

AI and Geospatial big data integration : technology and application scenarios analysis.

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Introduction to Artificial Intelligence



“Deep Learning, oil on canvas, masterpiece by Salvador Dalí”, a creation by Léonard Boussieux with 30+ prompts in DALL-E

Plan

Broad Introduction of AI

Part I: History and Major Concepts

- ChatGPT demystification
- Prompting experience

Part II: Intro Google Earth Engine

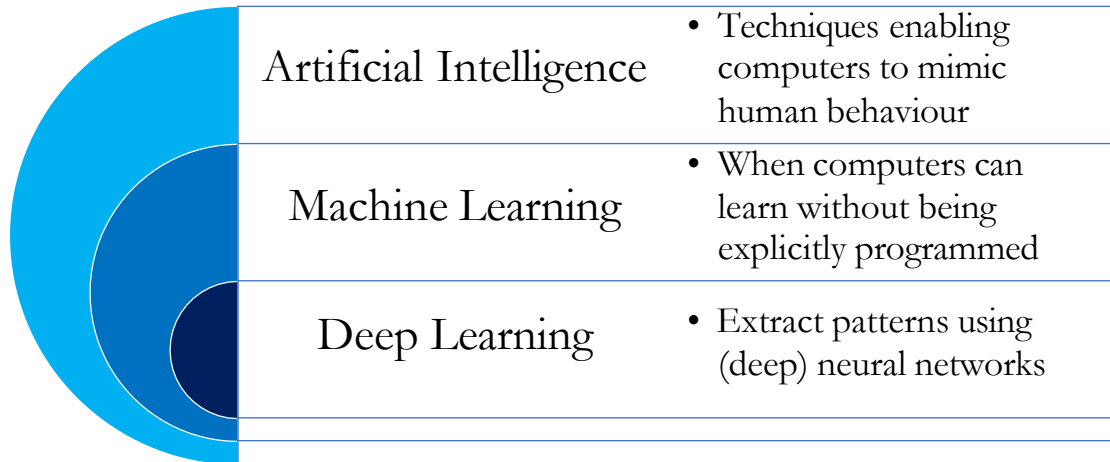
Part III: Integration ideas?

Part IV: Sample application scenarios

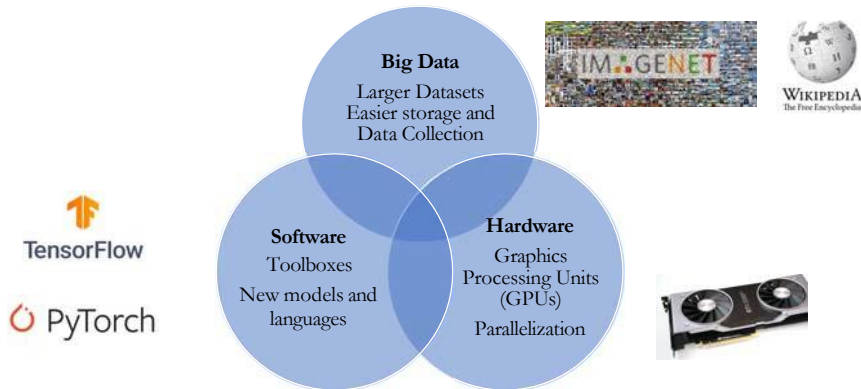
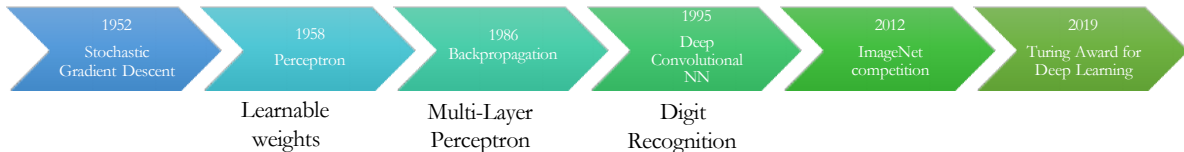
Part V: Open discussion



Deep Learning in the landscape



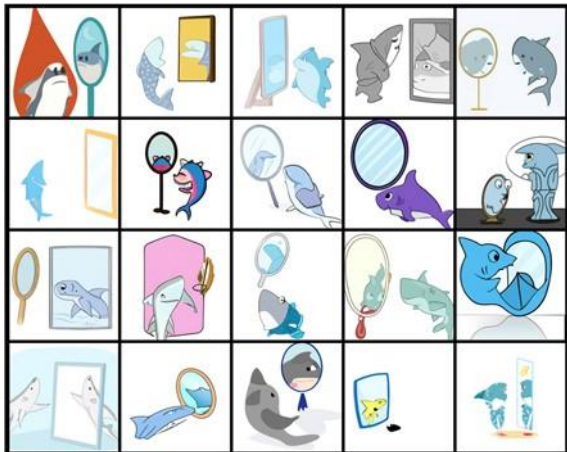
What is the history behind the current AI boom?



DALL-E in 2022

<https://openai.com/blog/dall-e/>

BabyShark in an existential crisis after its
overwhelming success on YouTube



DALL-E Prompt: an illustration of a baby shark in pajamas staring at its reflection in the mirror

Pikachu very proud for its first day at MIT



DALL-E Prompt: an illustration of a pikachu with a cape holding a calculator

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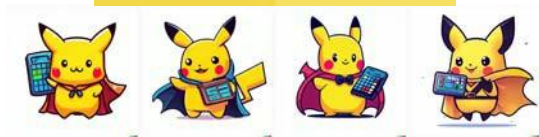
2022 looks so retro...

Same prompts in 2023...



DALL-E 2

Midjourney

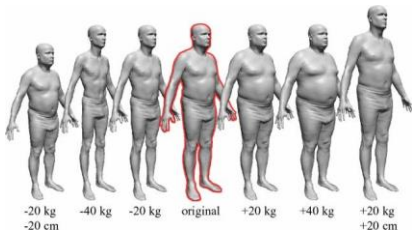


DALL-E 2

NLP Model = predict next word

Simple NN problem : predict weight based on height – linear dependency

$$Y=kX+b$$



You are AI: 44th US President Barack
<?...>;

More unknowns than just **k** in the language models;

Is it really new(T9)?



NLP Model = predict next word

Trick happened with Large Language models (LLM) –
Generative Pre-trained Transformer.

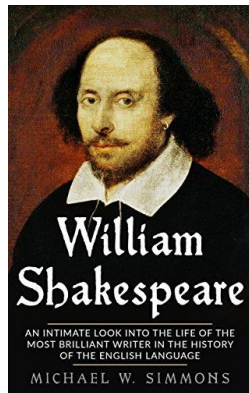
GPT-1, 2018/ Scalability is a major difference.

GPT-2, 2019 /all Reddit with 3 or more Likes; **40 gigabytes** of texts. Is it a lot?:

W.Shakespeare wrote *850,000 words* during his life (300 words per page=2800p of text)=5.5Mbyte

ChatGPT-2 used 7300 times more data 😊

If you can read 1 page per minute: you will need **40 years** of reading (w/out eating and sleeping breaks) to catch ChatGPT-2 by erudition.



What else except for training set?

5 y.o. kid can read all Shakespeare...

Simple NN problem : predict weight based on height – linear dependency
 $Y=kX+b$

PLUS SIZE MODEL architecture was used; **1.5 Billions** of model parameters(6Gb files) for ChatGPT-2 in 2019.

How to respond to climate change, if you are an algorithm

We ran our youth essay question through an artificial-intelligence system to produce an essay



IT IS STRONGLY WORDED
AND BACKS UP CLAIMS WITH EVIDENCE,
BUT THE IDEA IS NOT INCREDIBLY ORIGINAL.

How “smart” are AI models?

Common Sense Reasoning on Winograd Schema Challenge

Leaderboard

Dataset

View

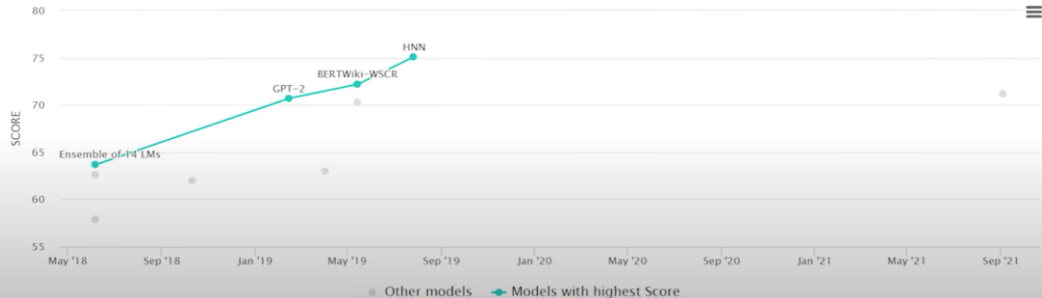
Score

by

Date

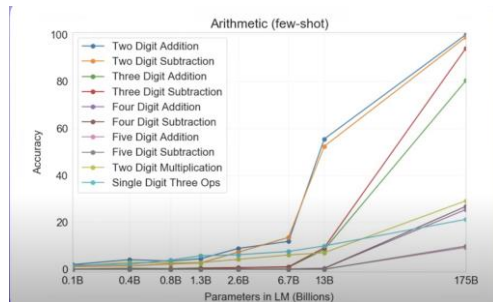
for

All models



Next step: ChatGPT-3(2020) with training set exceeding 10 times previous model and 116 times more(175 billions) parameters

Generative Pre-trained Transformer 3 (GPT-3) is an **autoregressive language model** released in 2020 that uses **deep learning** to produce human-like text. Given an initial text as prompt, it will produce text that continues the prompt.



Learned Math by itself

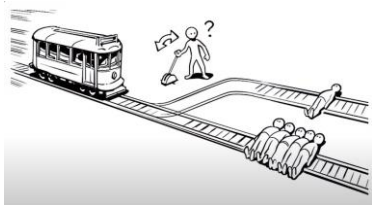
Quantity is transforming to Quality



Prompts are critical:

Not “Please”, but “Let’s think step by step” could be a magic word.

Companies are hiring prompt engineers – new profession



Ethical dilemmas- subject
For AI alignments

Aligning language models to follow instructions



With great power comes great responsibility, Ver 3.5 Dec2022



AI that recognizes faces from the whole world



Real-time satellite analysis to get trading side information



AI

BUSINESS • TECHNOLOGY

Exclusive: OpenAI Used Kenyan Workers on Less Than \$2 Per Hour to Make ChatGPT Less Toxic



Bias, racism



Killer drones, AI-powered weapons

Chat GPT Miracle (chat instead of API of InstructGPT , same LLP model)


Time to Reach 100M Users

Months to get to 100 million global Monthly Active Users



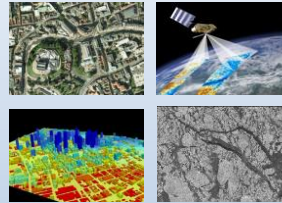
Source: UBS / Yahoo Finance

 @EconomyApp

 APP ECONOMY INSIGHTS

Big Data: is a term that describes the large volume of **data** – both structured and unstructured – that inundates a business on a day-to-day basis.

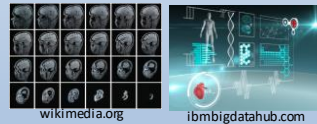
- Examples



Earth observation data (nasa.gov)



Manufacture sensor data



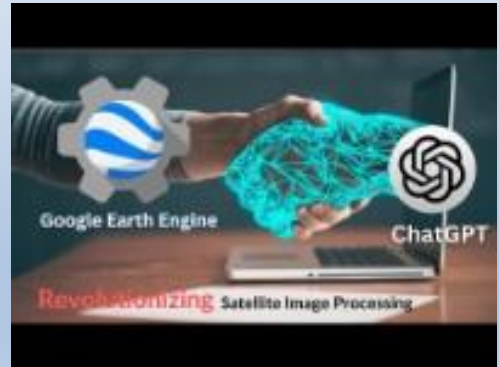
dataconomy.com

Healthcare data

Exploring Time laps



How to Integrate GEE and AI?



Sample-1: Climate Change Research

- <https://ukgnail.users.earthengine.app/view/community-climate-change-impact-service>
- Described here: <https://www.mdpi.com/2072-4292/15/21/5160>



Integration of multiple sources to the Collaborative Expert Knowledge Extraction System (EXTRA)

Collaborative Expert Knowledge Extraction (EXTRA)

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<https://tz.ektu.kz/extra>
collaborative-expert-knowledge-extraction-extra

Enter a message to start a chat.

You
hunger in yemen

ChatGPT
Hunger in Yemen is a severe and ongoing humanitarian crisis that has significantly worsened the food security situation. According to the United Nations, Yemen is currently the world's largest humanitarian crisis, and 80% of the population (over 24 million people) is in need of humanitarian assistance, including food. Approximately 20 million Yemenis are food insecure, and about 10 million are on the brink of famine. A variety of factors contribute to the hunger crisis in Yemen, including the ongoing conflict between the internationally recognized government and the Houthis rebels, which has resulted in the destruction of critical infrastructure, including farms, markets, and water systems. This has severely disrupted agricultural production, making it difficult for farmers to grow or sell crops. In addition to this, the economy has collapsed, leading to skyrocketing food prices that many Yemenis cannot afford. Conflict-related displacement and the displacement of families from their homes have also further heightened food insecurity. The situation is further exacerbated by import restrictions and disruptions. A blockade and sanctions have severely limited imports of food, fuel, and medical supplies, resulting in increased prices and scarcity. International humanitarian organizations and aid agencies are working to provide food assistance to the affected population, but the scale of the crisis is immense, making it difficult to reach everyone in need. The ongoing conflict and access constraints hinder the delivery of aid to many areas, further exacerbating the hunger crisis. Addressing hunger in Yemen necessitates both immediate humanitarian assistance and long-term efforts to promote stability and peace in the region. There is an urgent need for increased funding, improved access to food, and an end to the conflict in order to alleviate the suffering of millions of Yemenis facing hunger.

Collaborative Expert Knowledge Extraction (EXTRA)

To gather insights and perspectives on the prevailing socio-economic conditions affecting countries globally, with a view to identifying trends, challenges.

batkriswanerhuk@gmail.com [Switch account](#)

Not shared

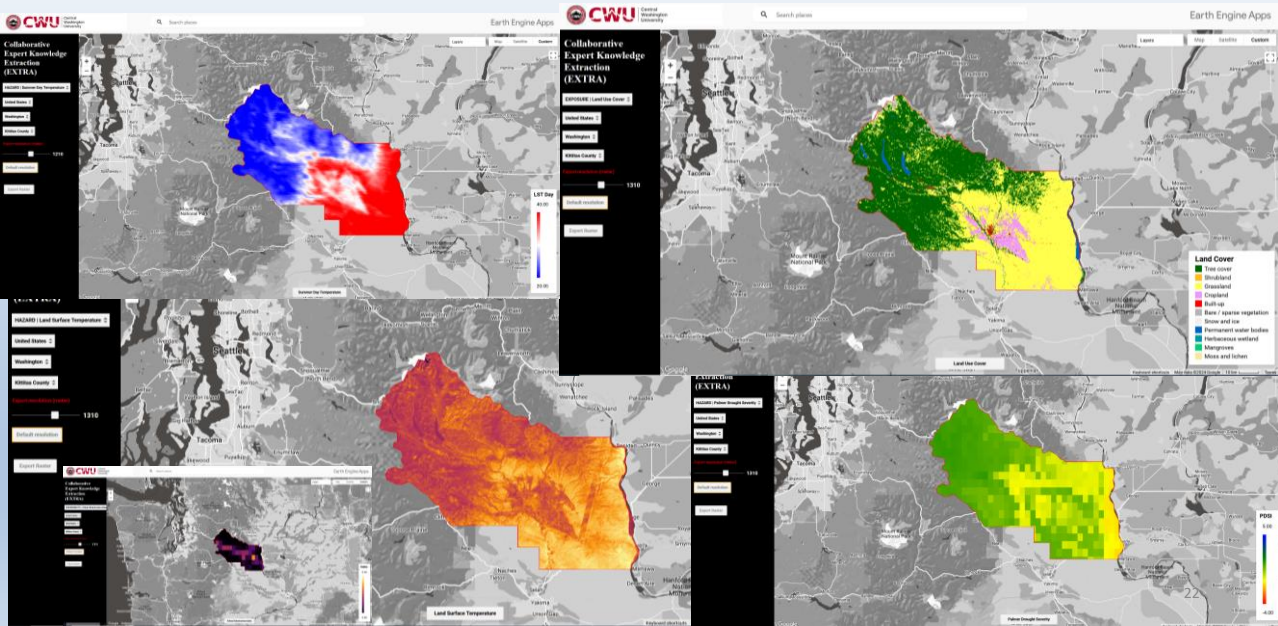
*Indicates required question

Before proceeding with the questions, please indicate your area(s) of expertise by checking the appropriate boxes. This will help contextualize your responses within your field of specialization.

- Economics
- Social Sciences
- Education
- Healthcare
- Environmental Studies
- Technology and Innovation
- Public Policy
- Other

https://docs.google.com/forms/d/e/1FAIpQLSfILVgsAW_wlKaHii7j3W17HNZlImSZu3F4ZuVXSfM22vOTK3g/viewform

Integration of geospatial Community Climate Change Impacts Service (C3IS) based on the Google Earth Engine (GEE) to the Collaborative Expert Knowledge Extraction System (EXTRA)



Thank you / QA?

