Magyar chatbot fejlesztése deep learning alapokon

Hungarian chatbot development on deep learning bases

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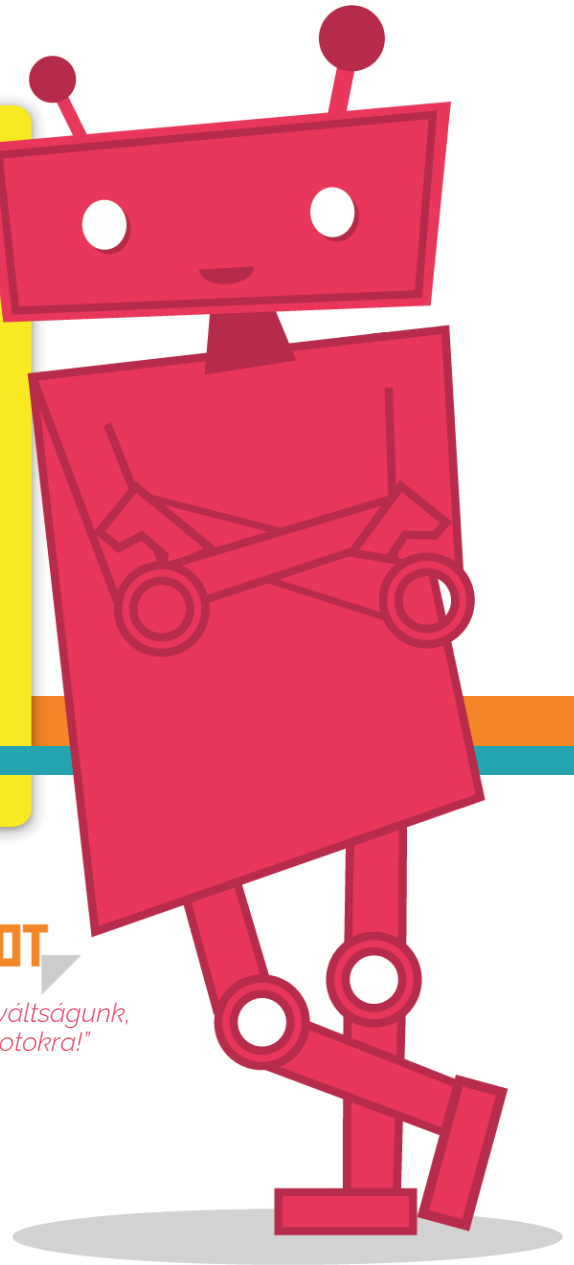

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"A kreativitás a mi kiváltságunk, bízzuk a többit a robotokra!"

Sources of our experience

90+ client

5,5 million visitor

40 million conversation

Chatbot types

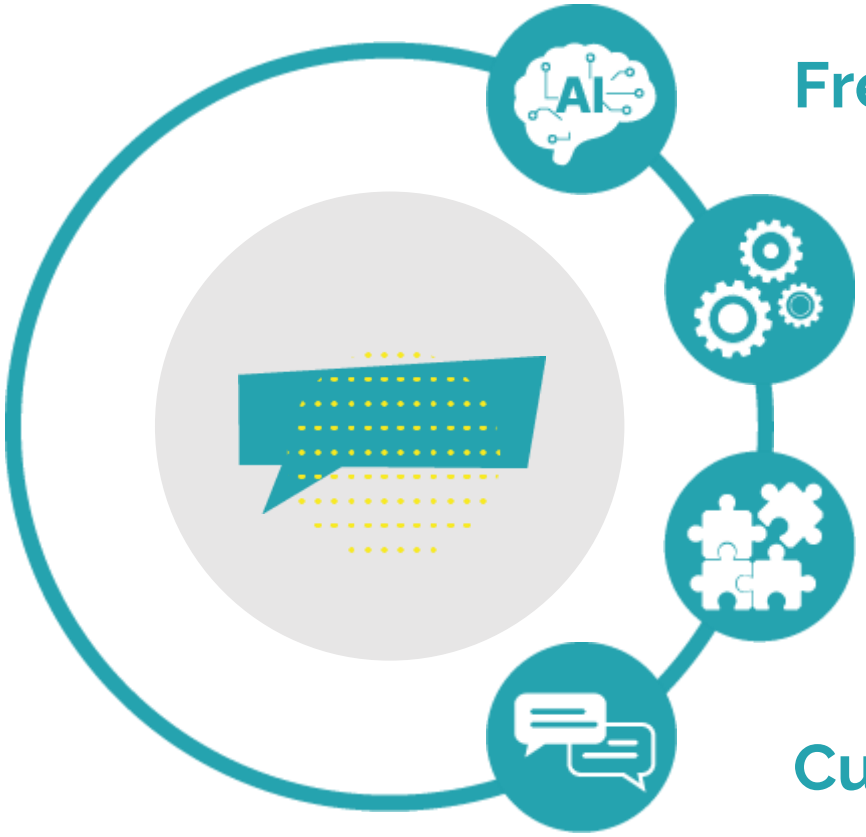
Open domain

- Chit-chat bots
- Dialog model
- Generates relevant answer

Commercial use

- Specific use-case
- Predefined datased
- Validated answers
- Default answer use

Specialisations



Free text evaluation

Built in custom features

Pre/Postprocessing integrations

Customer service fallback

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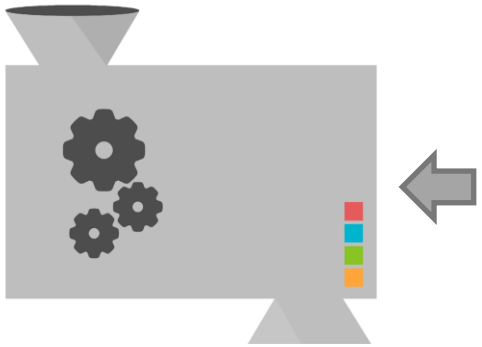
CHATBOT

Dataset

FAQ provided by clients is devided into smaller groups called **intents**.

Each intent represent an **answer**.

User input



Bot answer

Intent: Foglalás	**Intent**: Kereső	**Intent**: Kapcsolat
Useractions: • Két főre foglalnék asztalt • Asztal szeretnék két főre	**Useractions:** • Hol találom a legközelebbi ATM-et? • Hol tudok pénzt felvenni? • Közeli ATMek	**Useractions:** • Ügyfélszolgálatt al akarok beszélni • Mi a telefonszámuk?

Transformation logic

User input: Van közelben ATM?

0.21	0.83	0.46
Intent: Foglalás	**Intent**: Kereső	**Intent**: Kapcsolat
Useractions: • Két főre foglalnék asztalt • Asztal szeretnék két főre	**Useractions:** • Hol találom a legközelebbi ATM-et? • Hol tudok pénzt felvenni? • Közel ATMek	**Useractions:** • Ügyfélszolgálattal akarok beszélni • Van telefonos elérhetőség?

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Free text

Conventional:
Previously used solution

Vs.

ML:
New generation approach

Interaction

- Traditional algorithmic software
- Using manual keywords weighting
- Requires a global understanding and overview of the dataset

Amira

- Deep learning architechture
- Modular framework
- Stateless
- Scalable
- Easy to manage

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System integrations

Preprocessors

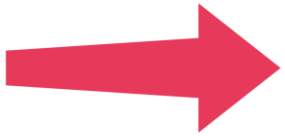
- STT - Speech To Text
- OCR – Optical Charachter Recogniser
- Sign langauge scanning form Video records
- Other types of transcripting applications

Postprocessors

- TTS - Text To Speech
- Operation controlling
- Custom commands

Changing paradigm

CONVENTIONAL PROGRAMMING



MACHINE LEARNING

Conventional programming approach

Advantages

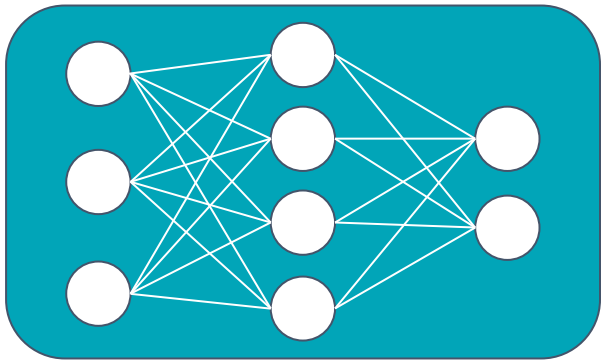
- Better debugging capabilities
- Great interpretability

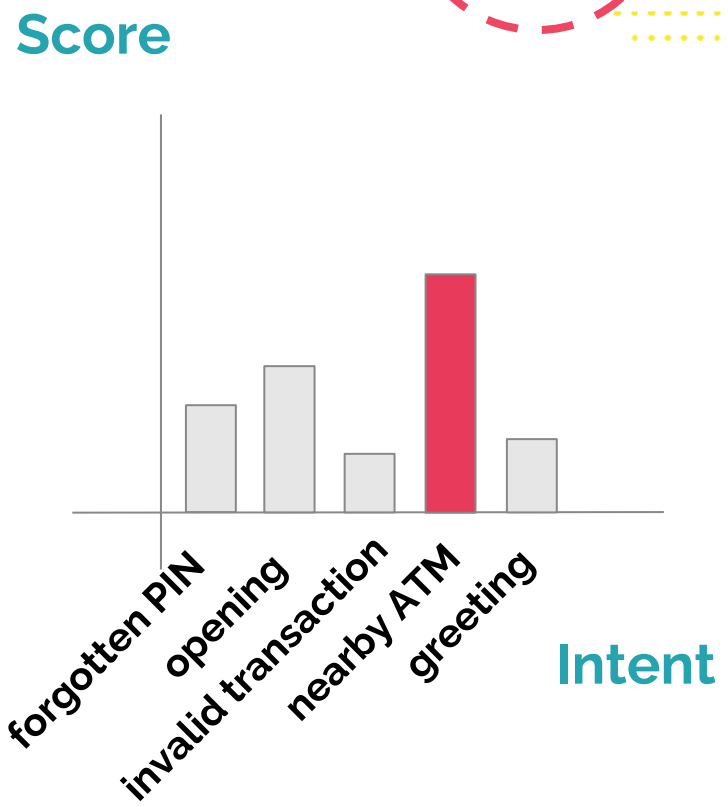
Disadvantages

- Does not scale to more complex logic
- Large amount of human decisions during development

Machine learning approach

Van a közelben ATM?





Machine learning approach

Advantages

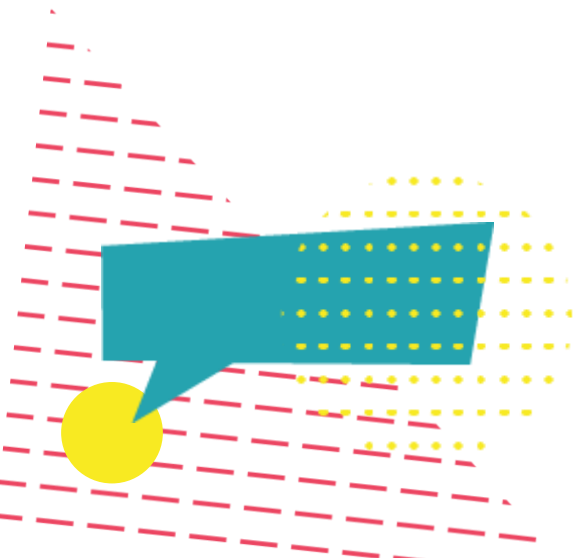
- Potential to imitate complex logic by learning from data
- Less supervision required for data management

Disadvantages

- Trade-off in prediction quality and interpretability
- Limited possibilities for fixing bad predictions

Expectations

- Maintaining interpretability
- Black-box behaviour must be contained in smaller modules
- Frequent feedbacks with readable outputs
- Usable models without expertise



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Motivation

Rasa

State of the art machine learning models for NLU

Easy configuration for users

Tensorflow implementation

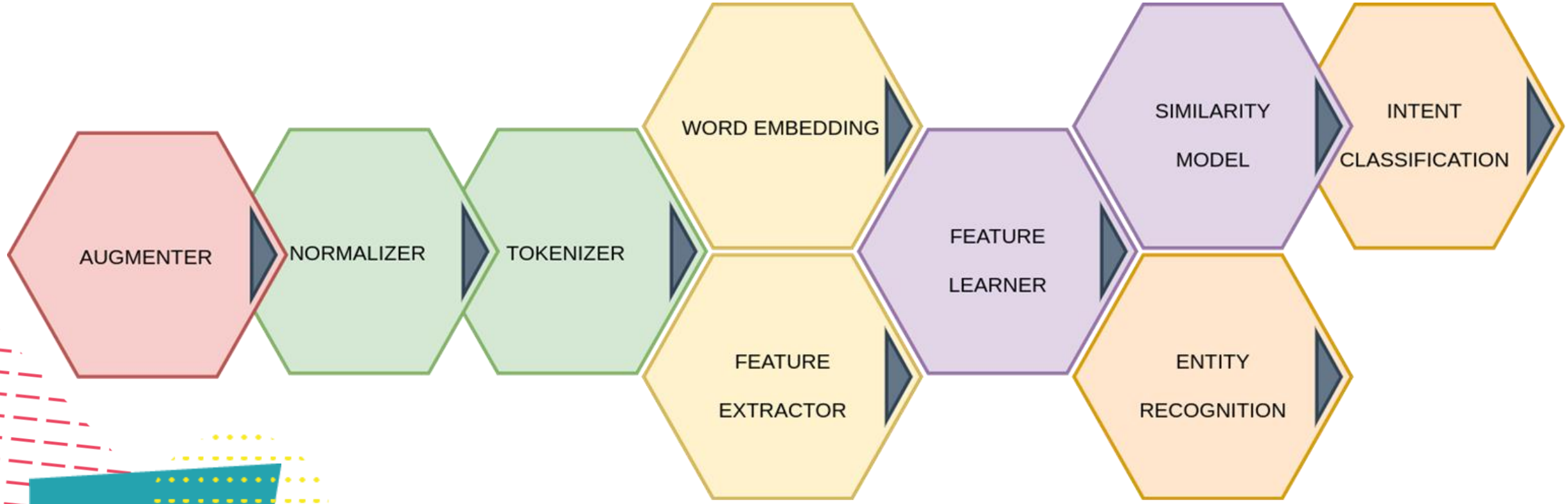
Solution

Amira

Easy configuration for developers

Pytorch implementation

Pipeline



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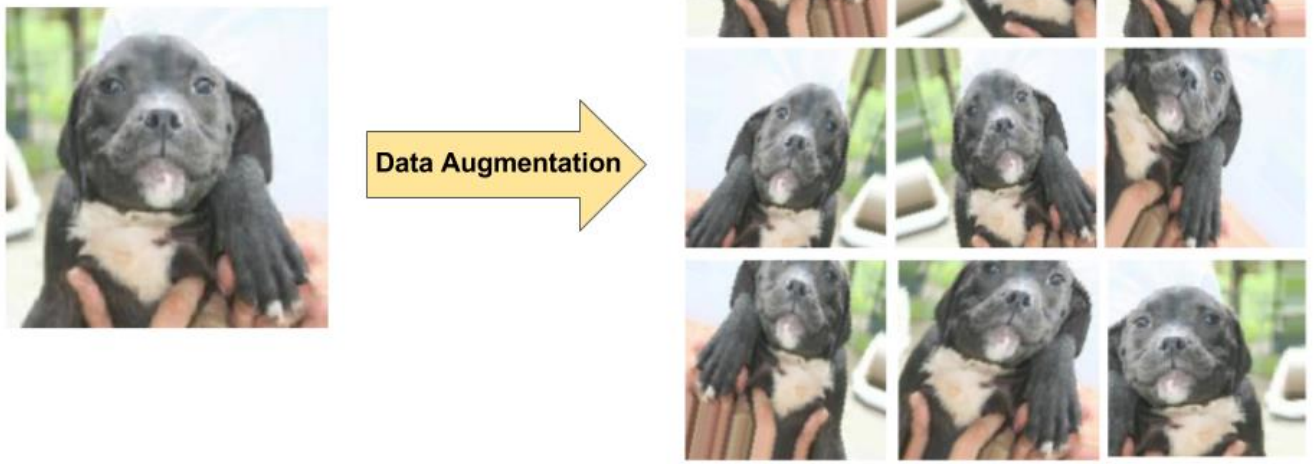
Augmentation



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Augmentation

Many customers initiated a return process of the product as it was not suitable for use

Many customers launched a return process of the product as it was not appropriate for use

It was conditioned in very thin box which caused scratches on the main screen

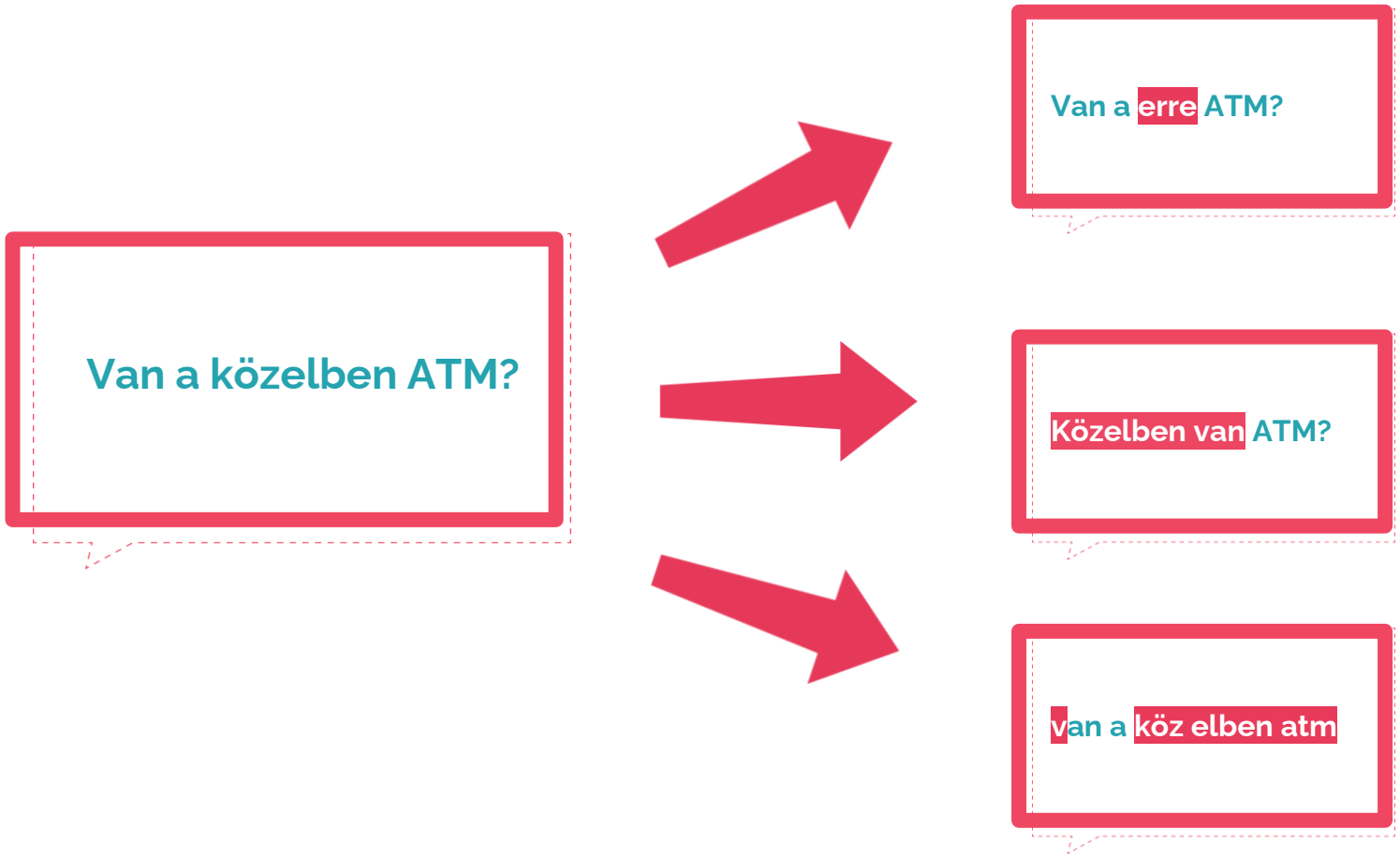
It was packaged in very thin table which provoked scratches on the main screen

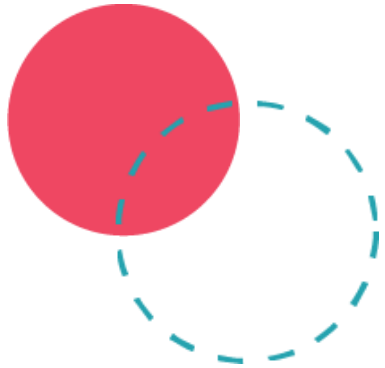
The involved firms positively answered their clients who were fully refunded

The involved firms favourably answered their clients who were fully reimbursed

Pipeline

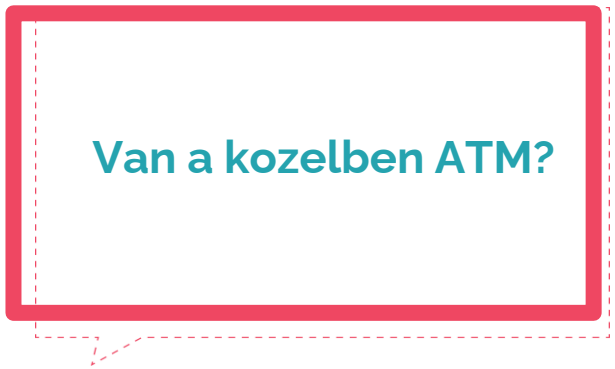
Augmenter

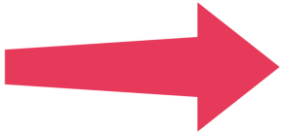


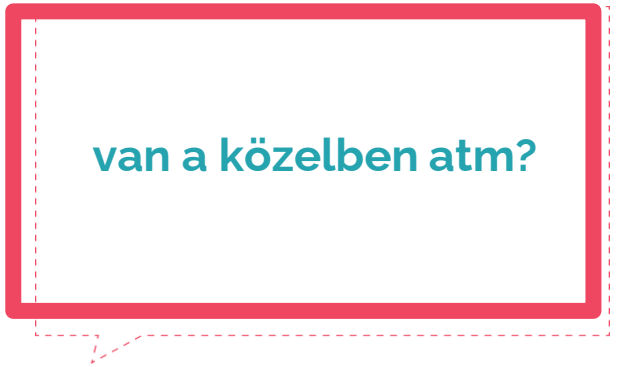


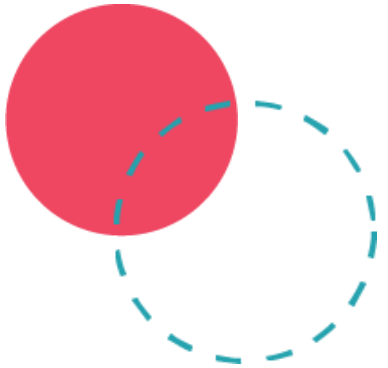
Pipeline

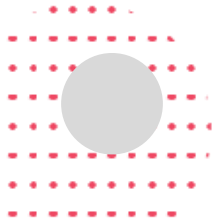
Normalizer











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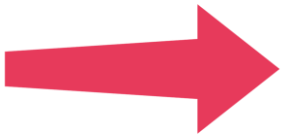
Pipeline

Tokenizer

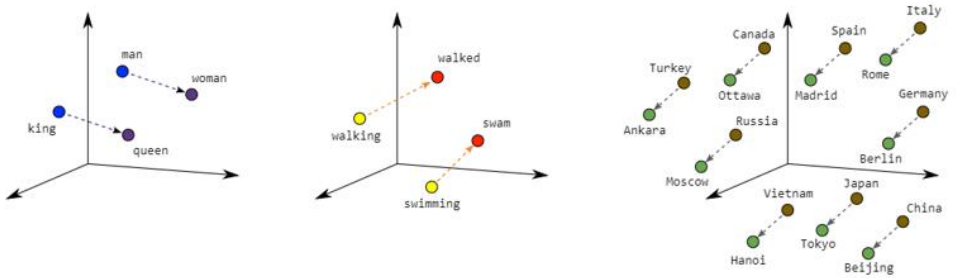
van a közelben atm?



```
[
  “van”, ”a”,
  ”közelben”,
  ”atm”, ”?”
]
```

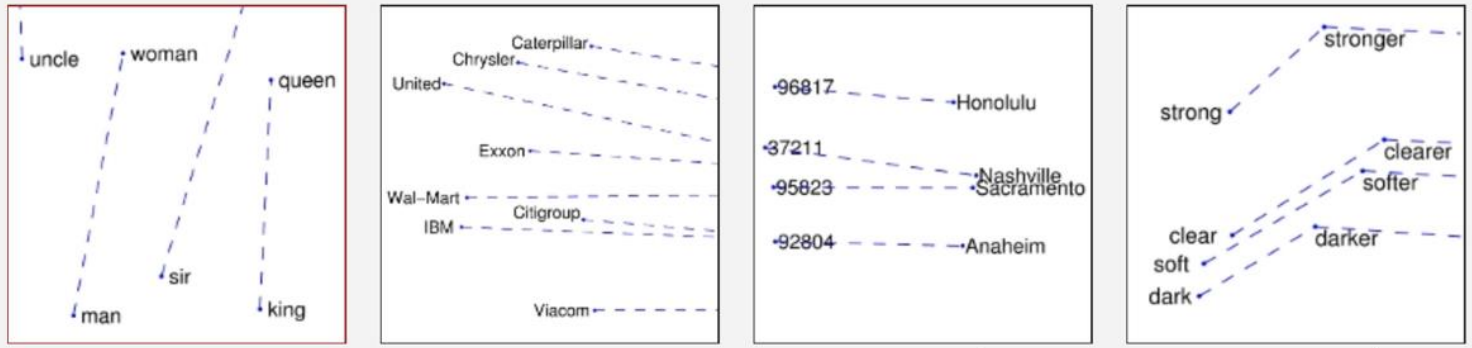
Word embedding

Word2Vec



Male-Female | Verb Tense | Country-Capital

GloVe



man - woman | company - ceo | city - zip code | comparative - superlative

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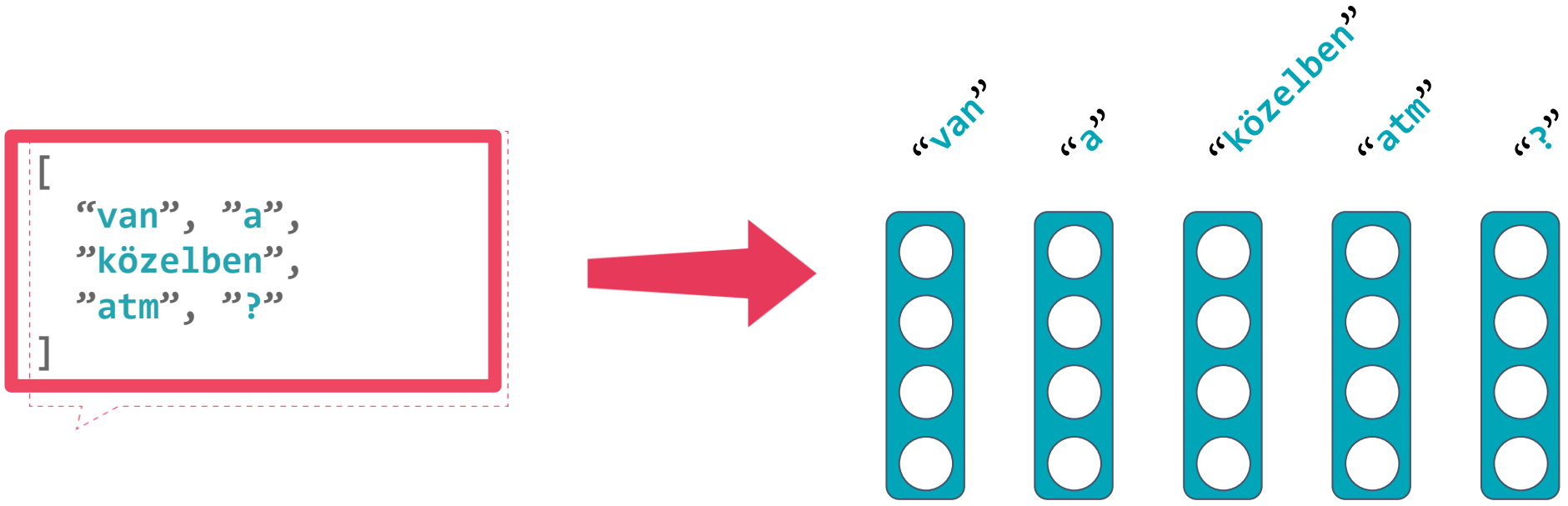
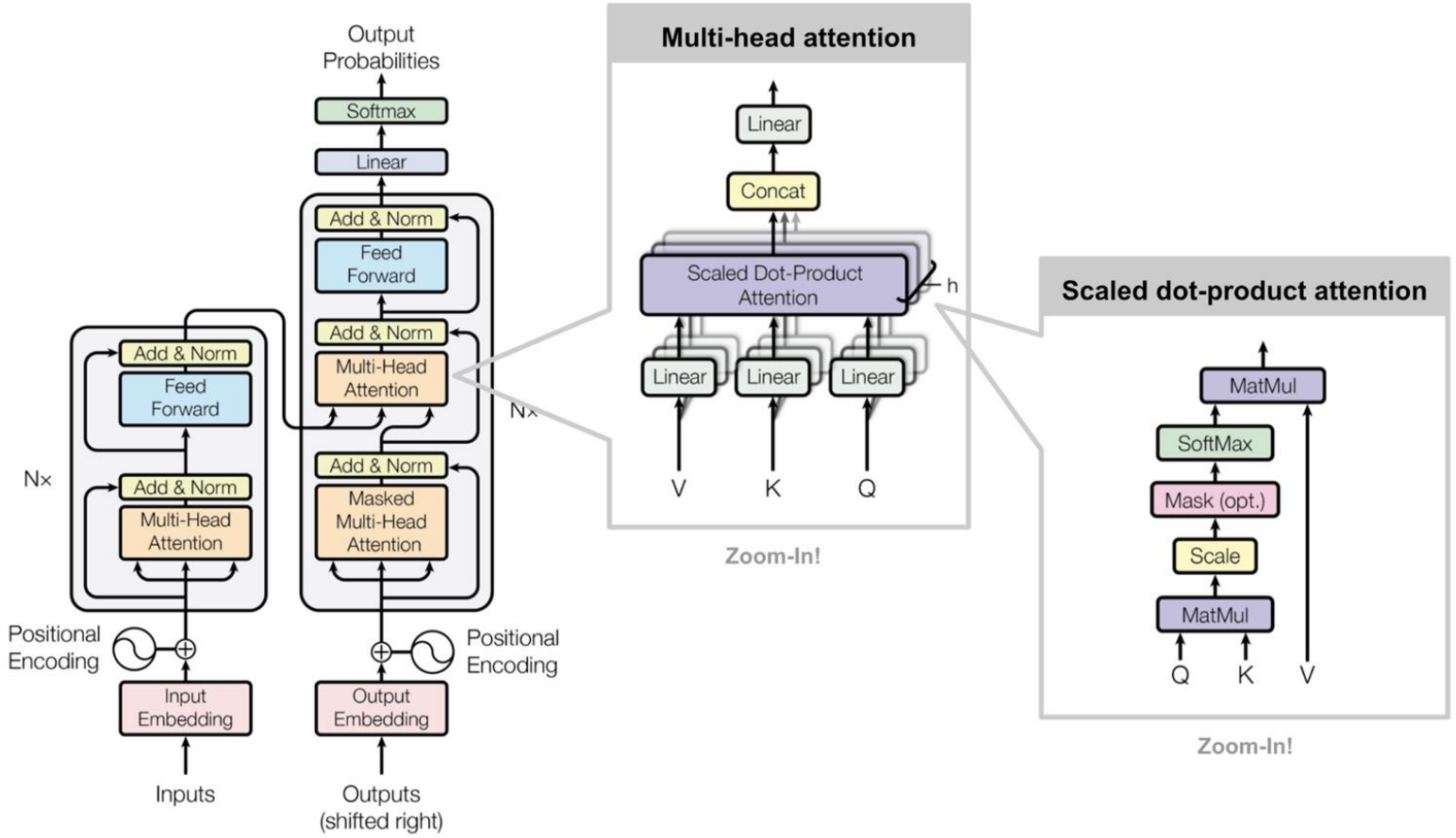
Pipeline

Word embedding



Transformer



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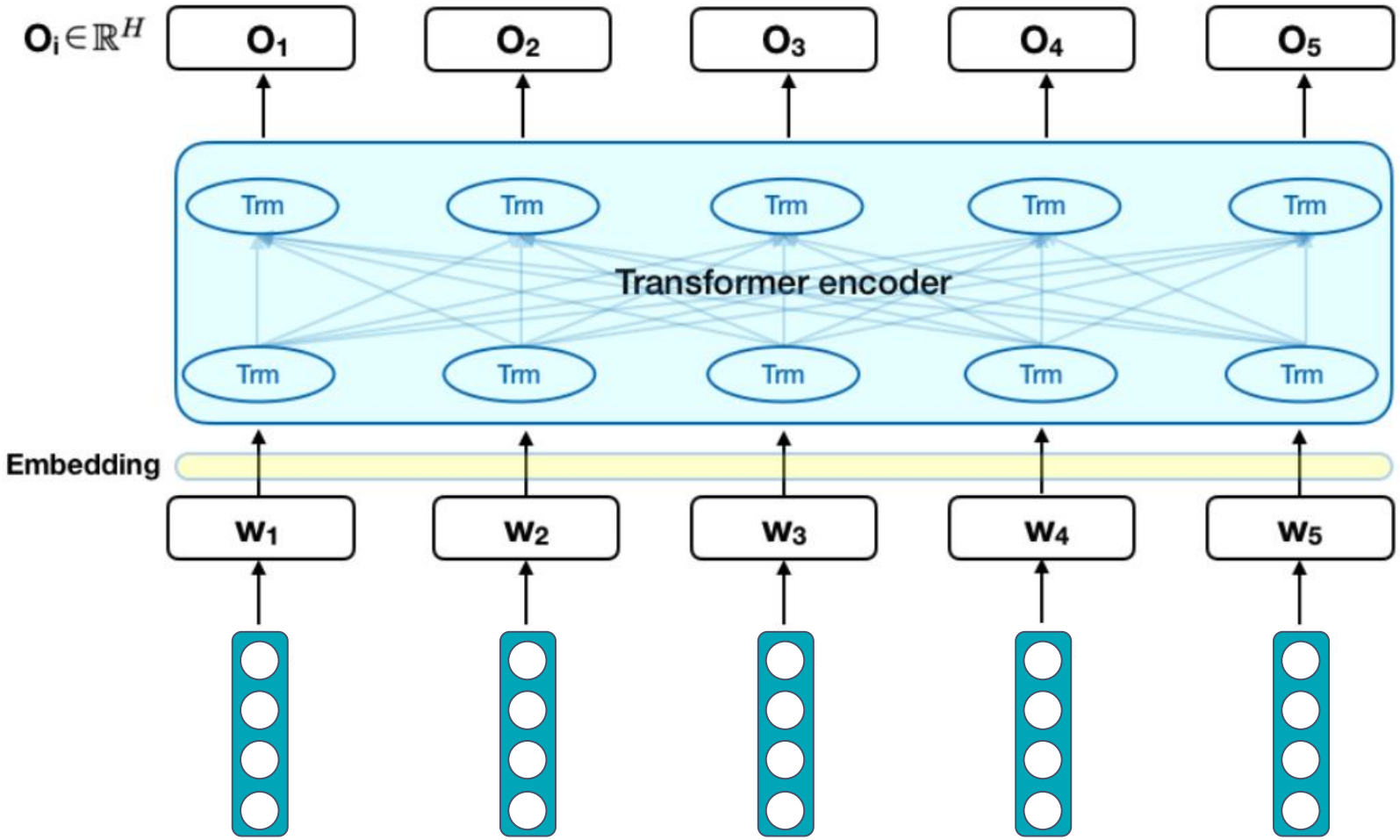
Pipeline

Feature model



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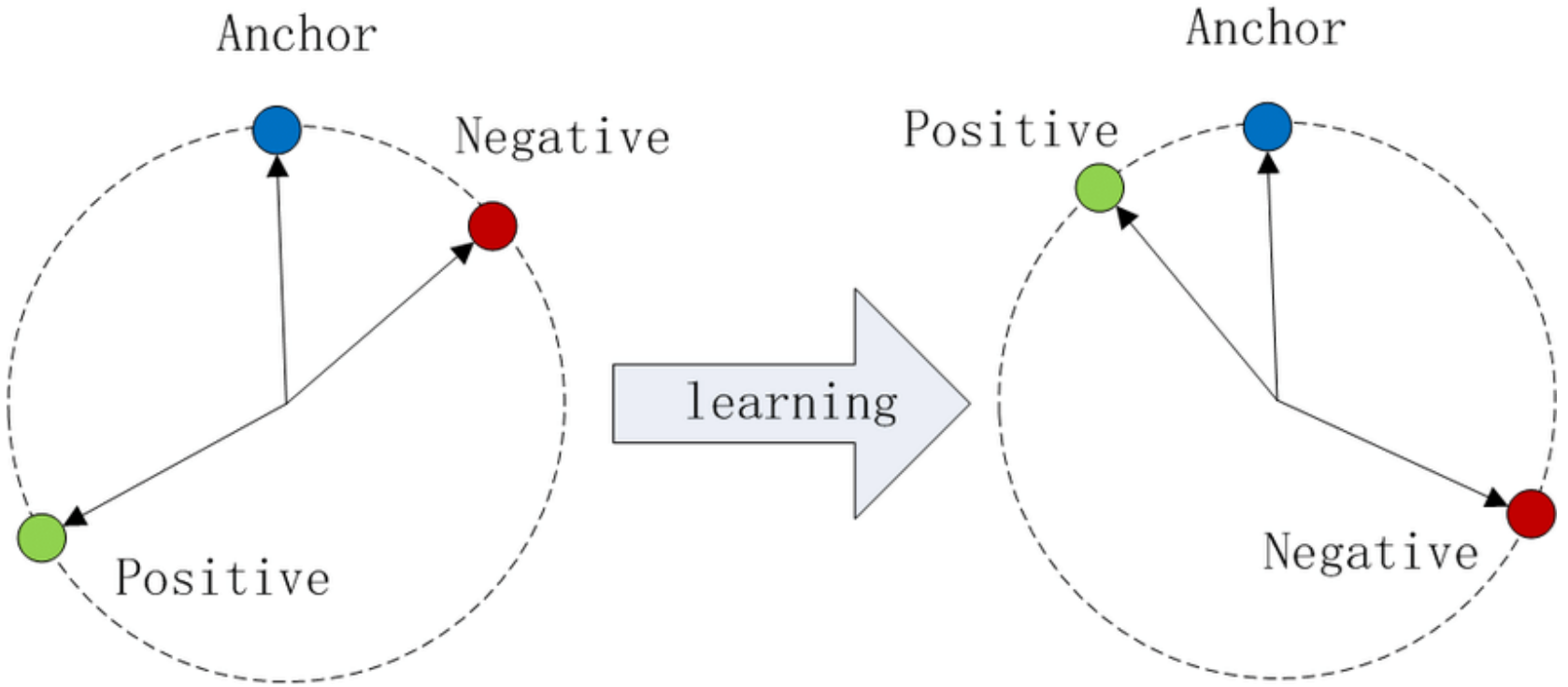
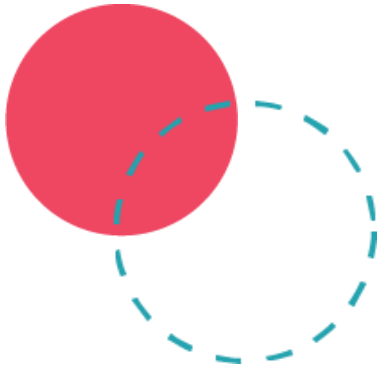
Similarity model





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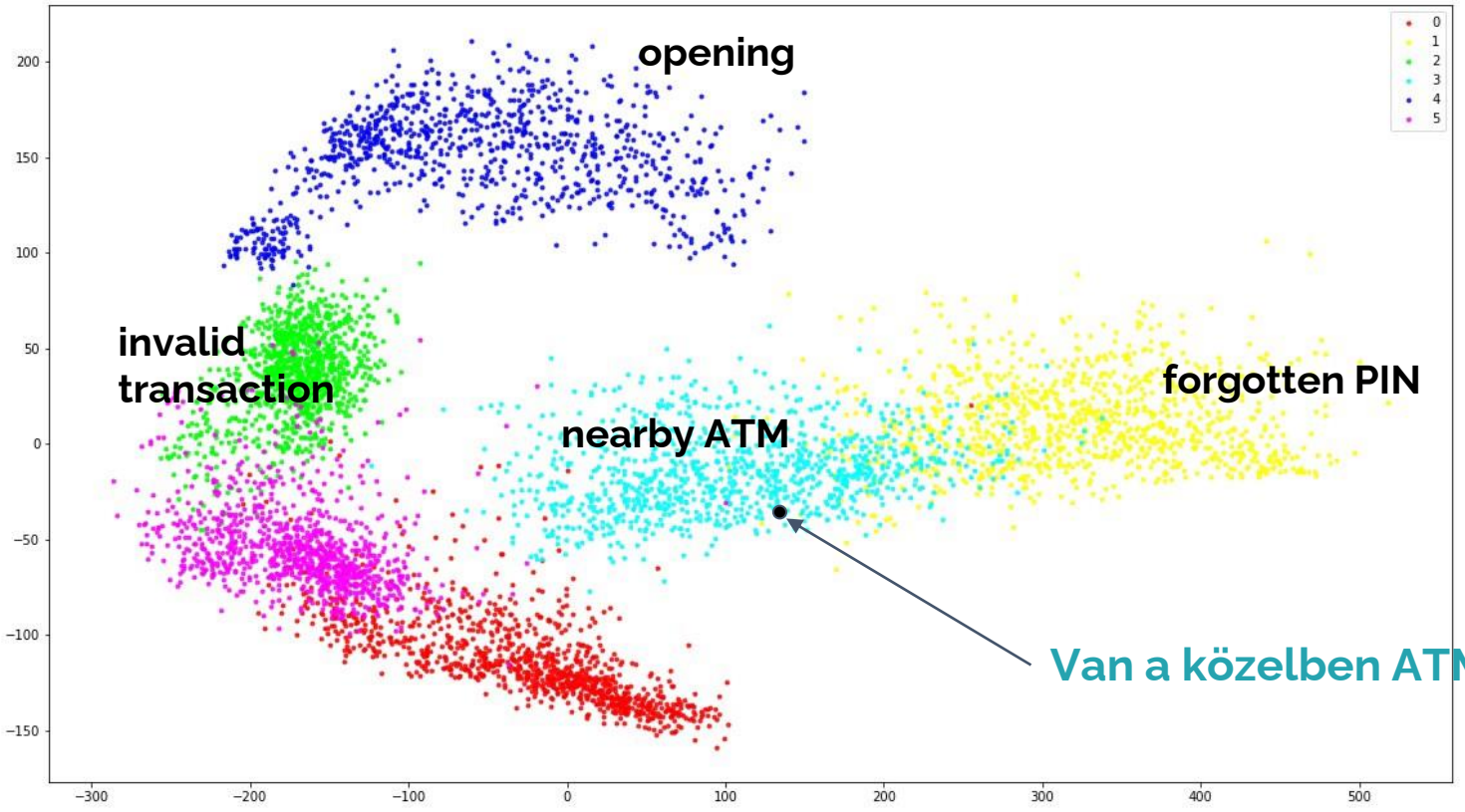
Similarity



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Benchmark

Transformer

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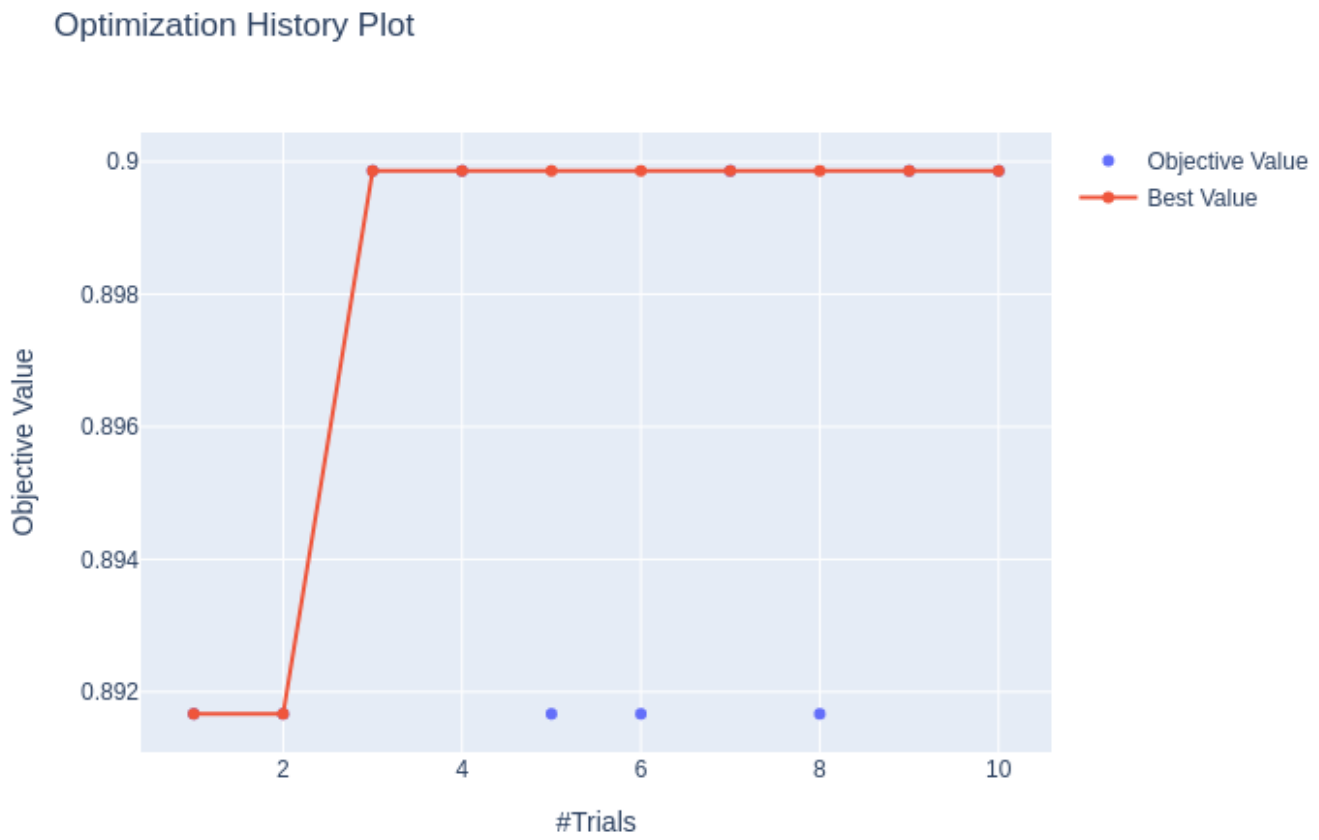
Benchmark

huBERT

Nemeskey, Dávid Márk (2020). “Natural Language Processing methods for Language Modeling”



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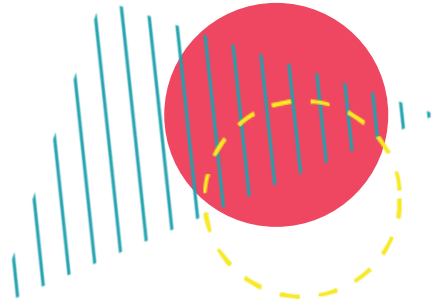

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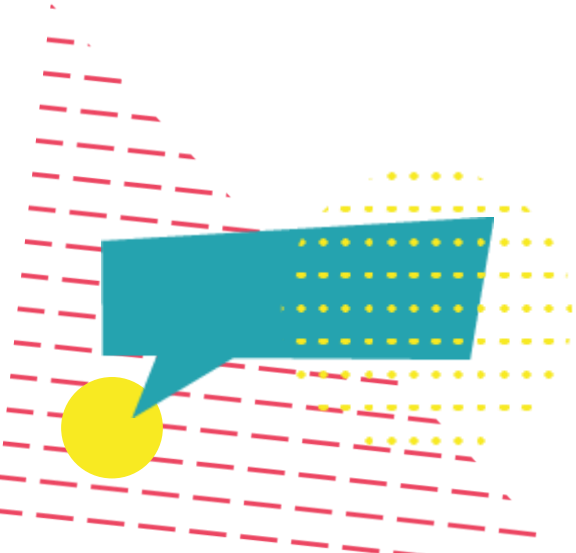

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References

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