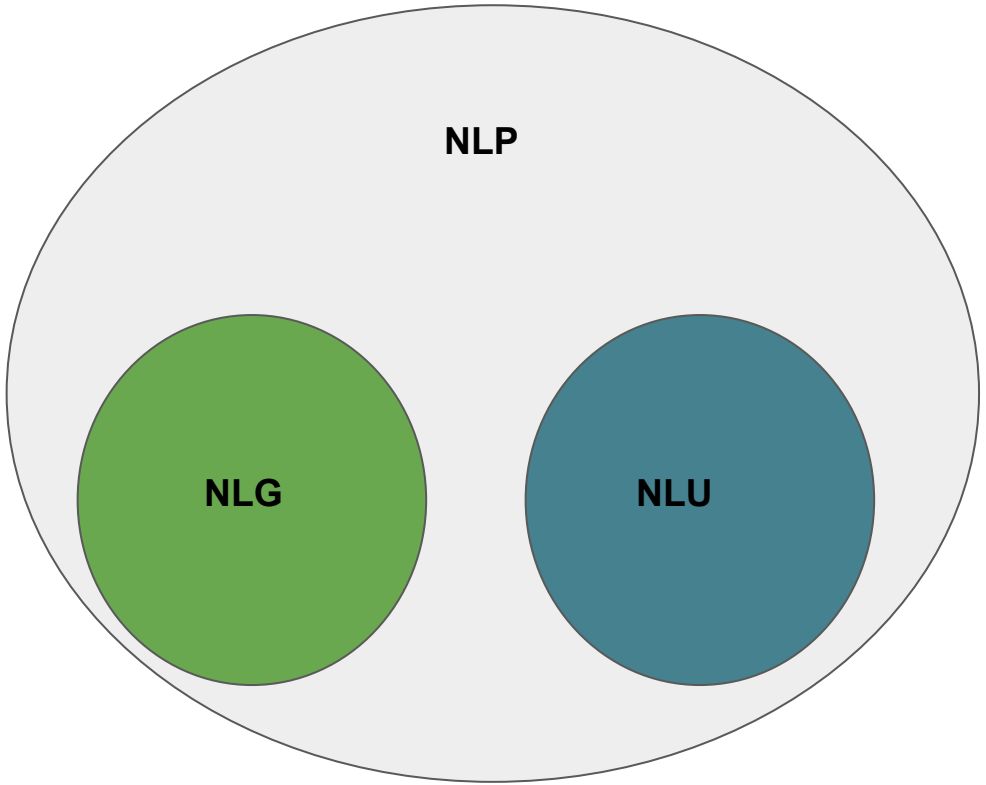
Natural Language Processing

Introduction

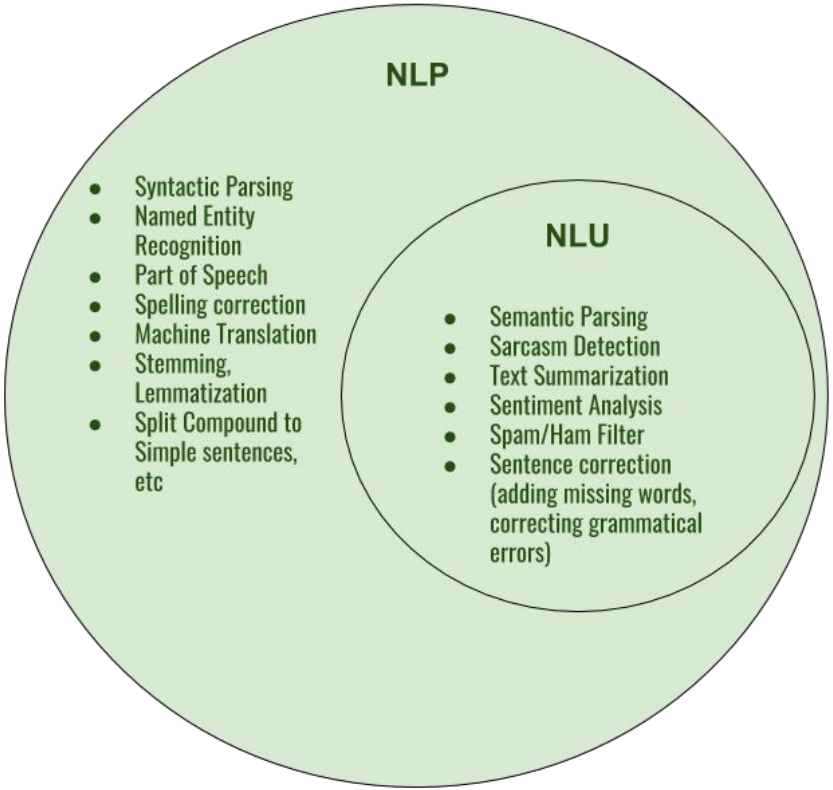
Introduction

- Natural Language Processing (NLP)
  - It is the study of the computational treatment of natural (human) language.
  - In other words, teaching computers how to understand (and generate) human language.

Introduction



Introduction



https://www.asksid.ai/resources/nlp-vs-nlu-vs-nlg/

Applications

- Search engines
  - Google, Yahoo, Bing, Baidu
- Question answering
  - IBM's Watson
- Natural language assistants
  - Apple's Siri, MS Cortana
- Translation systems
  - Google Translate
- News digest
  - Yahoo!
- Automated stock market reports
  - Narrative Science
- Automated earthquake reports
  - LA Times

The Los Angeles Times was the first newspaper to publish a story about an earthquake on Monday - thanks to a robot writer.

Introduction: Watson

http://www.geekwire.com/2013/ibm-takes-watson-cloud/

Introduction: Watson

- In February 2011, the world was introduced to Watson (after Thomas J. Watson, the founder of IBM), IBM's cognitive computing system that defeated **Ken Jennings** and **Brad Rutter** at the American TV quiz show Jeopardy!, and received the 1st place prize of $1 million.

- The program, which has been broadcast in the United States for more than 25 years, pits 3 human contestants against one another to answer rich natural language questions over a broad.

- Watson was developed in IBM's DeepQA project by a research team led by principal investigator David Ferrucci.

Introduction: Watson

- Watson is a Question-Answering (QA) system that applies advanced natural language processing, information retrieval, knowledge representation, automated reasoning, and machine learning technologies to the field of open domain question answering.

- Watson had access to **200 million pages** of structured and unstructured content consuming **4 terabytes** of disk storage including dictionaries, references, and the full text of Wikipedia, but was not connected to the Internet during the game.

Introduction: Watson

Introduction: Watson

- What does “divergent” mean?
- What year was Abraham Lincoln born?
- How many states were in the United States that year?
- How much Chinese silk was exported to England in the end of the 18th century?
- What do scientists think about the ethics of human cloning?

Introduction: Watson

IBM Watson Demo

Introduction: Information Extraction

Event: NLP meeting
Date: 10-08-2022
Start: 03:00pm
End: 04:00pm
Location: 101

Subject: **NLP meeting**

Date: August 1, 2022

To: XYZ

Dear XYZ,

Good morning, hope you are doing well. For the upcoming semester a meeting is scheduled on 03:00-04:00PM, 10th August 2022 at 101

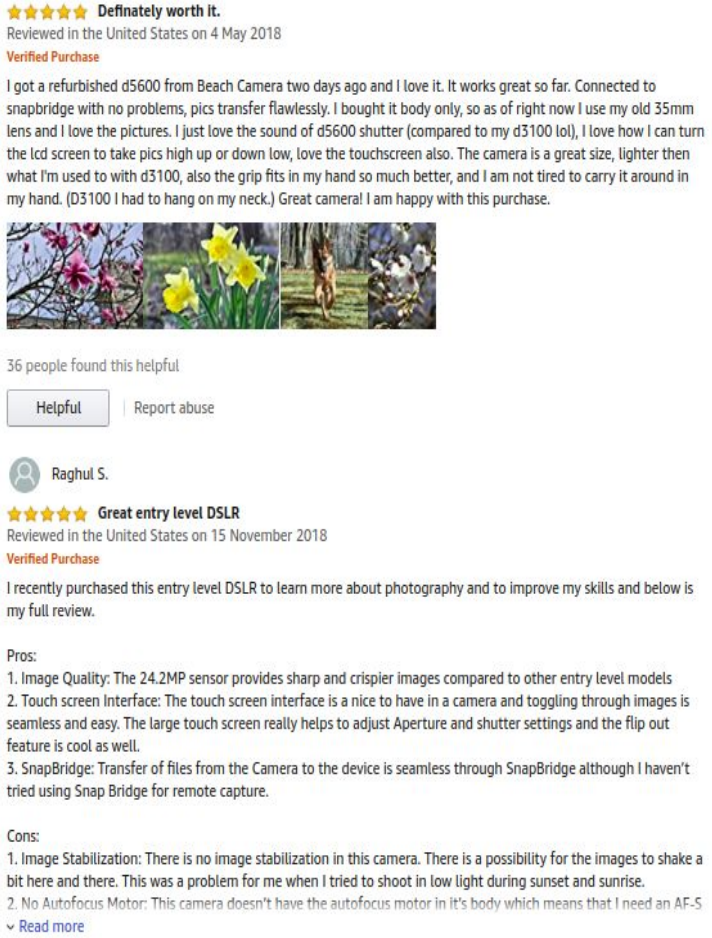
-

Introduction: Information Extraction

Attributes:
- zoom
- affordability
- size and weight
- flash
- ease of use

Size and weight

- ✓ nice and compact to carry!
- ✓ since the camera is small and li around those heavy, bulky profe
- ✗ the camera feels flimsy, is plasti you have to be very delicate in t camera



★★★★★ **Definately worth it.**
Reviewed in the United States on 4 May 2018
Verified Purchase

I got a refurbished d5600 from Beach Camera two days ago and I love it. It works great so far. Connected to snapbridge with no problems, pics transfer flawlessly. I bought it body only, so as of right now I use my old 35mm lens and I love the pictures. I just love the sound of d5600 shutter (compared to my d3100 lol), I love how I can turn the lcd screen to take pics high up or down low, love the touchscreen also. The camera is a great size, lighter then what I'm used to with d3100, also the grip fits in my hand so much better, and I am not tired to carry it around in my hand. (D3100 I had to hang on my neck.) Great camera! I am happy with this purchase.

36 people found this helpful

Helpful | Report abuse

Raghul S.

★★★★★ **Great entry level DSLR**
Reviewed in the United States on 15 November 2018
Verified Purchase

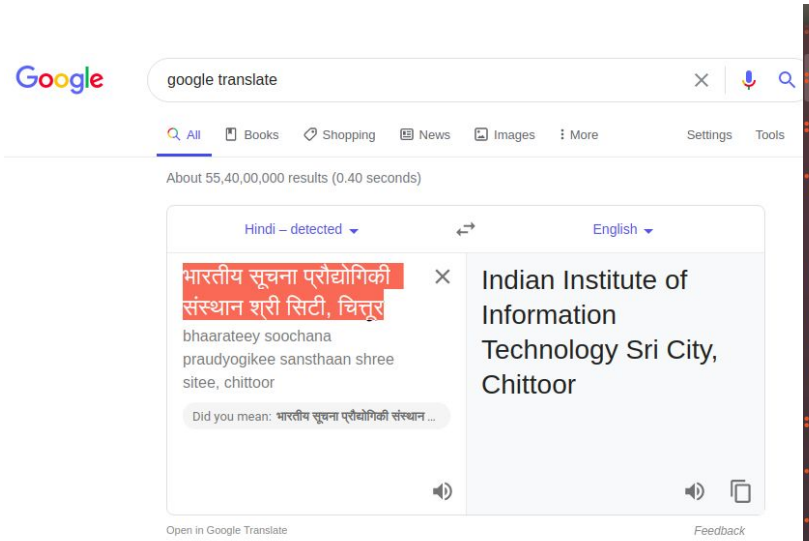
I recently purchased this entry level DSLR to learn more about photography and to improve my skills and below is my full review.

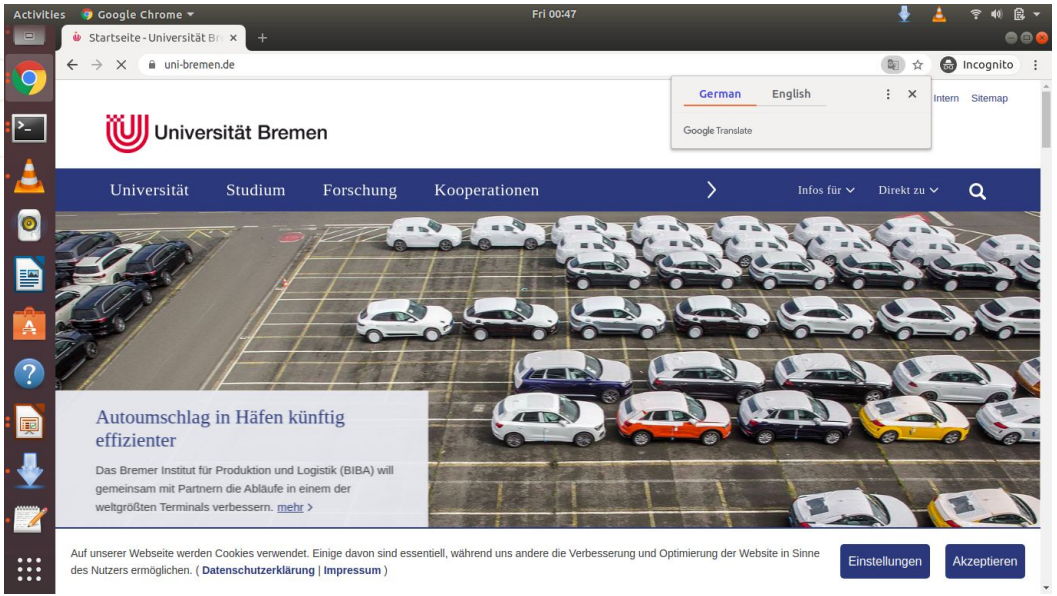
Pros:
1. Image Quality: The 24.2MP sensor provides sharp and crispier images compared to other entry level models
2. Touch screen Interface: The touch screen interface is a nice to have in a camera and toggling through images is seamless and easy. The large touch screen really helps to adjust Aperture and shutter settings and the flip out feature is cool as well.
3. SnapBridge: Transfer of files from the Camera to the device is seamless through SnapBridge although I haven't tried using Snap Bridge for remote capture.

Cons:
1. Image Stabilization: There is no image stabilization in this camera. There is a possibility for the images to shake a bit here and there. This was a problem for me when I tried to shoot in low light during sunset and sunrise.
2. No Autofocus Motor: This camera doesn't have the autofocus motor in it's body which means that I need an AF-S

Read more

Introduction: Machine Translation





INTERSTELLAR
TARS
CASE

Introduction: Alexa

"Alexa, What is my Credit Card Balance "

"Alexa, nearest bank to me"

"Alexa, turn on welcome home"

"Alexa, my last 5 transaction"

"Alexa, turn on the TV"

Introduction: Alexa

Introduction: Text-to-Speech

- **Amazon Polly**
  - Amazon Polly is a service that turns text into lifelike speech, allowing you to create applications that talk, and build entirely new categories of speech-enabled products.
  - Amazon Polly is a Text-to-Speech service that uses advanced deep learning technologies to synthesize speech that sounds like a human voice.

kindle
amazon

Introduction: Text-to-Speech

Introduction: Speech Recognition

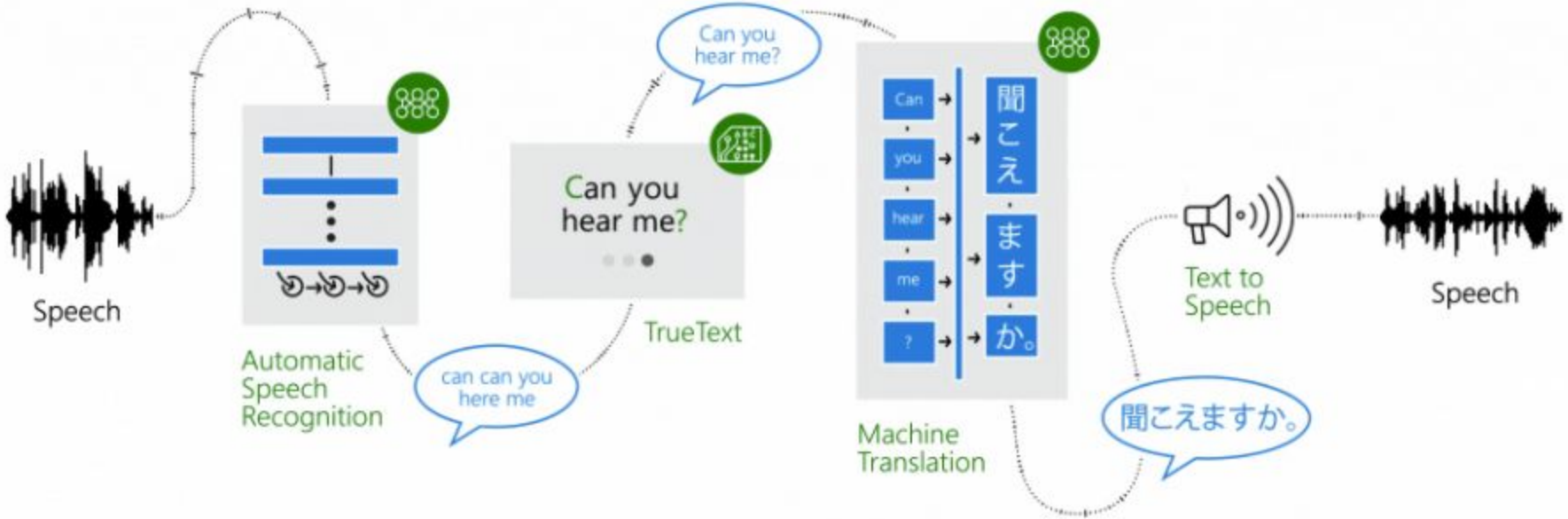
Google Speech Recognition

NLP tools in Google Docs ?

Bilingual conversation

https://miro.medium.com/max/1080/1*O0_Ui7TDNMt10IggNmyaMQ.jpeg

Introduction: Speech to Speech



https://www.microsoft.com/en-us/translator/blog/wp-content/uploads/sites/13/2018/09/SpeechTransStill.png

Introduction: Interesting tools

https://www.youtube.com/watch?v=oFUlm_o453E

Introduction: ELIZA

```
Human:  Men are all alike.
ELIZA: In what way?
Human:  They're always bugging us about something.
ELIZA: Can you think of a special example?
Human:  Well, my boyfriend made me come here.
ELIZA: Your boyfriend made you come here?
Human:  He says I'm depressed much of the time.
ELIZA: I'm sorry to hear that you are depressed much of the time.
Human:  It's true.  I'm unhappy.
ELIZA: Do you think coming here will help you not to be unhappy?
Human:  I need some help, that much seems certain.
```

http://psych.fullerton.edu/mbirnbaum/psych101/Eliza.htm

Introduction:

Text summarization

Introduction: Language Understanding

Where is Baahubali playing in Chennai?

Baahubali is playing at the Cinemax Theater.

When is it playing there?

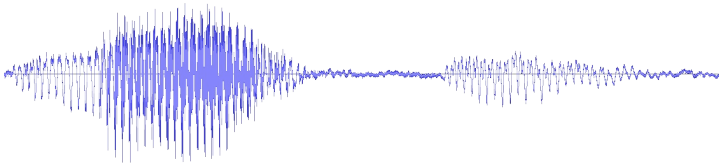
It's playing at 2pm, 5pm, and 8pm.

OK. I'd like 1 adult and 2 children for the first show. How much would that cost?

But we need domain knowledge, discourse knowledge, world knowledge, linguistic knowledge.

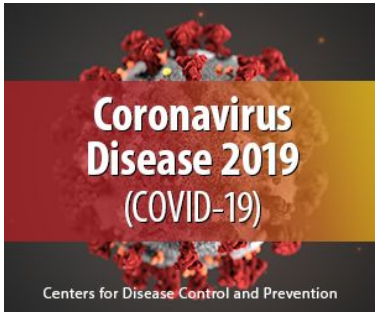
Introduction: Language Understanding

- Sound



- Gesture

- Text



Introduction: Language Understanding

car

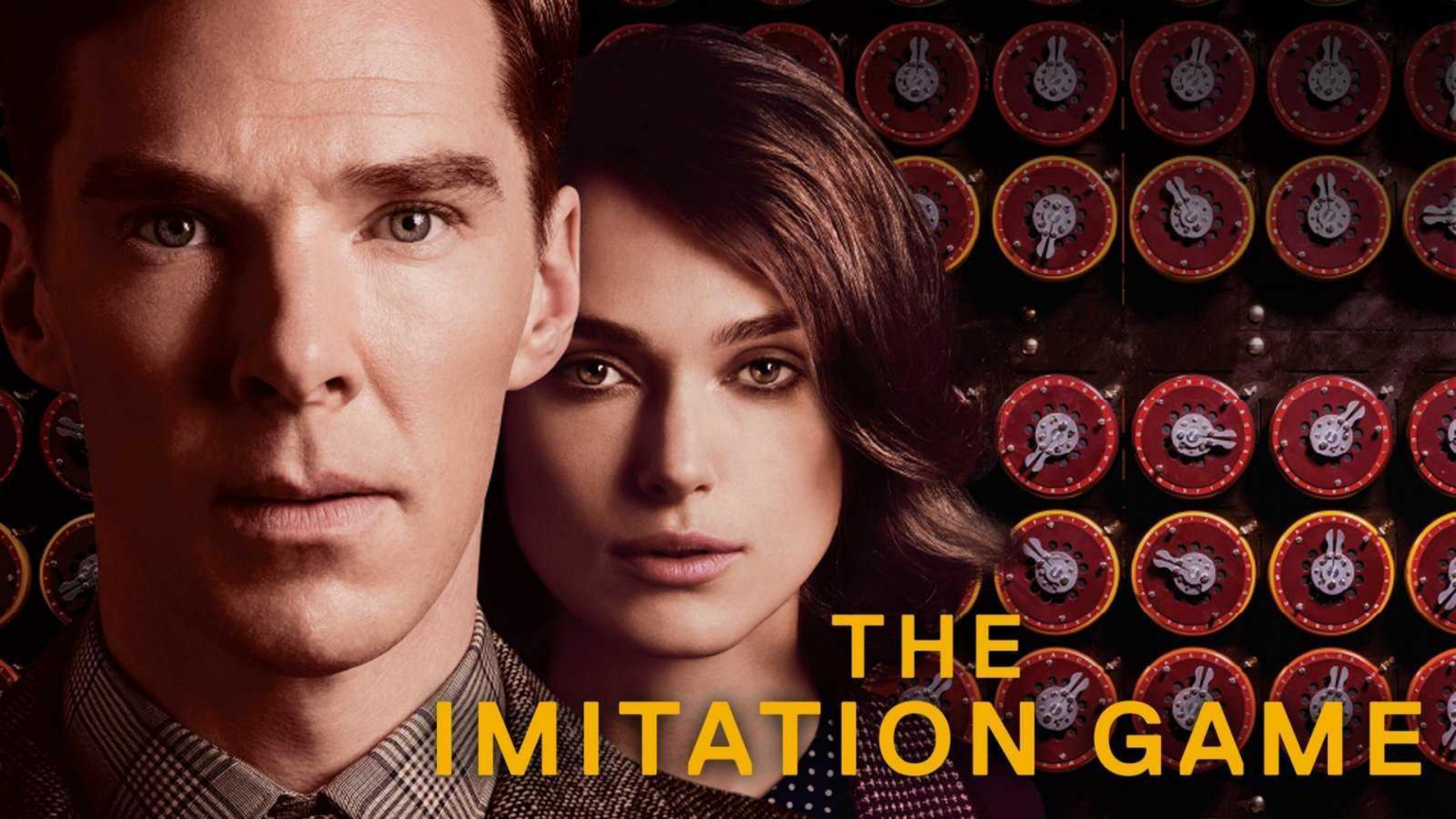
tiger

laptop

doctor

Introduction: Language Understanding

- Speaker
  - Intention (goals, shared knowledge and beliefs)
  - Generation (tactical)
  - Synthesis (text or speech)
- Listener
  - Perception
  - Interpretation (syntactic, semantic, pragmatic)
  - Incorporation (internalization, understanding)
- Both
  - Context (grounding)

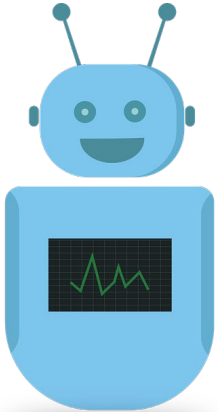

THE
IMITATION GAME

Introduction

- Who?
  - Alan Turing
- Why?
  - Can A Computer talk like a Human?

Introduction: The Imitation Game

Introduction: The Imitation Game



Respondent 1: Bot

Turing Test

Respondent 2: Human

Questioner

Introduction: Turing Test

- Turing Test requires three terminals, each of which is physically separated from the other two. One terminal is operated by a computer, while the other two are operated by humans.
- During the test, one of the humans functions as the questioner, while the second human and the computer function as respondents.
- The questioner interrogates the respondents within a specific subject area, using a specified format and context.
- After a preset length of time or number of questions, the questioner is then asked to decide which respondent was human and which was a computer.

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Introduction: DIALOG SYSTEMS

Microsoft Xiaolce

Introduction: Applications

- Machine Translation
- Information Retrieval
- Question Answering
- Dialogue Systems
- Text-to-speech
- Speech Recognition
- Information Extraction
- Sentiment Analysis

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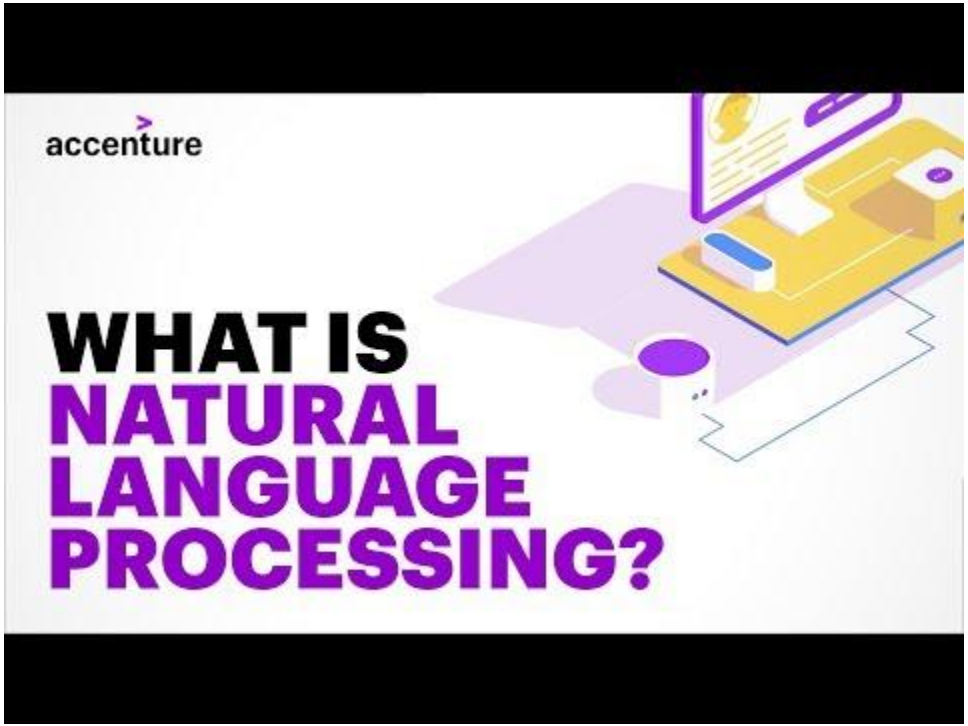
Introduction: Some Links

WATSON in Hospital

What is NLP?

What is NLP?



THANKS

> NLP made it possible for machines to become our friend.

BILL GATES
MICROSOFT CO-FOUNDER
AT HUNTER COLLEGE IN NYC

https://miro.medium.com/max/1024/0*xjHCGhipvNmwp0wo

Source:towardsdatascience.com