PKETA 2022 International Conference

PKETA PAN-KOREA ENGLISH TEACHERS ASSOCIATON

Introducing Python and R for language research and education

Special session:

(3:50 ~ 4:50 PM)

Miran Kim
Associate Professor
Dept. of English Education
Gyeongsang National University

Overview

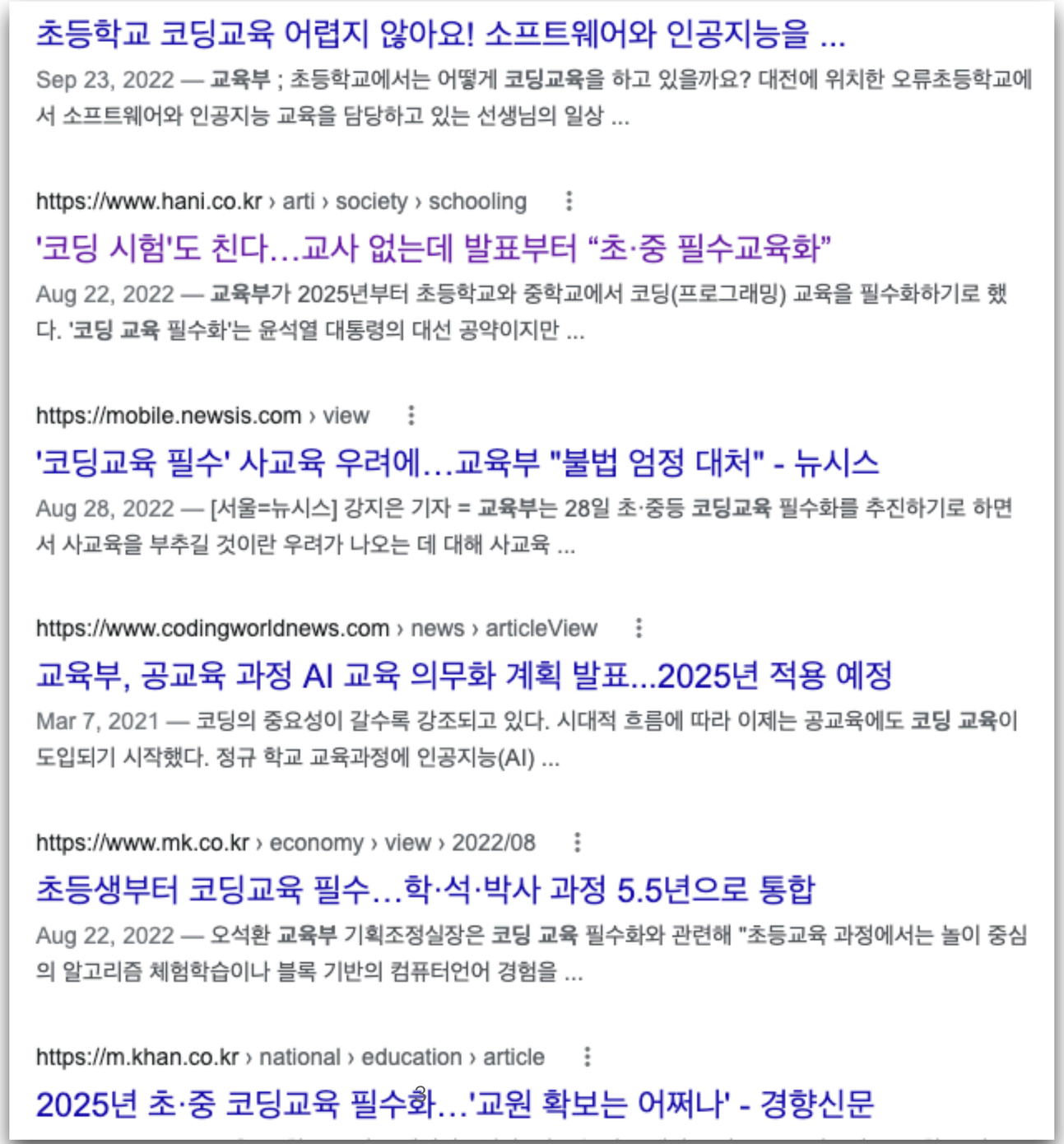
This lecture will talk about:

- Computer programming languages: Python and R
- Python and R in language research
- Python & language education
- Concluding remarks

ISSN 2671-9460 (Online)
ISSN 1228-6566 (Print)

Overview

Keyword 1: Coding?



초등학교 코딩교육 어렵지 않아요! 소프트웨어와 인공지능을 ...

Sep 23, 2022 — **교육부** ; 초등학교에서는 어떻게 **코딩교육**을 하고 있을까요? 대전에 위치한 오류초등학교에서 소프트웨어와 인공지능 교육을 담당하고 있는 선생님의 일상 ...

https://www.hani.co.kr › arti › society › schooling

'코딩 시험'도 친다…교사 없는데 발표부터 "초·중 필수교육화"

Aug 22, 2022 — **교육부**가 2025년부터 초등학교와 중학교에서 코딩(프로그래밍) 교육을 필수화하기로 했다. '**코딩 교육** 필수화'는 윤석열 대통령의 대선 공약이지만 ...

https://mobile.newsis.com › view

'코딩교육 필수' 사교육 우려에…교육부 "불법 엄정 대처" - 뉴시스

Aug 28, 2022 — [서울=뉴시스] 강지은 기자 = **교육부**는 28일 초·중등 **코딩교육** 필수화를 추진하기로 하면서 사교육을 부추길 것이란 우려가 나오는 데 대해 사교육 ...

https://www.codingworldnews.com › news › articleView

교육부, 공교육 과정 AI 교육 의무화 계획 발표...2025년 적용 예정

Mar 7, 2021 — 코딩의 중요성이 갈수록 강조되고 있다. 시대적 흐름에 따라 이제는 공교육에도 **코딩 교육**이 도입되기 시작했다. 정규 학교 교육과정에 인공지능(AI) ...

https://www.mk.co.kr › economy › view › 2022/08

초등생부터 코딩교육 필수…학·석·박사 과정 5.5년으로 통합

Aug 22, 2022 — 오석환 **교육부** 기획조정실장은 **코딩 교육** 필수화와 관련해 "초등교육 과정에서는 놀이 중심의 알고리즘 체험학습이나 블록 기반의 컴퓨터언어 경험을 ...

https://m.khan.co.kr › national › education › article

2025년 초·중 코딩교육 필수화…'교원 확보는 어쩌나' - 경향신문

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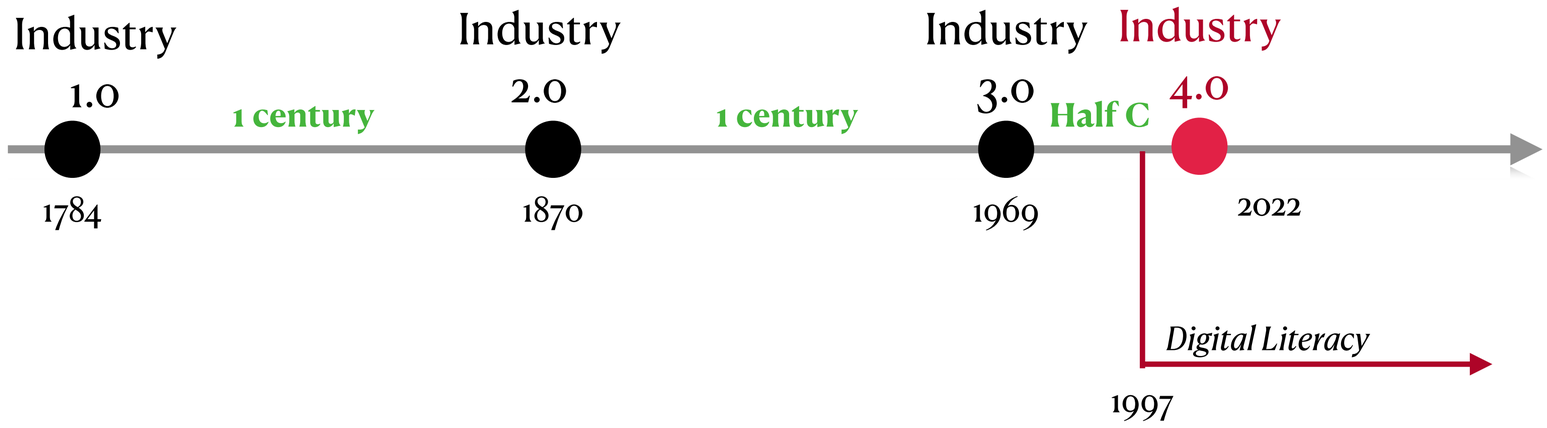
Overview

Keyword 2:
4th Industrial revolution



- **Digital Literacy**:

"… the ability to use **information** and communication technologies to find, evaluate, create, and communicate **information**, requiring both **cognitive** & **technical** skills."

(American Library Association)

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https://www.interaction-design.org/literature/topics/human-computer-interaction

Input

Output

HTML
(programming language)

View Page Source

Back End

Front End

Programming language?

Calculate
25 **x** 25

```
[2]   1 print(25*25)
0s
```

??

```
[2]   1 print(25*25)
0s
625
```

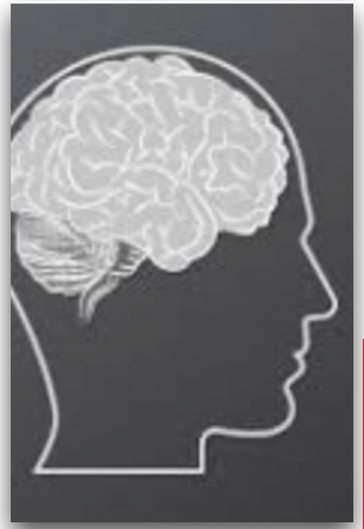
Calculate
11001 * 11001

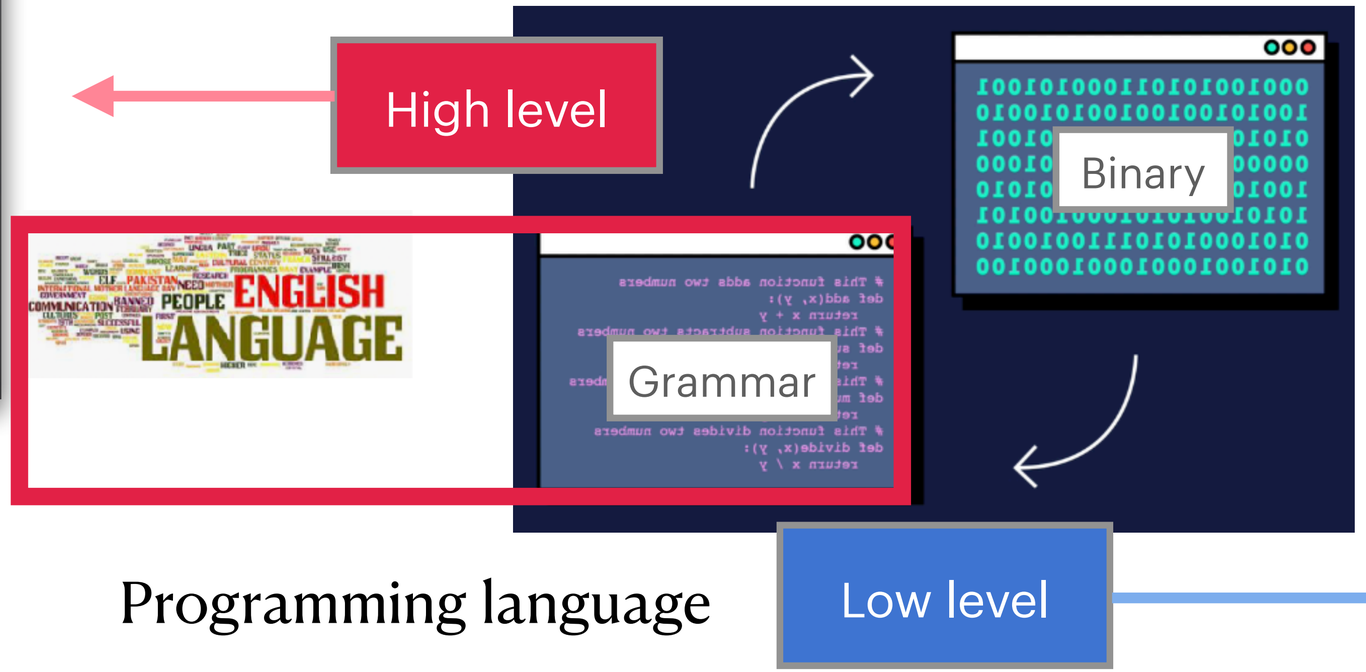
1001110001

Binary representation of 25 is 11001

Image source: https://bootcamp.uxdesign.cc/why-does-the-computer-understand-only-0s-and-1s-50b6e135d2ec

Programming language?





01000011101010100
11001000010100110
.....

Coding

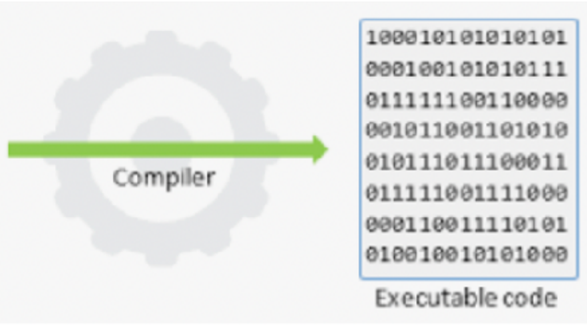
Programming languages

Front End	High level	Low level	Front End: Action

icon

e.g., play(x)

e.g., print(x)

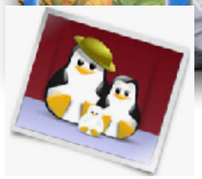


Printing

Playing sounds

Books

Video Tapes



Calculate
11001 * 11001

1001110001

Binary representation of 25 is 11001

Films

Photos

CDs

Digital Literacy

Technical skills

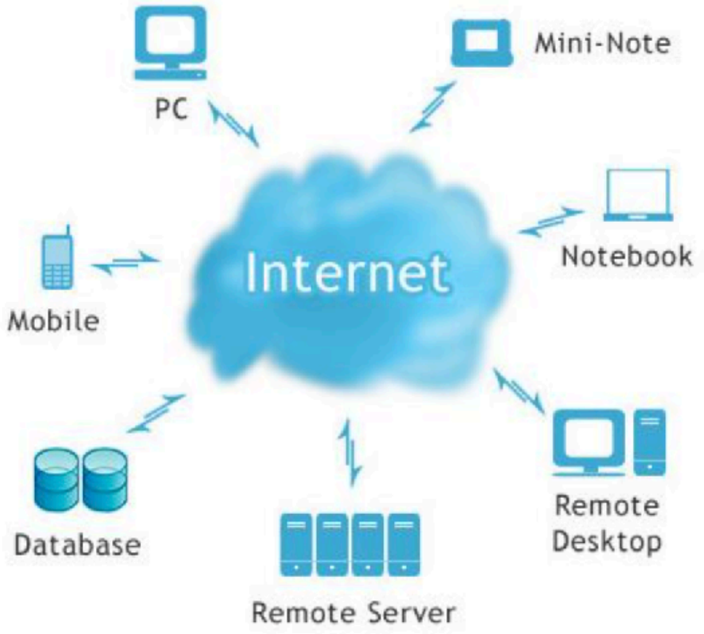
Calculate
11001 * 11001

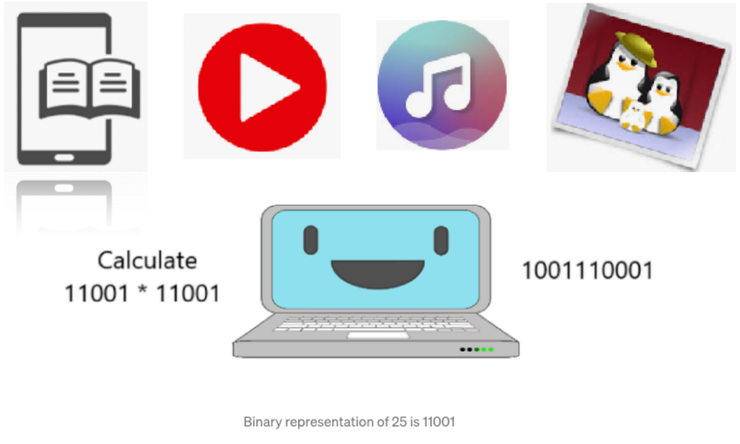
1001110001

Binary representation of 25 is 11001

Cognitive skills?

Digital skills





Binary representation of 25 is 11001

1. Computer programming languages: Python and R

Since 1989

General purpose

Since 1995

(Specialized)

Statistical computing

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1. Computer programming language:

2. Python and R in language research

3. Python and language education

4. Concluding remarks

R vs Python: Battle of the Best Programming Languages

R vs Python — Edureka

https://medium.com/edureka/r-vs-python-48eb86b7b40f

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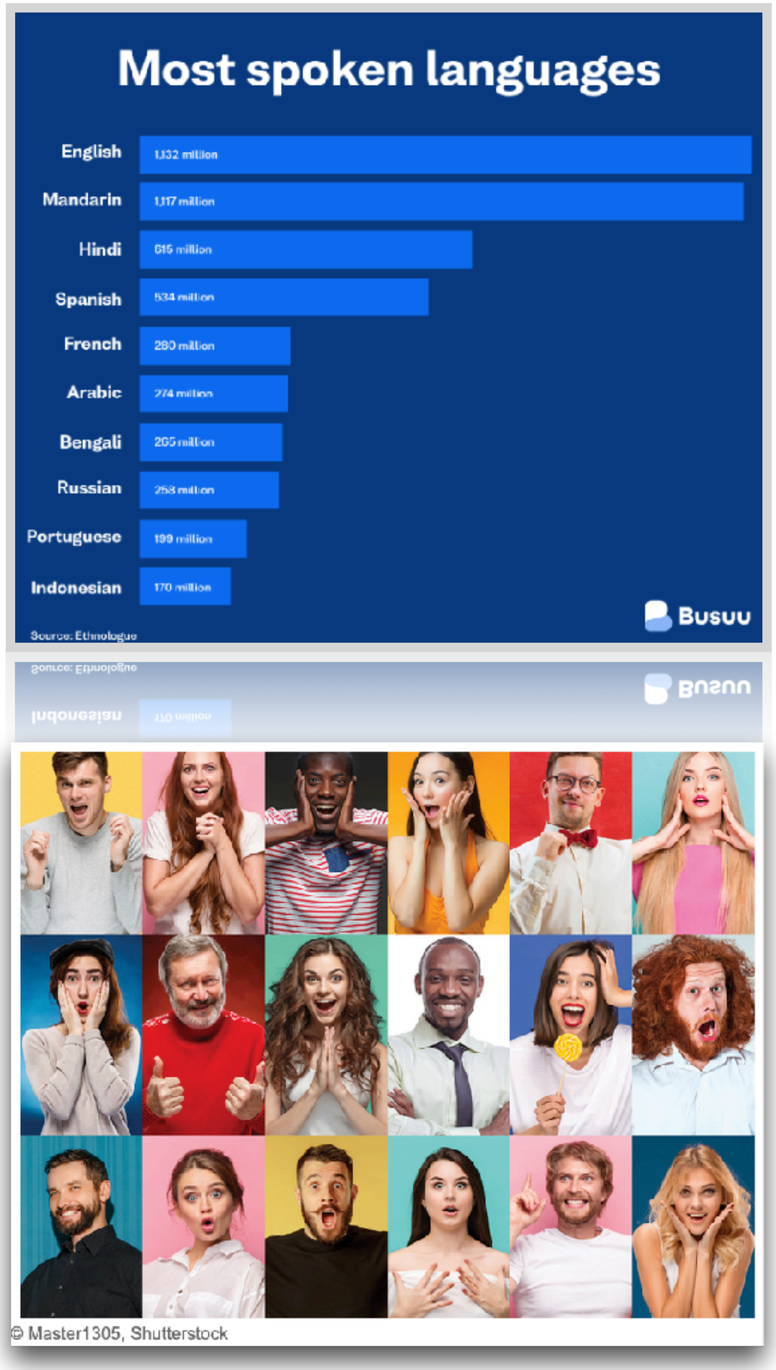


TOP 10 PROGRAMMING LANGUAGES

IT IS WORTH THE ATTENTION.

Recently IEEE spectrum comes with the ranking sheet of top programming language 2022 according to their popularity – Programming Languages Popularity

Language Rank	Types	Spectrum Ranking
1. Python		100.0
2. C		99.7
3. Java		99.5
4. C++		97.1
5. C#		87.7
6. R		87.7
7. JavaScript		85.6
8. PHP		81.2

trends.google.com

R and Python Interest over time (as of Oct. 12. 2022)

2022.2

510,032 (7,328 pages)

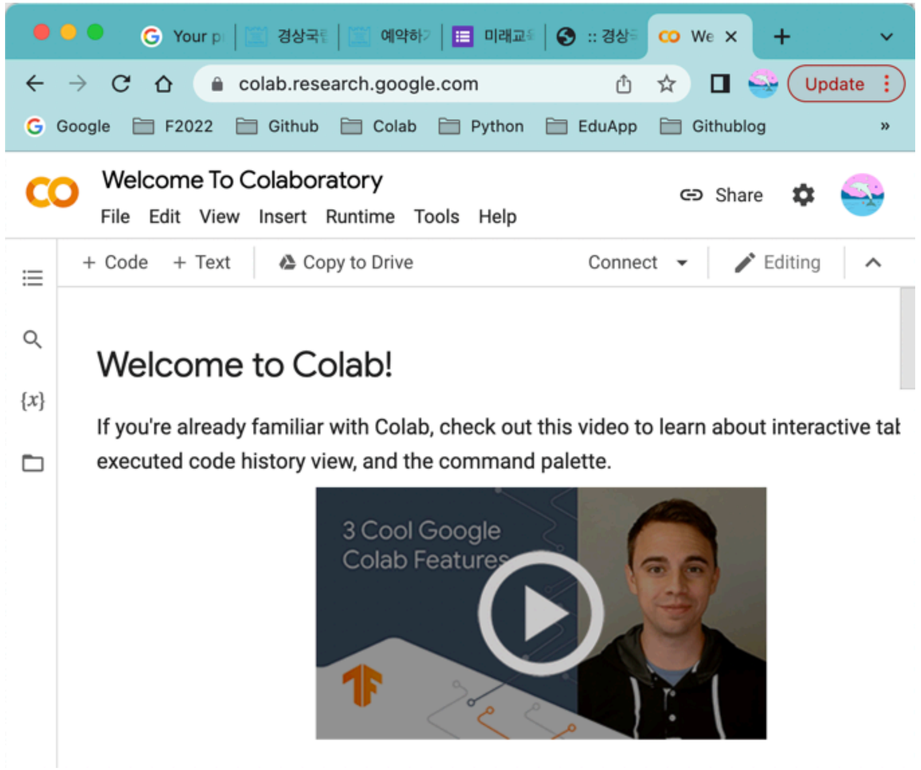
2014?

2010

Google have released Colaboratory: a web IDE for python, to enable Machine Learning with storage on the cloud — this internal tool had a pretty quiet public release in late 2017, and is set to make a huge difference in the world of machine learning, artificial intelligence and data science work.

https://medium.com/kainos-applied-innovation/how-google-has-crushed-it-with-colaboratory-5664b5fb5856

Google Colab
https://colab.research.google.com



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trends.google.com

R and Python Interest over time (as of Oct. 12. 2022)

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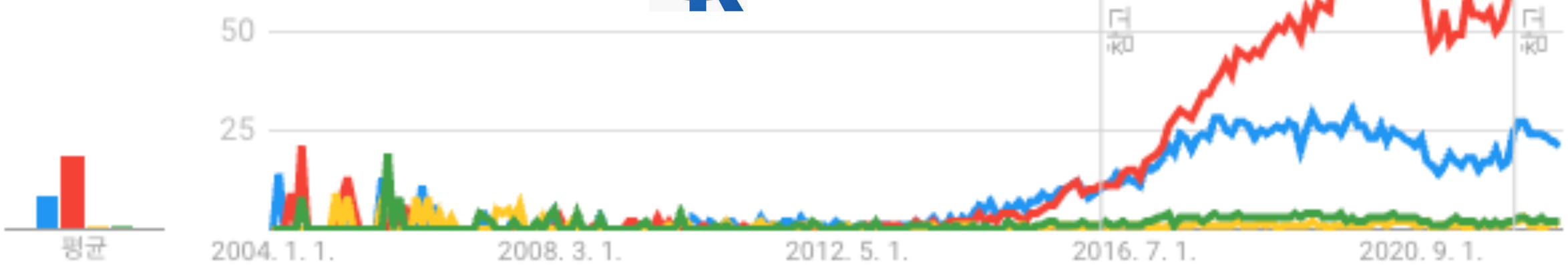

Compared breakdown by region

R statistics SPSS statistics

trends.google.com

파이(π) 값 소숫점 아래 62조8000억 번째 자리까지 알아냈다…세계 기록 경신

2021.08.17 15:10

스위스 그라운뷘덴 응용과학대, 108일 9시간 걸려 계산

3.14159265358979323846264338327950288419716939937510582097494459230781640628620899862803482534211706798214808651328230664709384460955058223172535940812848111745028410270193852110555964462294895493038196442881097566593344612847564823378678316527120190914564856692346034861045432664821339360726024914127372458700660631558817488152092096282925409171536436789259036001133053054882046652138414695194151160943305727036575959195309218611738193261179310511854807446237996274956735188575272489122793

https://m.dongascience.com/news.php?idx=48765 픽사베이 제공

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Introduction to R & Python

R is considered to be the best programming language for any statistician as it possesses an extensive catalog of statistical and graphical methods. **Python** on the other hand, can do pretty much the same work as **R** but it is preferred by the data scientists or data analysts because of its simplicity and high performance. R is a powerful scripting language and highly flexible with a vibrant community and resource bank whereas Python is a widely used, object oriented language which is easy to learn and debug.

(2019). https://medium.com/edureka/r-vs-python-48eb86b7b40f

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- **Data access: collecting or creating**
- **Pre-processing**
- **Data analysis: linguistic, statistical, visualization**
- **Examining implications / interpretations**

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[1] Data access: collecting and creating

BNC corpus: 100 million words (4049 texts)

COCA corpus: 560 + million words

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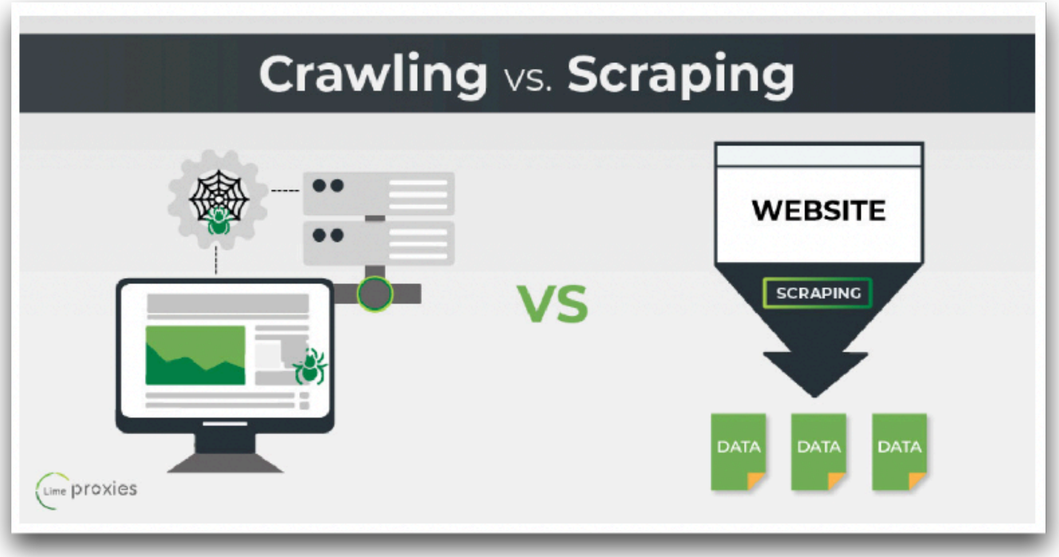
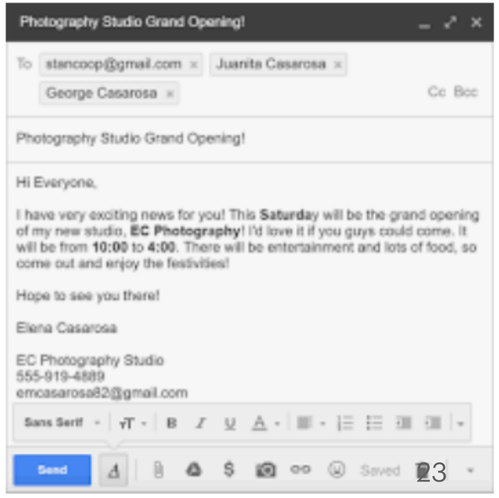
[1] Data access: collecting and creating (example)





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[2] Pre-processing

Raw text

Pre-processing

- Tokenization
- Lemmatization
- Removing Punctuations and stopwords
- Part of Speech Tagging

Paragraph

Sentence

Word

Syllable

Character

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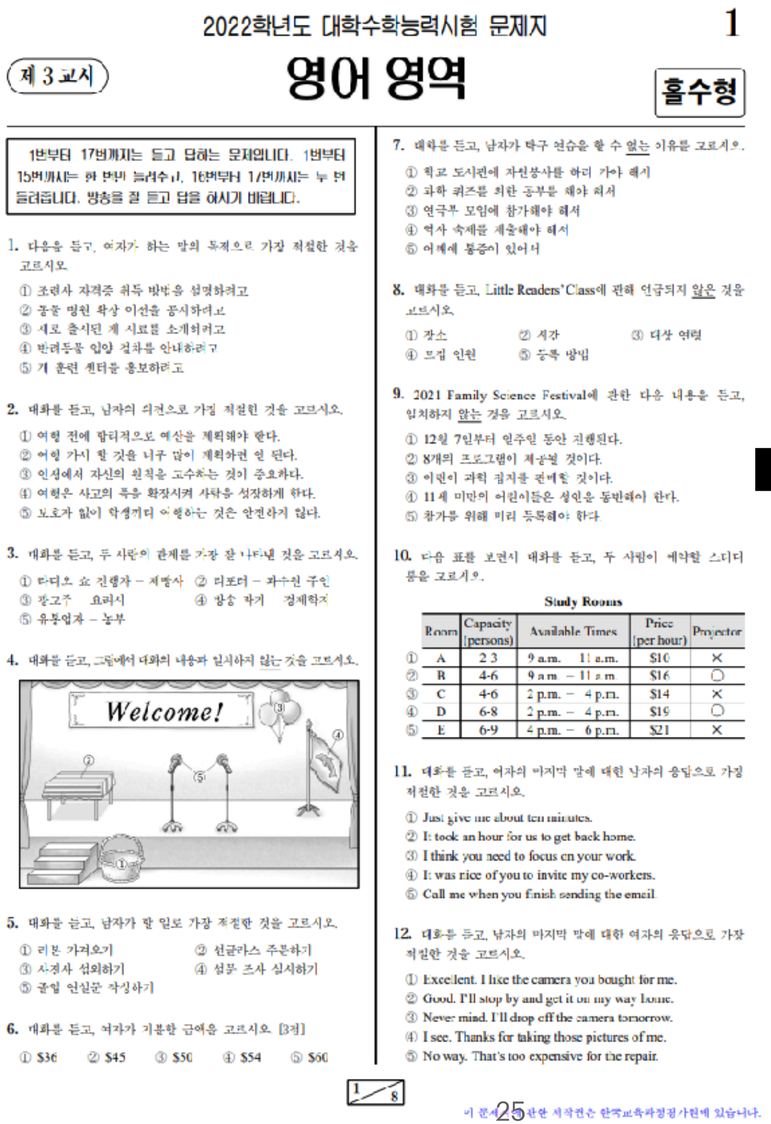
[2] Pre-processing



2022학년도 대학수학능력시험 문제지 1

제 3 교시

영어 영역

홀수형

1번부터 17번까지는 듣고 답하는 문제입니다. 1번부터 15번까지는 한 번씩 들려주고, 16번부터 17번까지는 두 번 들려줍니다. 방송을 잘 듣고 답을 어시기 바랍니다.

1. 다음을 듣고, 여자가 하는 말의 목적으로 가장 적절한 것을 고르시오.
① 조리사 자격증 취득 방법을 설명하려고
② 동물 병원 확장 이전을 공시하려고
③ 새로 출시된 개 시료를 소개하려고
④ 반려동물 입양 절차를 안내하려고
⑤ 개 훈련 센터를 홍보하려고

2. 대화를 듣고, 남자의 의견으로 가장 적절한 것을 고르시오.
① 여행 전에 합리적으로 예산을 계획해야 한다.
② 여행 가서 할 것을 너무 많이 계획하면 안 된다.
③ 인생에서 자신의 원칙을 고수하는 것이 중요하다.
④ 여행은 사고의 폭을 확장시켜 사람을 성장하게 한다.
⑤ 모호자 없이 학생끼리 여행하는 것은 안전하지 않다.

3. 대화를 듣고, 두 사람의 관계를 가장 잘 나타낸 것을 고르시오.
① 디자이너 – 제빵사 ② 디자이너 – 파수원 주인
③ 동고주 요리사 ④ 광고 작가 경제학자
⑤ 유통업자 – 농부

4. 대화를 듣고, 그림에서 대화의 내용과 일치하지 않는 것을 고르시오.

5. 대화를 듣고, 남자가 할 일로 가장 적절한 것을 고르시오.
① 리본 가져오기 ② 선글라스 주문하기
③ 사진사 섭외하기 ④ 설문 조사 실시하기
⑤ 결혼 연설문 작성하기

6. 대화를 듣고, 여자가 지불한 금액을 고르시오. [3점]
① $36 ② $45 ③ $50 ④ $54 ⑤ $60

7. 대화를 듣고, 남자가 탁구 연습을 할 수 없는 이유를 고르시오.
① 학교 도서관에 자원봉사를 하러 가야 해서
② 과학 퀴즈를 위한 공부를 해야 해서
③ 연극부 모임에 참가해야 해서
④ 역사 숙제를 제출해야 해서
⑤ 어깨에 통증이 있어서

8. 대화를 듣고, Little Readers' Class에 관해 언급되지 않은 것을 고르시오.
① 장소 ② 시간 ③ 대상 연령
④ 모집 인원 ⑤ 등록 방법

9. 2021 Family Science Festival에 관한 다음 내용을 듣고, 일치하지 않는 것을 고르시오.
① 12월 7일부터 일주일 동안 진행된다.
② 8개의 프로그램이 제공될 것이다.
③ 어린이 과학 질지를 전개될 것이다.
④ 11세 미만의 어린이들은 성인을 동반해야 한다.
⑤ 참가를 위해 미리 등록해야 한다.

10. 다음 표를 보면서 대화를 듣고, 두 사람이 예약할 스터디 룸을 고르시오.

Study Rooms

	Room	Capacity (persons)	Available Times	Price (per hour)	Projector
①	A	2-3	9 a.m. – 11 a.m.	$10	×
②	B	4-6	9 a.m. – 11 a.m.	$16	○
③	C	4-6	2 p.m. – 4 p.m.	$14	×
④	D	6-8	2 p.m. – 4 p.m.	$19	○
⑤	E	6-9	4 p.m. – 6 p.m.	$21	×

11. 대화를 듣고, 여자의 마지막 말에 대한 남자의 응답으로 가장 적절한 것을 고르시오.
① Just give me about ten minutes.
② It took an hour for us to get back home.
③ I think you need to focus on your work.
④ It was nice of you to invite my co-workers.
⑤ Call me when you finish sending the email.

12. 대화를 듣고, 남자의 마지막 말에 대한 여자의 응답으로 가장 적절한 것을 고르시오.
① Excellent. I like the camera you bought for me.
② Good. I'll stop by and get it on my way home.
③ Never mind. I'll drop off the camera tomorrow.
④ I see. Thanks for taking those pictures of me.
⑤ No way. That's too expensive for the repair.

1 / 8

이 문제에 관한 저작권은 한국교육과정평가원에 있습니다.

22. One of the most common mistakes made by organizations when they first consider experimenting with social media is that they focus too much on social media tools and platforms and not enough on their business objectives. The reality of success in the social web for businesses is that creating a social media program begins not with insight into the latest social media tools and channels but with a thorough understanding of the organization's own goals and objectives. A social media program is not merely the fulfillment of a vague need to manage a "presence" on popular social networks because "everyone else is doing it." "Being in social media" serves no purpose in and of itself. In order to serve any purpose at all, a social media presence must either solve a problem for the organization and its customers or result in an improvement of some sort (preferably a measurable one). In all things, purpose drives success. The world of social media is no different.

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[2] Pre-processing

22. One of the most common mistakes made by organizations when they first consider experimenting with social media is that they focus too much on social media tools and platforms and not enough on their business objectives. The reality of success in the social web for businesses is that creating a social media program begins not with insight into the latest social media tools and channels but with a thorough understanding of the organization's own goals and objectives. A social media program is not merely the fulfillment of a vague need to manage a "presence" on popular social networks because "everyone else is doing it." "Being in social media" serves no purpose in and of itself. In order to serve any purpose at all, a social media presence must either solve a problem for the organization and its customers or result in an improvement of some sort (preferably a measurable one). In all things, purpose drives success. The world of social media is no different.

```
[ ]  import nltk
     from nltk import tokenize
     nltk.download("punkt")

     text = """
     One of the most common mistakes made
     """

     sent1 = tokenize.sent_tokenize(text)

     import pandas as pd

     nth = []
     for i in range(0, len(sent1)):
       n = "S" + str(i+1)
       nth.append(n)

     df = pd.DataFrame()
     df["Sent_number"] = nth
     df["Sentence"] = sent1
```

S_number	Sentence
S1	One of the most common mistakes made by organi...
S2	The reality of success in the social web for b...
S3	A social media program is not merely the fulfi...
S4	In order to serve any purpose at all, a social...
S5	In all things, purpose drives success.
S6	The world of social media is no different.

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[2] Pre-processing

ksatdata_to_analyze

Year	Category	QN	Passage
2022	Context	Q18	Dear Ms. Green, My name is Donna Williams, a science teacher at Rogan High School. I am planning a special workshop for our science teachers. We are interested in learning how to teach online science classes. I have been impressed with your ideas about
2022	Context	Q19	It was Evelyn's first time to explore the Badlands of Alberta, famous across Canada for its numerous dinosaur fossils. As a young amateur bone-hunter, she was overflowing with anticipation. She had not travelled this far for the bones of common dinosaur species. Her life-long dream to find rare
2022	Context	Q20	when they first consider experimenting with social media is that they focus too much on social media tools and platforms and not enough on their business objectives. The reality of success in the social web for businesses is that creating a social media program begins not with insight into the latest social media tools and channels but with a thorough understanding of
2022	Context	Q22	Environmental hazards include biological, physical, and chemical ones, along with the human behaviors that promote or allow exposure. Some environmental contaminants are difficult to avoid (the breathing of polluted air, the drinking of chemically contaminated public drinking water, noise in open
2022	Context	Q23	Scientists use paradigms rather than believing them. The use of a paradigm in research typically addresses related problems by employing shared concepts, symbolic expressions, experimental and mathematical tools and procedures, and even some of the same theoretical statements. Scientists need only
2022	Context	Q24	Mending and restoring objects often require even more creativity than original production. The preindustrial blacksmith made things to order for people in his immediate community; customizing the product, modifying or transforming it according to the user, was routine. Customers would bring things back if something went wrong; repair was thus an extension of

```
[ ]  import nltk
     from nltk import tokenize
     nltk.download("punkt")

     text = """
     One of the most common mistakes made
     """

     sent1 = tokenize.sent_tokenize(text)

     import pandas as pd

     nth = []
     for i in range(0, len(sent1)):
       n = "S" + str(i+1)
       nth.append(n)

     df = pd.DataFrame()
     df["Sent_number"] = nth
     df["Sentence"] = sent1
     df
```

Coding

10 years' data
in 10 seconds.

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[3] Data analysis

Lexical Diversity measures

ksat_LD_result

Year	Category	QN	Passage	String	Splits	N_Split	Lemma	TTR	RTTR	LogTTR	MSTTR	FDTTR	MATTR	HDD	MTLD	BILOG	MA
2022	Context	Q40	Philip Kitc there are	1069	['Philip',	154	['philip', 'kitc	0.519	6.44658	0.8699757	0.059439	0.70666	0.68838	0.7089	39.0298	38.83116	34.36
2021	Context	Q40	From a cr public lea	1086	['From',	180	['from', 'a', 'c	0.561	7.52809	0.8887269	0.049339	0.78000	0.75007	0.7884	57.0703	62.00555	51.71
2020	Context	Q40	Biological organisms, including human societies both with and without market systems, discount distant outputs over those available at the present time based on risks associated with an uncertain future. As the timing of inputs and outputs varies greatly depending on the type of energy, there is a strong case to incorporate time when assessing energy alternatives. For example, the energy output from solar panels or wind power engines, where most investment happens before they begin producing, may need to be assessed differently when compared to most fossil fuel extraction technologies, where a large proportion of the energy output comes much sooner, and a larger (relative) proportion of inputs is applied during the extraction process, and not upfront. Thus fossil fuels, particularly oil and natural gas, in addition to having energy portability, etc.) ove				0.9239634	0.034759	0.84666	0.81257	0.8712	106.436	111.8376	83.23
2019	Context	Q40								0.9239634	0.034759	0.84666	0.81257	0.8712	106.436	111.8376	83.23
2018	Context	Q40								0.9269487	0.032568	0.80666	0.80698	0.8391	98.1991	119.1428	104.3
2017	Context	Q40								0.8866275	0.051564	0.74000	0.77522	0.7697	54.5300	57.46835	62.21
2016	Context	Q40								0.8958619	0.048883	0.73	0.74069	0.7779	59.3103	58.08148	53.84
2015	Context	Q40								0.8936798	0.048985	0.74	0.76242	0.8159	54.4755	61.64864	61.37
2022	Infer-Logic	Q39								0.8926382	0.047917	0.77333	0.79199	0.7972	71.0083	69.80459	68.44
2021	Infer-Logic	Q39								0.8845460	0.052003	0.70666	0.70854	0.7664	49.9330	45.81927	38.70

```
[ ] import nltk
    from nltk import tokenize
    nltk.download("punkt")

    text = """
    One of the most common mistakes made
    """

    sent1 = tokenize.sent_tokenize(text)

    import pandas as pd

    nth = []
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      n = "S" + str(i+1)
      nth.append(n)

    df = pd.DataFrame()
    df["Sent_number"] = nth
    df["Sentence"] = sent1
    df
```

Coding

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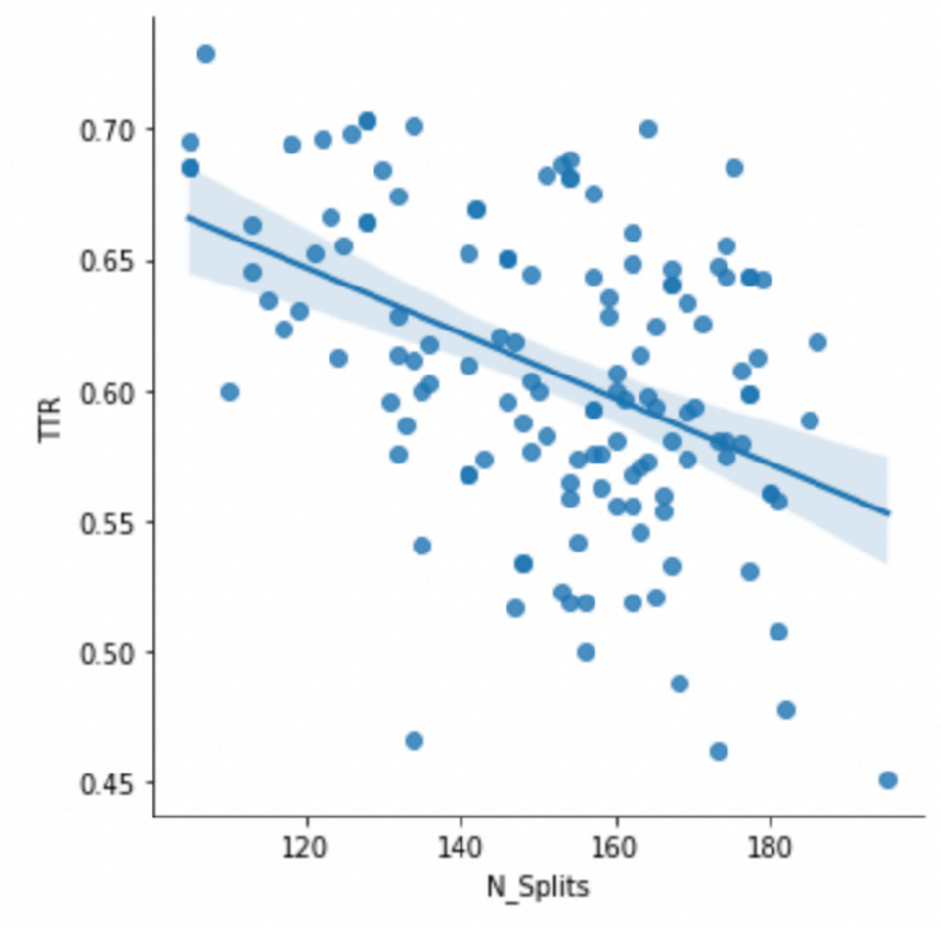
[3] Data analysis (statistical analysis)

```
sns.lmplot(x = "N_Splites", y = "TTR", data = df)
plt.show()
```

Linear regression plot



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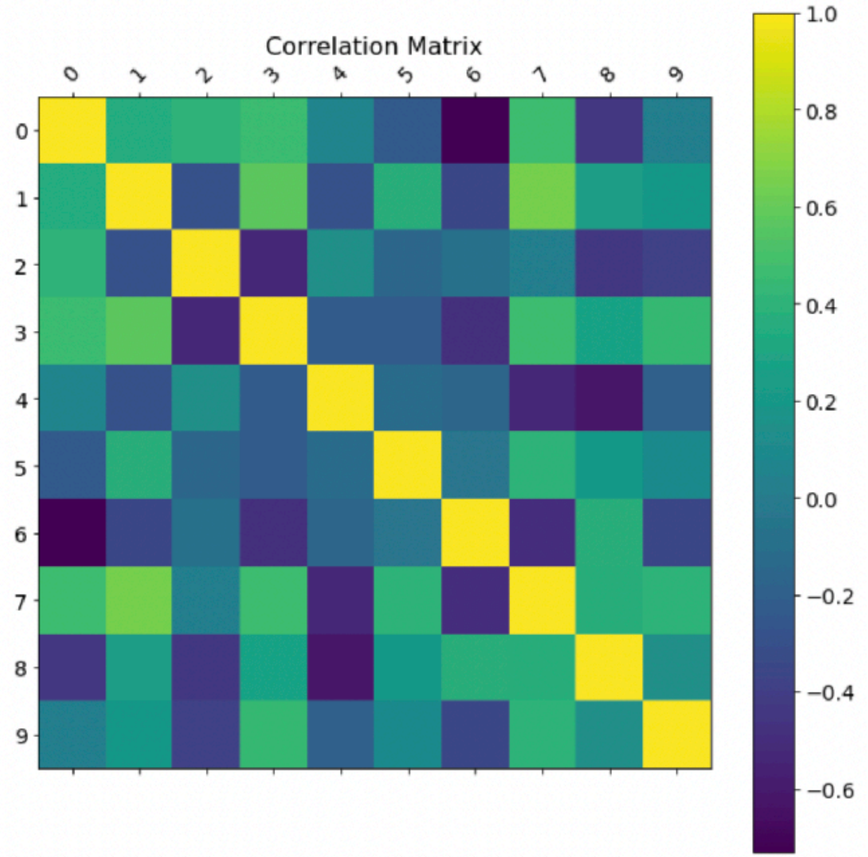
[3] Data analysis (statistical analysis)

	0	1	2	3	4	5	6	7	8	9
0	1.000000	0.347533	0.398948	0.455743	0.072914	-0.233402	-0.731222	0.477978	-0.442621	0.015185
1	0.347533	1.000000	-0.284056	0.571003	-0.285483	0.382480	-0.362842	0.642578	0.252556	0.190047
2	0.398948	-0.284056	1.000000	-0.523649	0.152937	-0.139176	-0.092895	0.016266	-0.434016	-0.383585
3	0.455743	0.571003	-0.523649	1.000000	-0.225343	-0.227577	-0.481548	0.473286	0.279258	0.446650
4	0.072914	-0.285483	0.152937	-0.225343	1.000000	-0.10				
5	-0.233402	0.382480	-0.139176	-0.227577	-0.104438	1.00				
6	-0.731222	-0.362842	-0.092895	-0.481548	-0.147477	-0.03				
7	0.477978	0.642578	0.016266	0.473286	-0.523283	0.4				
8	-0.442621	0.252556	-0.434016	0.279258	-0.614603	0.2(				
9	0.015185	0.190047	-0.383585	0.446650	-0.189916	0.09				

Correlation matrix



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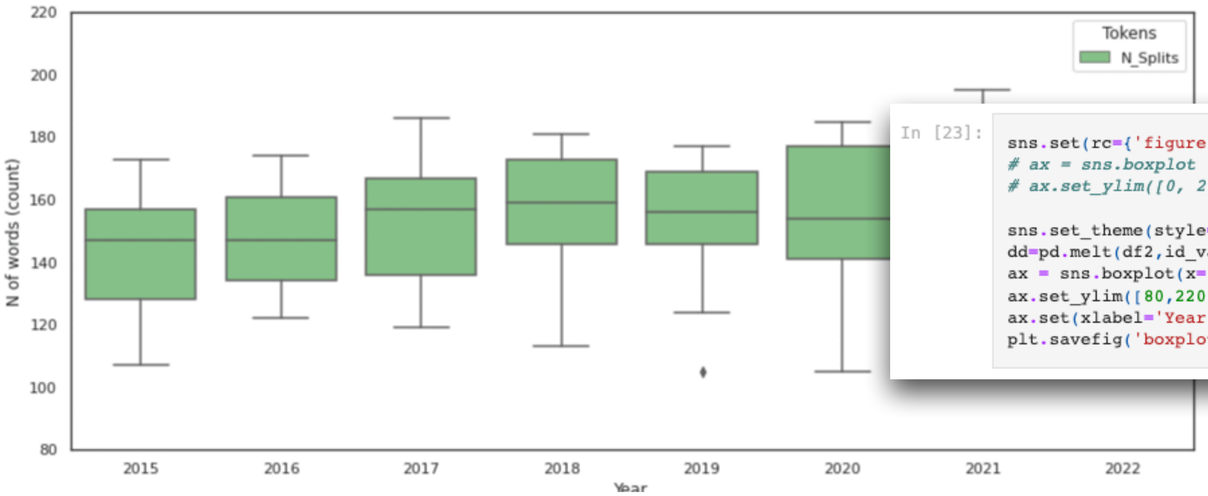
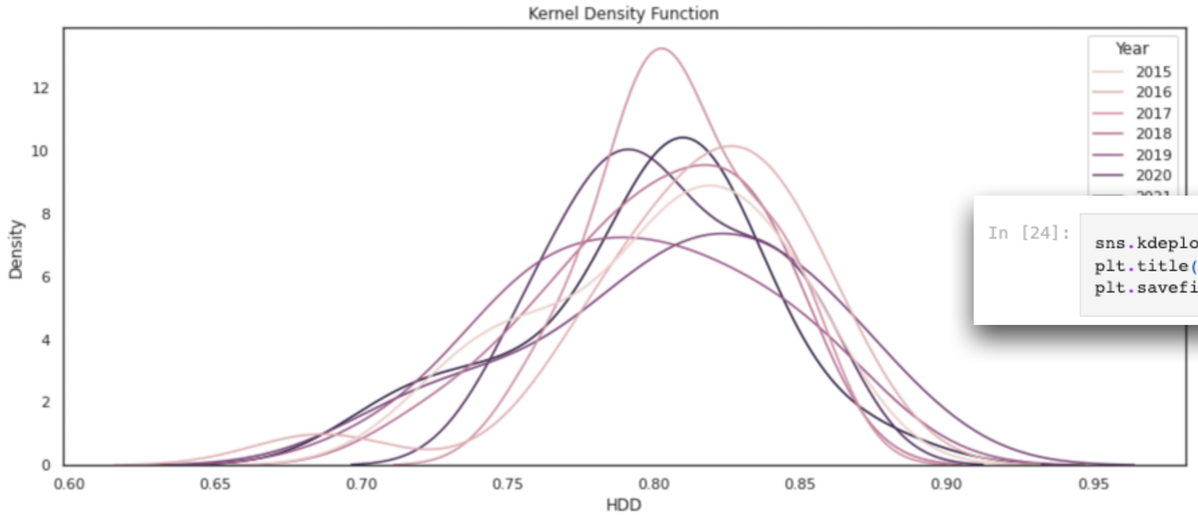
[3] Data analysis (Data visualization)




```
In [23]: sns.set(rc={'figure.figsize':(8,6),"font.size":40,"axes.titlesize":140,"axe
         # ax = sns.boxplot (y=df2)
         # ax.set_ylim([0, 210])

         sns.set_theme(style='white')
         dd=pd.melt(df2,id_vars=['Year'],value_vars=['N_Splits'],var_name='Tokens')
         ax = sns.boxplot(x='Year',y='value',data=dd,hue='Tokens',palette="Accent")
         ax.set_ylim([80,220])
         ax.set(xlabel='Year', ylabel='N of words (count)')
         plt.savefig('boxplot_Nsplit.png')
```




```
In [24]: sns.kdeplot(x='N_Splits', data=df2, hue='Year', common_norm=False);
         plt.title("Kernel Density Function")
         plt.savefig('Density_Nsplit.png')
```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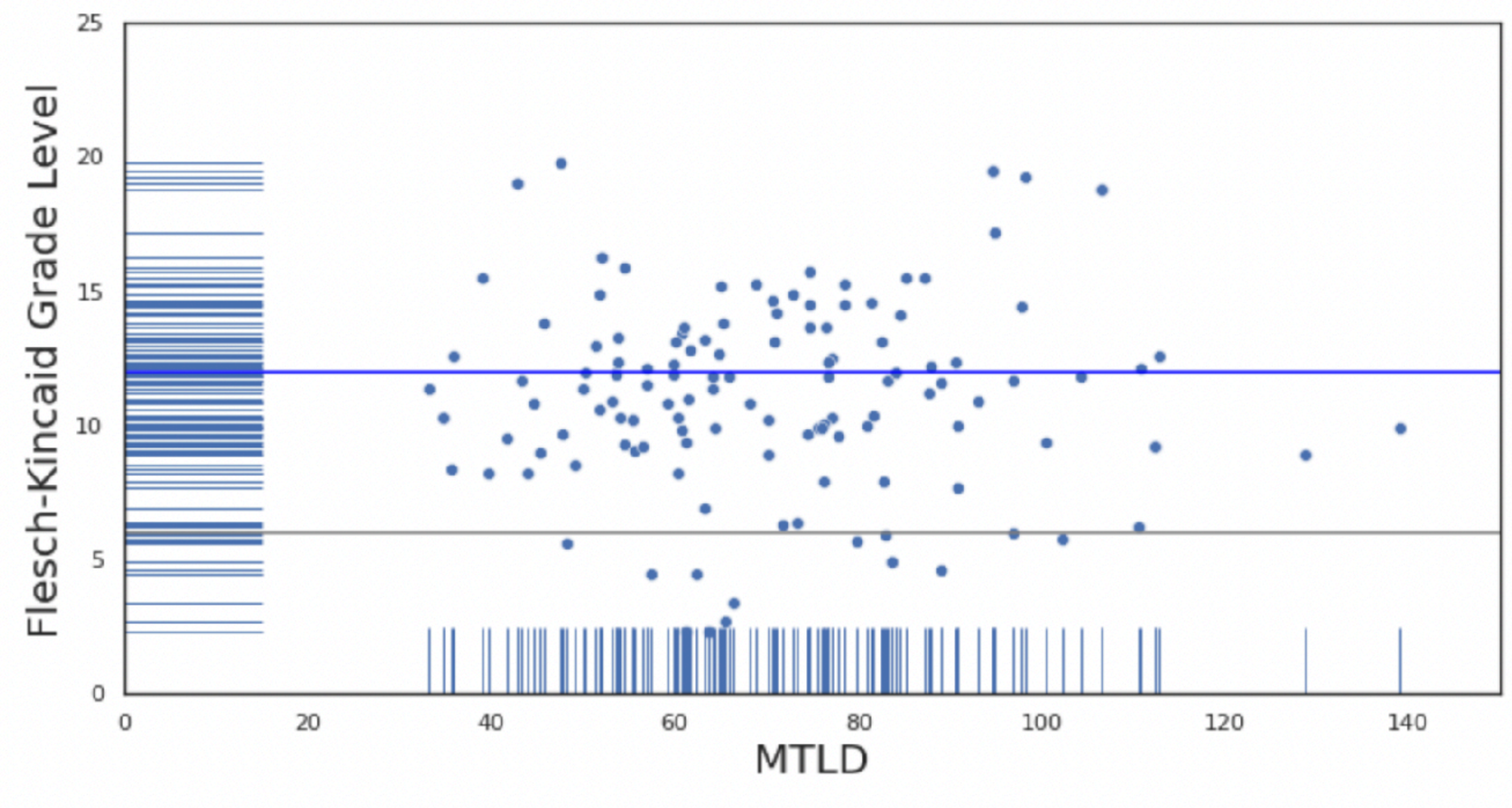
[3] Data analysis (Exploratory)



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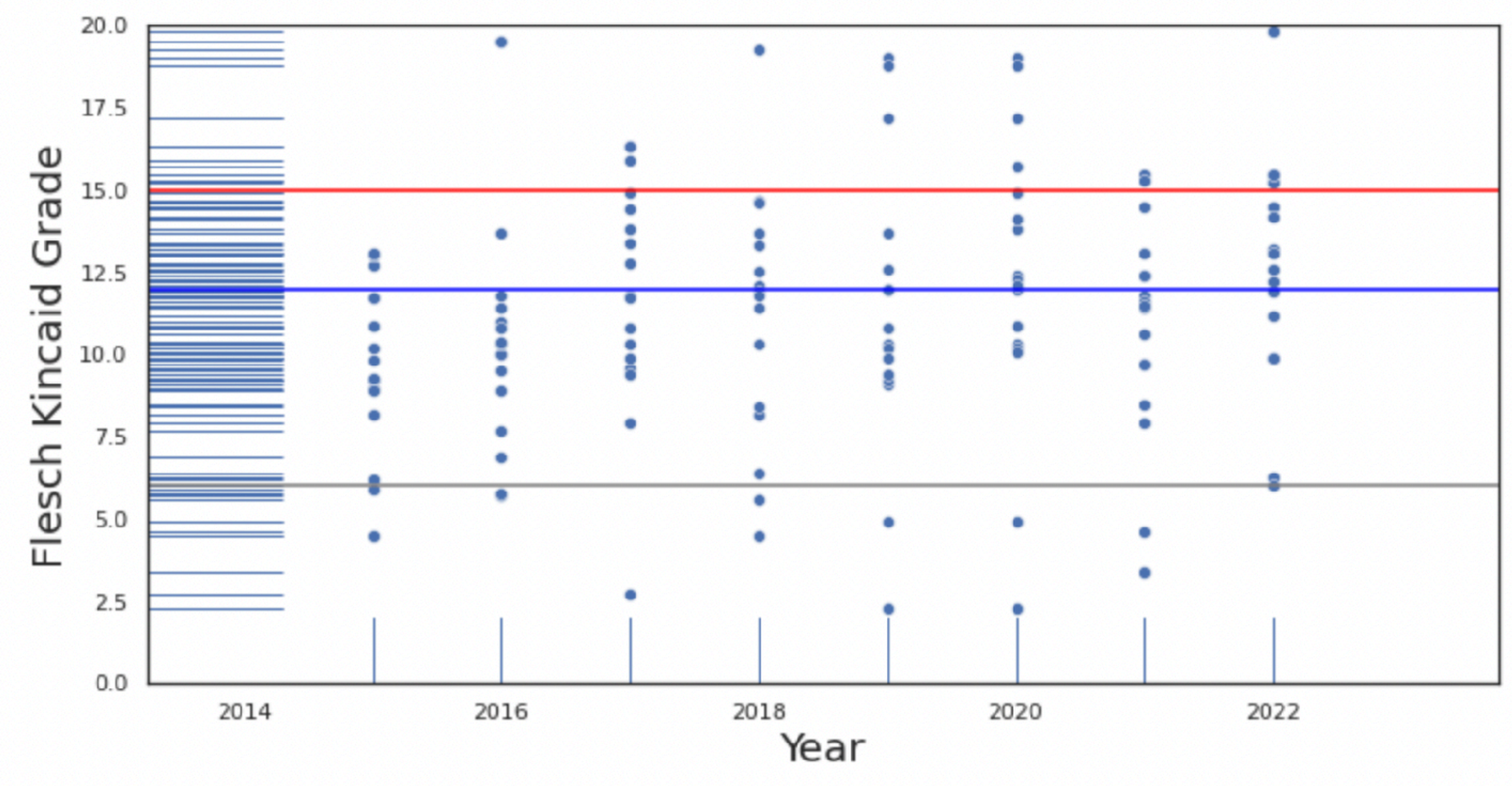
[4] Examining implications / interpretations



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[4] Examining implications / interpretations

Article PDF Available

How the hand has shaped sign languages

nature portfolio

July 2022 · Scientific Reports 12(1)

DOI:10.1038/s41598-022-15699-1

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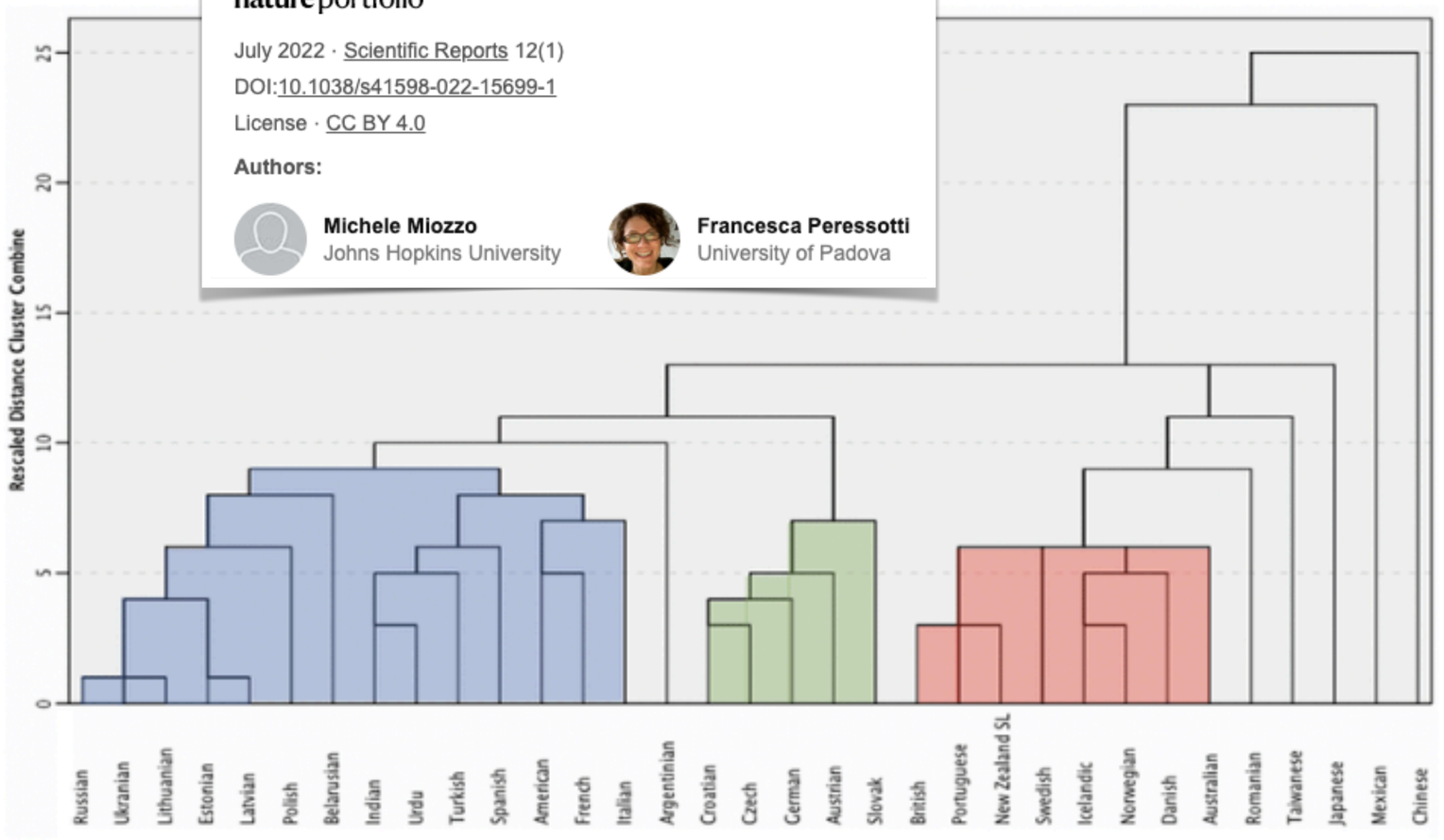
Authors:

Michele Miozzo
Johns Hopkins University

Francesca Peressotti
University of Padova



The dendrogram illustrates the three language families revealed by the hierarchical cluster analysis that was conducted on the handshape frequencies of 33 languages. Languages were historically related to French (blue) or Northern-European languages (red), or they were part of the central-European group (green).

1. Computer programming language:

2. Python and R in language research

3. Python and language education

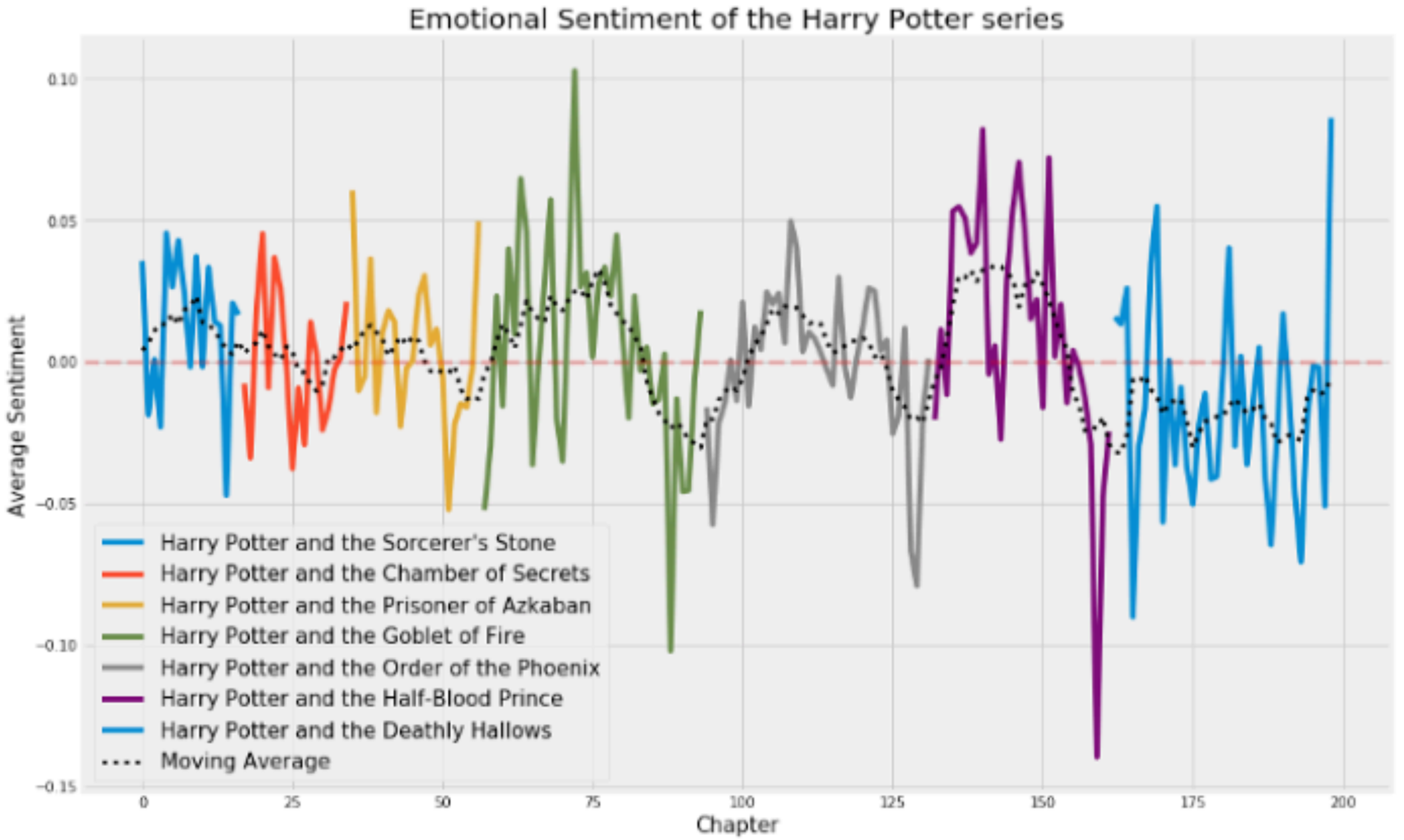
4. Concluding remarks

Greg Rafferty

Dec 22, 2018 · 9 min read · Listen

Sentiment Analysis on the Texts of Harry Potter

With bonus tutorial of Matplotlib advanced features!



Goblet of Fire, Chapter 16: Harry discovers the missionary position

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NLP & AI (example)

- Data: The preface of PKETA “Code of Ethics (272 words)
- TASK: Summary

```
[{'summary_text':

'The Association's Code of Ethics (hereinafter, "the Code") prescribes the principles and standards that Members, as educators, must comply with. Members must abide by the Code, fulfill their duties as researchers, acknowledge one another's research, and share the results of their work.'}]
```

272 words => 43 words

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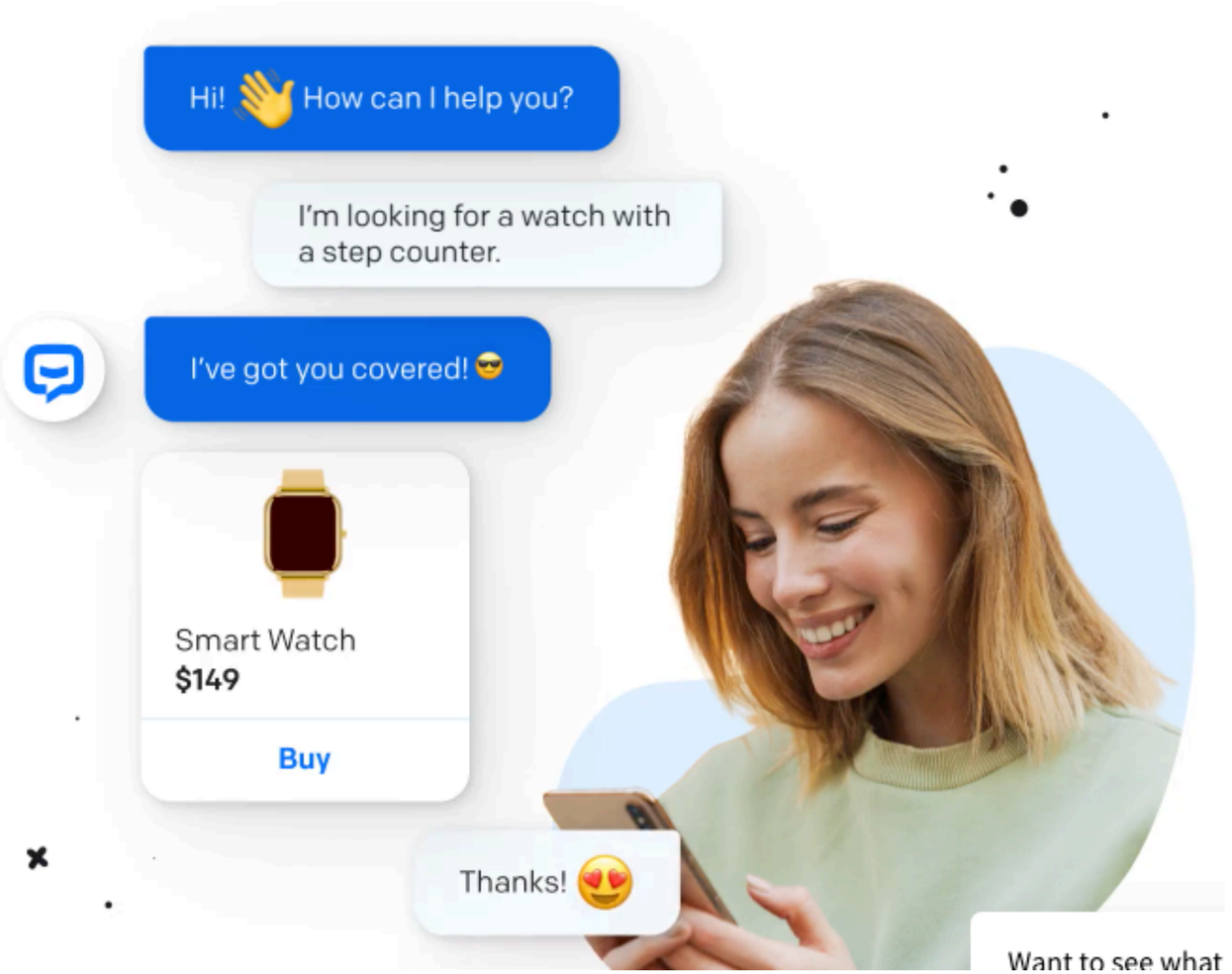
https://medium.com/globant/abstractive-text-summarization-bccb4bf5851c

chatbot.com



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4. **Concluding remarks**

huggingface.co

The AI community building the future.

Build, train and deploy state of the art models powered by the reference open source in machine learning.

Star 72,516

More than 5,000 organizations are using Hugging Face

Hub

Home of Machine Learning

Create, discover and collaborate on ML better. Join the community to start your ML journey.

Sign Up

- Allen Institute for AI — Non-Profit · 129 models
- Meta AI — Company · 408 models
- Graphcore — Company · 33 models
- Google AI — Company · 518 models
- Intel — Company · 58 models
- SpeechBrain — Non-Profit · 55 models
- Microsoft — Company · 199 models
- Grammarly — Company

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- **Various self-learning material accessible to students**
- **Application assisted classroom**
- **(Creating learning apps for my students)**
- **(Deep learning, AI application)**

& more...

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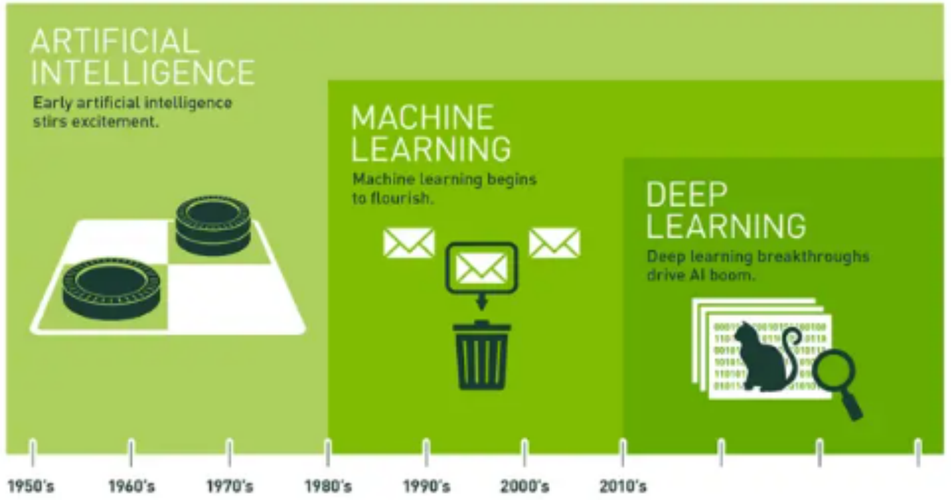
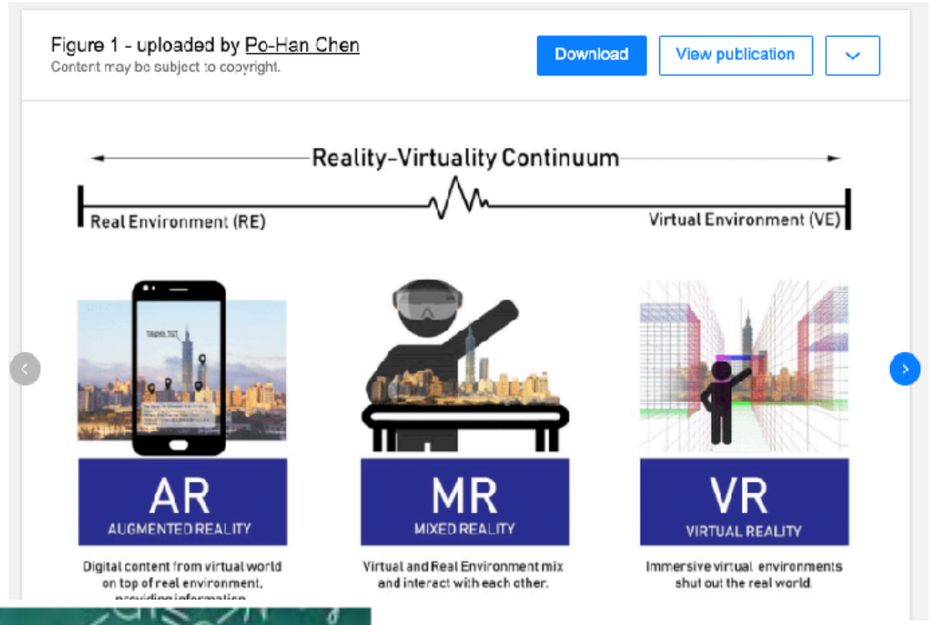
3. Python and language education





How Artificial Intelligence Is Taking ...
colocationamerica.com

Thanks to AI in the classroom: the ...
eqoptech.org

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Image by Author through Canva

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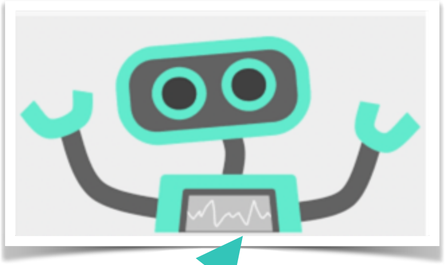
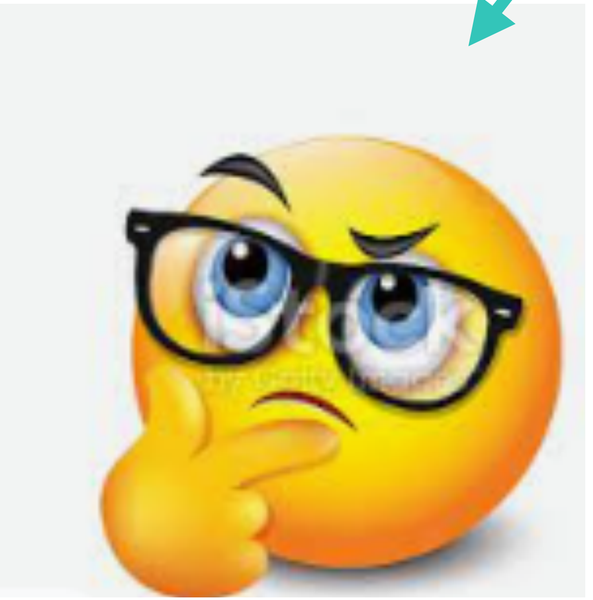


How???

How??



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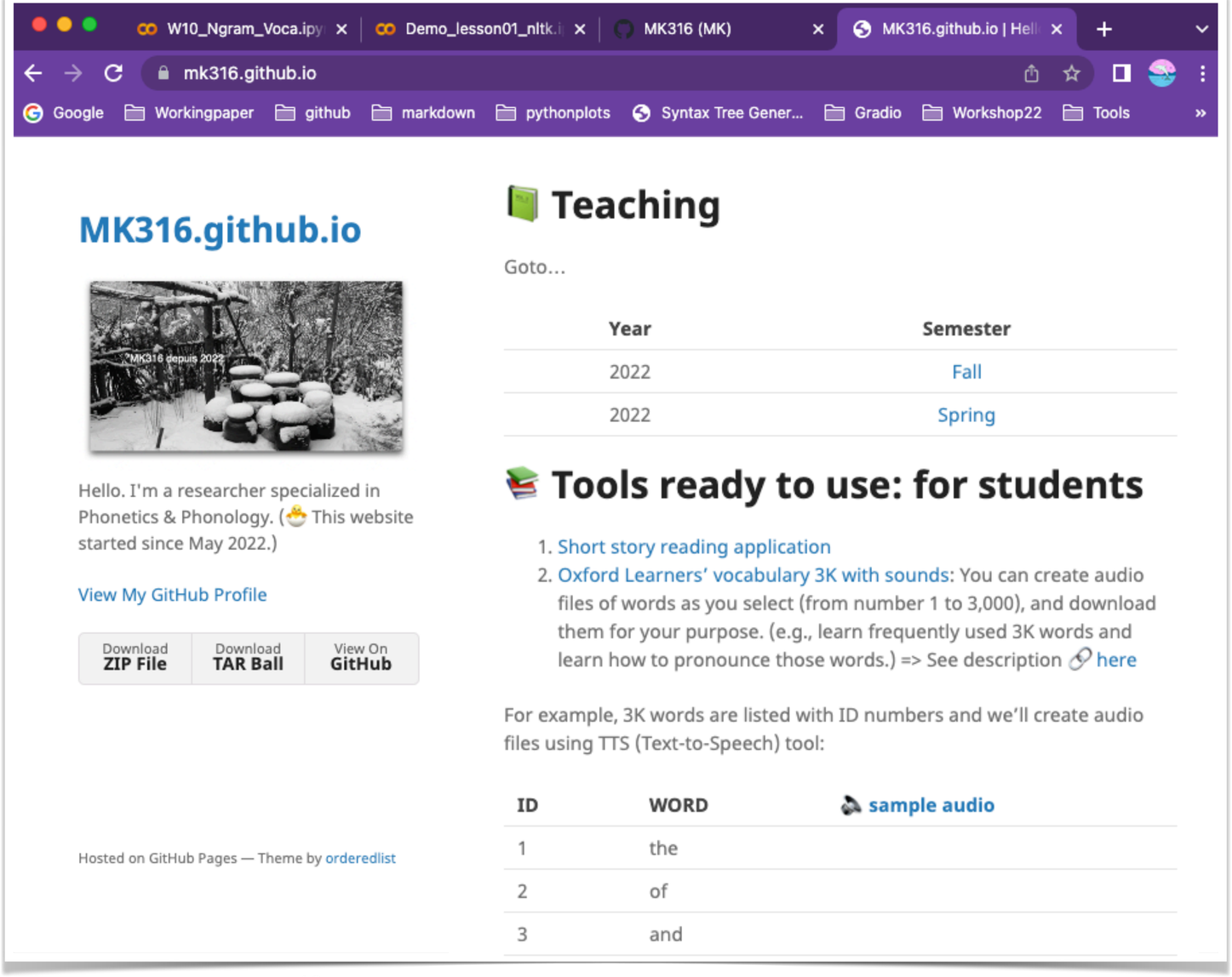
MK316.github.io



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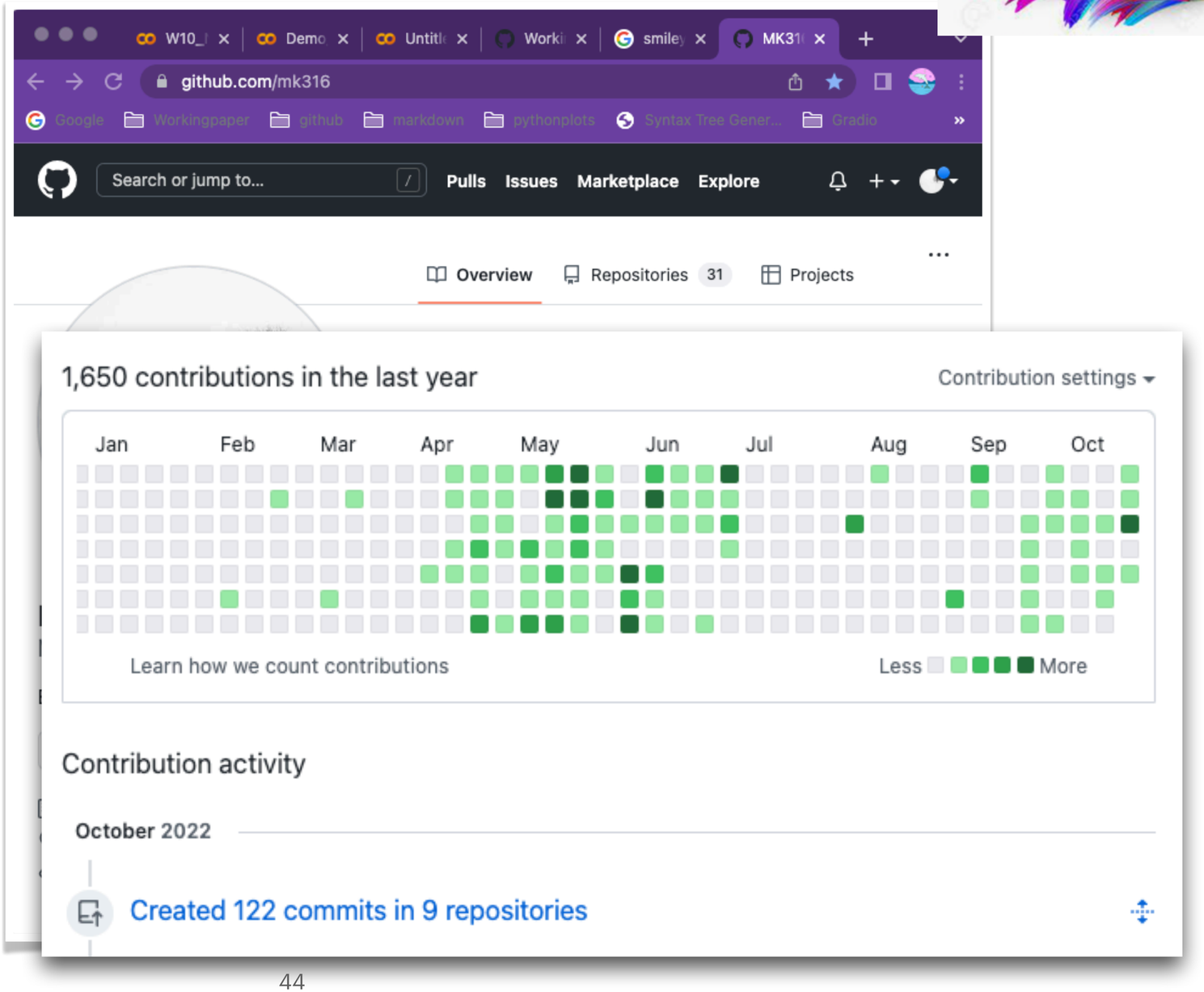
Github.com/mk316



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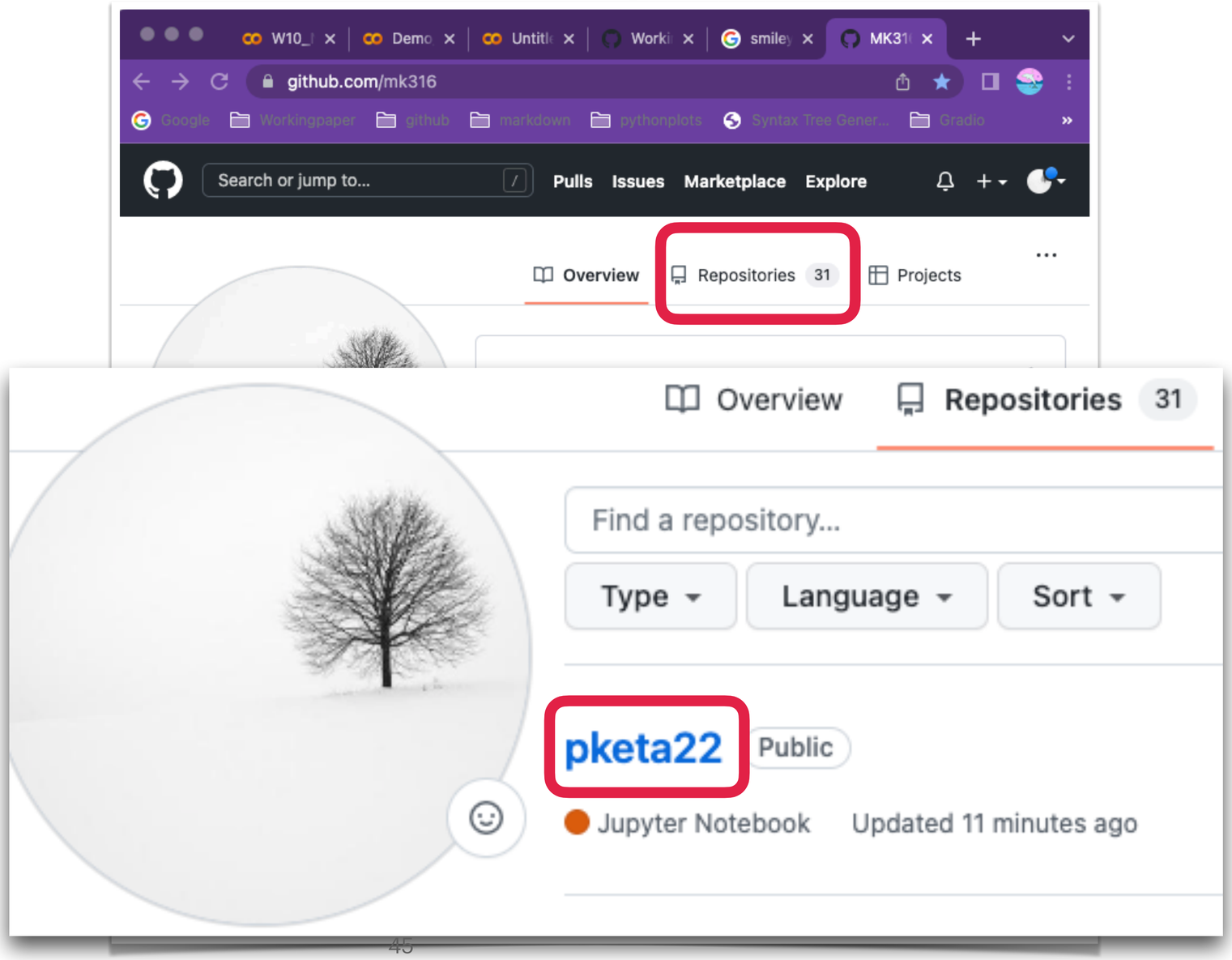

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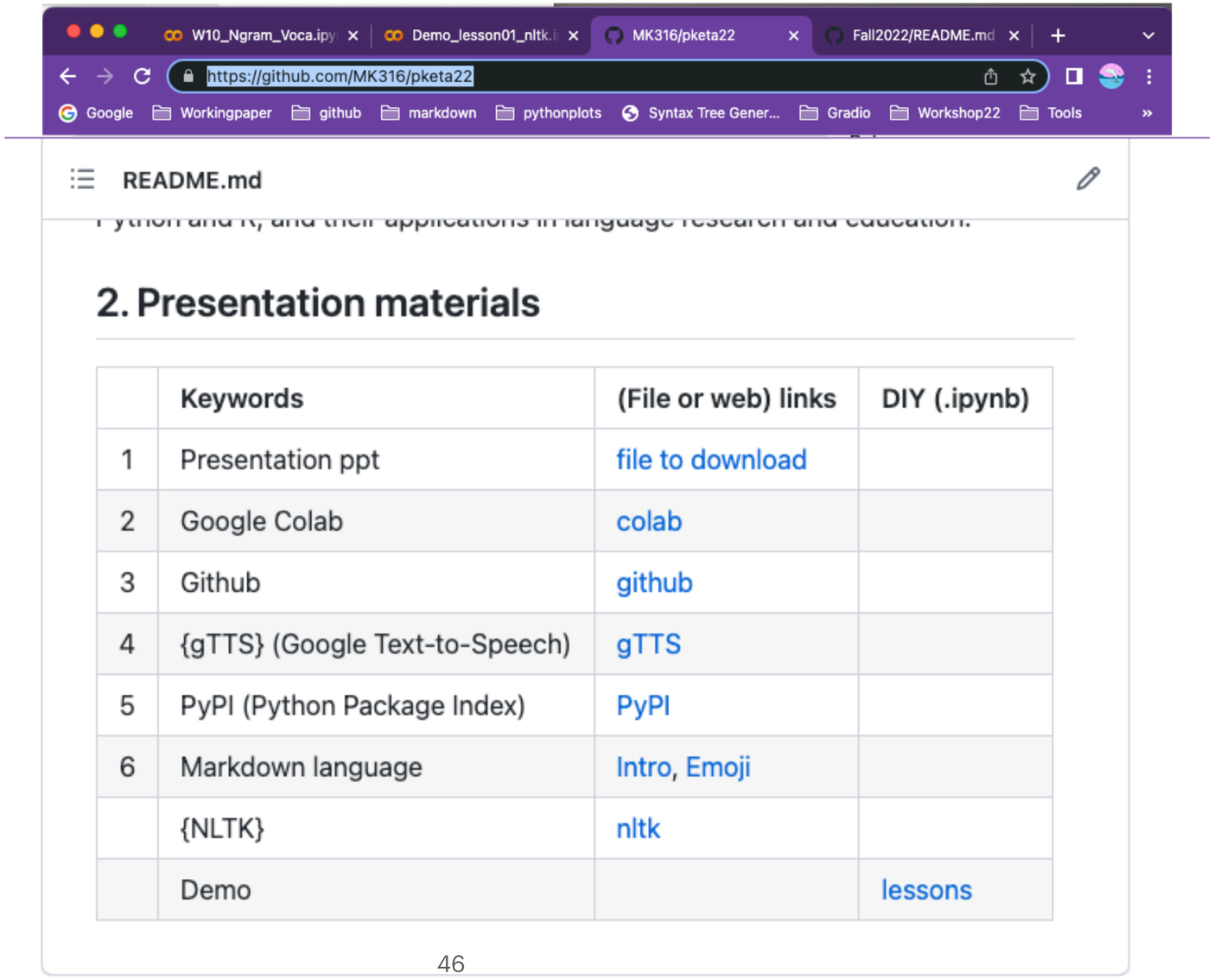
https://github.com/MK316/pketa22



2. Presentation materials

	Keywords	(File or web) links	DIY (.ipynb)
1	Presentation ppt	file to download	
2	Google Colab	colab	
3	Github	github	
4	{gTTS} (Google Text-to-Speech)	gTTS	
5	PyPI (Python Package Index)	PyPI	
6	Markdown language	Intro, Emoji	
	{NLTK}	nltk	
	Demo		lessons

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Demo lesson

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The New York Times

THE SHIFT

An A.I.-Generated Picture Won an Art Prize. Artists Aren't Happy.

"I won, and I didn't break any rules," the artwork's creator says.

Jason Allen's A.I.-generated work, "Théâtre D'opéra Spatial," took first place in the digit
via Jason Allen

Submitted under the name "Jason M. Allen via Midjourney" — was created using A.I.

Midjourney

Midjourney is an independent research lab that produces a proprietary artificial intelligence program that creates images from textual descriptions, similar to OpenAI's DALL-E and the open-source Stable Diffusion. The tool is currently in open beta, which it entered on July 12, 2022. Wikipedia

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Human Computer Interaction (HCI; 1980s)

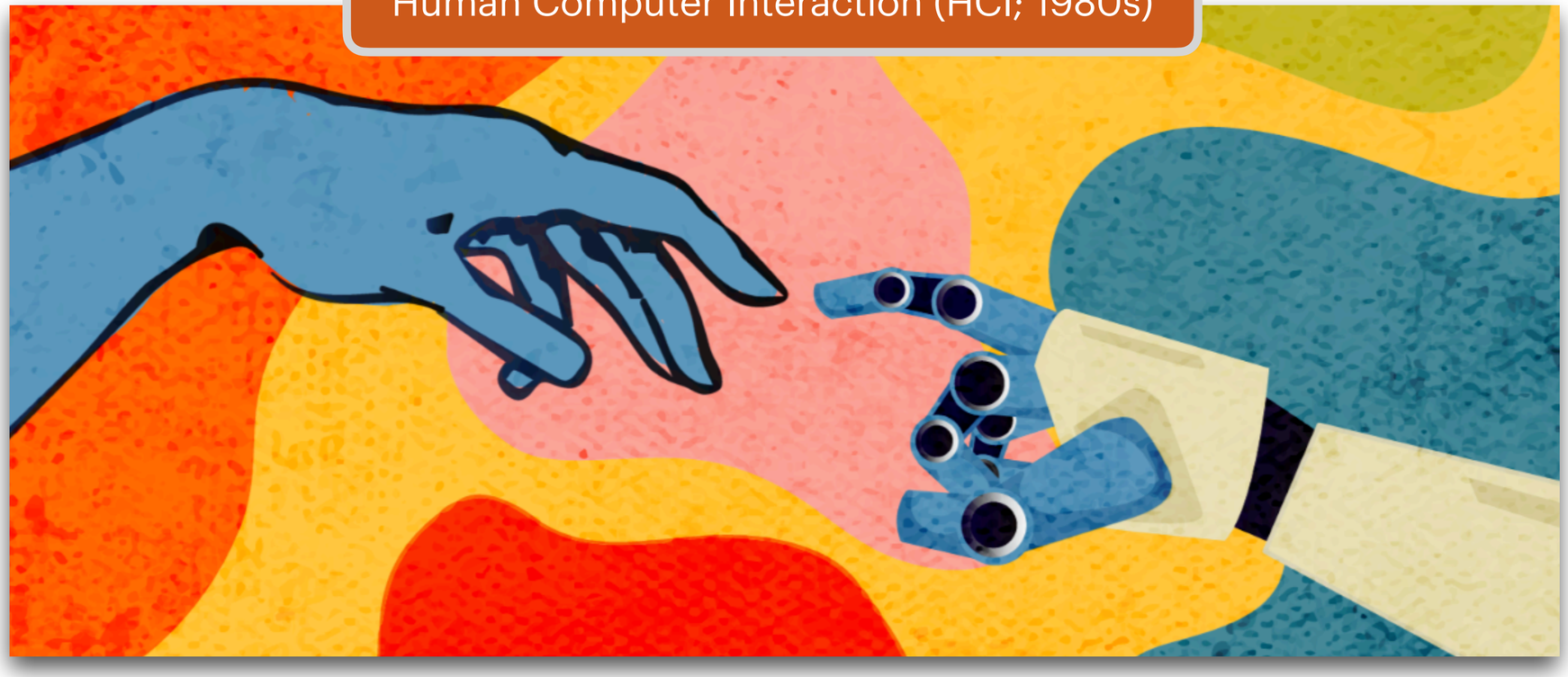

Illustration by Nayane de Souza Hablitzel

https://xd.adobe.com/ideas/principles/human-computer-interaction/man-and-machine-guide-to-human-computer-interaction/

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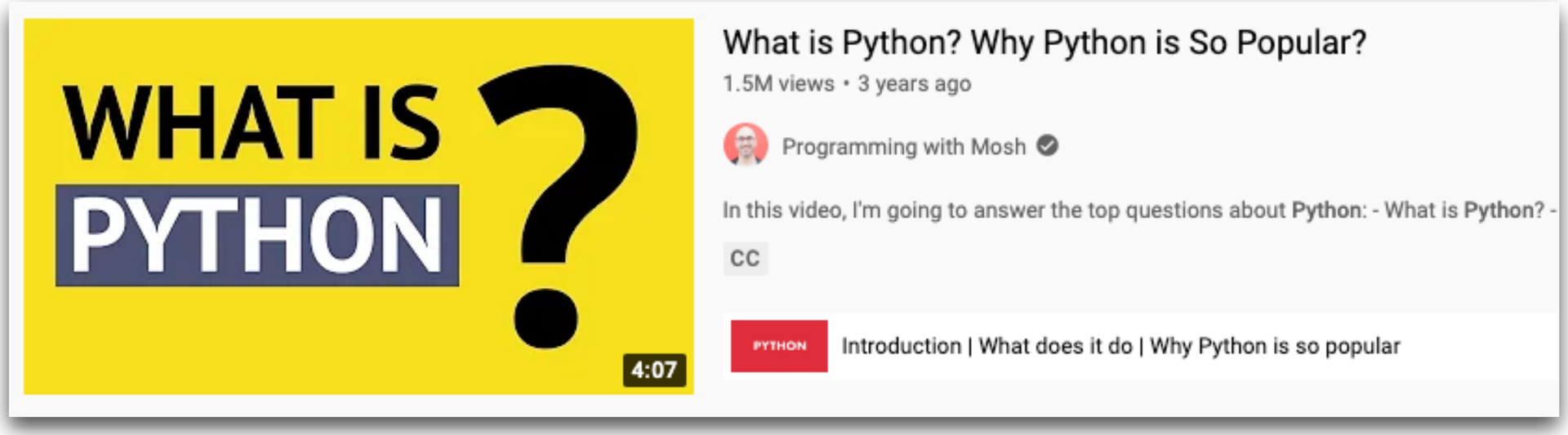
Learning English?



Learning coding?

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Thank you for listening.

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