NLP and its Applications

By: Wafaa Mohammed

Self Introduction

- Name: Wafaa Mohammed
- Bachelor: EEE, UofK. Software Engineering. (Sudan)
- Master’s: African Master’s in Machine Intelligence (AMMI). (Senegal)
- Interned at STEM-Away as machine learning project lead. (US, remote)
- Currently an NLP research intern at Gematria technologies. (UK, remote)

What is NLP?

NLP

- The branch of AI concerned with giving computers the ability to understand text and spoken words in much the same way human beings can.
- When this task will be fully solved, you will be able to communicate with your computer (or your tablet, cell phone, your smart refrigerator and your car) just as you do with another human being.

“Computers are incredibly fast, accurate and stupid; humans are incredibly slow, inaccurate and brilliant; together they are powerful beyond imagination.”

- Albert Einstein

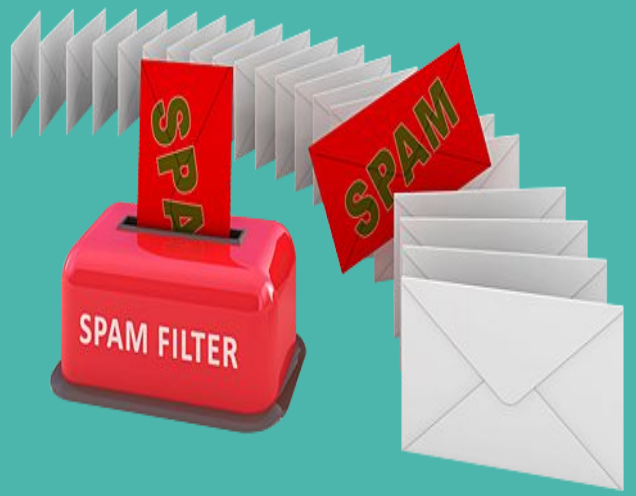
Sub processes

- Natural Language Understanding (NLU): **Language ⟶ Information**
- Natural Language Generation (NLG): **Information ⟶ Language**

What can you do with NLP?

Email filters

- Spam filters.
- Email classification: primary, social, promotions.
- Almost perfectly solved.

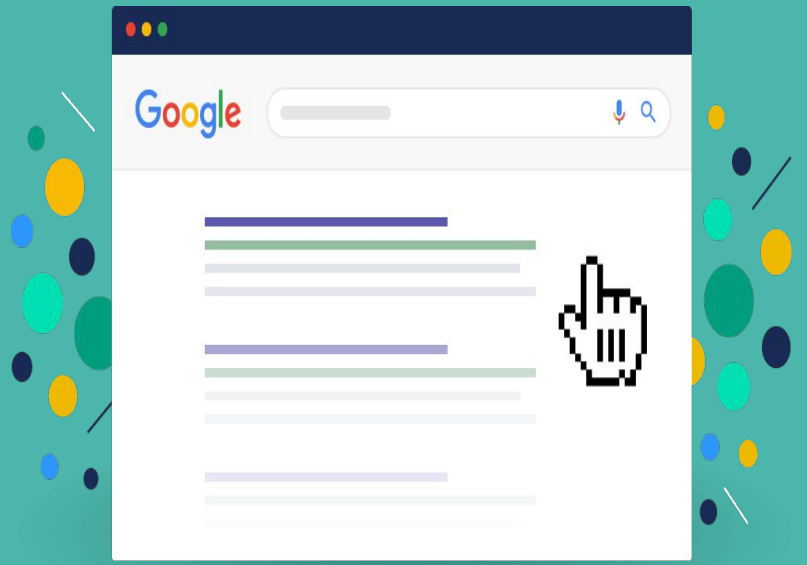


Fake news detection

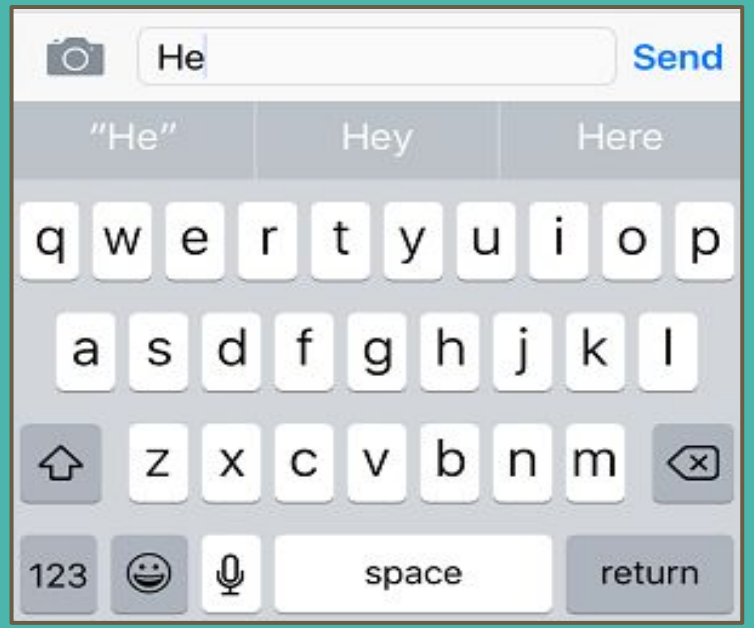
Challenges

- Multilingualism.
- Multimedia content, particularly image and video, is becoming increasingly important on social media.
- When falsehood is subtly introduced (expanding authentic news with fake ones).
- explainable systems (black box).
- Bias !!

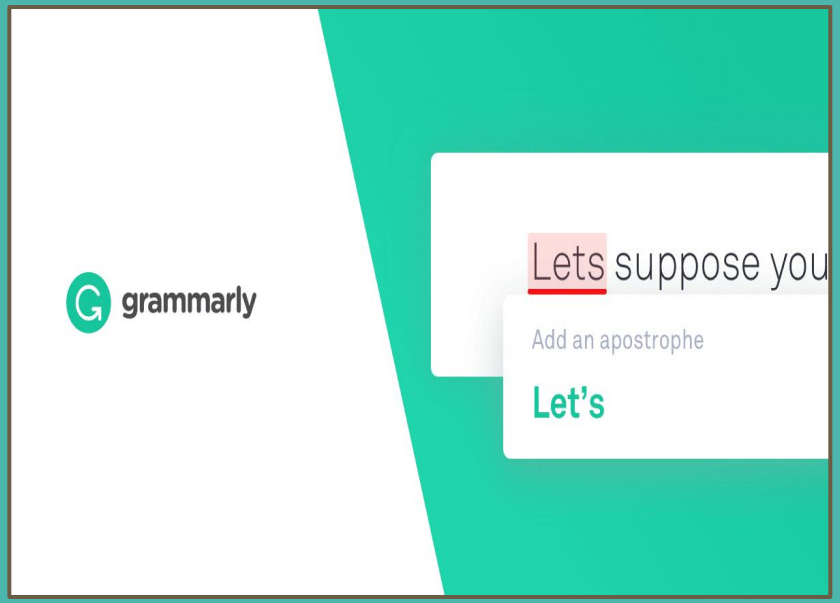
Search results



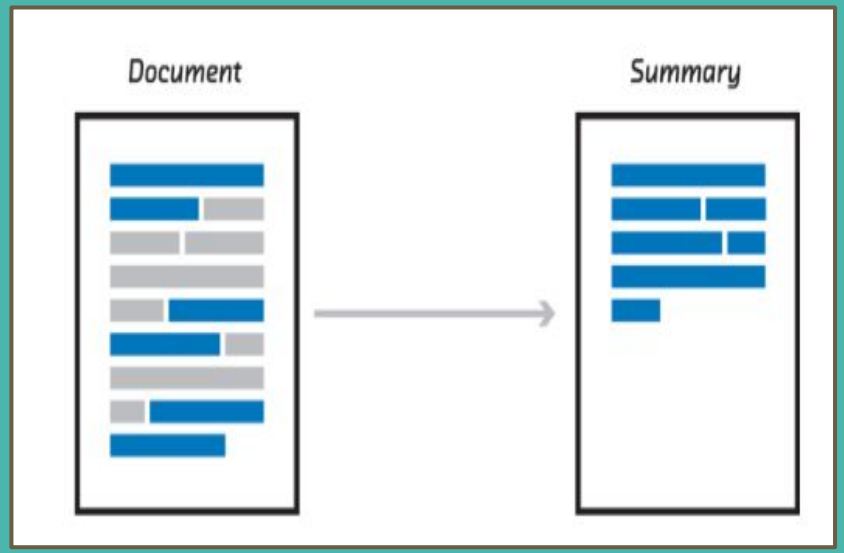
Predictive text



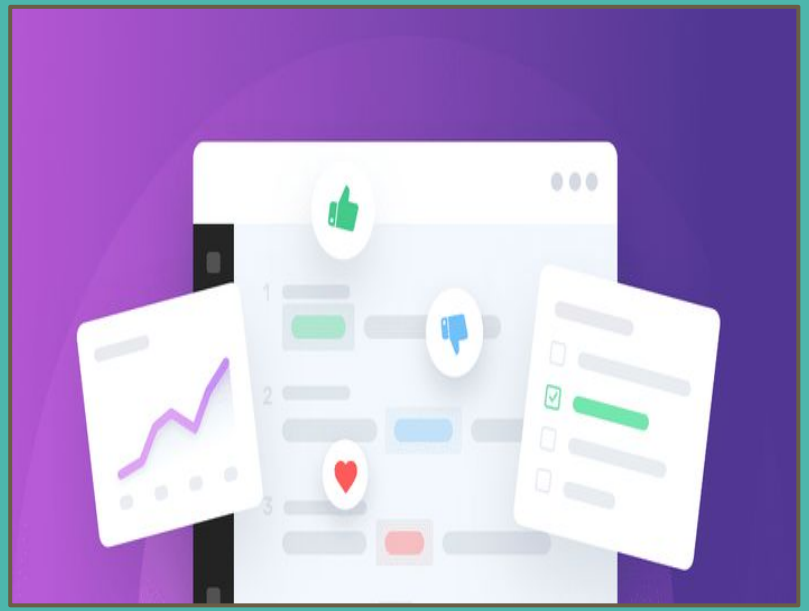
Grammar checkers



Text summarization



Written survey analysis

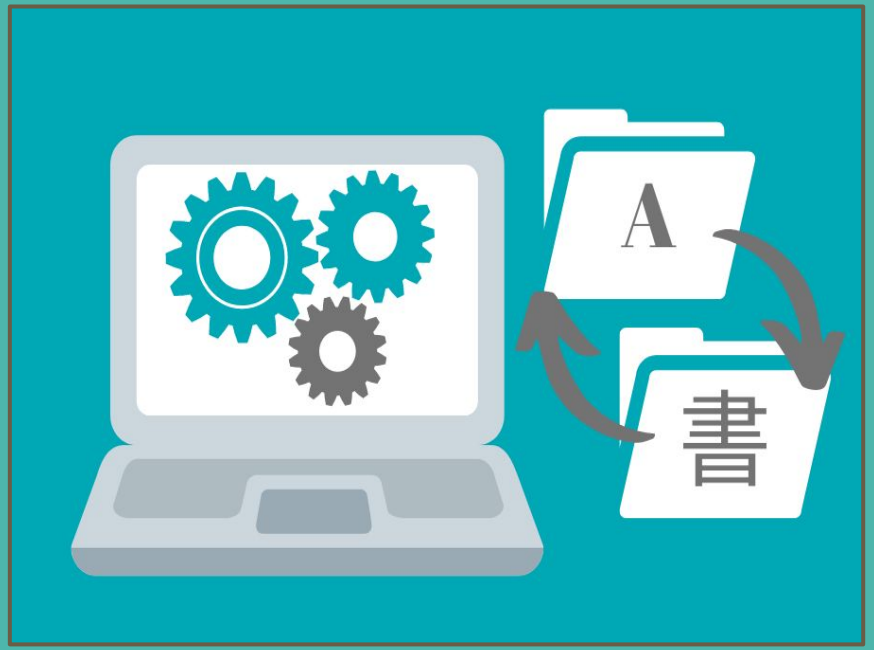


Hiring and recruitment

- Information extraction
- Named entity recognition
- Feature representation
- Classification (fit/ no fit)
- Recommendation (other roles)

Machine translation

the problem of converting a source text in one language to another language.



State of the art

- Google translate uses neural machine translation (NMT) for its translation services.

Challenges

- Contextual words and phrases

*I **ran** to the store because we **ran** out of milk*

*The house is looking really **run** down*

Challenges - cont.

- Scientific Language translation

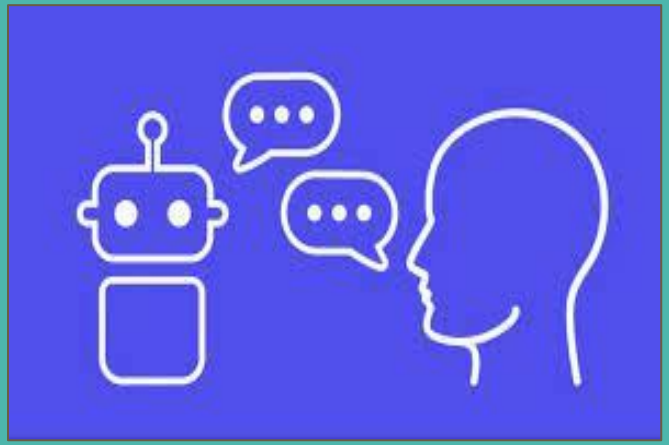
Challenges - cont.

- Low resourced languages

There are over 3,000 languages in Africa

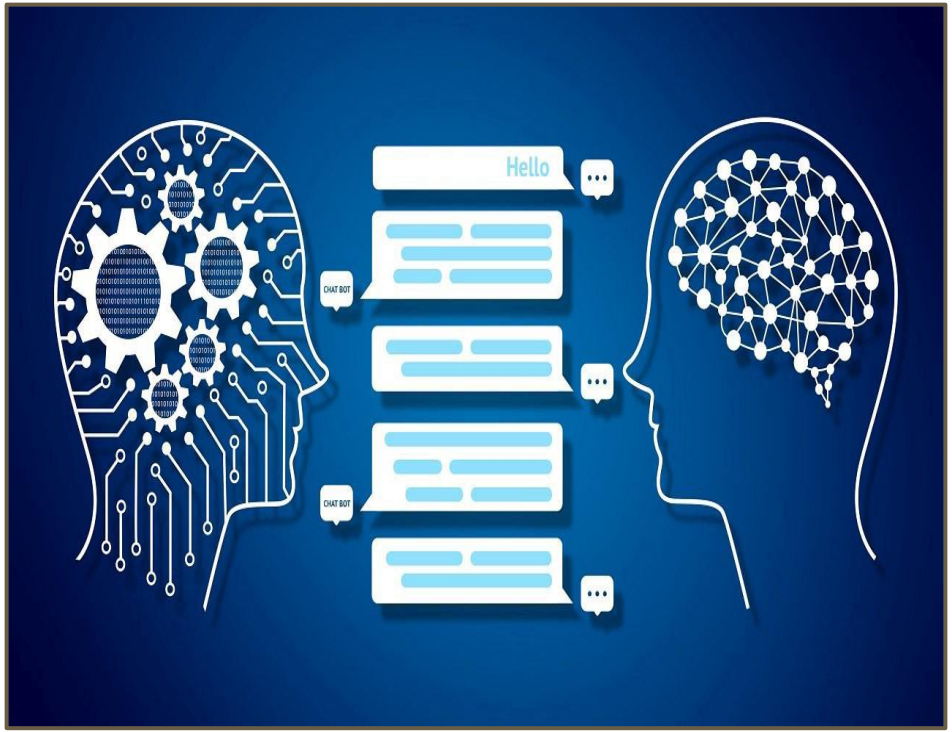
Conversational AI

The set of technologies behind automated messaging and speech-enabled applications that offer human-like interactions between computers and humans.



Example applications

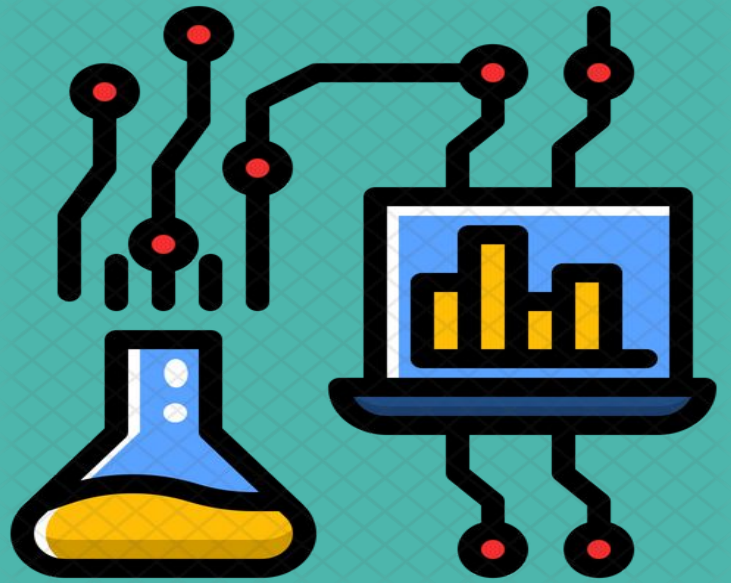
- Chat-bots
- Virtual assistants: Apple's Siri, Amazon's Alexa.



NLP and Bioinformatics

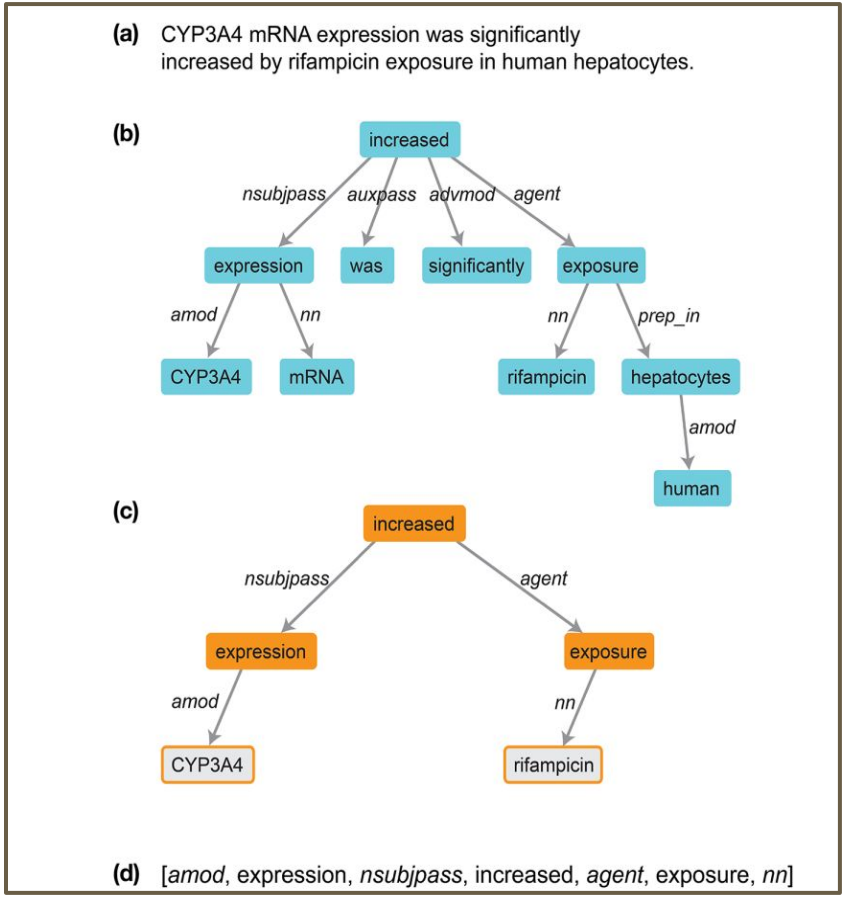
Bioinformatics

the science of collecting and analysing complex biological data such as genetic codes.



Applications

- Drug-target relationships extraction from biomedical literature: entity recognition, parsing, clustering.



NLP and Computer Vision

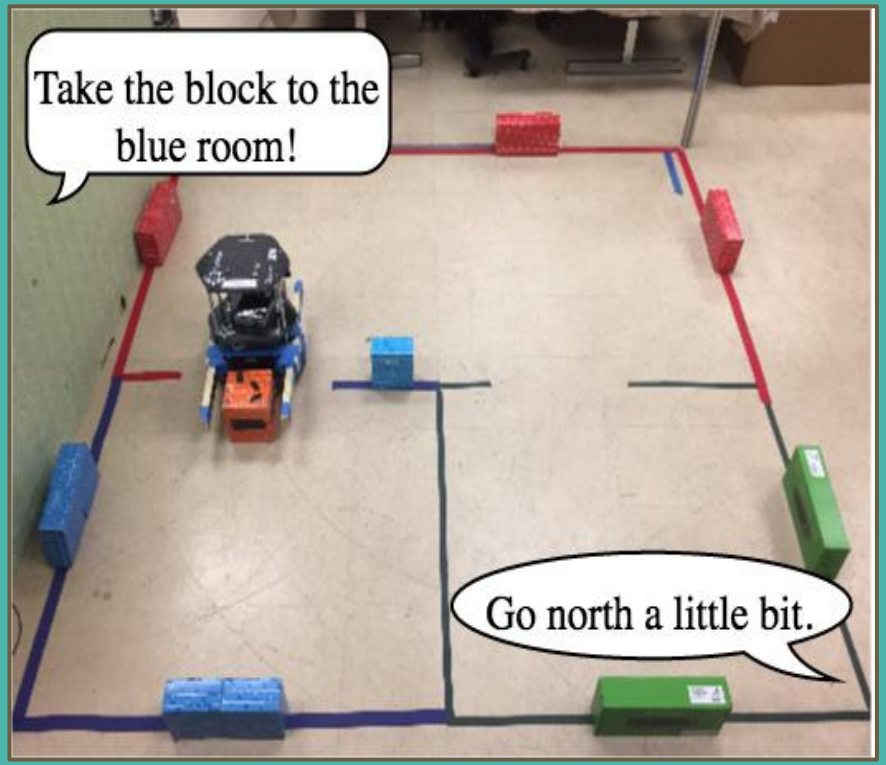
Image Captioning

Visual Question Answering

NLP and Robotics

Grounded Language Learning

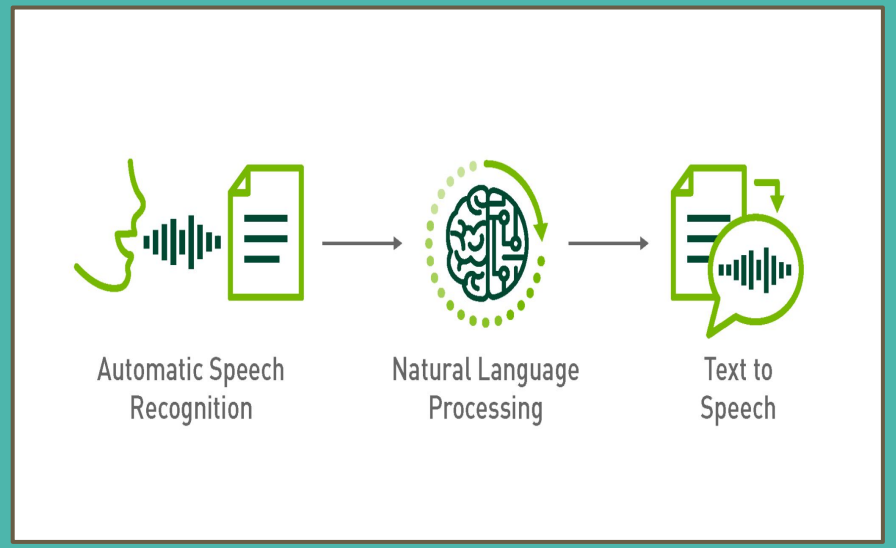
Learning the meaning of language as it applies to the physical world.



NLP and Speech processing

Speech processing in NLP

It allows intelligent systems to interact with users via verbal language.



NLP models deployment

Definition

- Integrating a machine learning model into a production environment.

Challenges

- GPT-3 has 175 Billion parameters, it needs around 700 GB of memory.
- Embedded systems is much more difficult than using the cloud.
- Concept drift.
- Legal requirements.


OK, NOW WHAT?

“The world belongs to the few people who are not afraid to get their hands dirty.”

- Howard Schultz


THANKS FOR LISTENING
ANY QUESTIONS ?
memegenerator.net

Thanks!

Contact:

Linkedin: Wafaa Mohammed
Email: wafamoh97@gmail.com