Harsh Jhamtani**, ***Varun Gangal****, *Eduard Hovy, Graham Neubig, Taylor Berg-Kirkpatrick*
Accepted for **ACL 2018**

[C.5] Charmanteau: Character Embedding Models For Portmanteau Creation [ARXIV][SLIDES][CODE][DATA]
Varun Gangal*, *Harsh Jhamtani**, *Graham Neubig, Eduard Hovy, Eric Nyberg*
Accepted for **EMNLP 2017**

[C.4] Detecting and Explaining Causes From Text For a Time Series Event [ARXIV]
Dongyeop Kang, ***Varun Gangal***, *Ang Lu, Zheng Chen, Eduard Hovy*
Accepted for **EMNLP 2017**

[C.3] Shakespearizing Modern Language Using Copy-Enriched Sequence-to-Sequence Models [ARXIV][CODE]
*Harsh Jhamtani**, ***Varun Gangal****, *Eduard Hovy, Eric Nyberg*
Accepted for **EMNLP 2017 Workshop on Stylistic Variation**

[C.2] HEMI: Hyperedge Majority Influence Maximization [PDF]
Varun Gangal, *Balaraman Ravindran, Ramasuri Narayanam*
Accepted for **The Second IJCAI Workshop on Social Influence Analysis (SocInf 2016)**

[C.1] Trust And Distrust Across Coalitions: Shapley Value Centrality Measures For Signed Networks [PDF]
Varun Gangal, *Abhishek Narwekar, Balaraman Ravindran, Ramasuri Narayanam*
Accepted for **NIPS 2015 Workshop on Networks In the Social And Information Sciences**

ABSTRACTS

[A.2] Personifications are Cunning: Exploring Approaches For Personification Identification [PDF]
Kevin Lu, Steven Feng, ***Varun Gangal***, *Harsh Jhamtani, Eduard Hovy*
Accepted for **New Directions in Analyzing Text as Data (TADA) 2021**

[A.1] Trust And Distrust Across Coalitions: Shapley Value Centrality Measures For Signed Networks [PDF]
Varun Gangal, *Abhishek Narwekar, Balaraman Ravindran, Ramasuri Narayanam*
Accepted for **AAAI Student Abstract 2016**

PREPRINTS

[P.2] NL-Augmenter: A Framework for Task-Sensitive Natural Language Augmentation [ArXiv] [CODE]
Kaustubh Dhole, Varun Gangal, Sebastian Gehrmann, Aadesh Gupta ... (Multiple Authors)

[P.1] The GEM benchmark: Natural Language Generation, its Evaluation and Metrics [ArXiv] [CODE]
*Sebastian Gehrmann, Tosin Adevumi**, *... Varun Gangal**, *...* (Multiple Authors)

ORGANIZATIONAL EXPERIENCE

- **GEM: Natural Language Generation, its Evaluation and Metrics Workshop** ACL 2021
  Role : Organizer Jan - July 2021
  - This workshop aimed to create and discuss better and standardized evaluation and comparison of NLG models and systems - a parallel to GLUE for NLG. Was closely involved in choosing tasks, designing challenging test sets, developing basic tutorial notebooks, reviewing, and inviting panelists/speakers.
- **CtrlGen: Controllable Generative Modeling in Language and Vision Workshop** NEURIPS 2021
  Role : Organizer Jan - December 2021
  - Our workshop explores disentanglement and control for generative models in CV and NL. Co-conceptualized idea with co-organizer Steven Feng, assembled co-organizer team, involved in proposal drafting, scheduling, inviting speakers, formulating Call for Papers and publicity.

TALKS & LECTURES

- November 13, 2021: 1-hour invited Lecture as a part of the CS1699: Intro To NLP course at **University Of Pittsburgh**. Spoke on *"Style In NLG"*. [VIDEO]
- October 15, 2021: Invited 1-hour Seminar talk at **University Of Pittsburgh**. Spoke on *"Endowing Generators With Style, Creativity and Commonsense"*. [VIDEO]
- August 30, 2021: Invited talk and discussion session at **Google Research** with co-author Steven on our *"A Survey of Data Augmentation Approaches for NLP"* work ([C.12]) [VIDEO]
- October 22, 2020: Invited 1-hour talk at **University of Utah Data Science Seminar**. Presented my work on data augmentation for conditional generation ([C.10]) and probing extra-sentential abilities of BERT ([C.9],[C.11]) [VIDEO]
- February 8, 2016: Co-taught a two-part tutorial on Linear Algebra as part of the Introduction to Machine Learning MOOC with 135 participants, designed by IIT-Madras for the NPTEL platform. The videos have received $38K+$ and $22K+$ views respectively [PART I VIDEO][PART II VIDEO]

REVIEWING

Conferences: ACL '19, EMNLP '19, AAAI '20, ACL '20, COLING '20, ACL-RR '21, AAAI '22
Workshops: HAMLETS@ NEURIPS '20

PROFESSIONAL EXPERIENCE

- **Unsupervised OOD Detection For Task Based Dialog** Facebook Conversational AI, Menlo Park, CA
  Mentors : Sonal Gupta, Arash Einolghozati, Abhinav Arora May – August 2019
  - Task-based dialog systems on deployment often get user inputs which aren't actually intents pertaining to any domain, such as rhetorical remarks, subjective questions and ill-specified search queries.
  - If not filtered, these inputs can wreak havoc on downstream components like slot detection. Furthermore, it is infeasible to curate training data for these *"OOD"* inputs. Hence, we need unsupervised approaches to detect these at test-time jointly with intent classification.
  - We explore **likelihood ratio** with a **background** likelihood as an alternative to plain likelihood. We find this to consistently improve OOD detection for multiple types of likelihood functions.
  - We propose learning a **generative classifier** and computing a marginal likelihood (ratio) for OOD detection. This outperforms approaches based on simple likelihood as well as discriminative classifiers.
  - **Accepted at AAAI 2020** [C.8]
- **Centrality and Influence in Unconventional Social Networks** IBM Research, India
  Mentor : Ramasuri Narayanam May – July 2015
  - Worked on centrality measures for signed networks [C.1], multiplex networks and hypergraphs [C.2].
- **Building Ad Customer Profile Using ML (CUPRUM)** Bing Ads Team, Microsoft India
  Mentor : Prashant Rajoria May – July 2014
  - Worked on building models of various aspects of Bing advertisters such as spamminess, malware and serveability using supervised machine learning methods, based on features from their ad pages.

RESEARCH MENTORING EXPERIENCE

- **Kevin Lu - Univ of Waterloo Undergrad, CS, Class of 2026, ([C.18] [A.2])** — June-Present 2021
- **Dheeraj Mekala - Univ of San Diego Masters, CS, Class of 2021, ([C.16])** — Jan-Sept 2021
- **Zhuofu Tao - UCLA 1st Year PhD, CS, ([C.16])** — June-August 2021
- **Sedrick Keh - CMU Masters, Machine Learning, Class of 2023** — Sept-Present 2021
- **Petros Karypis - UMN Masters, Computer Science, Class of 2022** — Sept-Present 2021
- **Steven Y. Feng - CMU Masters, LTI, Class of 2022, ([C.10])** — April-Sept 2020

TEACHING EXPERIENCE

- **Teaching Assistant - Neural Networks For NLP, Spring 2018** — CMU
- **Teaching Assistant - Grammars & Lexicons, Fall 2017** — CMU
- **Teaching Assistant - Machine Learning MOOC, Spring 2016** — NPTEL & IIT Madras
- **Teaching Assistant - Reinforcement Learning, Spring 2016** — IIT Madras
- **Teaching Assistant - Machine Learning, Fall 2016** — IIT Madras