

Machine Learning

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Applications

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Machine Learning is EVERYWHERE

- You might be surprised by how many **domains** incorporate Machine Learning (ML) effectively for some of their use cases
- As a technology user, you probably frequently make use of ML without even realizing it
- With chatGpt-like applications, we will have tremendous ml-based apps

Facebook: Face Recognition

- You probably noticed that Facebook draws a box around your face!



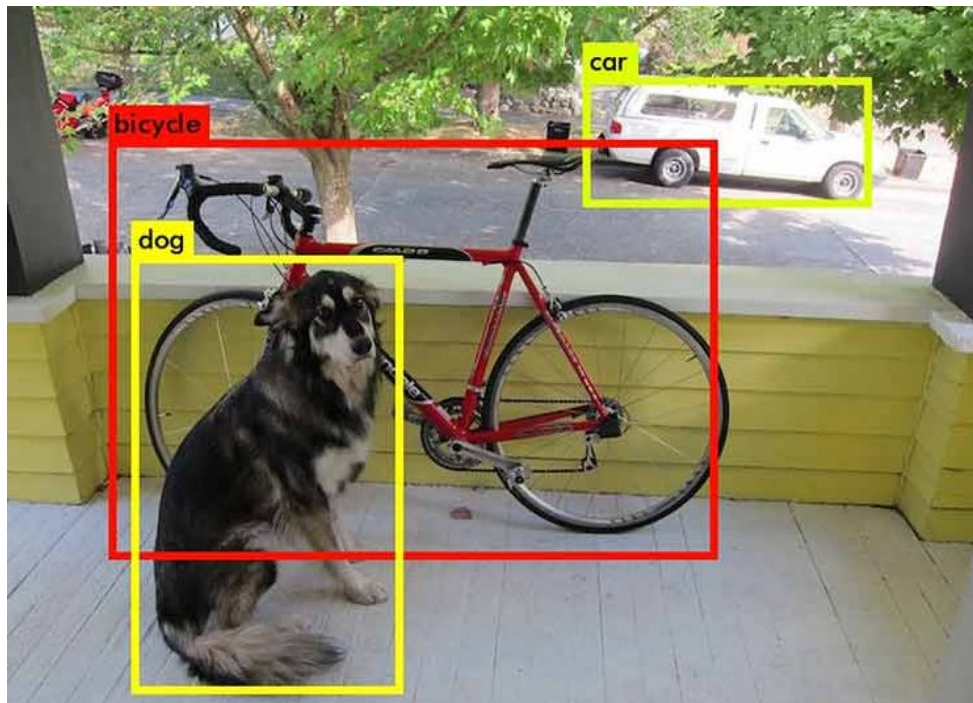
Facebook: Person Identification

- Another task: Who is that person?



Object Detection

- Given an image, find all objects (e.g. person, car, cow, train, etc) of interest

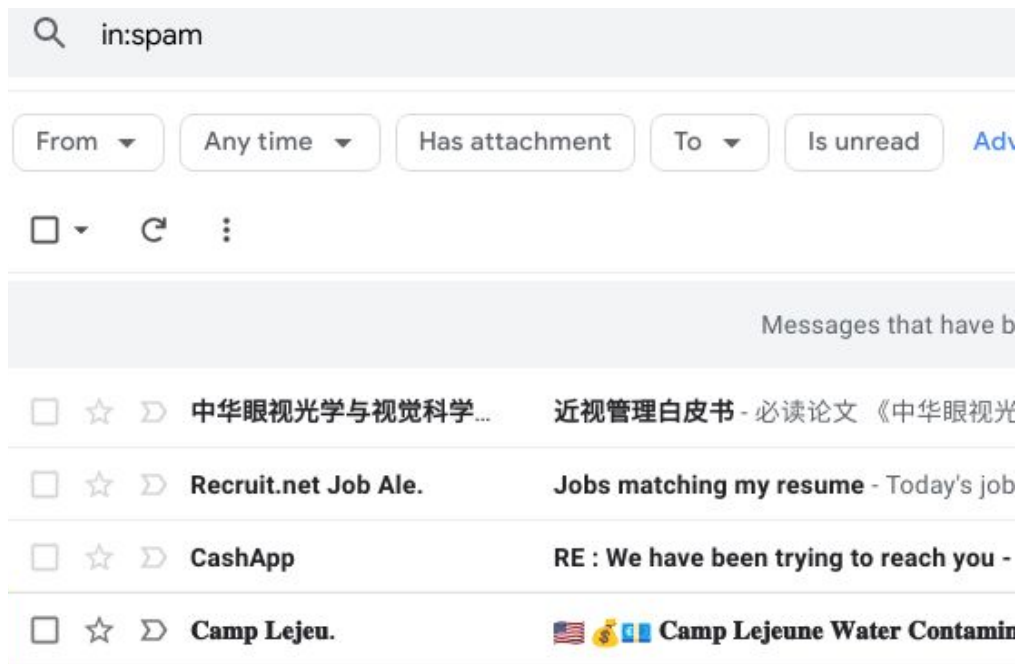


Computer Vision (CV) Field

- The previous tasks belong to the computer vision field!
- In this field, the AI's main target is to understand images and videos
- CV is one of the major AI fields in the market
 - Some of the domains are heavy: Autonomous driving, robotics and augmented reality


Google: Gmail Spam folder


- Many emails are so suspicious
- Gmail uses ML to judge the email's **text**




Google: Text Translation

- Enter text
- Select the languages: from and to
- Get the translated text!

 Text

 Documents

 Websites

DETECT LANGUAGE **ENGLISH** ARABIC SPANISH ▾All the faith he had had had had no effect on the outcome of his life. 

He had had a lot of faith, but it had had no effect on the outcome of his life.

ARABIC ENGLISH SPANISH ▾

☆ كل إيمانه لم يكن له أي تأثير على نتيجة حياته.

كان لديه الكثير من الإيمان ، لكن لم يكن له أي تأثير على نتيجة حياته.

Twitter: Emotion Analysis

- A tweet's text can be analyzed to work out the underlying sentiment (attitude) of the text
- A text could display emotions including happiness, relief, fear, sadness, anxiety, anger - among others!



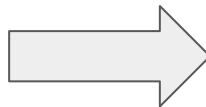
Everyone ▾

I used this application and it is very slow. Don't buy it. A complete waste of money!

🗨️ Everyone can reply



Tweet



Natural Language Processing (NLP) field

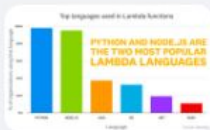
- The previous tasks belong to NLP!
- NLP is another major AI field in the market



Sponsored



Dell
dell.com



Serverless
Livestream 2022
datadoghq.com

Your Pages and profiles



CS Get-Skilled



13 Notifications



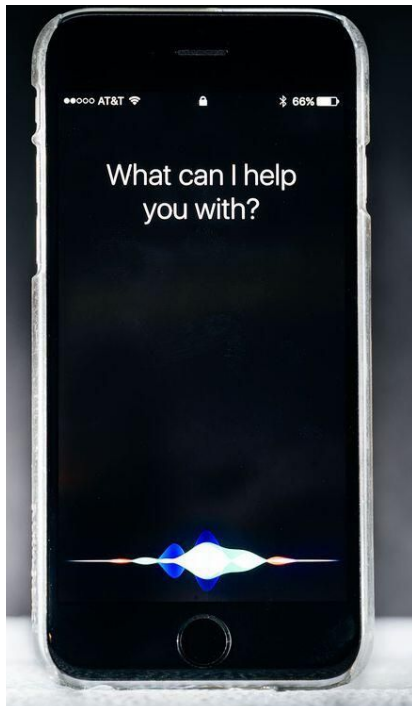
Create promotion

Facebook Ads

- In the USA alone, online advertising revenue grew by 35.4% in 2021 compared to 2020; from \$139.8 to \$189.3 billion US dollars
- Work in this field is very important, and very well-paid!
 - Most major companies make billions of dollars of revenue from ads

Voice Recognition: Siri / Alexa / Google

This involves recording speech, and converting it into text



Today's weather

Robotics / Autonomous Driving

- An autonomous driving car should be able to:
 - **Perception:** know where are the agents (cars, bicycles, pedestrians, etc) and their attributes
 - **Prediction:** predict what each agent will do (e.g. the front car will change lane)
 - **Planning:** plan its route such that no accidents happens and it get closer from the goal
- This is not just a task. It is a complex system!

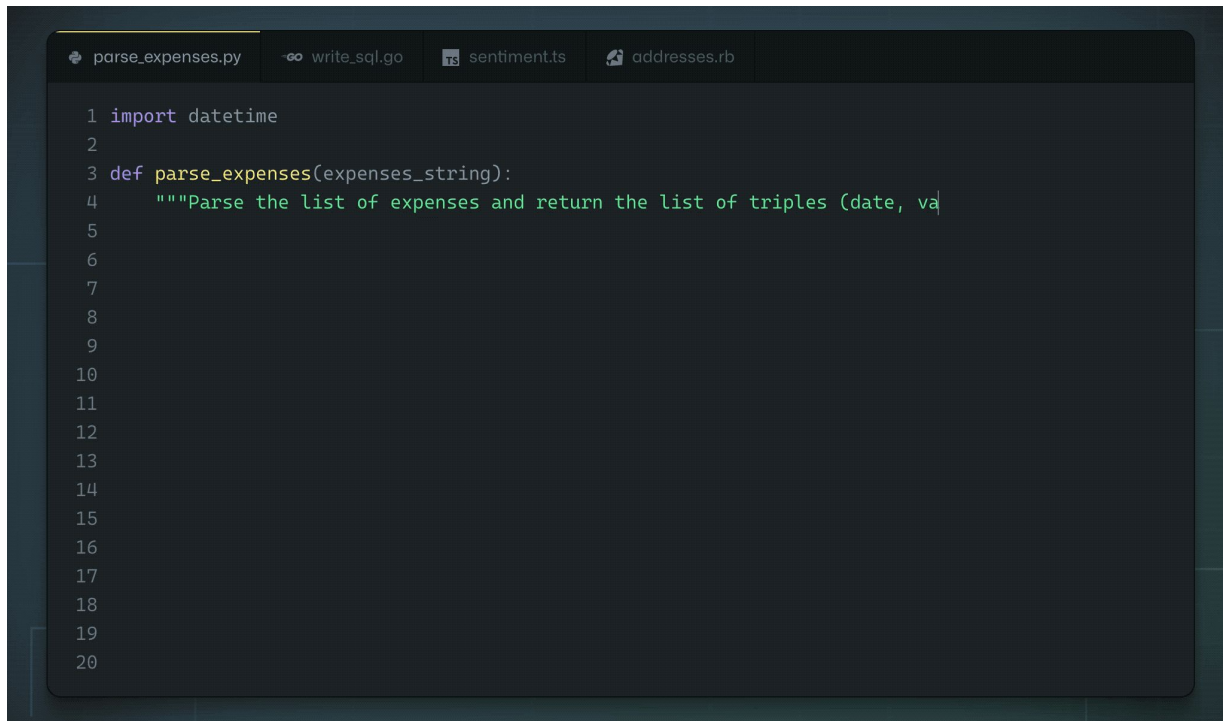


Coupon Discount Recommendation

- People think about how to apply ML in every single domain
- For example, consider a website that lists courses for up to \$1000
- We want to understand the users:
 - Soha: from her history, the website recognizes that she always buys the course at the regular price
 - If we give her a discount, we lose money! Don't
 - Mona: on the other hand, she NEVER makes a purchase unless there's a discount applied. Typically, a 50% discount encourages her to buy a course
 - Don't give discounts for less than 50%
 - Toka: finally, she always waits for big sales, such as the 90% discount

Code Copilot

- Fancy ideas are introduced. Write your request and get potential code for it

A screenshot of a code editor interface with a dark theme. The editor has four tabs at the top: 'parse_expenses.py' (active), 'write_sql.go', 'sentiment.ts', and 'addresses.rb'. The main editing area shows Python code with line numbers 1 through 20 on the left. The code defines a function 'parse_expenses' that takes 'expenses_string' as an argument. A docstring is partially visible: 'Parse the list of expenses and return the list of triples (date, va'.

```
1 import datetime
2
3 def parse_expenses(expenses_string):
4     """Parse the list of expenses and return the list of triples (date, va
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
```


ChatGPT

Human: Write a function that reads N numbers and count how many triples are less than 1000

AI: Sure, no problem. Here is your function:

```
def countTriplesLessThan1000(numbers):  
  
    triples = 0  
  
    for i in range(len(numbers)):  
        for j in range(i+1, len(numbers)):  
            for k in range(j+1, len(numbers)):  
                if numbers[i] + numbers[j] + numbers[k] < 1000:  
                    triples += 1  
  
    return triples
```

And much more!

- Banking
 - Fraud Detection
 - Loan Approval Prediction
- Weather forecasting, Stock Prediction
- Healthcare
 - Cancer detection, Robotic Surgery, Drug Discovery
- Recommender systems
 - Netflix, Facebook reels, Facebook timeline
- Search Engines, Chatbot, Customer Retention Rate, Character Recognition, Social Network Analysis, Surveillance Systems, Network Intrusion Detection

“Acquire knowledge and impart it to the people.”

“Seek knowledge from the Cradle to the Grave.”

