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Football Transfer Market News Generation

Federico Barbiero deltatre

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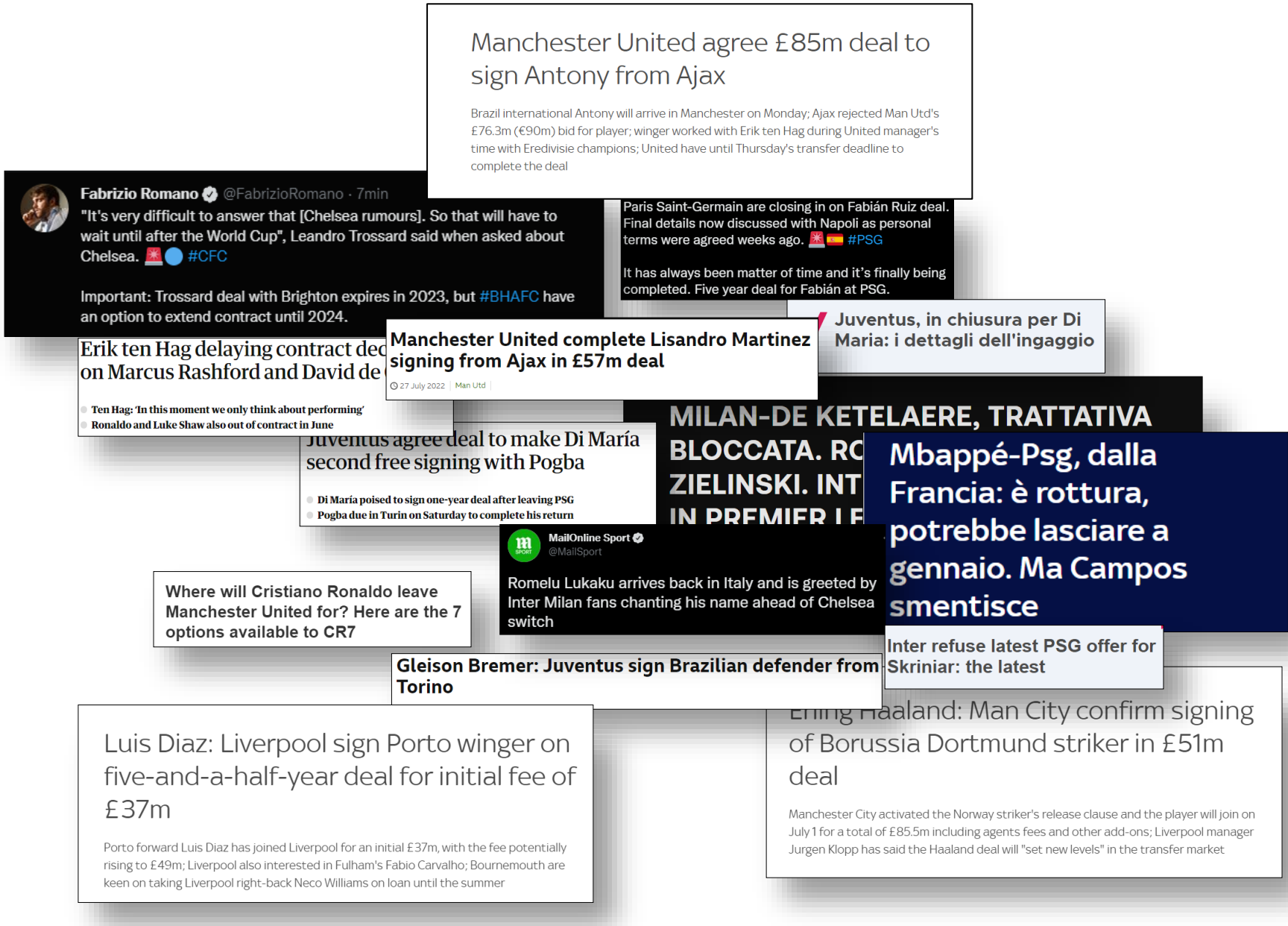
Football Transfer Market News Generation

Can we generate automatically the football transfer market news text?



Transfer Market News Generation

Inputs

Player Name

Cristiano Ronaldo

Club Name

Manchester United

Transfer Market Term

For Sale

League

Premier League

TeamB Name

Paris Saint Germain

Deltatre Innovation Lab

Model Input String

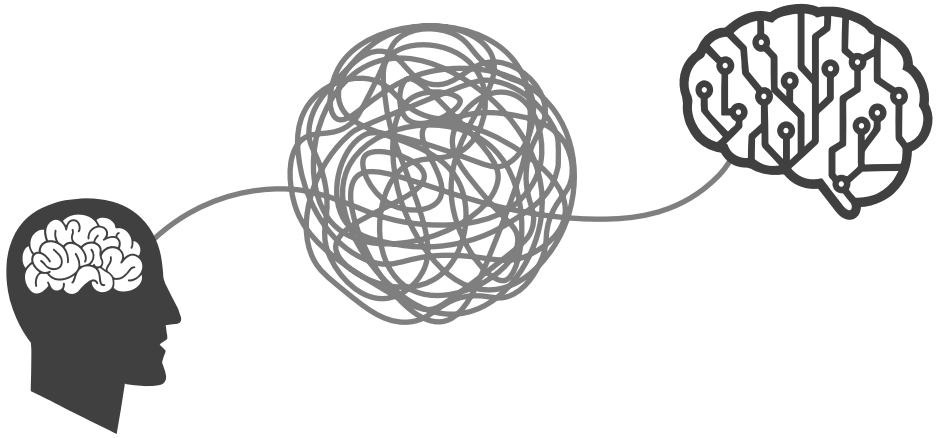
<|PERSON|> Cristiano Ronaldo <|PERSON|> <|CLUB|>Manchester United<|CLUB|> <|TRANSFER_MARKET|> For Sale <|TRANSFER_MARKET|> <|COMPETITION|> Premier League <|COMPETITION|> <|CLUB|> Paris Saint Germain <|CLUB|>

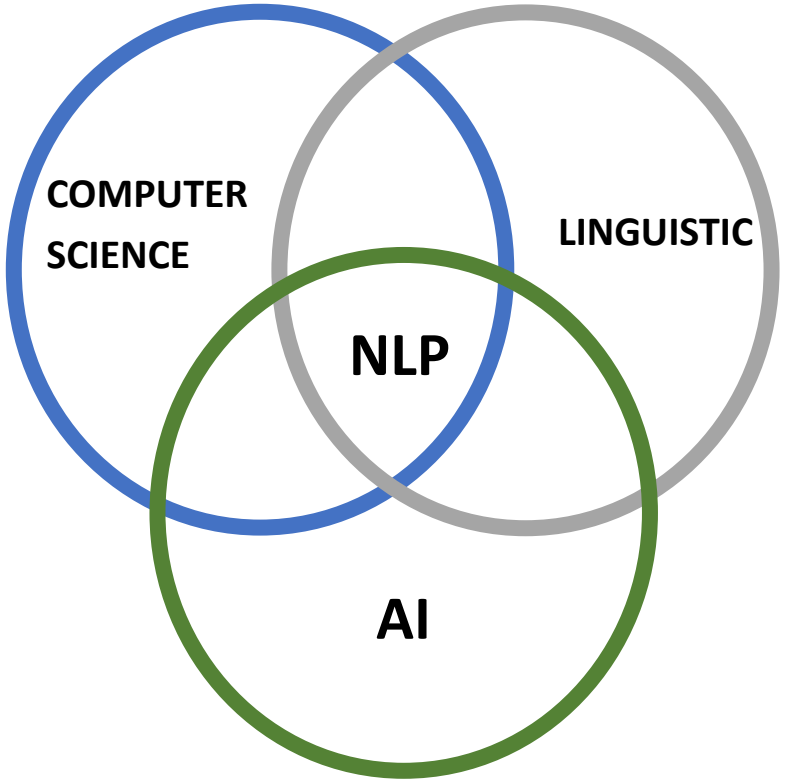
Output

Cristiano Ronaldo is set to leave Manchester United as hes not for sale in the Premier League. transfers Paris SaintGermain board already had direct talks with Cristiano before discussing about future options

Natural Language Processing (NLP)

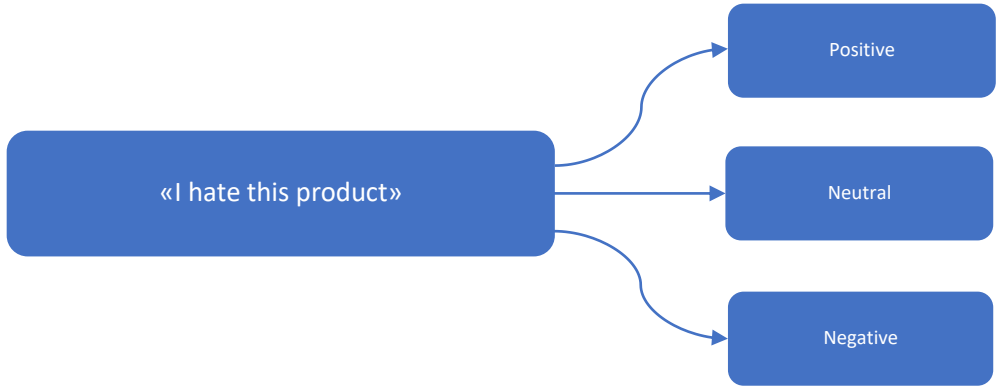
Natural language processing (NLP) is a subfield of linguistics, computer science, and artificial intelligence concerned with the **interactions between computers and human through language**.

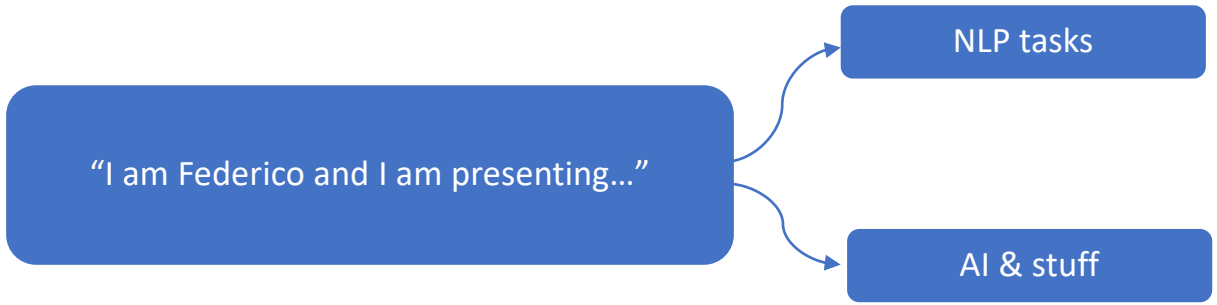


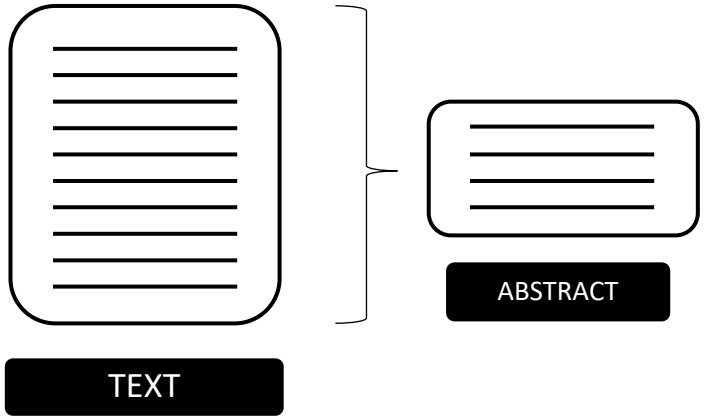


NLP common tasks

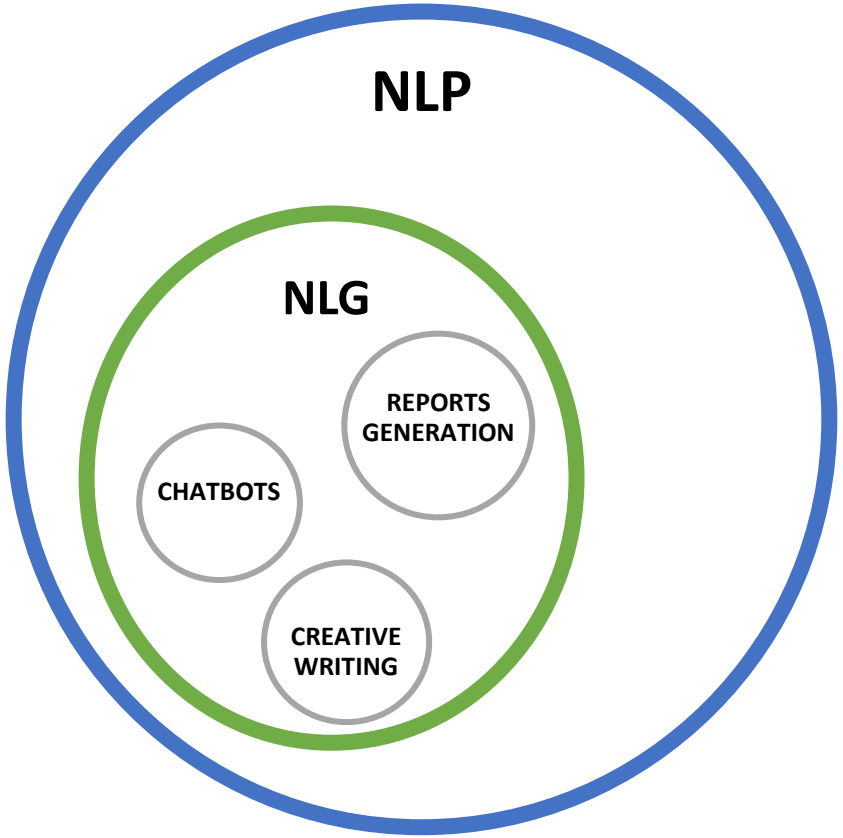
- Text Classification
- Named Entity Recognition (NER)
- Automatic Text Summarization
- Translation
- Text Generation
- Many others (and hybrids, heard about DALL-E?)…

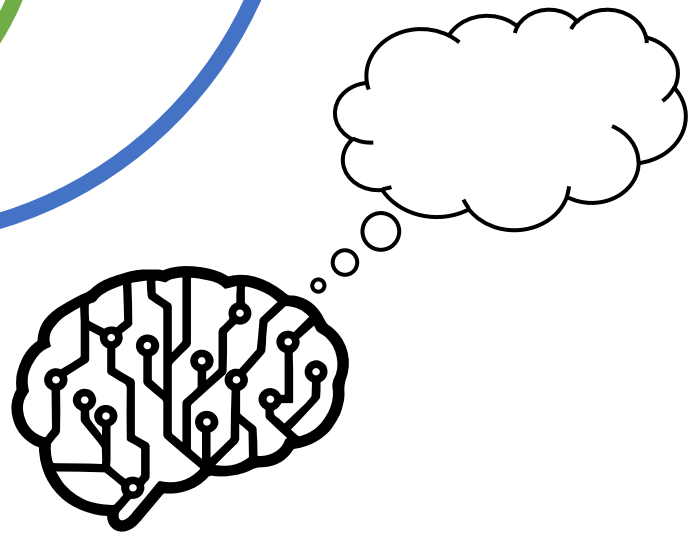






Natural Language Generation (NLG)





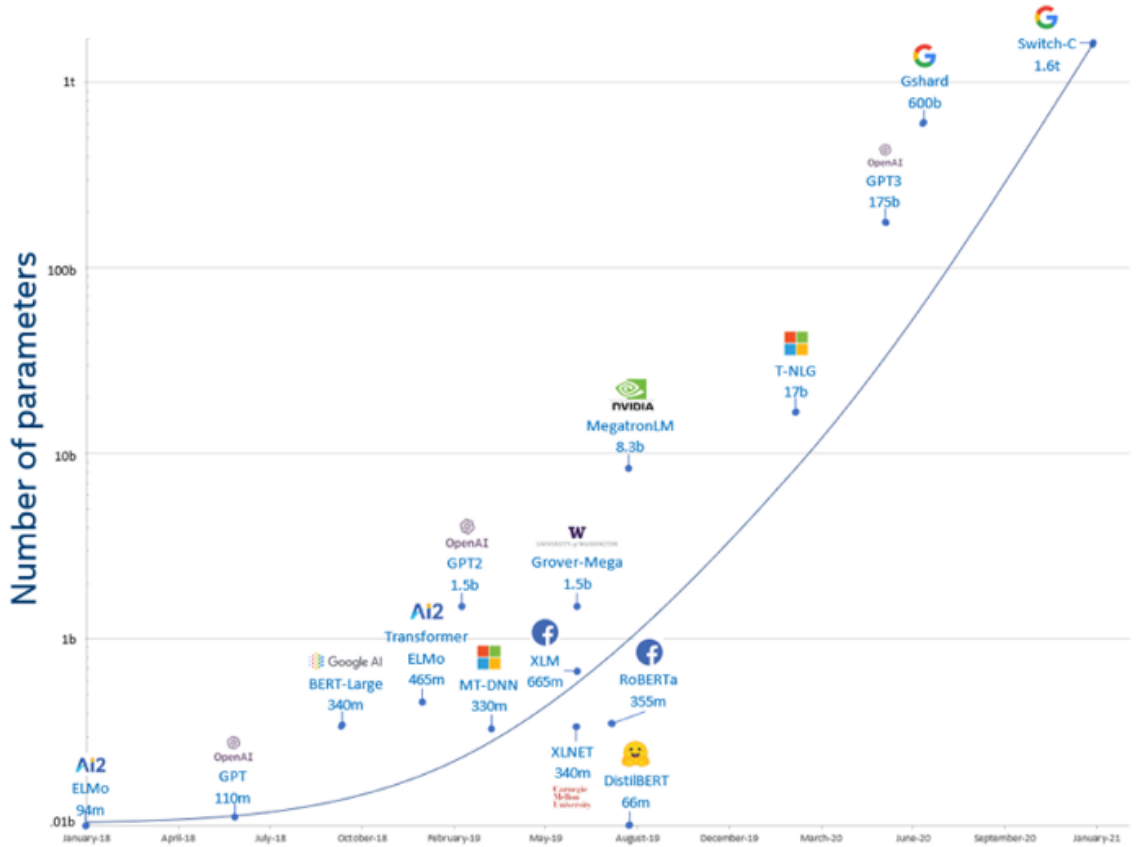
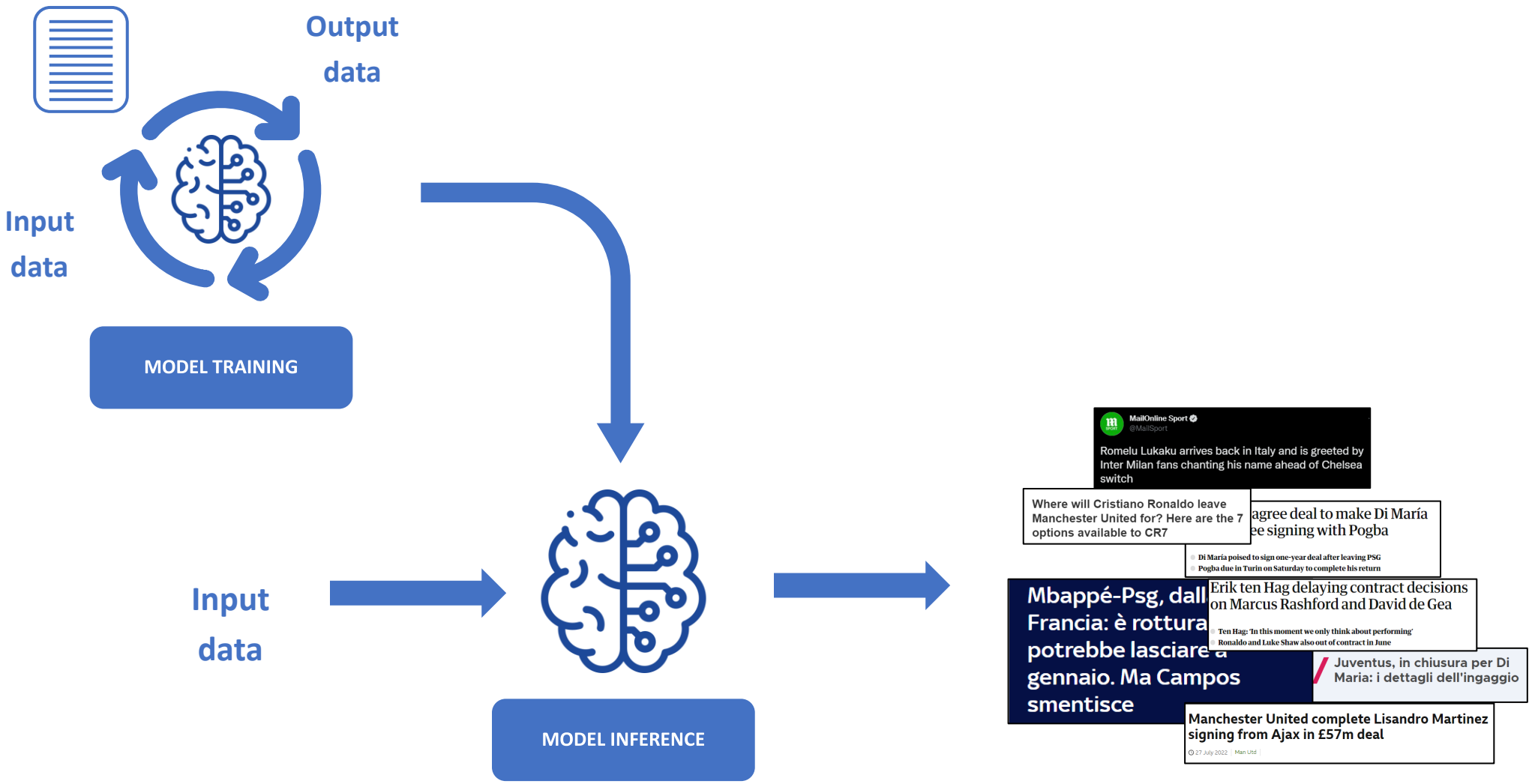


Figure 1: Exponential growth of number of parameters in DL models

The standard AI workflow



What do we need to start?

Most important things to start an AI project:

- **You need data!**
- **You need a lot of data!**
- **You need a lot of good data!**

Apart from that, **you need data**. And you need to **label your data**.

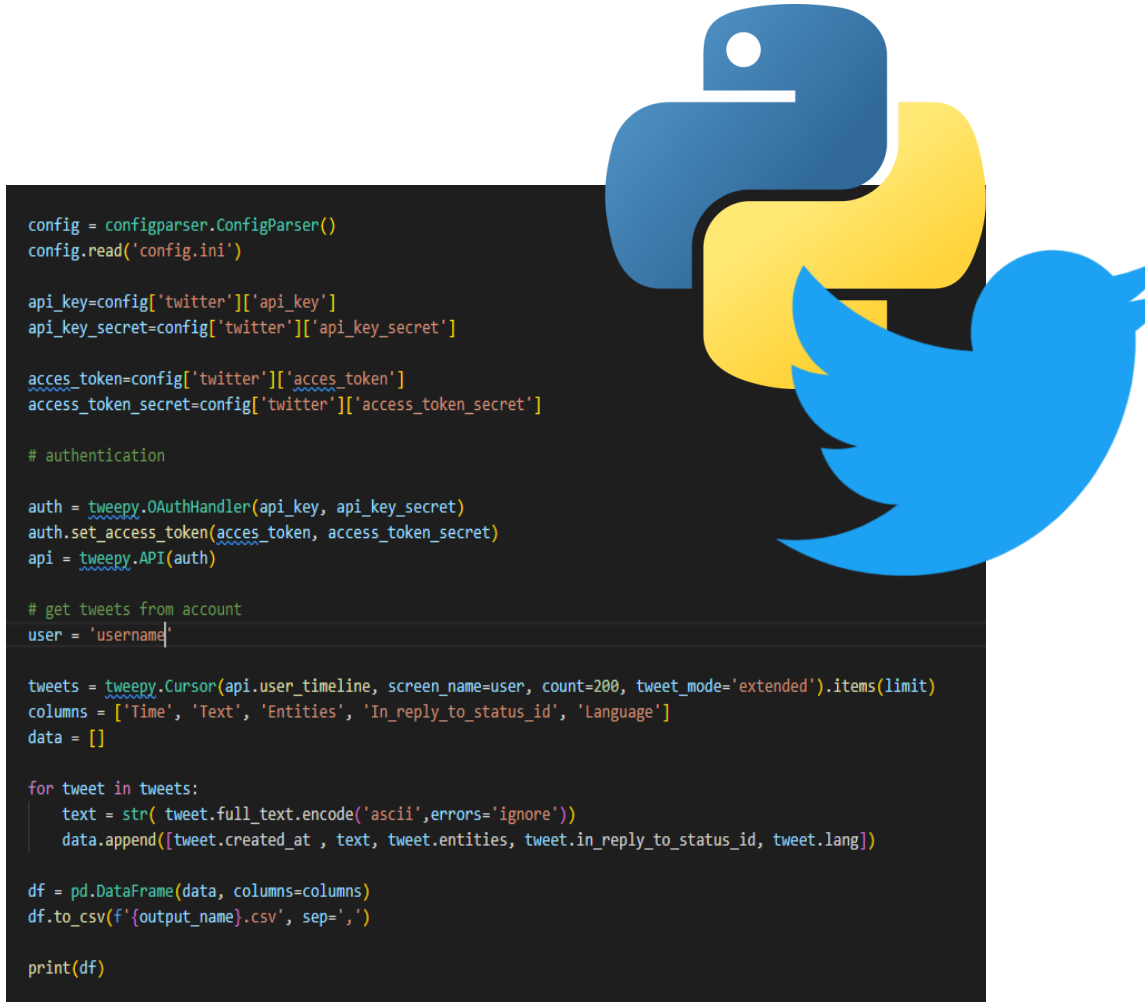
“Where can we find data to train a model like to generate football news?”

Our DATA

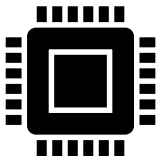
I thought that probably the best source of data I could find were **tweets**!

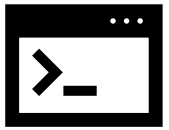
Twitter has its own API to download tweets, you just need **a developer account.**

To interact with Twitter, I used Python and its dedicated library Tweepy.



```
config = configparser.ConfigParser()
config.read('config.ini')

api_key=config['twitter']['api_key']
api_key_secret=config['twitter']['api_key_secret']

acces_token=config['twitter']['acces_token']
access_token_secret=config['twitter']['access_token_secret']

# authentication

auth = tweepy.OAuthHandler(api_key, api_key_secret)
auth.set_access_token(acces_token, access_token_secret)
api = tweepy.API(auth)

# get tweets from account
user = 'username'

tweets = tweepy.Cursor(api.user_timeline, screen_name=user, count=200, tweet_mode='extended').items(limit)
columns = ['Time', 'Text', 'Entities', 'In_reply_to_status_id', 'Language']
data = []

for tweet in tweets:
    text = str( tweet.full_text.encode('ascii',errors='ignore'))
    data.append([tweet.created_at , text, tweet.entities, tweet.in_reply_to_status_id, tweet.lang])

df = pd.DataFrame(data, columns=columns)
df.to_csv(f'{output_name}.csv', sep=',')

print(df)
```





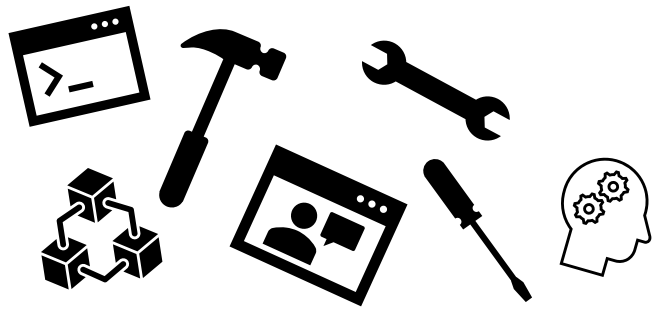
Cool we have DATA, but:

They are a mess!

We need to prepare them in order to make as clean as possible.

In AI/ML this phase is called **preprocessing**.

And this is what we want generate, what do we show as input to our model?



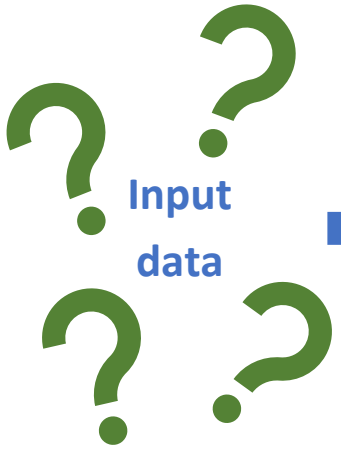
Napoli are set to sign Kim Min Jae as new centre back from Fenerbahçe by triggering €19.5m release clause as Koulibaly replacement. 🚨🔵🇰🇷 #Napoli

South Korean centre back was close to join Rennes but Napoli hijacked the deal. Medical today. @SkySport

b'Napoli are set to sign Kim Min Jae as new centre back from Fenerbahe by triggering 19.5m release clause as Koulibaly replacement. #Napoli\n\nSouth Korean centre back was close to join Rennes but Napoli hijacked the deal. Medical

Napoli are set to sign Kim Min Jae as new centre back from Fenerbahe by triggering 19.5m release clause as Koulibaly replacement. Napoli South Korean centre back was close to join Rennes but Napoli hijacked the deal. Medical today.

Input DATA



MODEL INFERENCE

We can use some **keywords**.

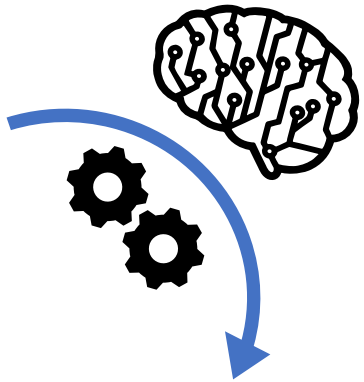
From these, the model should learn how to write the new.

NER

Antonio Conte admits Tottenham 'cannot work miracles' after Newcastle defeat as Jamie Redknapp questions delayed contract talks

Person
Team
Transfer Market
Result

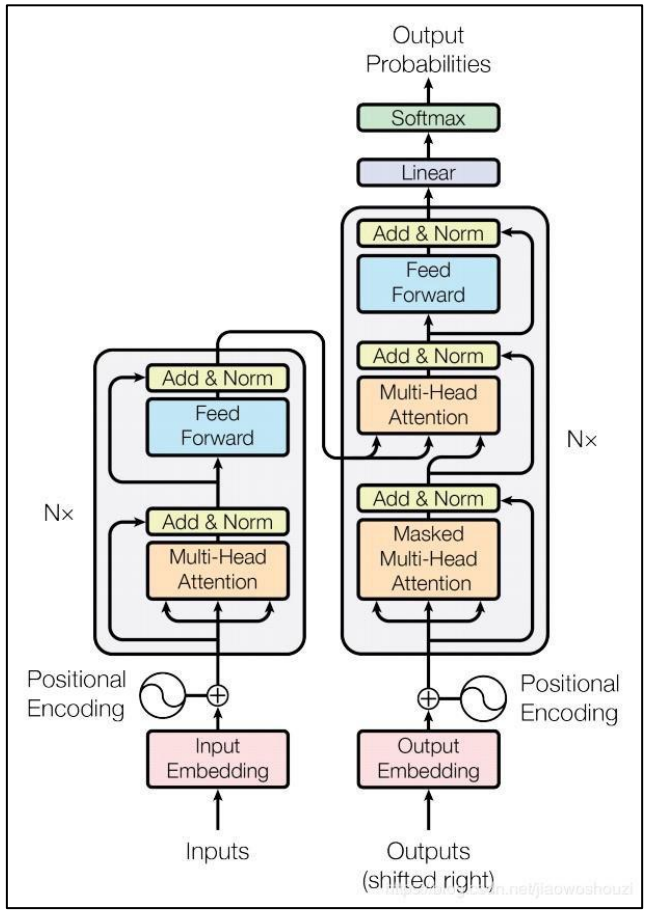
Cristiano Ronaldo will meet with Erik ten Hag to discuss about his future. Man Utd insist hes not for sale while Cristiano wants to go - Mendes, still pushing MUFC
No changes on Frenkie de Jong, as of now - no intention to accept a salary cut.



<|PERSON|> cristiano ronaldo <|PERSON|><|PERSON|> erik ten hag <|PERSON|>
<|CLUB|> man <|CLUB|><|TEAM_NICKNAME|> utd <|TEAM_NICKNAME|>
<|TRANSFER_MARKET|> for sale <|TRANSFER_MARKET|><|PERSON|> cristiano
<|PERSON|><|PERSON|> mendes <|PERSON|><|CLUB|> mufc <|CLUB|>
<|PERSON|> frenkie de jong <|PERSON|><|MONEY|> salary cut <|MONEY|>

CLUB
PERSON
COMPETITION
NATION/NATIONAL_TEAM
SCORE
RESULT
DATE
ORG
ROUND
GPE
STADIUM
POSITIONING
TEAM_NICKNAME
PERSON_NICKNAME
ROLE
SHOT_TYPE
MATCH_PHASE
SET_PIECE
AWARDS
CUSTOMS_&_TRADITIONS
BETTING
TRANSFER_MARKET
TACTICAL
DISCIPLINARY
INJURY
ESPORT
FAC
LOC
NORP
EVENT
TIME
PERCENT
MONEY
ORDINAL
CARDINAL

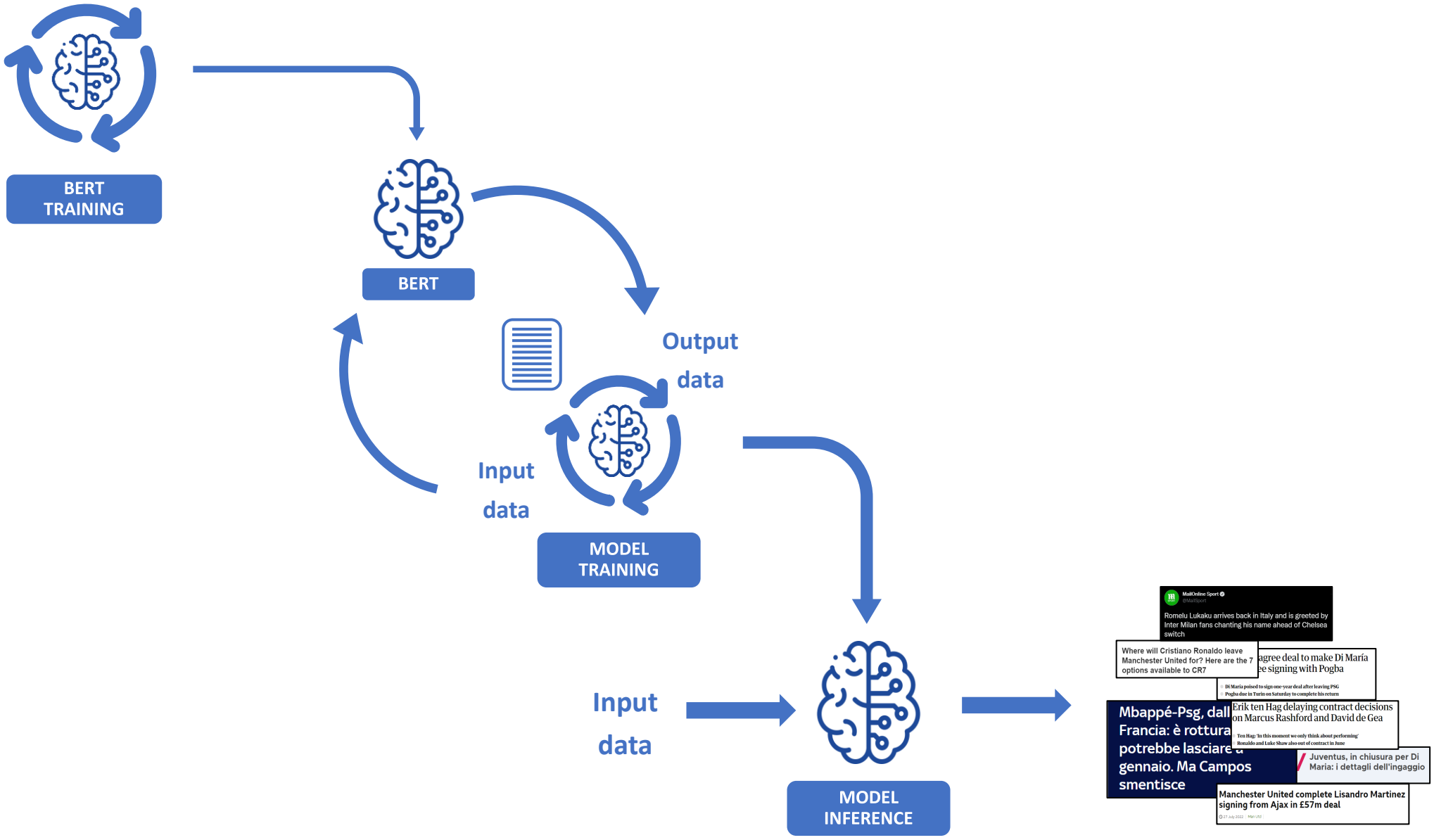
Training BERT



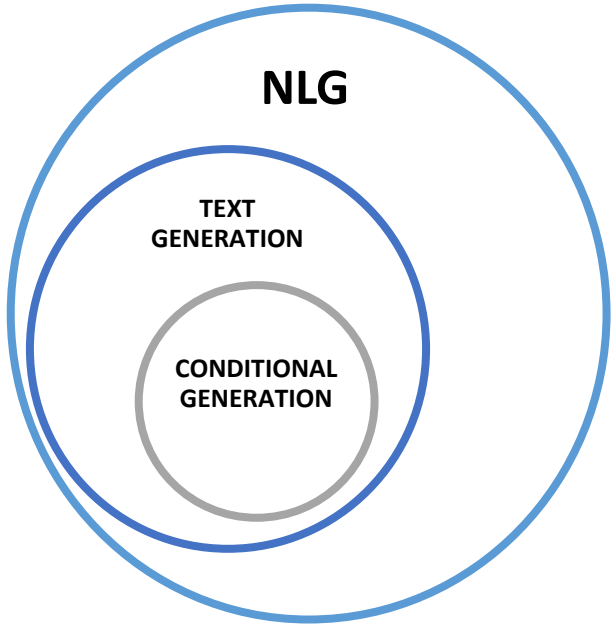

```python
def compute_metrics(p: EvalPrediction) -> Dict:
    preds_list, out_label_list = align_predictions(p.predictions, p.label_ids)
    return {
        "precision": precision_score(out_label_list, preds_list),
        "recall": recall_score(out_label_list, preds_list),
        "f1": f1_score(out_label_list, preds_list),
    }

# Initialize our Trainer
trainer = Trainer(
    model=model,
    args=training_args,
    train_dataset=train_dataset,
    eval_dataset=eval_dataset,
    compute_metrics=compute_metrics,
)

# Training
if training_args.do_train:
    trainer.train(
        model_path=model_args.model_name_or_path if os.path.isdir(model_args.model_name_or_path) else None
    )
    trainer.save_model()
    # For convenience, we also re-save the tokenizer to the same directory,
    # so that you can share your model easily on huggingface.co/models =)
    if trainer.is_world_master():
        tokenizer.save_pretrained(training_args.output_dir)
```

```python
tokens = tokenizer.tokenize(tokenizer.decode(tokenizer.encode(text)))
inputs = tokenizer.encode(text, return_tensors="pt")
outputs = model(inputs)[0]
predictions = torch.argmax(outputs, dim=2).detach().numpy()[0, :]
score_matrix = outputs.detach().numpy()
meaningful_ent = []

for i in range(0, len(predictions)):
    meaningful_ent.append(entity(tokens[i], label_list[predictions[i]], soft_max(score_matrix[0, i, :])))

entities_to_show=[m for m in merge_same_labels(remove_sobtokens(meaningful_ent)) if m.label!='O'and len(m.token)

return [{'text': ent.token , 'label': ent.label, 'score': ent.confidence} for ent in entities_to_show]
```

Our AI workflow

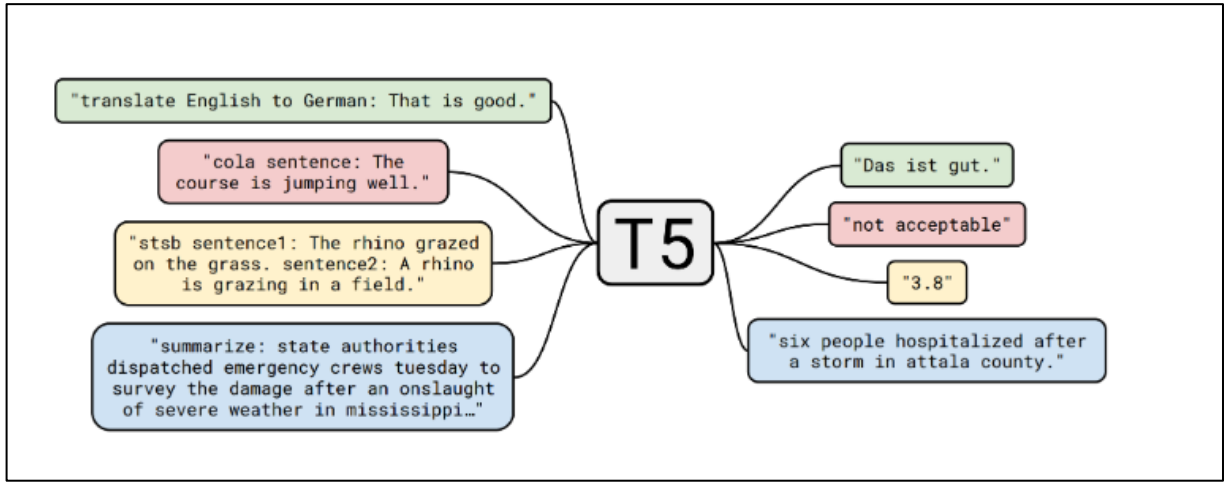


And now what model to generate text?



T5

(**T**ext-**t**o-**T**ext **T**ransfer **T**ransformer)



ToTTo

Table Title: Cristhian Stuani
Section Title: International goals
Table Description: As of 25 March 2019 (Uruguay score listed first, score column indicates score after each Stuani goal)

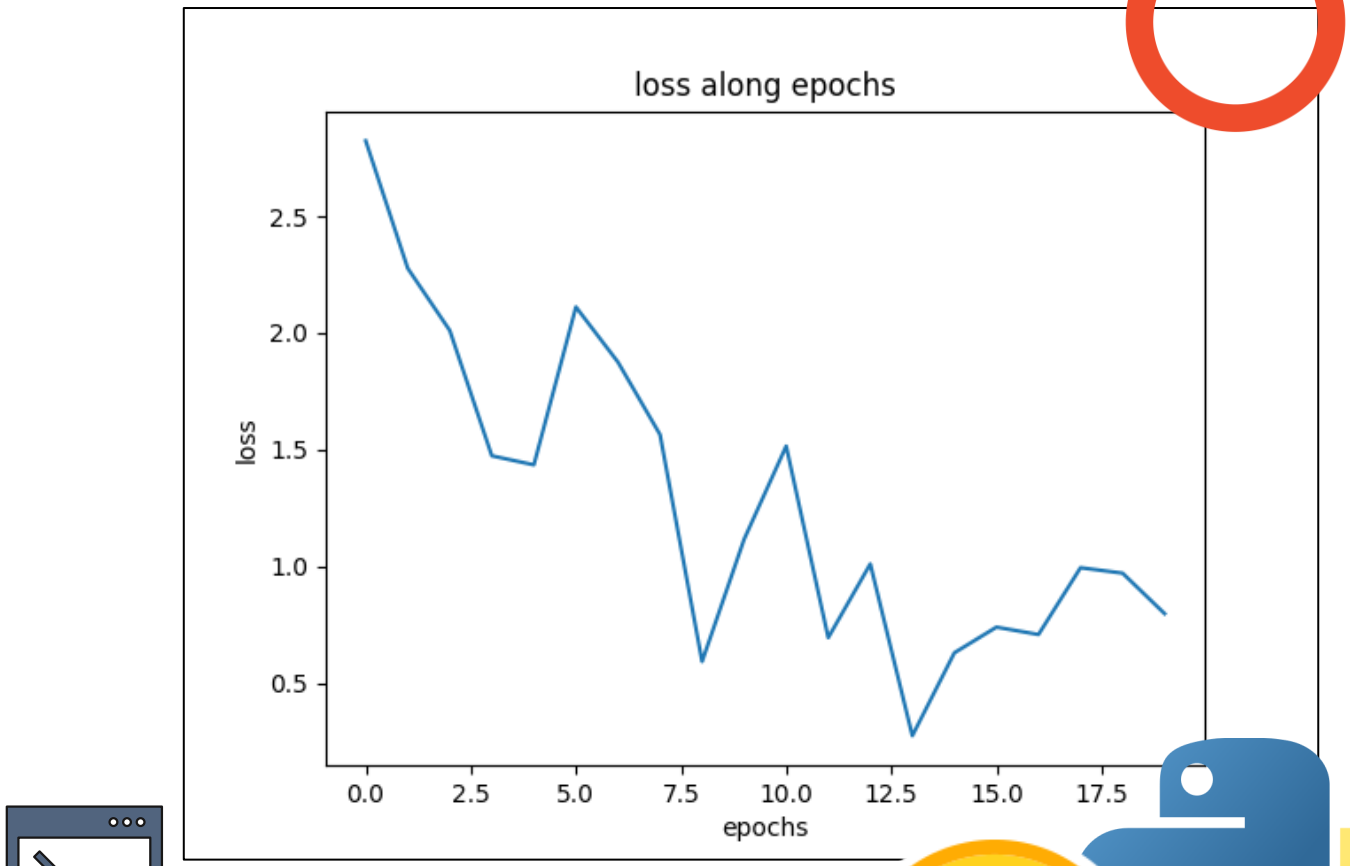
No.	Date	Venue	Opponent	Score	Result	Competition
1.	10 September 2013	Estadio Centenario, Montevideo, Uruguay	Colombia	2-0	2-0	2014 FIFA World Cup qualification
2.	13 November 2013	Amman International Stadium, Amman, Jordan	Jordan	2-0	5-0	2014 FIFA World Cup qualification
3.	31 May 2014	Estadio Centenario, Montevideo, Uruguay	Northern Ireland	1-0	1-0	Friendly
4.	5 June 2014		Slovenia	2-0	2-0	

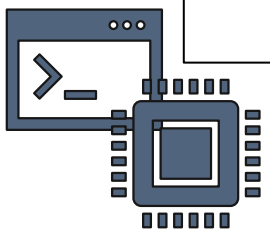
Original Text: On 13 November 2013, he netted the Charruas' second in their 5 – 0 win in Jordan for the playoffs first leg, finishing Nicolas Lodeiro's cross at close range.
Text after Deletion: On 13 November 2013, he netted the second in their 5 – 0 win in Jordan.
Text after Decontextualization: On 13 November 2013, Cristhian Stuani netted the second in 5 – 0 win in Jordan.
Final Text: On 13 November 2013 Cristhian Stuani netted the second in a 5 – 0 win in Jordan.

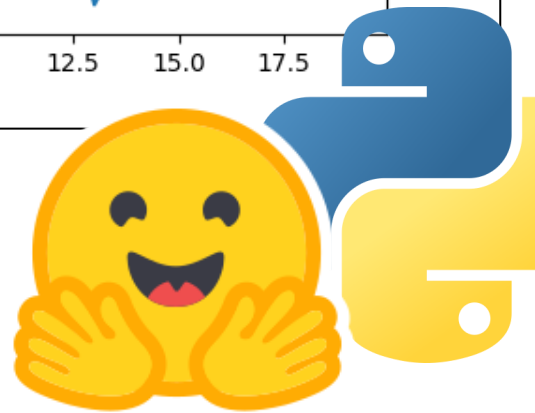
Table 1: Example in the ToTTo dataset. The goal of the task is given the table and set of highlighted cells, to produce the final text. Our data annotation process revolves around annotators iteratively revising the original text to produce the final text.

Train T5

- T5-large
- 20 epochs
- Batch size: 8
- Max length: 256
- Hardware: NVIDIA Titan RTX
- Loss: CrossEntropyLoss (default)
- Lr: 0.001







"I never use loss functions because I never lose"

AND NOW DEMO!

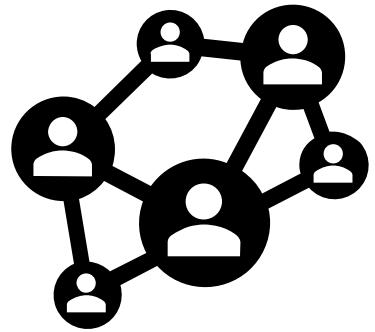

me: showing results' demo again
everyone else hearing at this presentation:
imgflip.com

TODO list:

- Identify a way to evaluate results apart from loss and human evaluation.
- Find a way to better represent input data structure and elements relations.
- Train bigger models (T5-3b, T5-11b) using more GPUs in parallel.
- Try other models (like T5X)
- If results are robust and reliable create an inference structure/API.

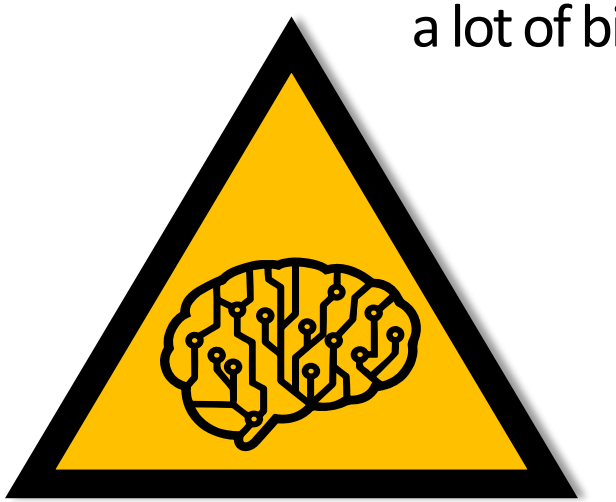
Houston, as usual, we have problems

- System invents, differently from GPT-3, but we still do not have coherence for sure.
- I need labelling resources
- Find a better data source maybe



Danger

- These systems are powerful but dangerous too.
- In wrong hands they be used to create bots/fake news or to help cyber criminals.
- OpenAI at first released GPT-3 just to developers.
- They are trained on a large corpus of data coming from different sources: they absorbed a lot of bias.



See you next time with session titled “Sessions generation with AI”

Thank You!

ευχαριστώ Salamat Po متشكرم شكراً Grazie

благодаря ありがとうございます Kiitos Teşekkürler 谢谢

ขอบคุณครับ Obrigado شكريه Terima Kasih Dziękuję

Hvala Köszönöm Tak Dank u wel дякую Tack

Mulţumesc спасибо Danke Cám ơn Gracias

多謝晒 Ďakujem תודה நன்றி Děkuji 감사합니다

Slides/Demo repository

Deltatre Innovation Lab

GitHub

https://github.com/deltatrelabs/deltatre-global-ai-dev-days-2022-demo

Useful links

- https://arxiv.org/pdf/1910.10683.pdf
- https://arxiv.org/pdf/2004.14373.pdf
- https://huggingface.co/docs/transformers/model_doc/t5
- https://developer.twitter.com/en/portal/dashboard
- https://www.tweepy.org/
- https://ai.googleblog.com/2021/01/totto-controlled-table-to-text.html
- https://paperswithcode.com/sota/data-to-text-generation-on-totto
- https://ai.googleblog.com/2018/11/open-sourcing-bert-state-of-art-pre.html
- https://github.com/google-research/bert
- https://huggingface.co/bert-base-uncased?text=The+goal+of+life+is+%5BMASK%5D.
- https://github.com/google-research/t5x