Nishant Kambhatla

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Education

- **PhD in Computing Science**
  Simon Fraser University, Canada , *2018–Present*
  Supervisor - Dr. Anoop Sarkar
- **M.Sc. in Computing Science**
  Simon Fraser University, Canada , *2016–2018*
  Supervisor - Dr. Anoop Sarkar
  Thesis Title: `Decipherment of Substitution Ciphers with Neural Language Models`
- **M.Sc. Software Engineering (Integrated Undergraduate Program)**
  Vellore Institute of Technology, India , (VIT University) *2011–2016*

Publications

[1] Pooya Moradi, Nishant Kambhatla, and Anoop Sarkar. Measuring and improving faithfulness of attention in neural machine translation. In *(To Appear) Proceedings of the 16th Conference of the European Chapter of the Association for Computational Linguistics (EACL): Volume 1, Long Papers*, 2021.

[2] Logan Born, Kate Kelley, Nishant Kambhatla, Carolyn Chen, and Anoop Sarkar. Sign clustering and topic extraction in proto-elamite. In *Proceedings of the LaTeCH-CLfL Workshop at Conference of the North American Chapter of the Association for Computational Linguistics (NAACL)*. Association for Computational Linguistics, 2019.

[3] Pooya Moradi, Nishant Kambhatla, and Anoop Sarkar. Interrogating the explanatory power of attention in neural machine translation. In *Proceedings of the 3rd Workshop on Neural Generation and Translation*, pages 221–230, 2019.

[4] Nishant Kambhatla, Anahita Mansouri Bigvand, and Anoop Sarkar. Decipherment of substitution ciphers with neural language models. In *Proceedings of the 2018 Conference on Empirical Methods in Natural Language Processing (EMNLP)*, pages 869–874. Association for Computational Linguistics, 2018.

Experience

- **CMPT 413 - Natural Language Processing** **Vancouver, Canada**
  Teaching Assistant, Simon Fraser University *Fall 2018, Fall 2019*
  Helped restructure the course for about 150 students. Designed a whole assignment from scratch with the aim of providing the students with a learning curve in applying their skills in computational decipherment.
- **NatLang Laboratory, Simon Frasr University** **Vancouver, Canada**
  Graduate Research Assistant, Advisor - Dr. Anoop Sarkar *Fall 2016–Present*
  Currently working on massively multilingual neural machine translation (NMT). Past projects have primarily focused on interpretable and explainable attention models in NMT, and computational decipherment - our approach is the first to use a large pretrained neural network language model to address the decipherment problem.
- **CMPT 165 - Introduction to the Internet and the World Wide Web** **Vancouver, Canada**
  Teaching Assistant, Simon Fraser University *Spring 2017, Spring 2018*
- **Aida Corporation** **Vancouver, Canada**
  Reaserch Intern *May 2017– Sept 2017*
  Worked towards improving customer-support automation workflow. Wrote an end-to-end neural machine translation system in PyTorch to train as a Question Answering system on the Amzon QA dataset. Also implemented a tool to normalize synonyms using PPDB, wordnet synsets and MT-evaluation metrics like BLEU and METEOR.

Research Projects

- **Stuttering and Cerebral Lateralization** **Vancouver**
  Advisor - Dr. Yue Wang *Spring 2020*
  - Studied the pathogenesis of stuttering or stammering remains an active area of research.
  - Five adult, right-handed stutterers (4 male, 1 female) and six adult non-stutterers (3 male, 3 female) were administered a dichotic non-syllable listening task to examine cerebral laterization.
  - Most stutterers exhibited LEA with 60% of them showing a reversal in ear-preference.
  - This evidences that stutterers might have a reversed or mixed cerebral dominance which results in an in-coordination of cortical areas supporting speech perception and speech production, resulting in stuttering. This finding is consistent with some previous research and supports the Orton-Travis theory that relates stuttering to abnormalities in hemispheric-lateralizations in brain.
- **Decipherment of Substituion Ciphers with Neural Language Models** **Vancouver**
  Fall 2017-Fall 2018
  - Developed a method for decipherment of substitution ciphers using neural language models (NLM).
  - This augments the state of the art which currently uses n-gram language models.
  - Modified the beam search algorithm to use global scoring of the full plaintext message constructed by sampling from NLM.
  - Successfully deciphered several substitution ciphers including 1:1 letter substituion ciphers and homophonic ciphers - Zodiac-408 and Beale Pt 2.
  - This approach outperforms the current state of the art, achieving lower error rates for smaller beam sizes.
- **Paraphrasing with Neural Machine Translation** **Vancouver**
  Fall 2016
  - Outlined a method to extract paraphrases for a source language using its translation by an NMT system.
  - Employed NMT system is encoder-decoder framework, where both encoder and decoder are Gated Recurrent Units, with an attention model to provide soft alignments by using a weighted sum of all encoder context vectors for predicting target tokens.
  - We follow the process of bilingual pivoting across the source-target language pair for extracting paraphrases.

Awards and Achievements

- *Helmut & Hugo Eppich Family Graduate Scholarship* *Spring 2021*
- *Accepted to Advanced Language Processing School (ALPS) in Grenoble, France* *Jan 2021*
- *MITACS Research Award to support research in Massively Multilingual NMT* *Summer 2020*
- *FAS Graduate Fellowship, Simon Fraser University* *Spring 2020*
- *CMPT Graduate Fellowship, Simon Fraser University* *Summer 2019*
- *CMPT Graduate Fellowship, Simon Fraser University* *Fall 2016*

Service

- **Conference/Workshop Reviewer**
  , ACL 2021, AfricaNLP 2021, NAACL 2021, ALW 2019, ACL 2020, EMNLP 2020, WOAH 2020 (Program Committee)
- **NLP Mentor in AI4ALL summer school (July 2019)**
  , Mentored 11 high school girls in fundamental concepts of NLP; co-authored a paper [1] with one of the students.

For reference contact Dr. Anoop Sarkar, Professor, Simon Fraser University – `anoop@sfu.ca`