

W207— Applied Machine Learning

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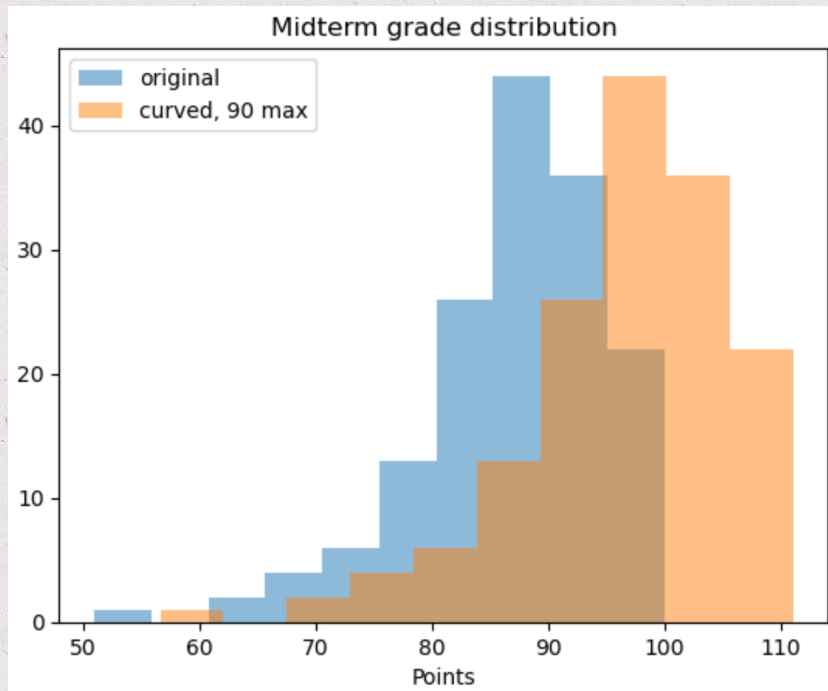
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Sequence modelling and Embeddings

Announcements

- Baseline presentation feedback: available in your team GitHub repo
- Curved midterm grades: Final score = Original score * 1.11



Last week

- Clustering analysis and PCA

Today's learning objectives

- Sequential modeling and Embeddings
- Application: Sentiment analysis based on **drug reviews** data

Sequential modeling

Typical ML algorithm

e.g., Linear model, Logistic reg,
Decision tree

- input is independent
- the order in which the training examples are given to the model is irrelevant

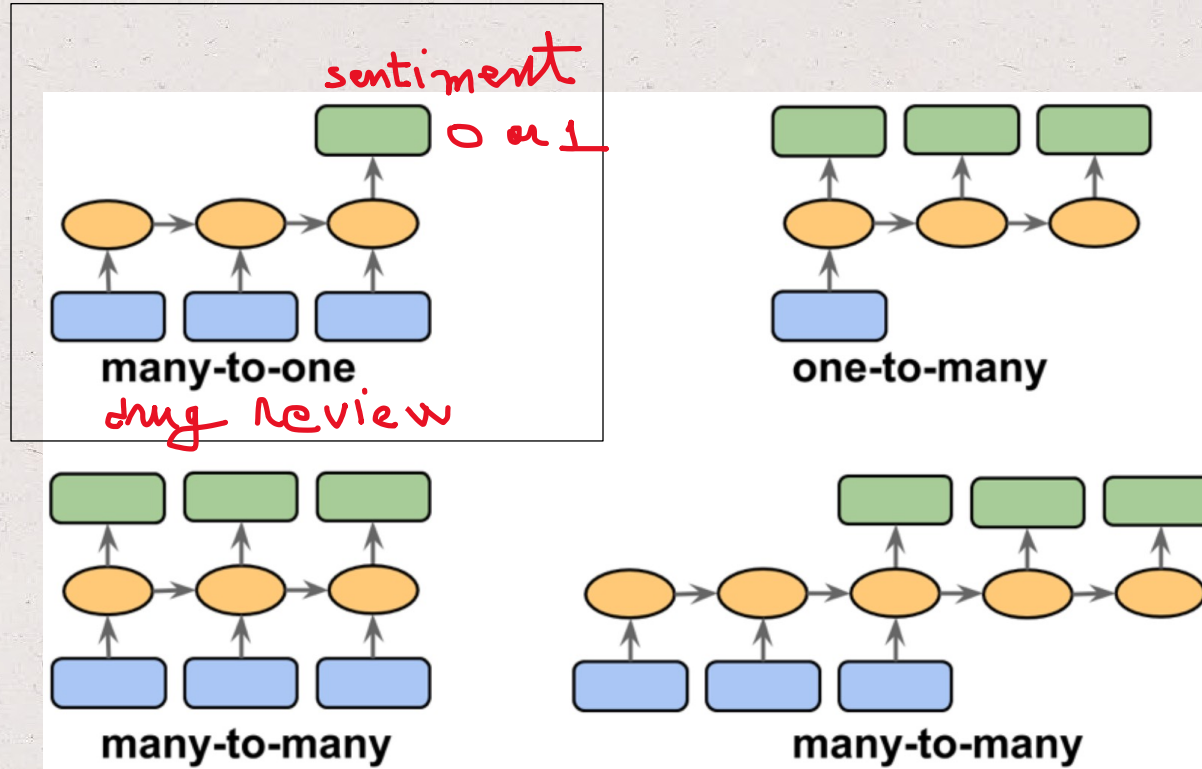
Sequential ML algorithm

e.g., RNN/LSTM, Transformers

- input is not independent (order matters)
- E.g., if your task is to predict diagnosis in the next hospital visit, then it would make sense to consider previous medical history in a date-sorted manner.

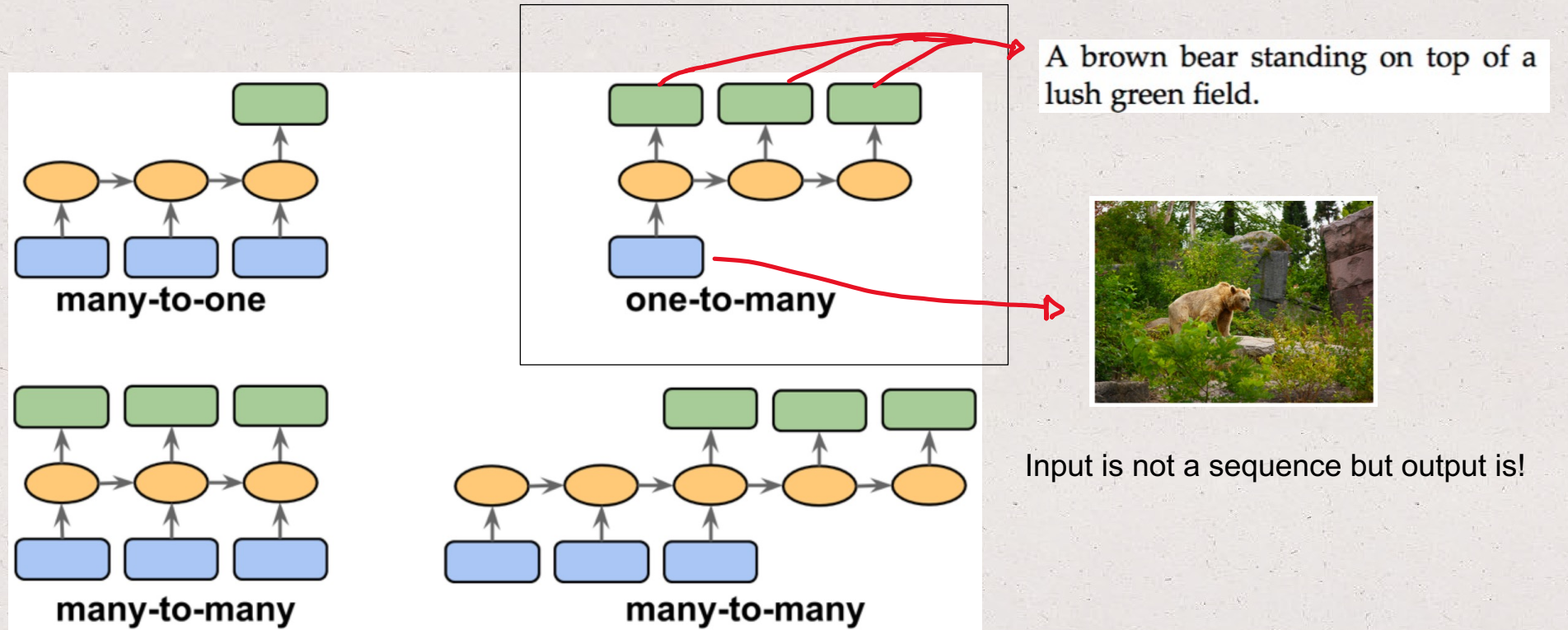
Sequential modeling

Can choose between different architectures depending on input data and output of interest



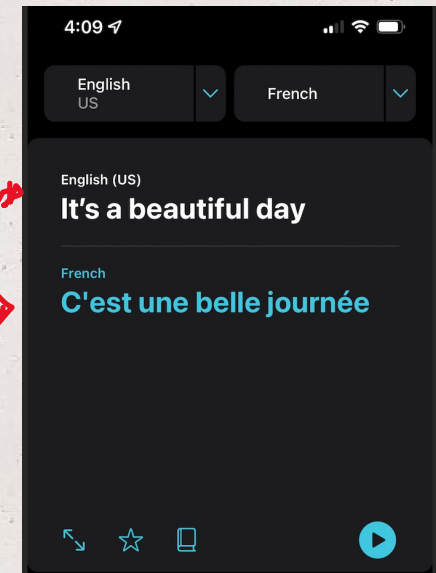
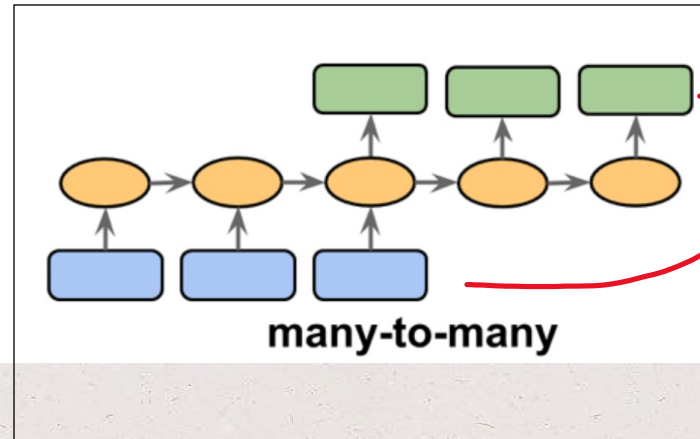
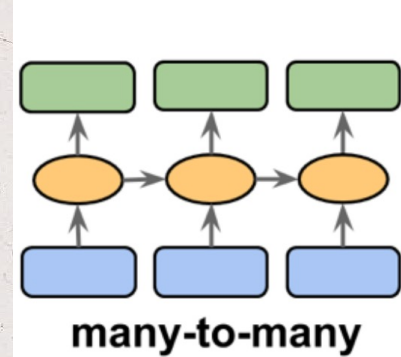
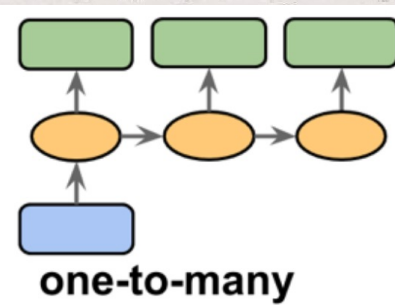
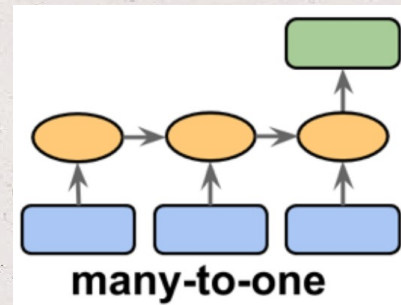
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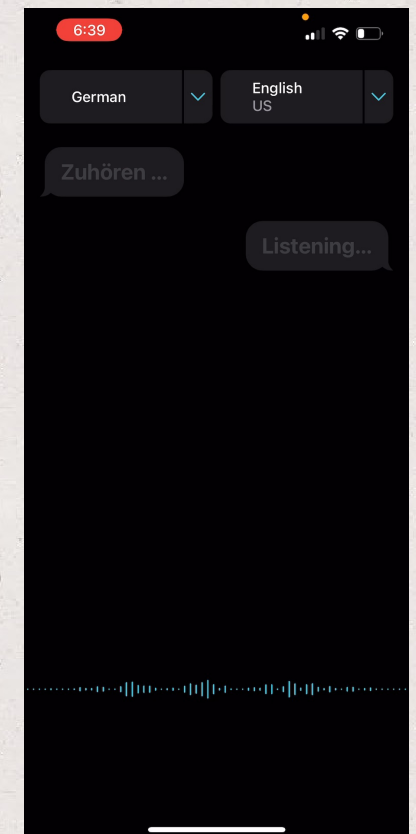
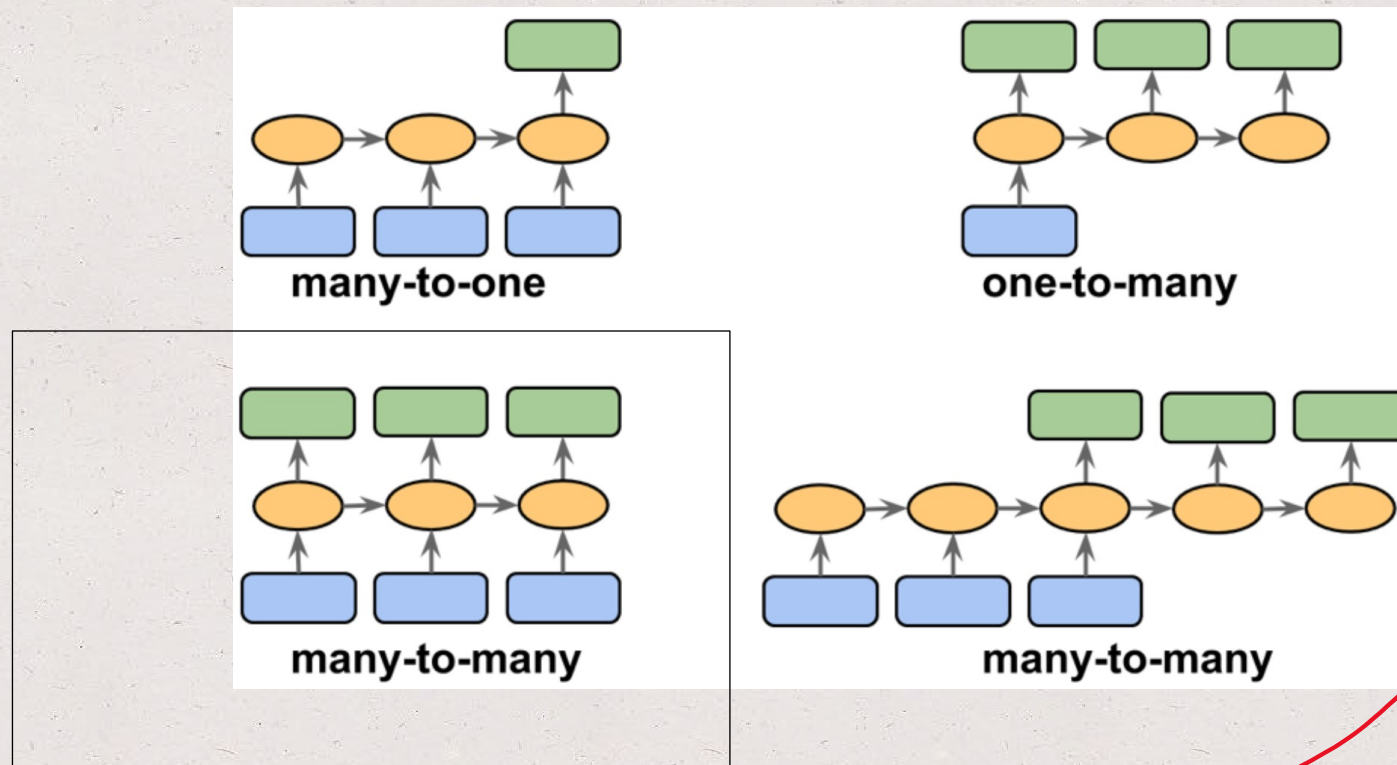
Sequential modeling

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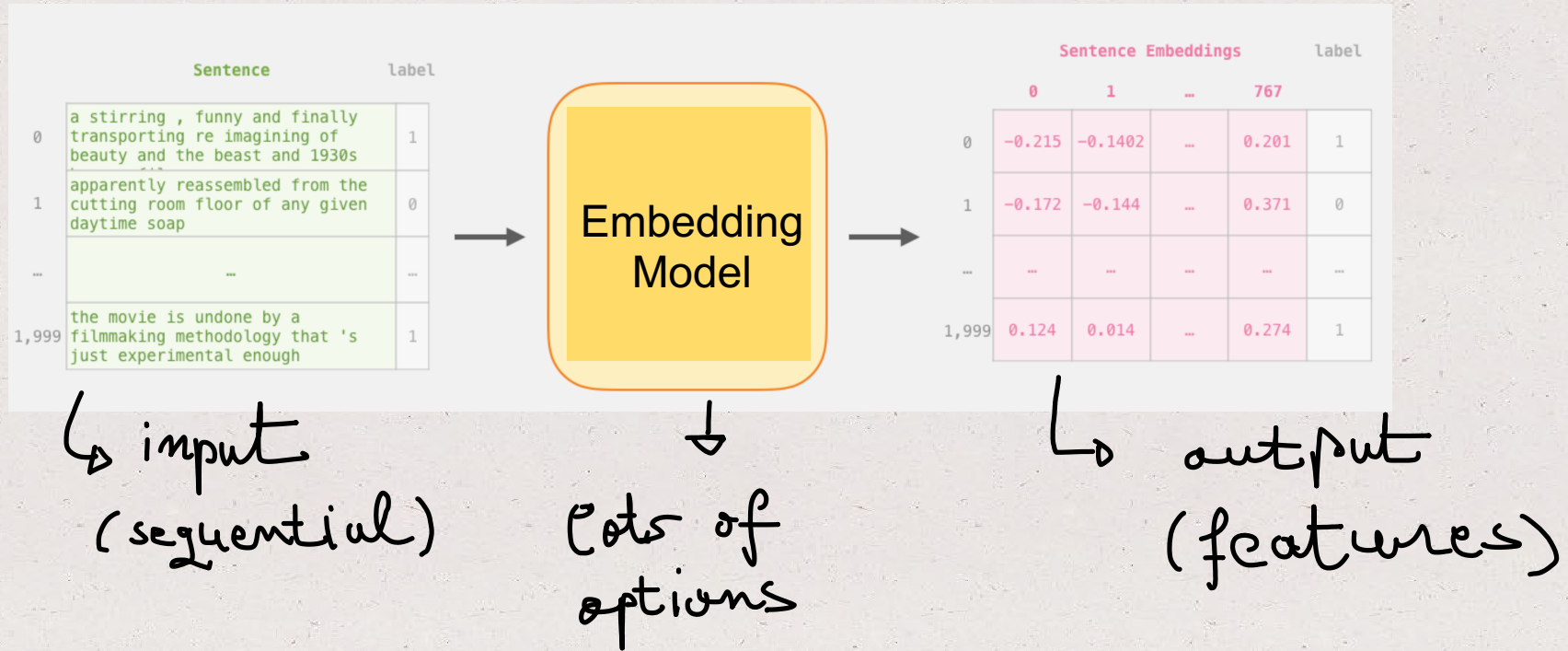
Sequential modeling

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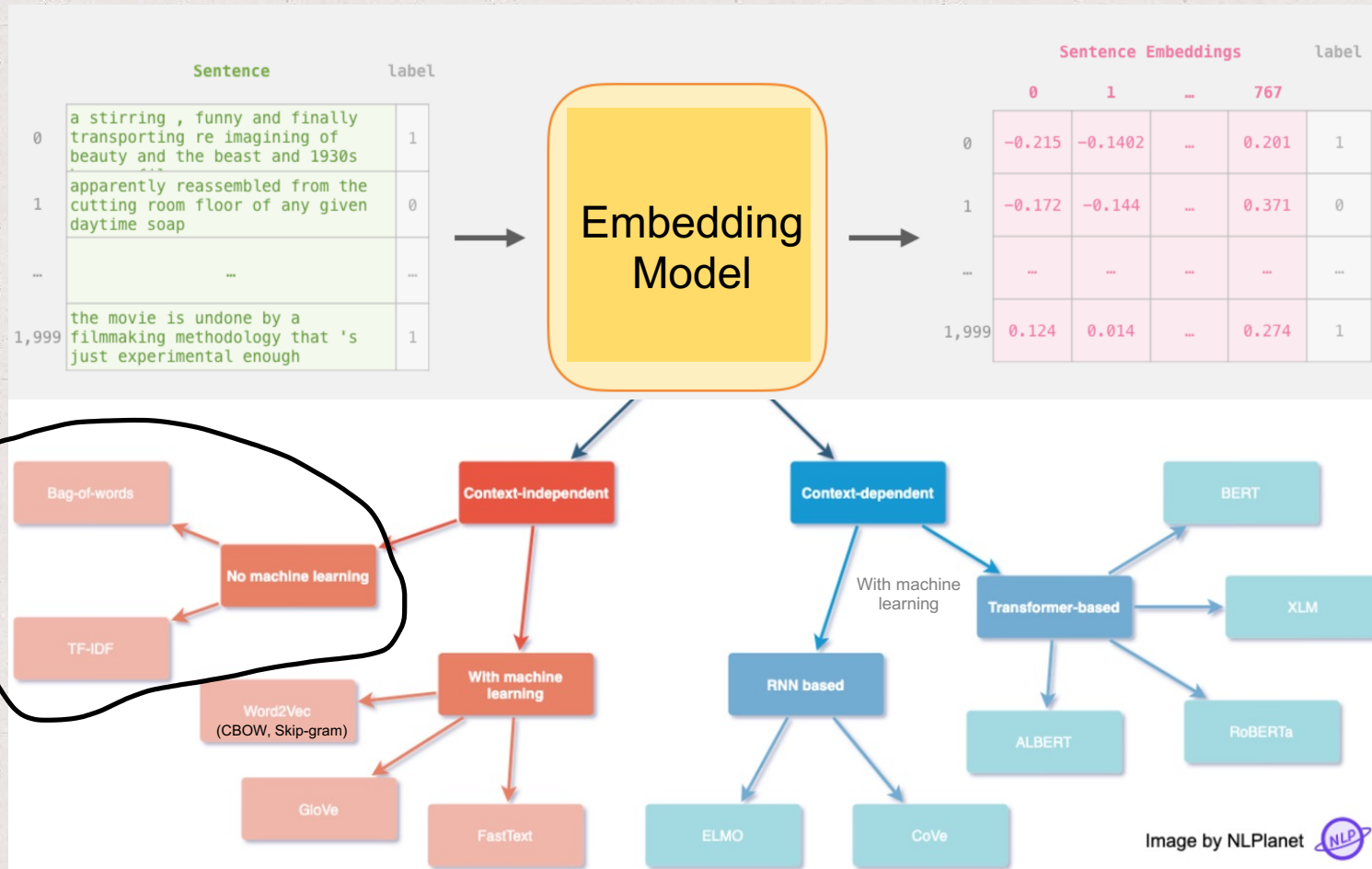


Translation updates as you speak

Embeddings

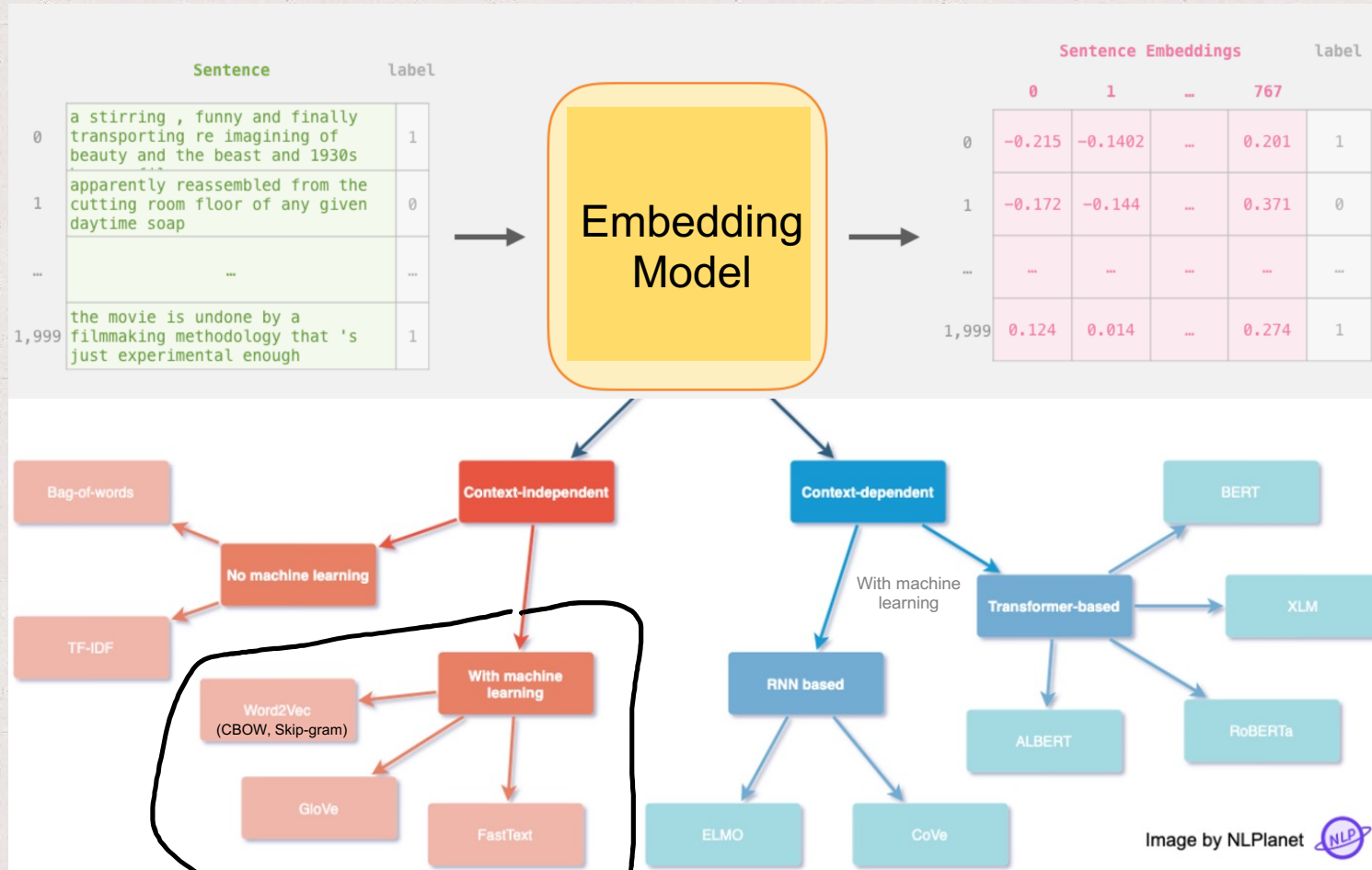


Embeddings



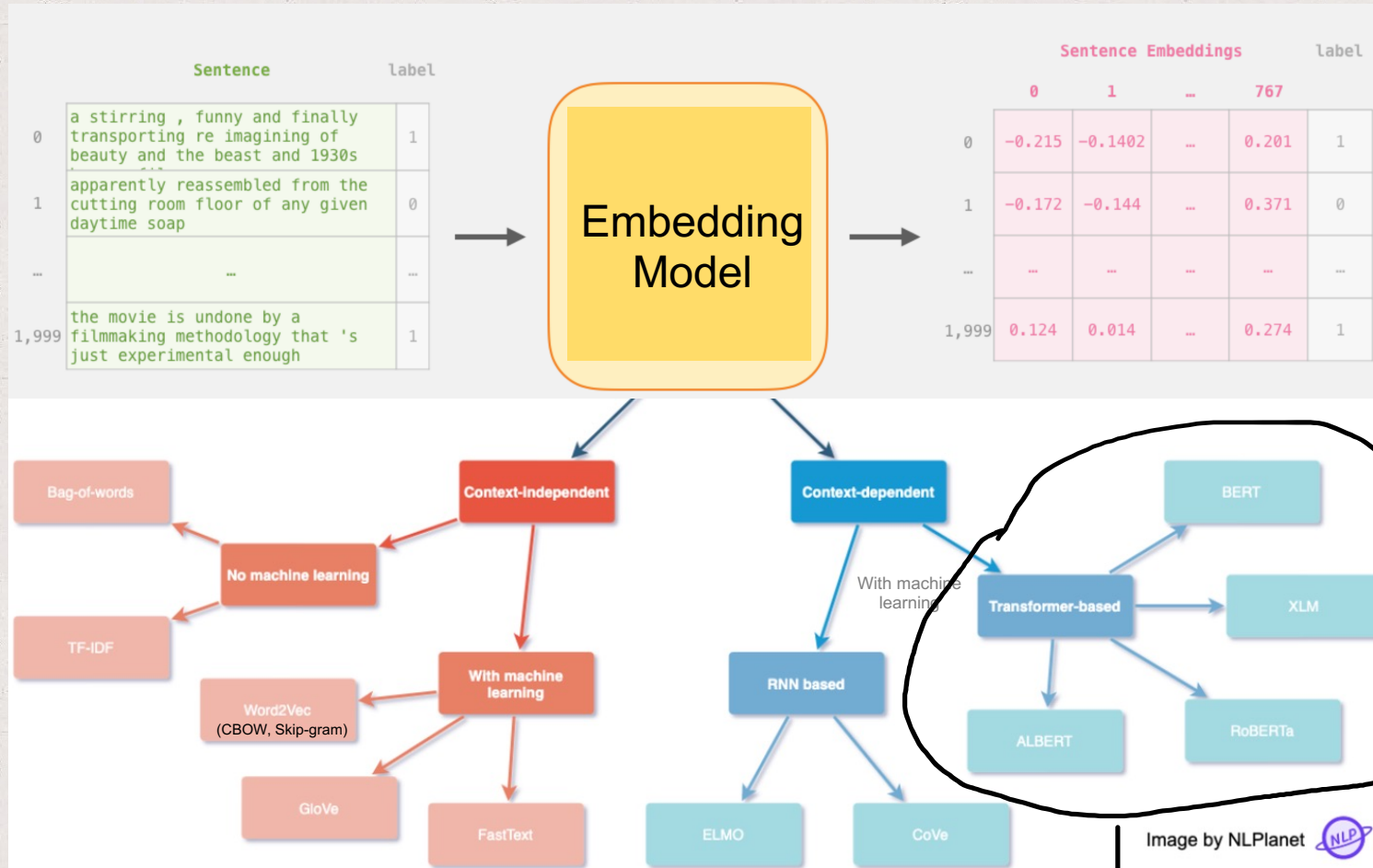
Nothing to learn (human input)
(RM, Ch 8)

Embeddings



↳ Not so popular anymore. Why?

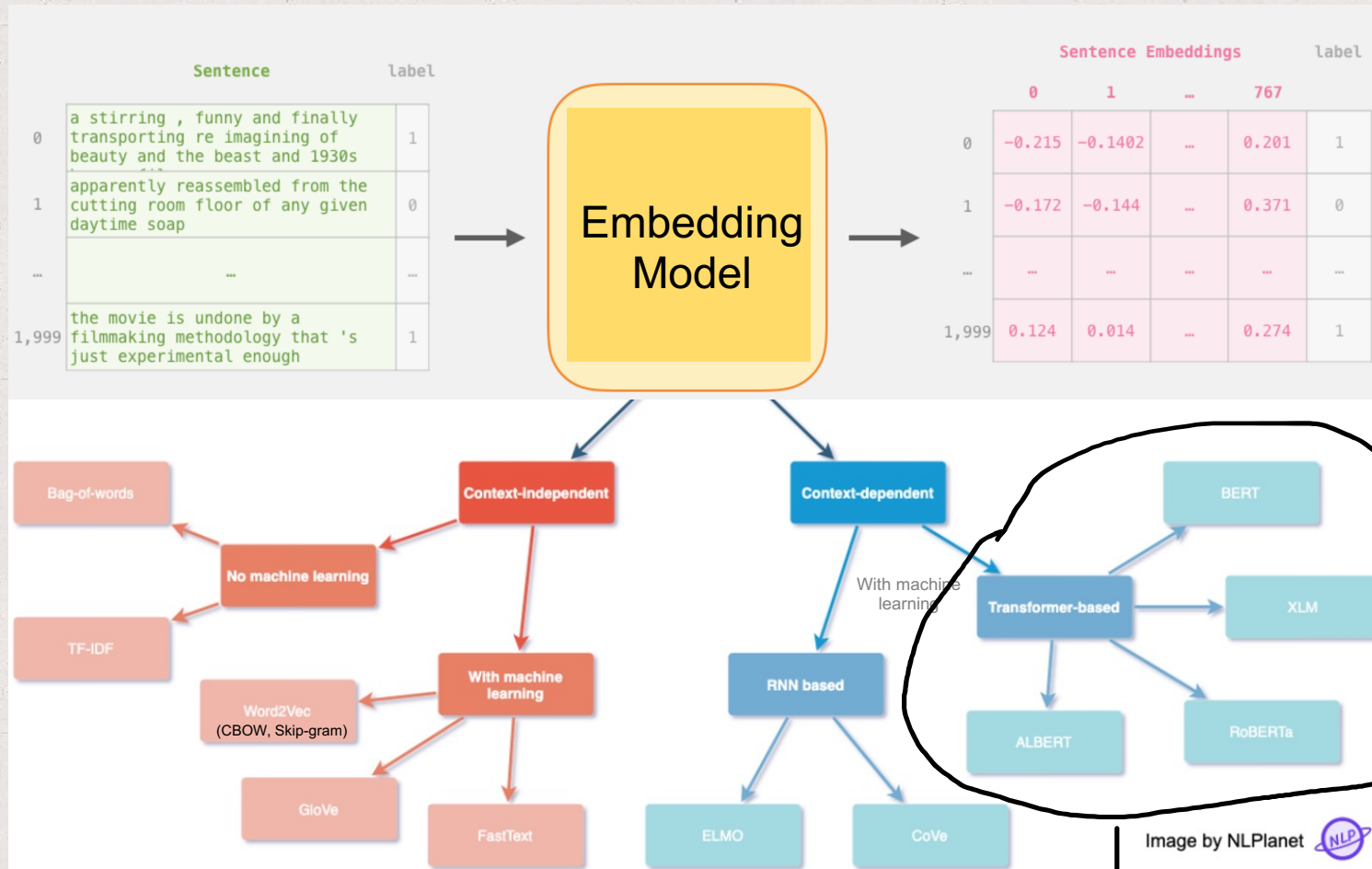
Embeddings



Transformers changed the game!

Week 13 material

Embeddings

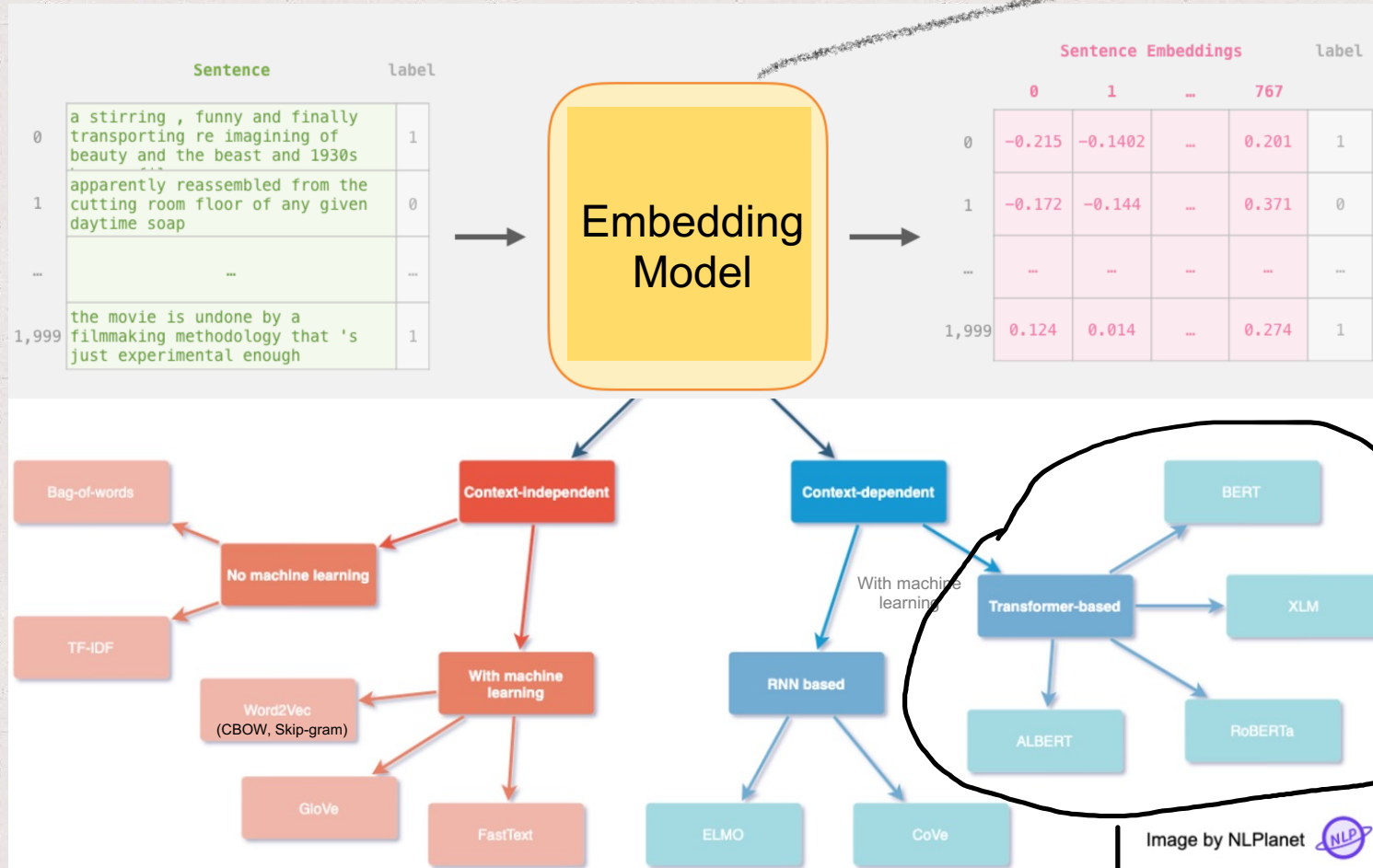


What embedding model is used for our drug sentiment classification task this week?

Transformers changed the game!

Week 13 material

Embeddings



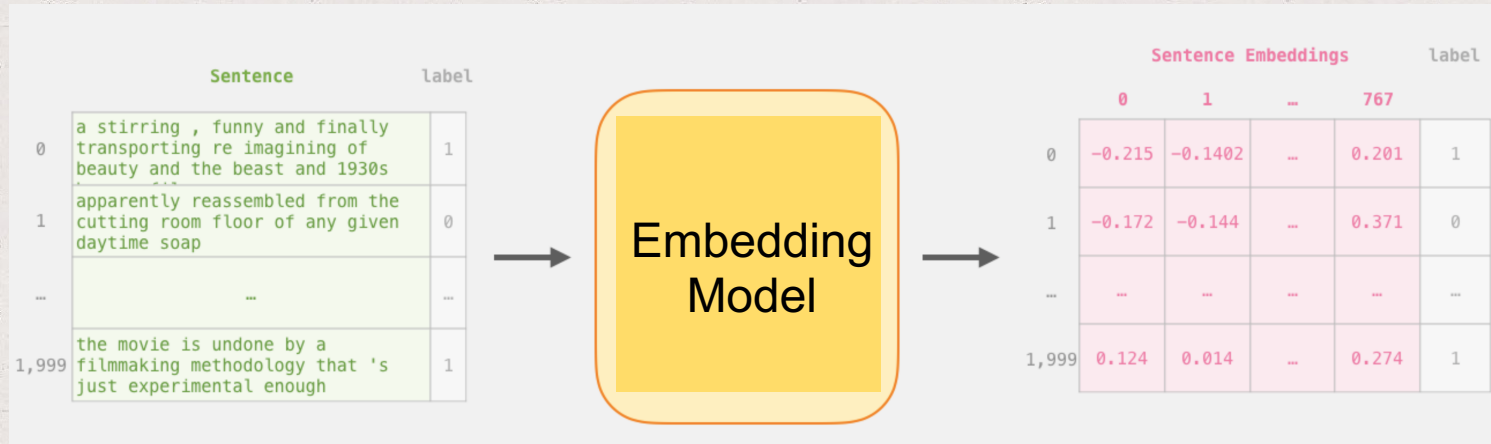
What embedding model is used for our drug sentiment classification task this week?

↓
we define our own FNN model!

Transformers changed the game!

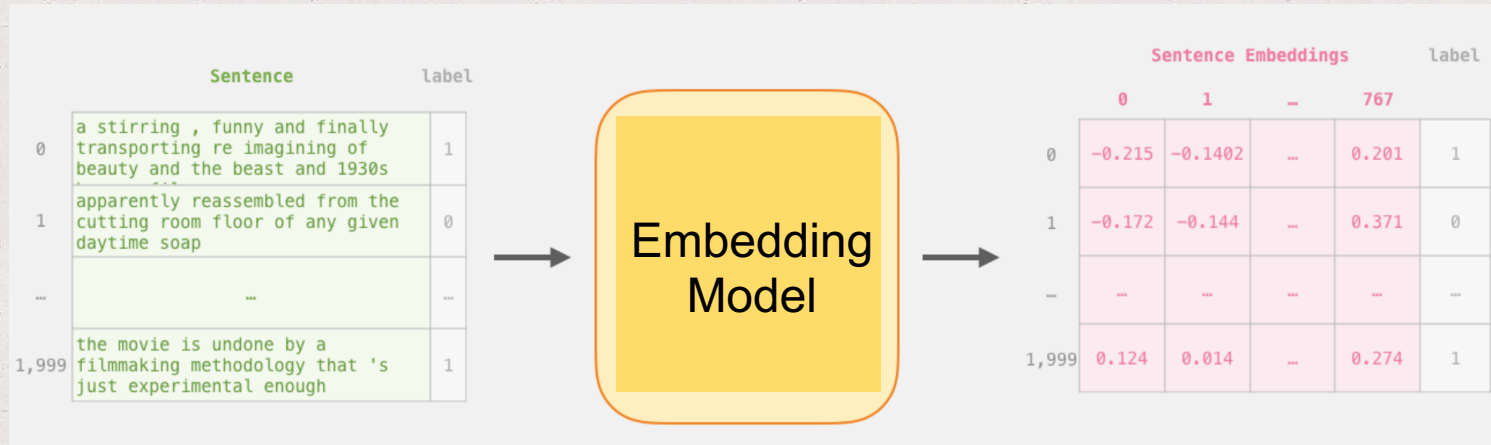
Week 13 material

Embeddings



What's next?

Embeddings

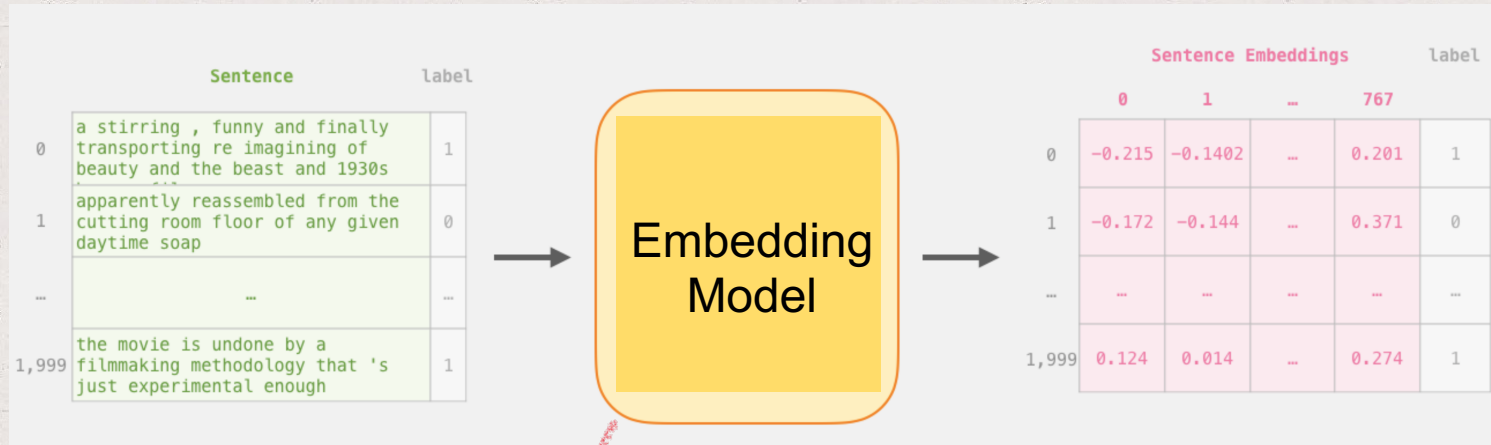


Provide these features to **downstream tasks**, e.g., sentiment classification



↓ class prediction
positive

Embeddings



Provide these features to **downstream tasks**, e.g., sentiment classification

The good news: **transfer-learning**!

(1) Transfer the learned embeddings (model trained on a large corpus of data., e.g., BERT)

(2) **Fine-tune** model on a downstream tasks (e.g., sentiment classification)

Logistic Regression

↓ class prediction
positive