

Uladzislau Yorsh

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Education

- present **Charles University in Prague**, PhD.
2022 **Czech technical university in Prague**, Ing, with honors.
2020 **Czech technical university in Prague**, Bc.

Experience

- Apr **Research Assistant**, THE BIGCODE PROJECT.
2021–present
 - Implemented Transformer model variants for code processing tasks, including classification and auto-completion.
 - Proposed, implemented and evaluated two architectures for processing sequential inputs with $\mathcal{O}(n)$ complexity w.r.t. a sequence length.

May **Data Science Intern**, RECOMBEE S.R.O.
2021–Oct
 - Proposed and developed a new model for the next basket prediction task, which improved the IoU score by 10%.
 - Implemented a new Trasformer variant for recommendation.

Mar **Research Assistant**, INFERENCE TECHNOLOGIES.
2021–May
 - Proposed and implemented an unsupervised classification algorithm of wafer bin map defects, which improved the existing system performance from 0.76 to 0.81 kappa score.
 - Used autoencoder to embed WBM into a latent space, a denoising variant to make a more robust embedding for classes with defects looking similar to noise.
 - Additionally experimented with several variational and adversarial autoencoder variants.

Publications

- ICANN 2022 **Linear Self-Attention Approximation via Trainable Feedforward Kernel.**
 - Proposed and implemented a new attention mechanism with a linear complexity w.r.t. an input sequence length.
 - Evaluated the model on the LRA benchmark and beaten most of the baseline models.

ITAT 2022 **Text-to-Ontology Mapping via Natural Language Processing Models.**
 - Explored the possibilities of an automatic assignment of an onthology to a text document.

Other Projects

- Aug **SimpleTRON: Simple Transformer with $\mathcal{O}(N)$ Complexity.**
2021–Feb
 - Proposed and implemented a new attention mechanism with a linear complexity w.r.t. an input sequence length.
 - Evaluated the model on the LRA subset and outperformed all other models on the considered tasks.

Skills

- Languages Python, C, C++, Scala, Java, JavaScript, R
Domains Machine Learning, Computer Vision, Signal Processing, Natural Language Processing, Data Preprocessing, Theoretical Informatics, Statistics
Technologies PyTorch, Tensorflow, Keras, JAX, SQL, Docker, Apache Cassandra, Elasticsearch, MongoDB, Hadoop, SPARK, git, REST
Communication English (B2), Czech (B2), Russian (native)

Research Interests

Handling long sequences, which contain tens and potentially hundreds of thousands of tokens, is a challenging machine learning task I tackle. The goal is to make the models to be able to work with text chapters or even whole articles, in contrary to the current state-of-the-art limitation of few paragraphs. As this task is highly hardware demanding, I am also keen on developing parameter-efficient models that are able to reach state-of-the-art performance using less amount of compute, and put an additional effort into backing my findings up with theoretical explanations.