Recap

Liad Magen

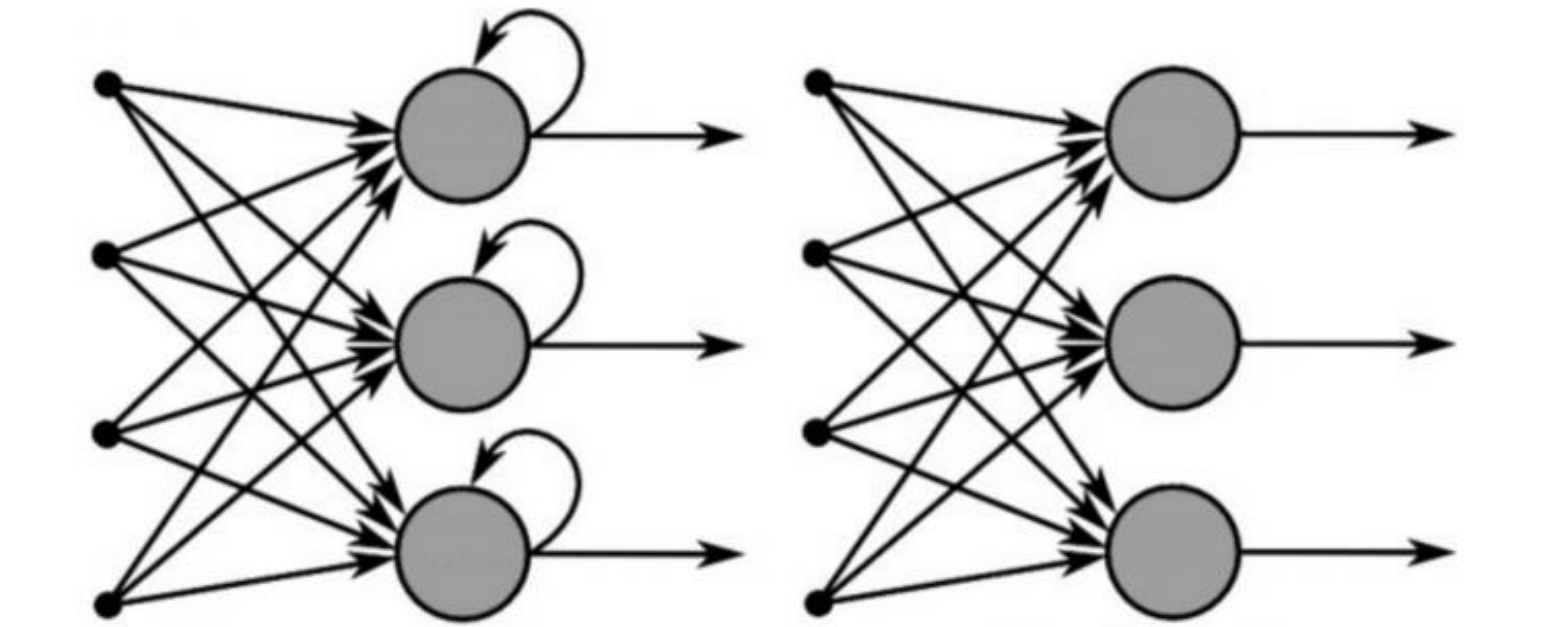
NLP - Usages

- Rule-based information extraction (RegExp)
- Classification
  - Sentence boundary
  - Ambiguity (PP attachment problem)
  - Sentiment/Opinion/Toxic texts
  - Named Entity Recognition (NER)
  - Semantic Role Labeling (SRL) / Part of speech (POS)

Methods

- One-hot-vector + TF/IDF
- Naïve Bayes / SVM
- Word Embedding (GloVe / FastText)
- BI-LSTM
- Contextual Word Embedding (ELMo)
- Transformers / BERTology

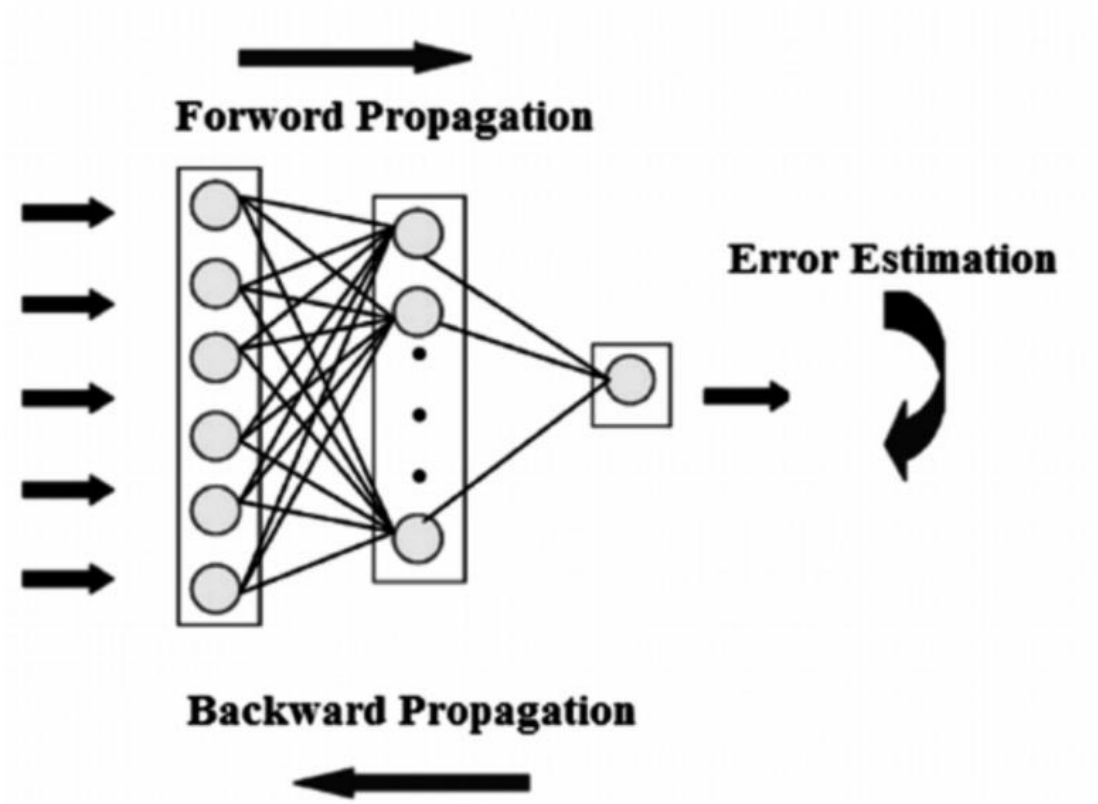
RNN

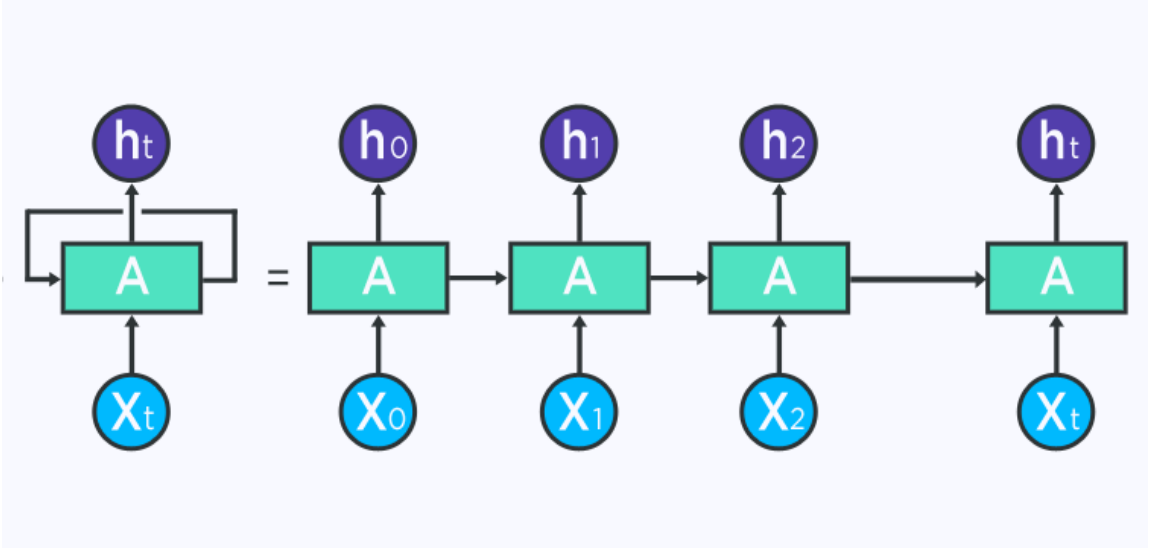


Recurrent Neural Network

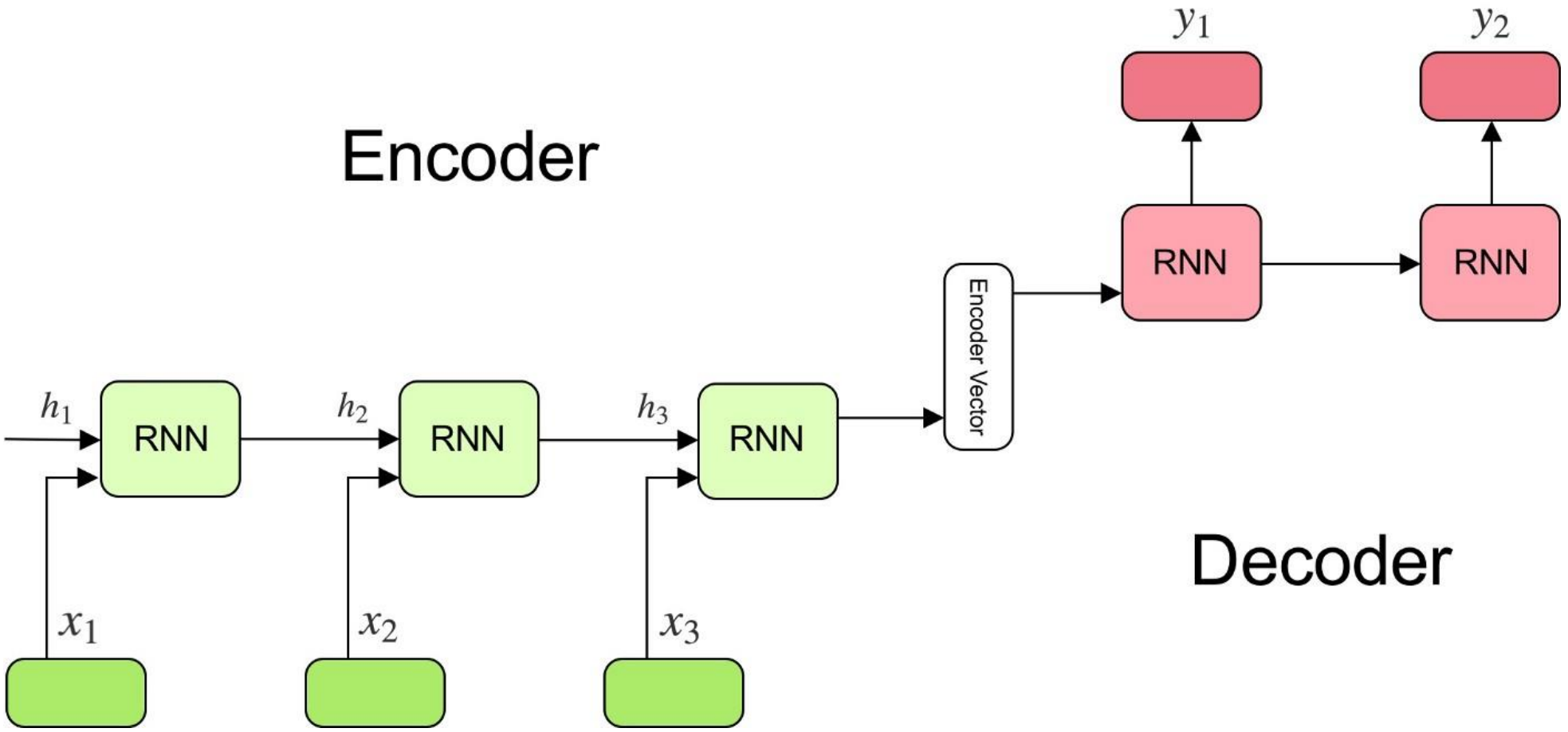
Feed-Forward Neural Network

RNN – Back Propagation



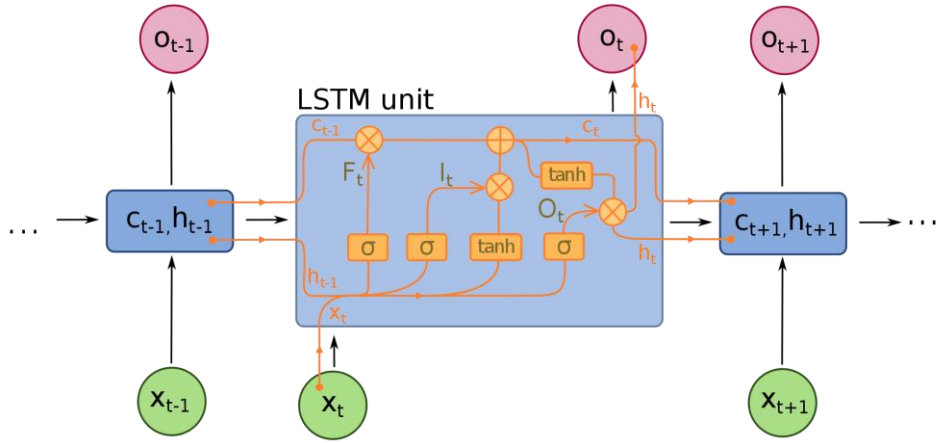


RNN – Encoder/Decoder

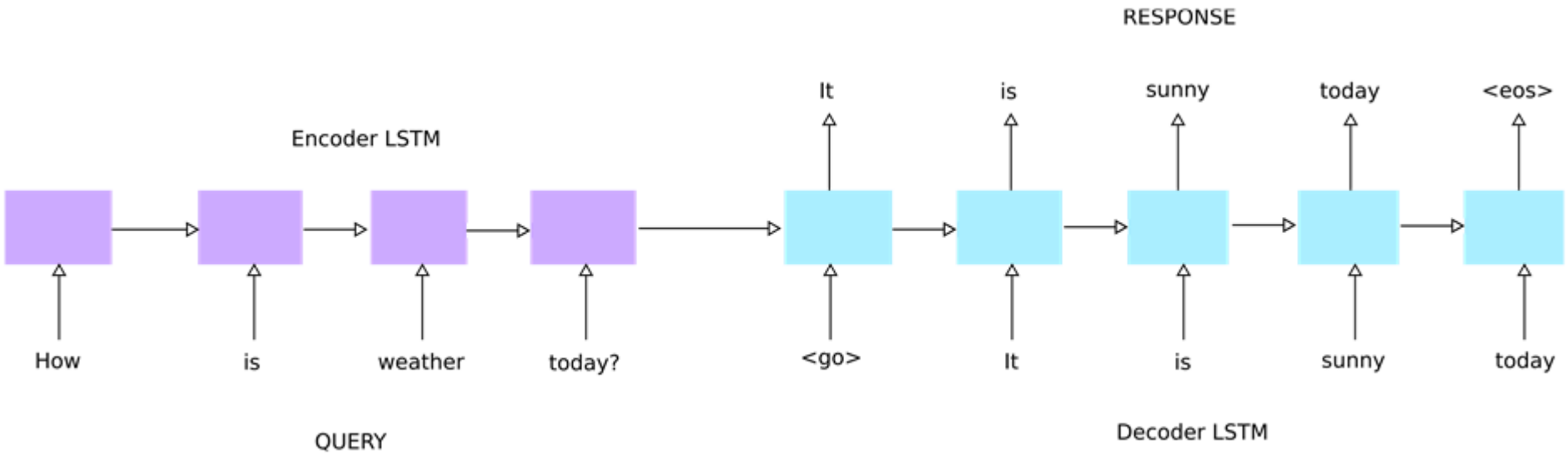


LSTM

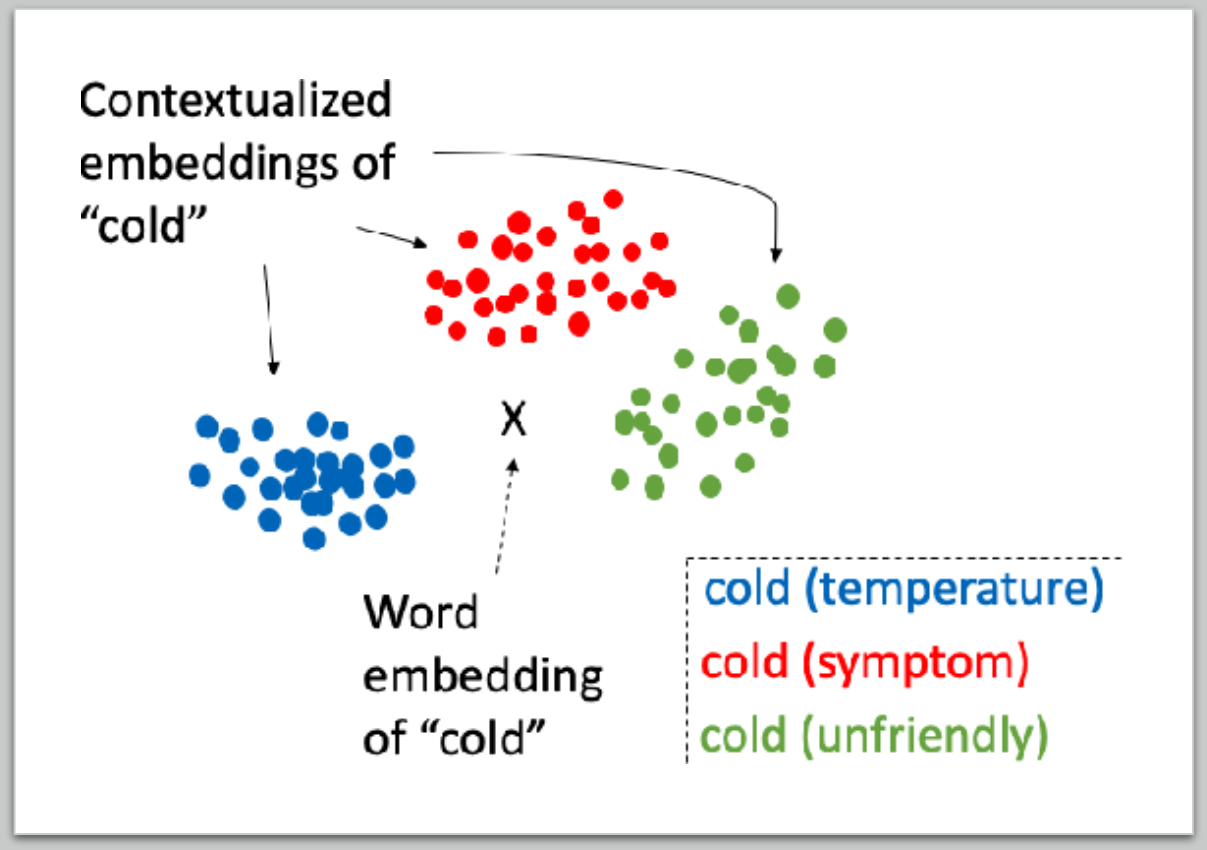
- A better version of RNN
  - Easier to train
  - Overcomes RNN issue of 'forgetting' and 'not learning' (vanishing gradient)
- BI-LSTM – Bi-directional LSTM
  - Can 'peek' into the future

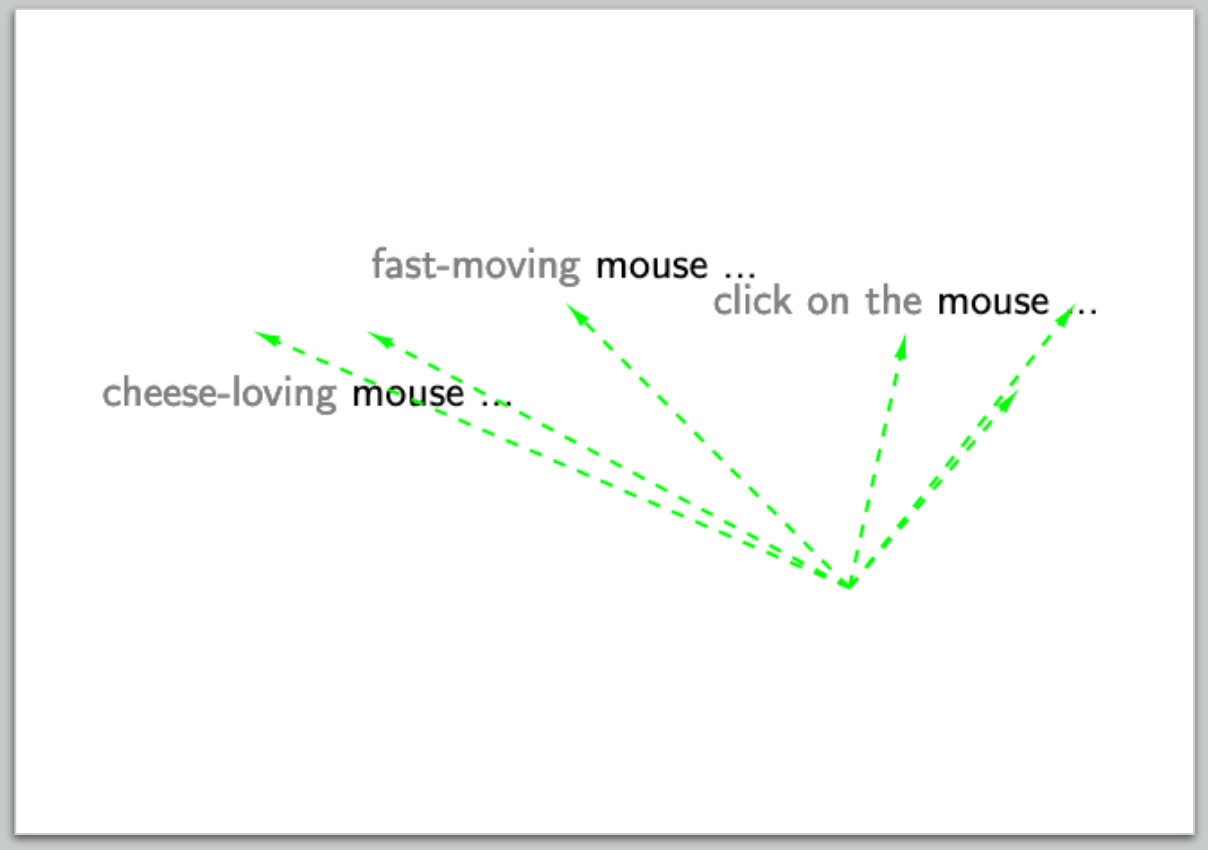


LSTM – Encoder/Decoder (Seq2Seq)



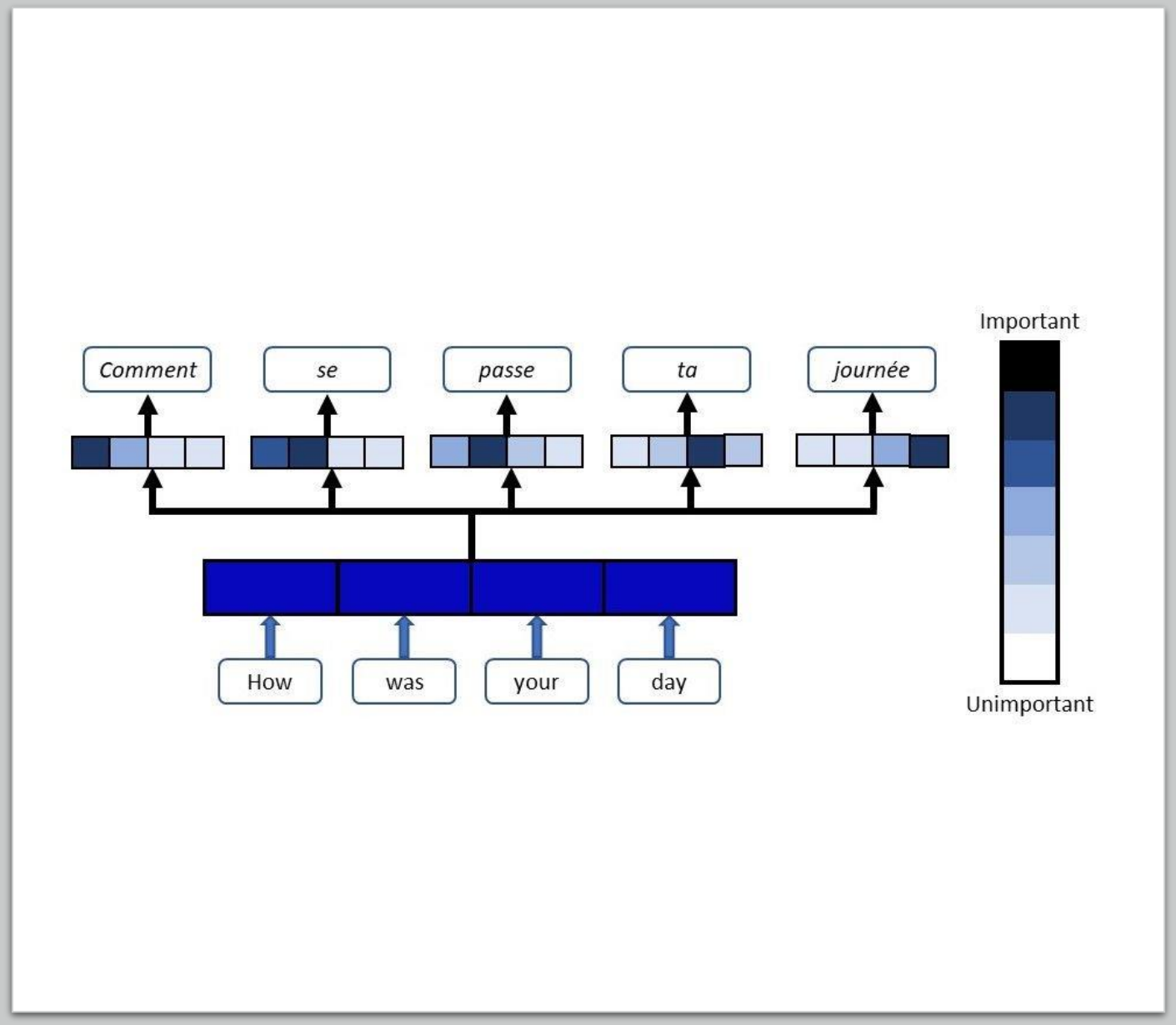
Contextual Word Embedding

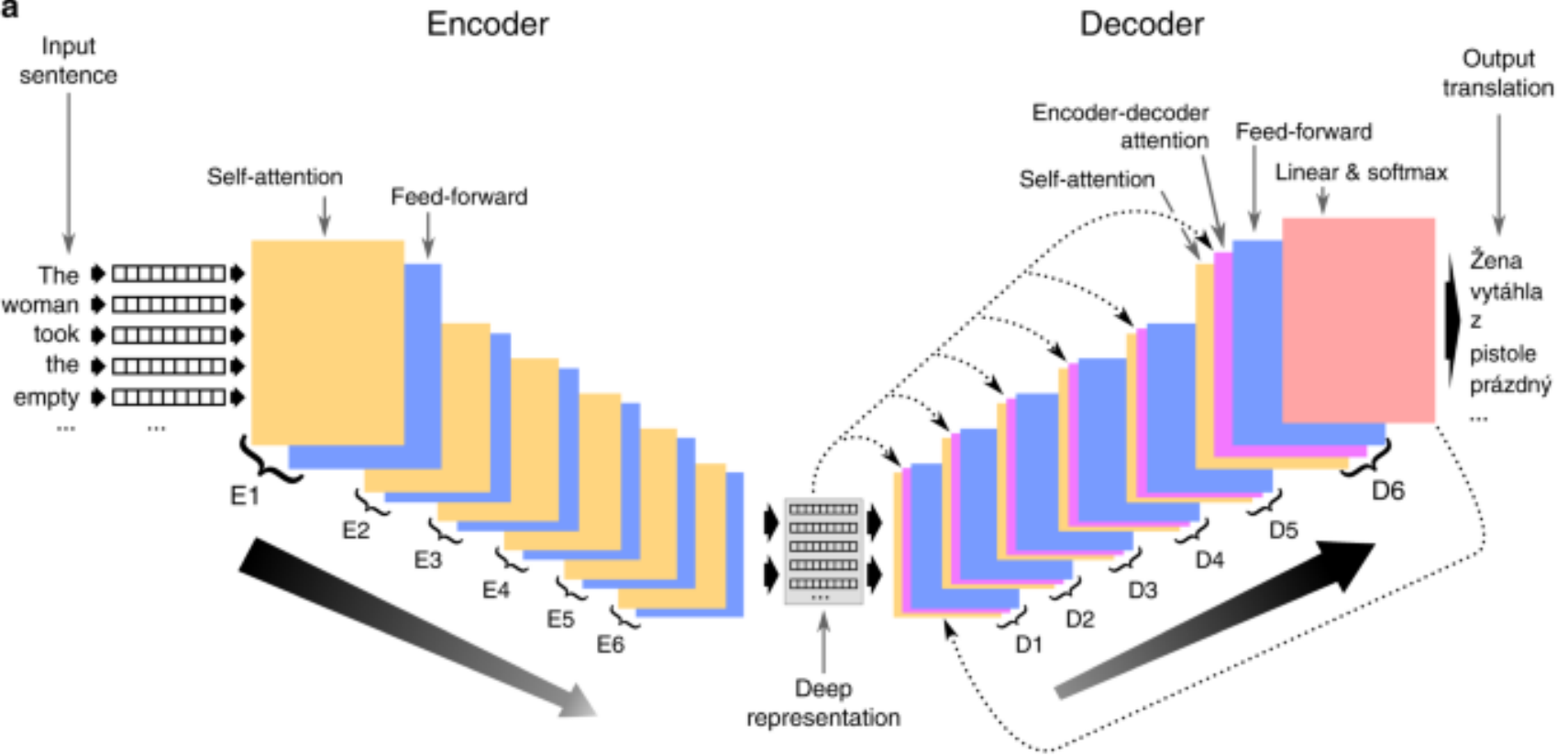


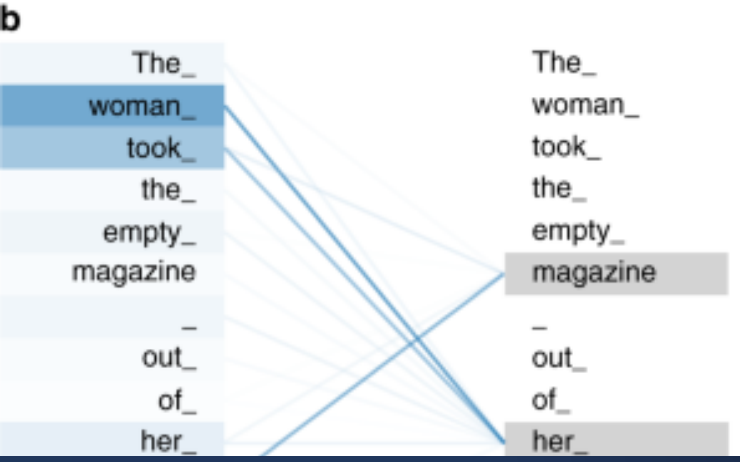


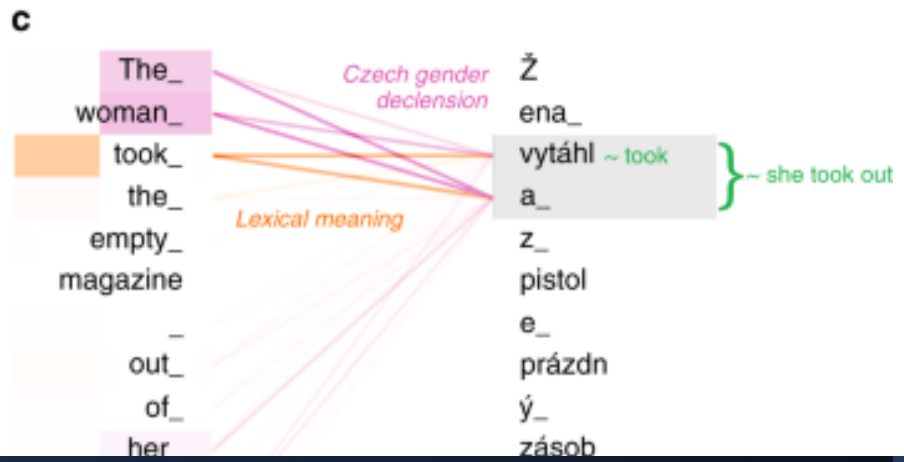
Attention Mechanism

- An architecture to learn the importance of words (X) and their inter-relations to a given target Y
- Learned Matrix



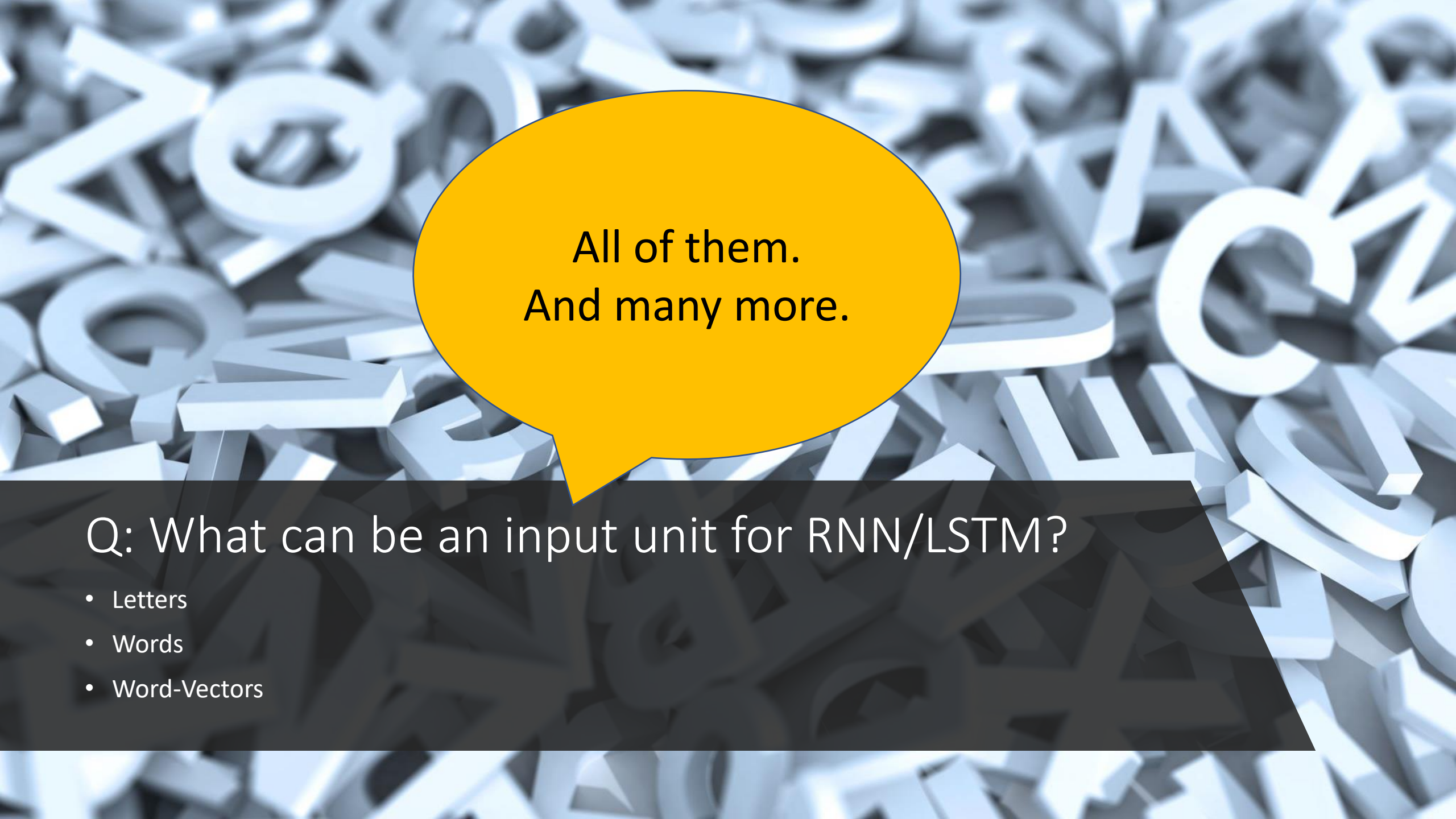






Transformers

- Encoder-Decoder
- Multiple Attention Matrices



Q: What can be an input unit for RNN/LSTM?

- Letters
- Words
- Word-Vectors

Q: What is the input unit for BERT?