Natural Language Processing for EdTech

Taking the best of ML and using it to empower education software and professionals

The problem - assessment

Automation

Example question

Here is an example question

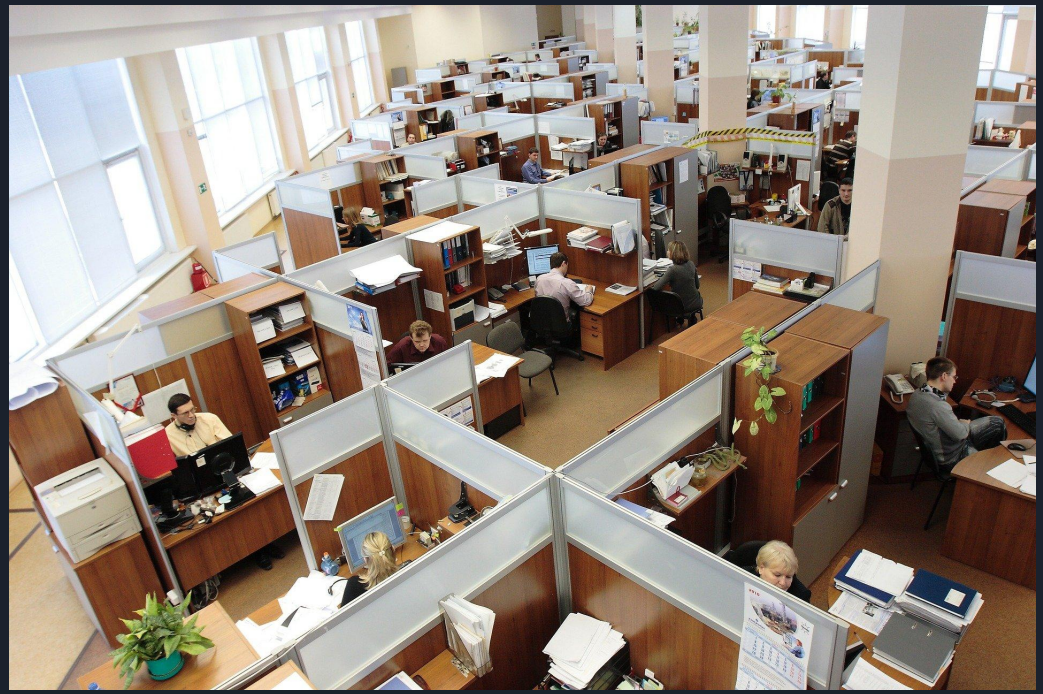
Do you...

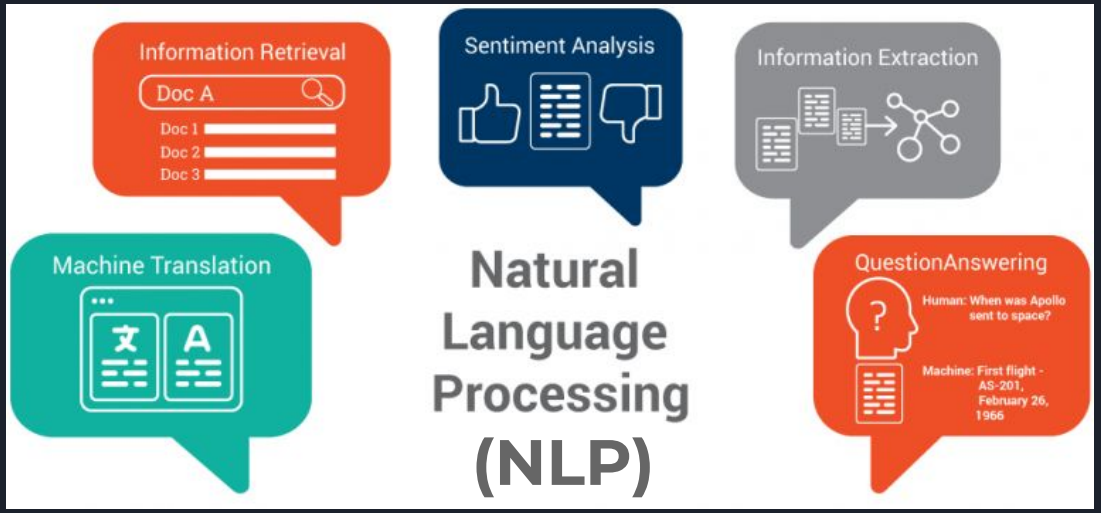
- The first answer, which is wrong
- The second answer, which is correct
- The third answer, which is wrong
- The fourth answer, which is wrong

CHECK ANSWER

< Previous Page

Done!



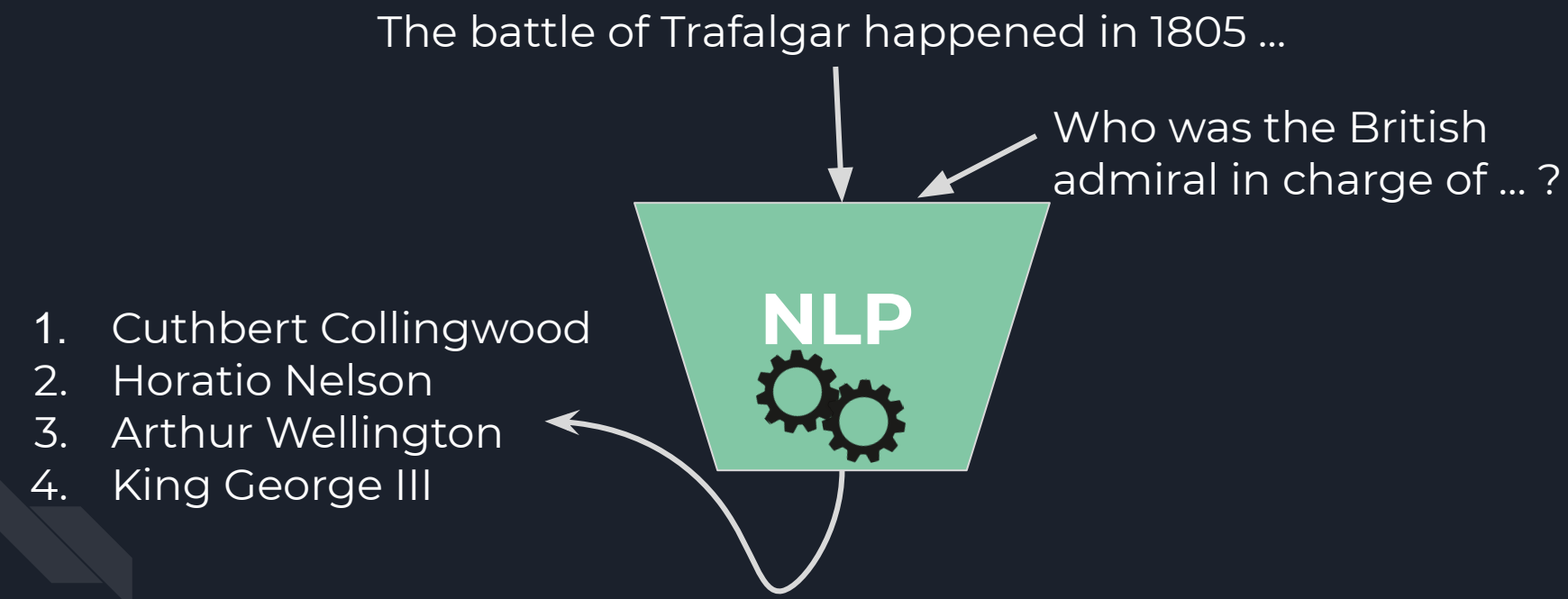


Turning text into data and getting insights, e.g. :

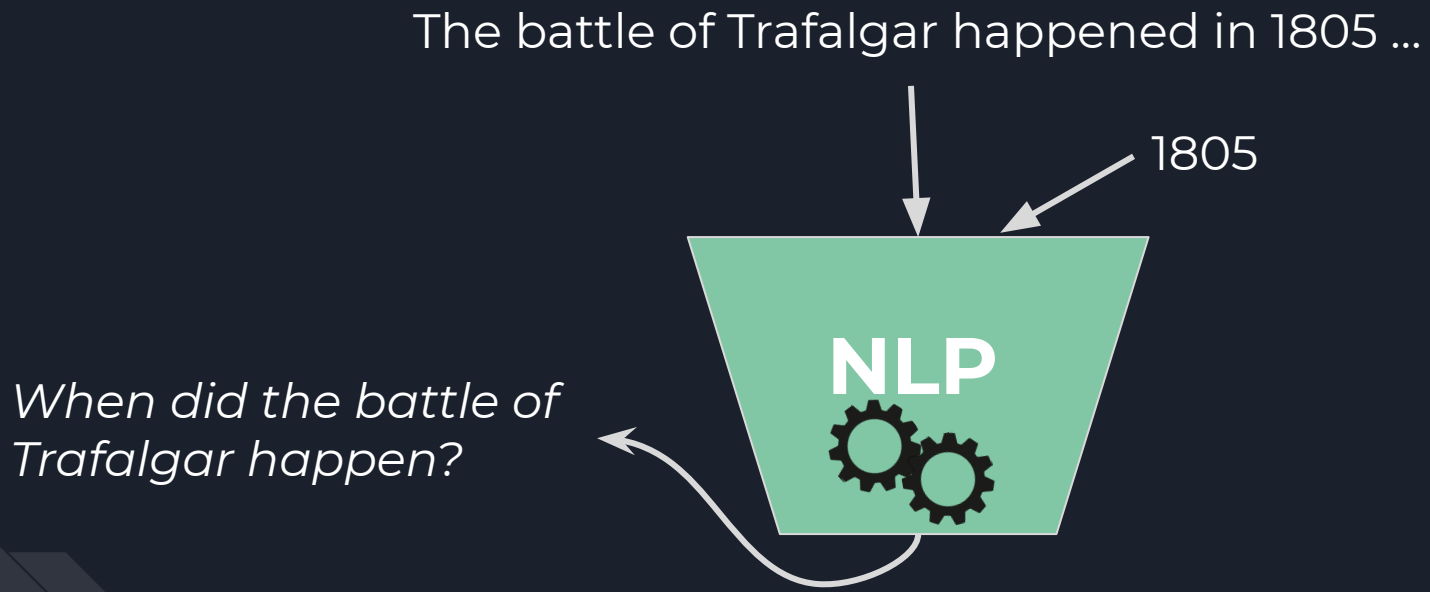
- analysing sentiment of a Tweet
- identifying the subject of a text
- translation

The Goal

01 Baseline: feed in text, questions and four equally plausible answers come out.

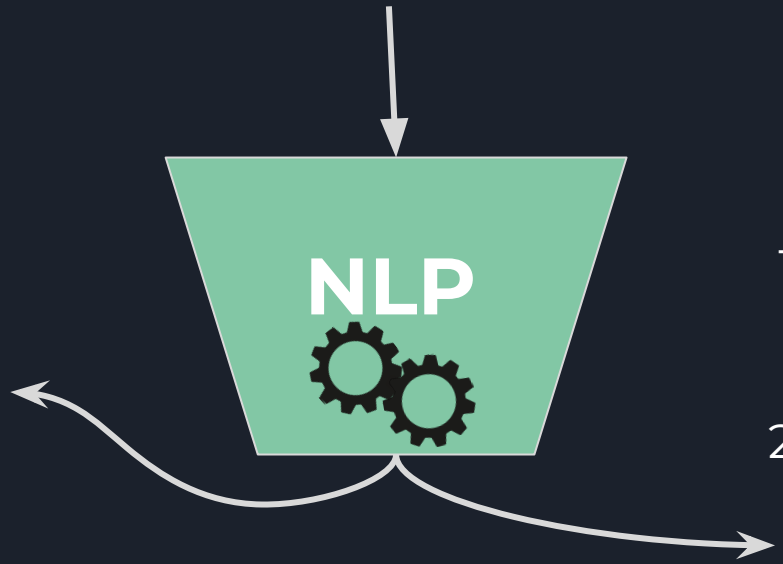


02 Even better: takes in text and an **answer**; gives out questions.



03 The dream: Just put in **any** text and it spits out questions **and** four plausible answers.

The battle of Trafalgar happened in 1805 ...



1. a. Cadiz
   b. Gibraltar
   ...
2. a. Gravina
   b. Villeneuve
   ...

1. Where was the British fleet coming from?
2. Who led the French force?

What are we working with here ?

SQuAD - Stanford Questions and Answers Dataset

Comprehension questions where the answer is always in the text

Teacher

The Stanford Question Answering Dataset

The role of teacher is often formal and ongoing, carried out at a school or other place of formal education. In many countries, a person who wishes to become a teacher must first obtain specified professional qualifications or credentials from a university or college. These professional qualifications may include the study of pedagogy, the science of teaching. Teachers, like other professionals, may have to continue their education after they qualify, a process known as continuing professional development. Teachers may use a lesson plan to facilitate student learning, providing a course of study which is called the curriculum.

WIKIPEDIA
The Free Encyclopedia

What is a course of study called?
Ground Truth Answers: the curriculum. | curriculum | curriculum
Prediction: the curriculum

What is another name to describe the science of teaching?
Ground Truth Answers: pedagogy | pedagogy | formal education
Prediction: pedagogy

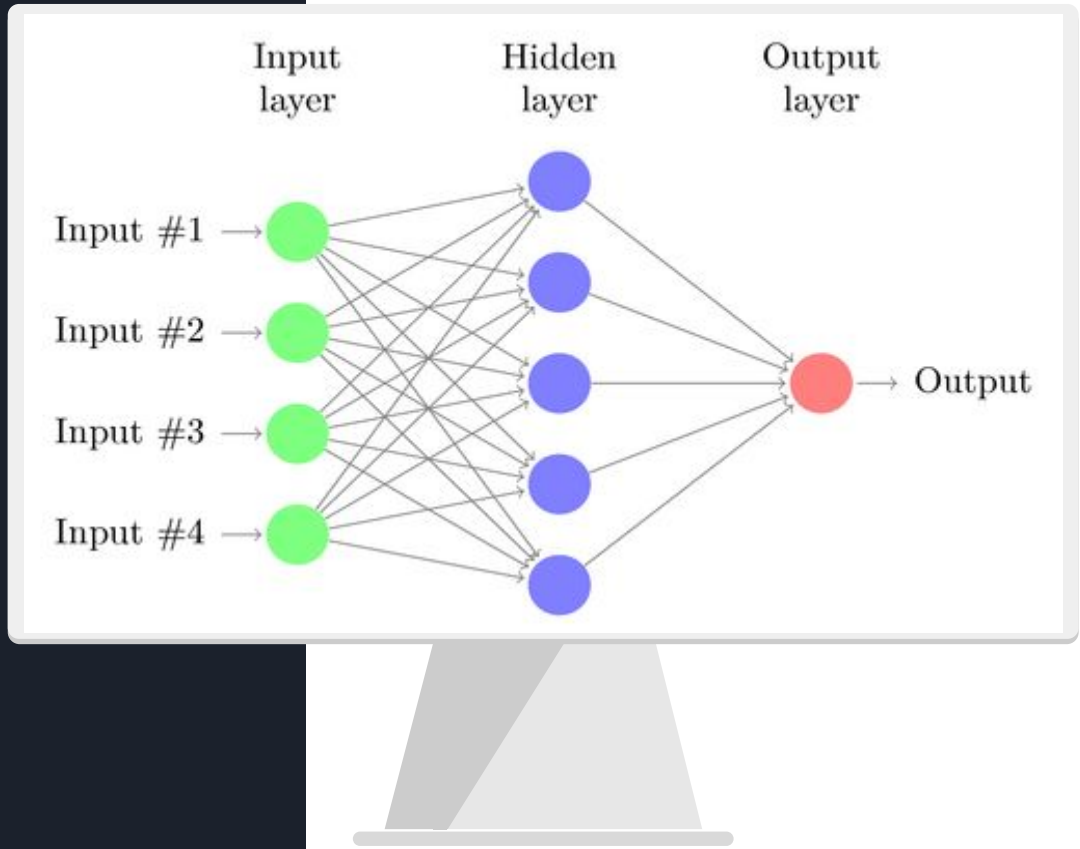
Where do most teachers get their credentials from?
Ground Truth Answers: university or college. | university | university or college
Prediction: university or college

Long term

Short term

Memory

Networks



Development Cycle

1. Architecture

Currently using LSTMs;
2nd stage - Transformers

2. Features to include

GloVe (semantic) embeddings; POS tags; stop words

3. Refine hyperparameters

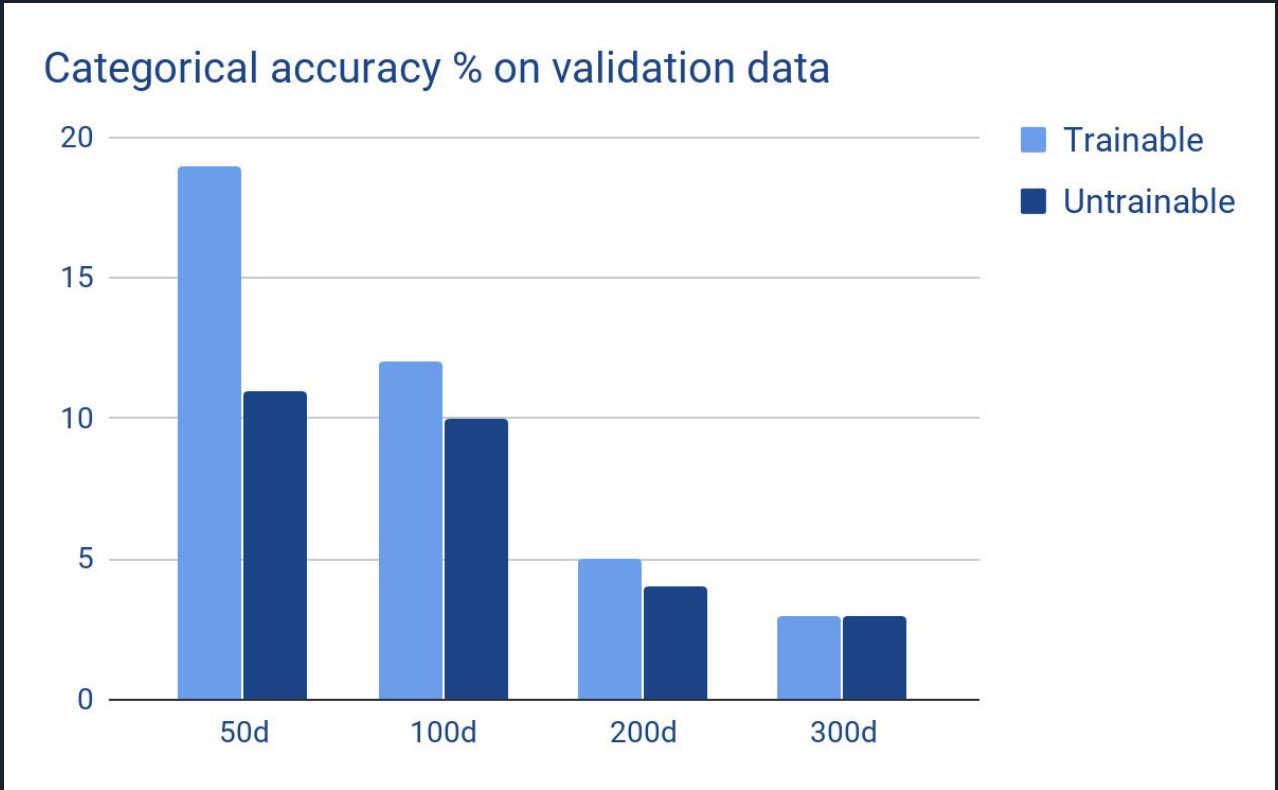
Trainable weights or not; metrics of success

4. Inspect results and detect faults

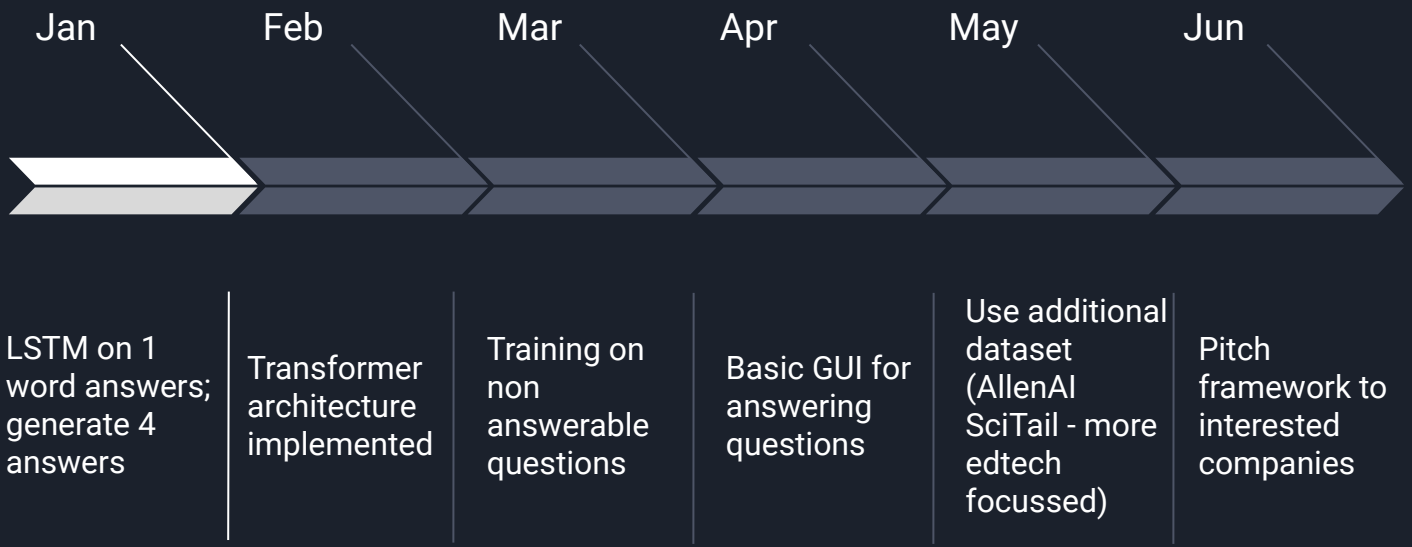
Overfitting → dropout rate;
Reconsider limitations, consult literature

LSTM so far

Low performance so far, improved with feature engineering, particularly with pre trained word embeddings



Timeline


Jan
Feb
Mar
Apr
May
Jun
LSTM on 1 word answers; generate 4 answers
Transformer architecture implemented
Training on non answerable questions
Basic GUI for answering questions
Use additional dataset (AllenAI SciTail - more edtech focussed)
Pitch framework to interested companies

Thank you!
Any questions?