Biraj Silwal

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Education

Tribhuwan University - Institute of Engineering, Pulchowk Campus — Lalitpur, Nepal
Master of Science in Computer Engineering, Data Science and Analytics — Feb 2022 – Feb 2024 *(expected)*
Thesis: Adding Interpretability to Word Embeddings

Tribhuwan University - Kantipur Engineering College — Lalitpur, Nepal
Bachelor's Degree in Computer Engineering — Jan 2017 – Jan 2022

Work Experience

Cedar Gate Technologies — Lalitpur, Nepal
Software Engineer, Data Processing — Apr 2022 – Oct 2022

- Developed the authentication system for the Data Processing department and was responsible for the automation of daily data deliverables.
- Managed the Data Processing platform and was responsible for monitoring the operations of the Production Engineers.

Sprout Technologies — Lalitpur, Nepal
Sports Analyst & Team Lead — Sept 2020 – Jan 2022

- Annotated, visualized and illustrated the minute by minute events and statistics of various varsity sports.
- Trained and led a team of ten analysts to produce the required data and visualizations.

Publications

- **B. Silwal**, "Syntactic Representations Enable Interpretable Hierarchical Word Vectors,", *under review at the Twelfth International Conference on Learning Representations.*
- **B. Silwal**, "Sense Aware Interpretable Syntactic Representations," *In preparation.*
- **B. Silwal**, "Aggregating Isolated Regularities as Word Vectors," *In preparation.*
- **B. Silwal**, "Adding Interpretability to Word Embeddings," Graduate thesis, *In preparation.*

Research

Aggregating Isolated Regularities — May 2023 - Dec 2023 *(expected)*

- Isolated syntactic and semantic regularities from pre-trained word vectors in terms of Syntactic Representations and Semantic Differentials respectively.
- Aggregated the isolated regularities to produce Aggregated Vectors, which work as a representation of the inductive aspect of the human learning process.
- Evaluated the performances of different iterations of the Aggregated Vectors in various benchmark evaluation tests and compared them against the state-of-the-art models.

Syntactic Representations & Hierarchical Word Vectors — Feb 2023 - Sept 2023

- Extracted syntactic regularities from pre-trained word vectors via means of post-processing to create a novel notion of Syntactic Representation, which is interpretable in terms of parts of speech.
- Created Hierarchical word vectors, which works as a representation of the hierarchical aspect of the human learning process, by associating Syntactic Representations with their respective pre-trained word vectors.

– Evaluated and reported the performance of various forms of the Hierarchical vectors against the pre-trained vectors, in an array of benchmark evaluation tests.

Fine-tuning pre-trained BERT models using social media data Dec 2022 - Mar 2023

– Evaluated various BERT models pre-trained on Nepali language to establish a baseline model and an oracle.

– Extracted, stored and pre-processed social media data i.e posts and tweets in Nepali language.

– Fine-tuned the identified baseline model using the pre-processed data and finally compared the results with that of the baseline model and the oracle.

Predicting the outcomes and scorelines of football matches Dec 2019 - Feb 2021

– Identified, implemented and reported the use of multiple classification and regression algorithms to predict the outcomes and scorelines of various football matches.

– Submitted as a partial requirement for the completion of the Bachelors' degree.

Awards

Four year merit scholarship

– Awarded as a result of excellent performance in the Institute of Engineering entrance examinations; ranked **297**th out of nearly **15000** applicants.

– Covered all admissions, tuition and exam fees for the duration of the Bachelors' degree.

Skills

Technical Proficiency

– **Proficient:** Python, NumPy, Scikit-Learn, PyTorch, Tensorflow, Git, LaTeX, SQL, Keras, Pandas

– **Familiar:** Linux, C, C++, R, Apache Spark, Matplotlib, Docker

Relevant Courses

– Artificial Intelligence, Machine Learning & Computational Intelligence, Modern Natural Language Processing, Fundamentals of Data Science and Analysis, Data Mining, Big Data Technologies, Big Data Analytics, Infirmation Visualization, Optimization Theory and Techniques