Varun Gangal

4th Year PhD Student, CMU LTI

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vgtomahawk.github.io

RESEARCH AREAS

Natural Language Processing, Machine Learning

EDUCATION

- **Language Technologies Institute, CMU** — Pittsburgh, Pennsylvania
  PhD in Language Technologies; **GPA**: 3.96/4.33 — 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*
  - Core Courses: *Networks, Databases, Operating Systems, Automata Theory, Compilers, Algorithms*
  - **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

- Likelihood Ratios and Generative Classifiers For Unsupervised Out-of-Domain Detection In Task-Based Dialog [PDF] (Cam-Ready under prep.)
  Authors: Varun Gangal, Abhinav Arora, Arash Einolghozati, Sonal Gupta
  Accepted for **AAAI 2020, New York City**
- (Male, Bachelor) and (Female, Ph.D) have different connotations: Parallelly Annotated Stylistic Language Dataset with Multiple Personas [PDF] [CODE+DATA] [PRESENTATION]
  Authors: Dongyeop Kang, Varun Gangal, Eduard Hovy
  Accepted for **EMNLP 2019, Hong Kong**
- Learning to Generate Move-by-Move Commentary for Chess Games [PDF] [POSTER]
  Authors: Harsh Jhamtani, Varun Gangal*, Eduard Hovy, Graham Neubig, Taylor Berg-Kirkpatrick*
  Accepted for **ACL 2018, Melbourne**
- Charmanteau: Character Embedding Models For Portmanteau Creation [ARXIV][DEMO][CODE][DATA]
  Authors: Varun Gangal, Harsh Jhamtani*, Graham Neubig, Eduard Hovy, Eric Nyberg*
  Accepted for **EMNLP 2017, Copenhagen**
- Detecting and Explaining Causes From Text For a Time Series Event [ARXIV]
  Authors: Dongyeop Kang, Varun Gangal, Ang Lu, Zheng Chen, Eduard Hovy
  Accepted for **EMNLP 2017, Copenhagen**
- Shakespearizing Modern Language Using Copy-Enriched Sequence-to-Sequence Models [ARXIV][CODE]
  Authors: Harsh Jhamtani, Varun Gangal*, Eduard Hovy, Eric Nyberg*
  Accepted for **EMNLP 2017 Workshop on Stylistic Variation, Copenhagen**
- HEMI: Hyperedge Majority Influence Maximization [PDF]
  Authors: Varun Gangal, Balaraman Ravindran, Ramasuri Narayanam
  Accepted for **The Second IJCAI Workshop on Social Influence Analysis (SocInf 2016), New York**
- Trust And Distrust Across Coalitions: Shapley Value Centrality Measures For Signed Networks [PDF]
  Authors: Varun Gangal, Abhishek Narwekar, Balaraman Ravindran, Ramasuri Narayanam
  Accepted for **AAAI Student Abstract 2016**
- Trust And Distrust Across Coalitions: Shapley Value Centrality Measures For Signed Networks [PDF]
  Authors: Varun Gangal, Abhishek Narwekar, Balaraman Ravindran, Ramasuri Narayanam
  Accepted for **NIPS 2015 Workshop on Networks In the Social And Information Sciences**

REVIEWING EXPERIENCE

- **ACL 2019, Generation Track & Machine Learning Track**
- **EMNLP 2019, Generation Track**
- **AAAI 2020**

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**, the pre-camera-ready draft can be viewed here (Cam-Ready under prep.)

- **Centrality and Influence in Unconventional Social Networks** IBM Research, India
  Mentor : Ramasuri Narayanam May – July 2015
  - Worked on centrality measures for unconventional social networks such as signed networks, multiplex networks and hypergraphs

- **Tongue Twister Generation** Snap Research, Venice, CA
  Mentor : William Brendel May – August 2018
  - Worked on learning natural language models for generating tongue twisters - sentences which are semantically meaningful as well as phonetically unusual.

- **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.

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**

TECHNICAL SKILLS

- **Programming Languages:** Java, Python, Matlab, C++, C
- **Tools & Libraries :** Dynet, PyTorch, NLTK, NetworkX, Python-igraph, Scikit-Learn, Django

CO CURRICULAR ACTIVITIES

- **Reporting & Writing**
  - Co-Author, Immerse[1] 2015 - Authored an article on Evolutionary Game Theory. [ARTICLE]

[1] IIT Madras research magazine