

S. M. Ali Modarressi

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Last update: Apr 2022

EDUCATION

| | | |
|---------------------------------|---|---------------------|
| June 2022 2019 (Expected) | Iran University of Science & Technology (IUST) <ul style="list-style-type: none">MSc. Artificial IntelligenceGPA: 19.08/20Selected Coursework: Deep Learning, Machine Learning, Pattern Recognition, Image Processing, Reinforcement Learning, Data Mining | Tehran, Iran |
| July 2019 2014 | University of Tehran (UT) <ul style="list-style-type: none">BSc. Electrical Engineering – CommunicationSelected Coursework: Introduction to Programming, Advanced Programming, Digital Signal Processing, Computer Networks | Tehran, Iran |

PUBLICATIONS

GlobEnc: Quantifying Global Token Attribution by Incorporating the Whole Encoder Layer in Transformers [\[link\]](#)

A. Modarressi*, M. Fayyaz*, Y. Yaghoobzadeh, M. T. Pilehvar

- Accepted to the 2022 Annual Conference of the North American Chapter of the Association for Computational Linguistics (NAACL 2022)

*Equal Contribution

AdapLeR: Speeding up Inference by Adaptive Length Reduction [\[link\]](#)

A. Modarressi*, H. Mohebbi*, M. T. Pilehvar

- Accepted to the 60th Annual Meeting of the Association for Computational Linguistics (ACL 2022)

*Equal Contribution

Not All Models Localize Linguistic Knowledge in the Same Place: A Layer-wise Probing on BERToids' Representations [\[link\]](#)

M. Fayyaz, E. Aghazadeh, H. Mohebbi, **A. Modarressi**, M. T. Pilehvar

- Accepted to the BlackboxNLP Workshop at the 2021 Conference on Empirical Methods in Natural Language Processing (EMNLP)

Exploring the Role of BERT Token Representations to Explain Sentence Probing Results [\[link\]](#)

H. Mohebbi*, **A. Modarressi***, M. T. Pilehvar

- Accepted to the 2021 Conference on Empirical Methods in Natural Language Processing (EMNLP)

*Equal Contribution

RESEARCH EXPERIENCE

Interests: Natural Language Processing, Deep Learning (Focus: *Interpretability and Analysis of Models, Efficient methods for NLP*)

MSc. Research

Iran University of Science & Technology

Supervisor: Mohammad Taher Pilehvar

March 2020 - Now

GlobEnc: Quantifying Global Token Attribution by Incorporating the Whole Encoder Layer in Transformers

Nov 2021 – Apr 2022

Accepted to NAACL 2022

- We expand the scope of analysis from attention block in Transformers to the whole encoder.
- Our method significantly improves over existing techniques for quantifying global token attribution in BERT.
- We qualitatively demonstrate that the attributions obtained by our method are plausibly interpretable.

AdapLeR: Speeding up Inference by Adaptive Length Reduction

May 2021 – Nov 2022

Accepted to ACL 2022

- We train BERT using a dynamic token representation drop method which leads to considerable speedups in various tasks.
- This is obtained via training explanation heads over each layer and guiding them using saliency values extracted from a fine-tuned model.
- We discover that the explanation heads mostly retain tokens which are considered to be influential using the MOVIES dataset in the ERASER benchmark.

Not All Models Localize Linguistic Knowledge in the Same Place: A Layer-wise Probing on BERToids' Representations

March - September 2021

Accepted to BlackboxNLP @ EMNLP2021

- We point out that the weight mixing evaluation strategy in edge probing does not lead to reliable conclusions in layer-wise cross model analysis studies.
- We utilize an information-theoretic probing approach to analyze three frequently used pre-trained models.
- We also extend our probing experiments to fine-tuned representations to examine how linguistic information changes during finetuning.

Exploring the Role of BERT Token Representations to Explain Sentence Probing Results

August 2020 - March 2021

Accepted to EMNLP 2021

- We make several interesting observations that shed light on the meaningful latent subspaces within BERT's representations, including:
 - While most of the positional information is diminished through layers, sentence-ending tokens are partially responsible for carrying this knowledge to higher layers in the model.
 - Clear distinctions exist between number and verb-tense subspaces in higher layers.
 - Abnormalities can be captured by specific token representations, e.g., in two consecutive swapped tokens or a coordinator between two swapped clauses.

NLP Reading Group [\[link\]](#)

Iran University of Science & Technology

Supervisor: Mohammad Taher Pilehvar

April 2020 - Present

- Weekly talks about recent papers in NLP
- Presented several talks about analysis on BERT-based models and fine-tuning methods

TEACHING EXPERIENCE

TA for Natural Language Processing (Graduate Course)

Tehran Institute for Advanced Studies (TelAS)

Instructor: Mohammad Taher Pilehvar

Spring 2021

TA for Digital Image Processing (Graduate Course)

Iran University of Science & Technology (IUST)

Instructor: Mohammad Reza Mohammadi

Fall 2020

HONORS & AWARDS

Outstanding Student Award

Iran University of Science & Technology, Iran
2020-2021

Best Undergraduate Project Award

University of Tehran, Iran
September 2018

- Project title: "A Communication Platform on Phone Line with Smartphone via Wi-Fi Network"

International Young Physicists Tournament – Gold Medal

Bad Saulgau, Germany
July 2012

- Participated with Team of Iran
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WORK EXPERIENCE

Open-Source Contributor @ Huggingface/Transformers

June 2020 – Present

SOTA NLP framework for PyTorch & TensorFlow 2.0

- Reported issues and fixed bugs for the optimizer creation and GLUE preprocessing in the TF-based codes ([#4940](#), [#6492](#))

Co-Founder, Technical Manager @ DigiExpo

September 2016 – June 2017

A platform for acquiring information about exhibitions and trade shows

- UI developer for Web platform & MVP-based mobile app

Full-Stack Developer @ Methodland

January 2016 – August 2016

Methodland is a Persian wiki-style app filled with how-to guides.

- Designed the Client-Side and Server-Side interaction schema
- Implemented Client-Side using Ionic and AngularJS

RELATED ACADEMIC PROJECTS

- **Analyzed BERT's layerwise characteristics using linguistic probes** (Spring 2020): Using SentEval probing tasks, we applied a layerwise probing on pre-trained & several fine-tuned versions of BERT to emphasize a similar convexity in the layerwise performance. Using MLM heads, we show the MLM pre-training is responsible for this effect.
- **Implementation of a Coupled Generative Adversarial Networks (CoGAN)** (Spring 2020): Reviewed, analyzed, and implemented a CoGAN model. Trained with MNIST to learn a joint distribution of two types of digit image styles.
- **Anomaly detection using a 1D-CNN model (DeepAnT)** (Spring 2020): Implemented the DeepAnT architecture in Keras & TF2, reviewed its advantages and limitations, then modified the anomaly thresholding method to an online solution.
- **Self-supervised representation learning by predicting image rotations** (Fall 2019): Reimplemented the [paper's](#) algorithm for CIFAR10 rotation prediction and extracting useful representations for logistic regression over the 10 classes.

TECHNICAL SKILLS

Frameworks & Libraries:

TensorFlow, Keras, HuggingFace, PyTorch, Numpy, Matplotlib

Hardware:

Arduino, Raspberry PI, FPGA (DE Boards)

Programming Languages:

Python, R, Bash, C++, MATLAB, JavaScript, PHP, Swift, Verilog

LANGUAGES

Persian: Native

English: Fluent – (IELTS Overall Band Score: 7.5 – L: 8.5, R: 7.5, W: 6.5, S: 7.5)

French: Familiar