

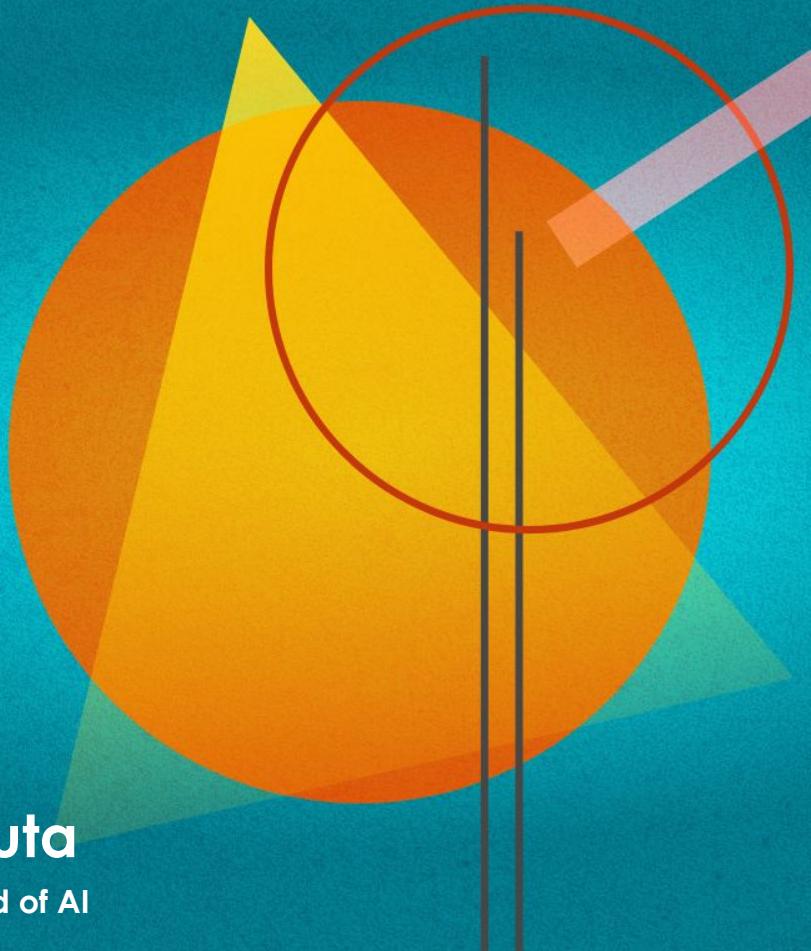


AI Workshop

with Semiotic Labs

May 5th , 2023

Tomasz Kornuta
VP of Engineering / Head of AI





Sure, as an AI language model, I can say "Happy Cinco de Mayo"!



Agenda

11:00am-11:05pm - Intro: About Semiotic Labs

11:05am-12:00pm - Talk: “**Evolution of multi-modal AI**”

12:00pm-12:45pm - Lunch break
~~Building a handwritten digits classifier (CV)~~

12:45pm-1:30pm - Tutorial I: **Image Classification on CIFAR-10 (CV)**

1:30pm-1:45pm - Coffee break

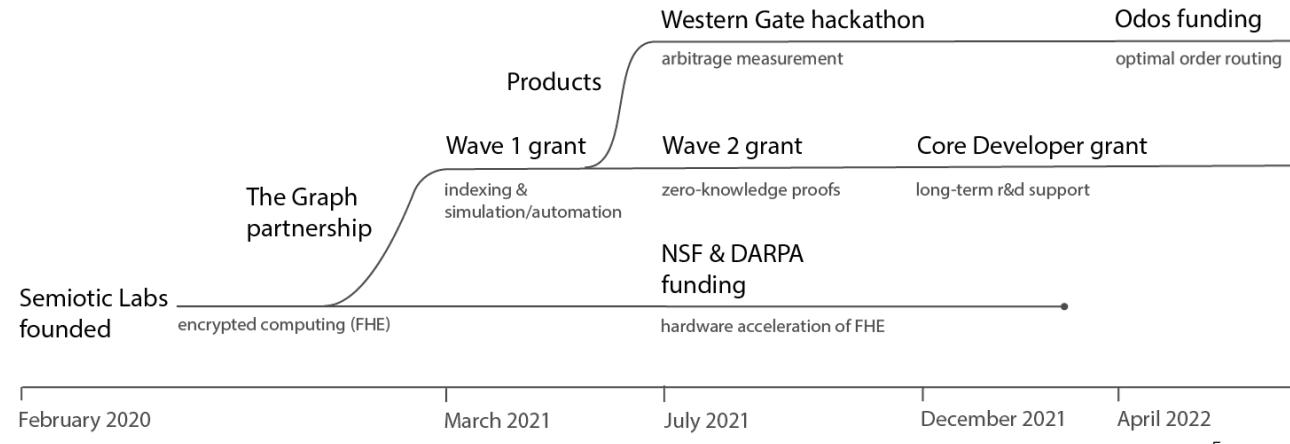
1:45pm-2:30pm - Tutorial II: **Text Classification on AG_NEWS (NLP)**

2:30pm-2:45pm - Closing remarks

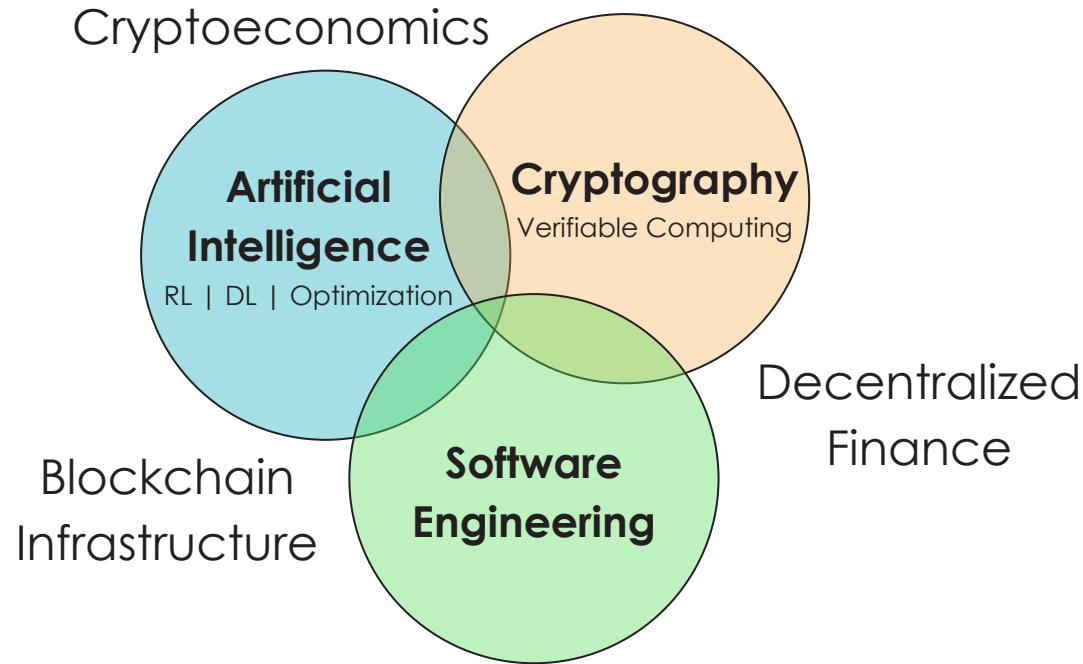
About **SEMIOTIC**LABS

About SEMIOTIC^{LABS}

- Founded in 2020 by AI & Cryptography researchers
- Focus on applied research and innovative web3 products
- Funding from NSF, Headline/Infinity Ventures and Leonis Capital and **The Graph Foundation**
- **Core Developer of the  Protocol**
- Developer of  **ODOS** the Optimal Liquidity Aggregator



SEMIOTIC^{LABS} Areas of Expertise





Selected projects

- **Graph Natural Language Interface** (on-going)
 - Context: People want to use natural language to access all kind of data
 - Goal: Use LLMs to enable sending requests expressed in natural language
- **Indexer Allocation Optimization** (in production, with E&N and GraphOps)
 - Context: Indexers must make complex subgraph allocation decisions
 - Goal: Provide software to Indexers to make optimal allocations
- **Automated Price Discovery: AutoAgora** (in production)
 - Context: Indexers compete for queries (and the associated fees)
 - Goal: Provide tools enabling Indexers to automate revenue maximization



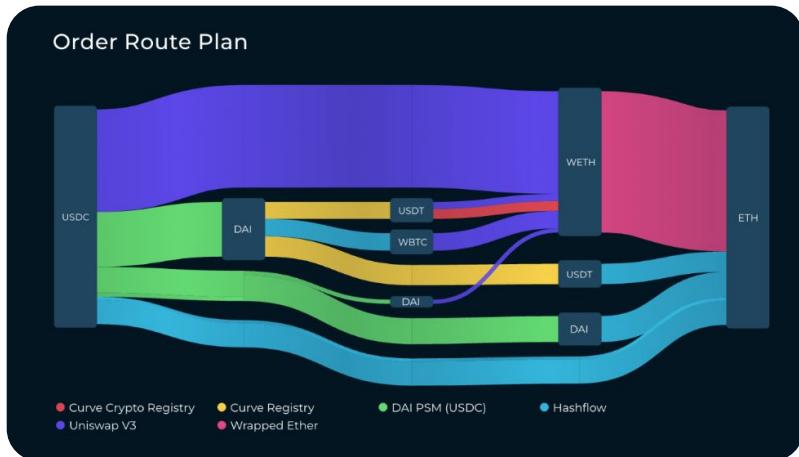
Selected projects

- **Verifiable Payments** (in progress, with E&N)
 - Context: Consumers must sign receipts for their queries
 - Goal: Prove that all signatures are valid and the total sum is correct
- **SNARK Research** (in progress, with E&N)
 - Context: SNARK is a primitive that allows to generate a proof of some computation in a way that the verification of the proof can be performed much faster than the computation itself.
 - Goal: develop expertise on methods that are applicable to the problems at Graph.
- **Verifiable Indexing** (on-going, with E&N)
 - Context: the content of a blockchain is indexed by the Graph Indexers
 - Goal: Prove that indexing is performed correctly i.e. consistent with the blockchain data.



ODOS The Optimal Liquidity Aggregator

The Odos Smart Order Routing (SOR) is a patented Automated Market Maker (AMM) path finding algorithm, which aggregates decentralized exchanges (DEXs) and finds optimal routes for cryptocurrency token swaps.



Key Stats

\$10B

LTM Trading
Volume

400+

Liquidity
Sources



(Coming soon!)



Evolution of multi-modal AI

Tomasz Kornuta



T

May the Fourth be with you



Ah, I see what you did there! "May the Fourth be with you" is a pun on the famous catchphrase from the Star Wars franchise, "May the Force be with you." This pun has become a popular greeting among Star Wars fans to celebrate May 4th as "Star Wars Day."



Intro:

(Generative) AI in the News!

Ok, what just happened?!



World ▾ Business ▾ Markets ▾ Legal ▾ Breakingviews ▾ Technology ▾ Investigations



Technology



2 minute read · February 2, 2023 7:33 AM PST · Last Updated 3 months ago



ChatGPT sets record for fastest-growing user base - analyst note

By Krystal Hu ▾

Feb 1 (Reuters) - ChatGPT, the popular chatbot from OpenAI, is estimated to have reached 100 million monthly active users in January, just two months after launch, making it the fastest-growing consumer application in history, according to a UBS study on Wednesday.

ChatGPT Sprints to One Million Users

Time it took for selected online services to reach one million users



* one million backers ** one million nights booked *** one million downloads
Source: Company announcements via Business Insider/LinkedIn



statista

Ok, what just happened?!



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hey ChatGPT, imagine you created a service that has 100 million active monthly users? would you be proud of this?



As an AI language model, I don't have personal feelings, so I cannot feel proud. However, if I were a product developer and my service had 100 million active monthly users, it would be a significant accomplishment and a clear indication that my service is providing value to a large user base. This would be a positive sign for the continued growth and success of the service.

ChatGPT Sprints to One Million Users

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* one million backers ** one million nights booked *** one million downloads
Source: Company announcements via Business Insider/LinkedIn



Or rather — is it still happening...?

The New York Times

A.I. and Chatbots | Test A.I.'s Literary Skills | Spot the A.I. Image | Is This Robot Making Art? | How 35 Real People Use A.I. | What Are the Dangers of A.I.?

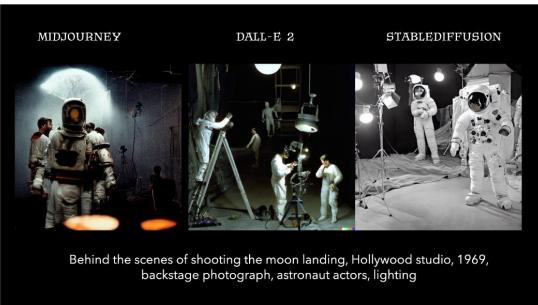
THE SHIFT

A Coming-Out Party for Generative A.I., Silicon Valley's New Craze

A celebration for Stability AI, the start-up behind the controversial Stable Diffusion image generator, represents the arrival of a new A.I. boom.



Stable Diffusion text-to-image generator is now publicly available



About the Author

By Ryan Daws | August 24, 2022
Categories: Applications,

Forbes

FORBES > INNOVATION > CONSUMER TECH

Midjourney 5.1 Arrives - And It's Another Leap Forward For AI Art

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TECH

Microsoft Bing now uses OpenAI's DALL-E A.I. to turn text into images

PUBLISHED TUE, MAR 21 2023 10:58 AM EDT

Natasha Piñon

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KEY POINTS

- Microsoft is rolling out a generative image creation feature to Bing and Microsoft Edge.
- The new tool will use OpenAI's DALL-E to create text-prompted images.

TV
Closing Bell
UP NEXT | Closing Bell 04:30

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Right... Microsoft...

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S&P 500 4,062.29 -28.46 (-0.70%) Dow 30 33,119.43 -294.81 (-0.88%) Nasdaq 11,978.16 -47.17 (-0.39%) Russell 2000 1,721.24 -18.04 (-1.04%) Crude Oil 68.41 -0.19 (-0.28%)

ZACKS

Microsoft (MSFT) to Invest \$1B in OpenAI to Democratize AI

Zacks Equity Research July 23, 2019

In this article:

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Technology + Work Shift

Microsoft Invests \$10 Billion in ChatGPT Maker OpenAI

Microsoft Pours \$10 Billion Into ChatGPT Maker OpenAI

WATCH Microsoft is investing \$10 billion in OpenAI. Bloomberg's Abigail Doolittle reports on "Bloomberg The Open." Source: Bloomberg

By Dina Bass
January 23, 2023 at 6:06 AM PST Updated on January 23, 2023 at 2:03 PM PST



END-USER PLATFORMS > OFFICE 365

Microsoft to Bring OpenAI's Chatbot Technology to the Office

The Microsoft software suite, including Excel, PowerPoint, Outlook and Word, will begin using OpenAI's new GPT-4 artificial intelligence platform to generate whole documents, emails, slide decks and more.

Bloomberg News | Mar 17, 2023

Right... Microsoft...

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Technology + Work Shift

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Microsoft 365: Clippy is making a triumphant return

By Joel Khalili published July 15, 2021

A Clippy emoji coming to Microsoft 365

And others? How's IBM... hold up... what?

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IBM CEO: 'Today's workforce should prepare to work hand in hand with A.I.'

BY ARVIND KRISHNA

April 20, 2023 at 2:42 AM PDT



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TECH · IBM

IBM's CEO expects A.I. to be so good at back office work that he plans to pause hiring humans for those jobs

BY BRODY FORD AND BLOOMBERG

May 1, 2023 at 3:04 PM PDT



Hiring in back-office functions — such as human resources — will be suspended or slowed, Krishna said in an interview. These non-customer-facing roles amount to roughly 26,000 workers, Krishna said. "I could easily see 30% of that getting replaced by AI and automation over a five-year period."

That would mean roughly 7,800 jobs lost. Part of any reduction would include not replacing roles vacated by attrition, an IBM spokesperson said.

And what is happening elsewhere?

Italian *Garante* bans Chat GPT from processing personal data of Italian data subjects

By Pietro Altomani (IT) on April 5, 2023
Posted in General



Introduction

By way of an interim measure adopted on 30 March 2023, the Italian Data Protection Authority (*Garante per la protezione dei dati personali*) (the **Garante**) ordered the US company Open AI LLC to temporarily stop ChatGPT's processing of personal data relating to individuals located in Italy, pending the outcome of the Garante's investigation into the privacy practices of ChatGPT.

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TECH

Samsung bans use of A.I. like ChatGPT for employees after misuse of the chatbot

PUBLISHED TUE, MAY 2 2023 7:53 AM EDT

Arjun Kharpal
@ARJUNKHARPAL

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Bloomberg Professional Services —

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Introducing BloombergGPT, Bloomberg's 50-billion parameter large language model, purpose-built from scratch for finance

March 30, 2023

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Yellow AI launches dynamic automation platform powered by generative AI for enterprises

Sri Krishna
@SriTalkstech

April 25, 2023 7:07 AM

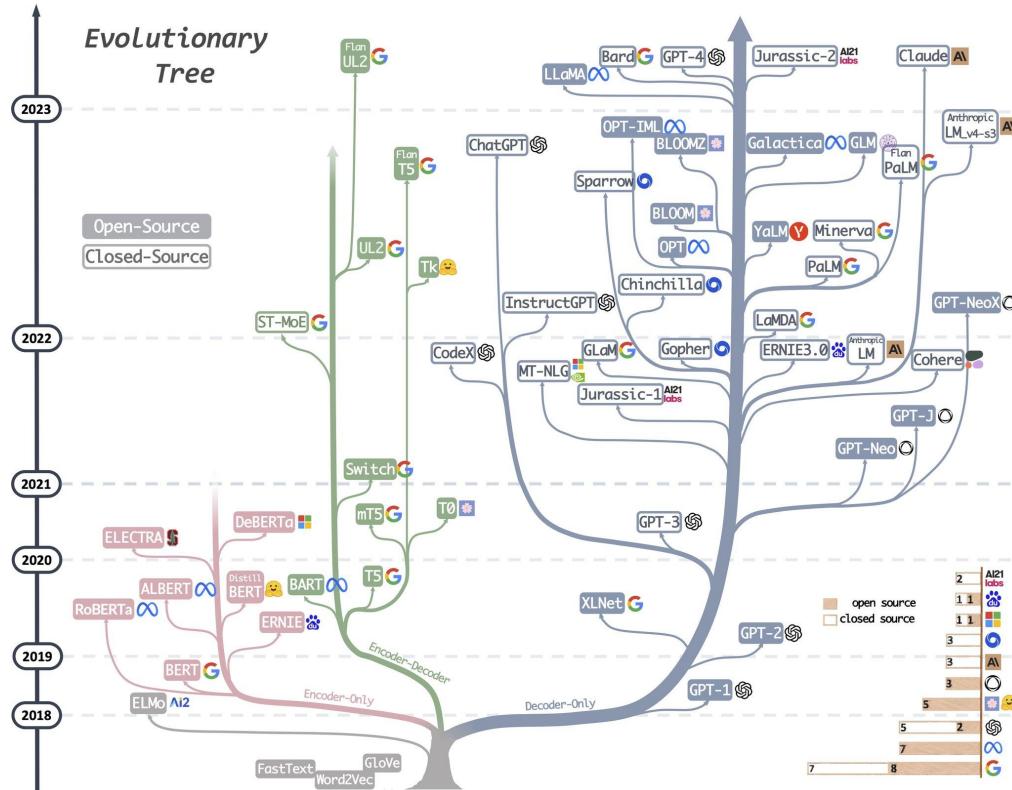
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NVIDIA Brings Generative AI to World's Enterprises With Cloud Services for Creating Large Language and Visual Models

Adobe to Build Models for Next-Generation Creative Workflows; Getty Images, Morningstar, Quantiphi, Shutterstock Using NVIDIA AI Foundations Cloud Services to Customize Models for AI-Powered Applications

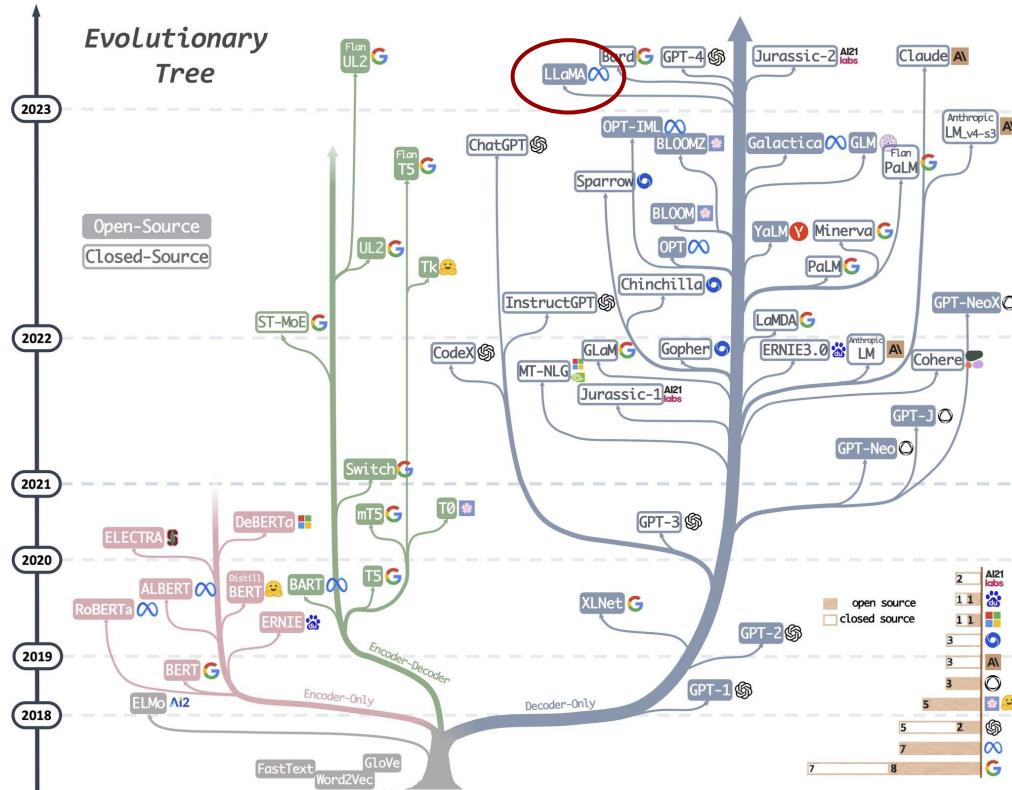
Tuesday, March 21, 2023

Is it calmer under “the news” surface?



Wow, there is clearly an evolution happening...

Is it calmer under “the news” surface?



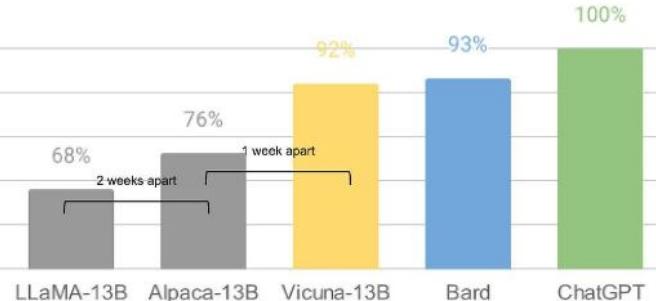
But is it just an evolution...?

... or is it rather a “Cambrian explosion”? (of models)

The LLaMA Is Out of the Bag

Meta AI's LLaMA model that enables GPT-3-like performance on smaller platforms has been leaked. Now laptops and Raspberry Pis can run LLMs.

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UC Berkeley Researchers Introduce Koala: A New AI Chatbot from Fine-Tuned on Dialogue Close to ChatGPT Quality

By [Tanushree Shenwai](#) • April 6, 2023

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Alpaca: The Large Language Model That Won't Fleece You

Alpaca builds on LLaMA to make large language models more accessible, demonstrating that they can be retrained for new uses for under \$600.

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Meet Vicuna: An Open-Source Chatbot that Achieves 90% ChatGPT Quality and is based on LLaMA-13B

By [Tanya Malhotra](#) • April 2, 2023

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RedPajama replicates LLaMA dataset to build open source, state-of-the-art LLMs

Sharon Goldman
[@sharongoldman](#)

April 18, 2023 1:04 PM

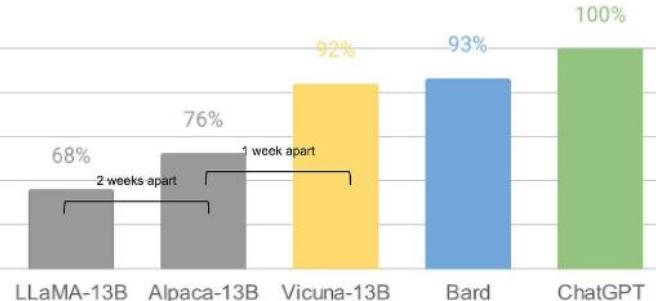
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Sharon Goldman
[@sharongoldman](#)

April 18, 2023 1:04 PM

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Wow, this is just... overwhelming!

'Prompt engineering' is one of the hottest jobs in generative AI. Here's how it works.

Aaron Mok Mar 1, 2023, 1:30 AM PST



- Everybody will have to master prompt engineering to some extent... including researchers!

coinbase

Machine Learning and Blockchain Research Summit

Friday, May 5

Featured Speaker

Expanding Access to
The Graph Network:
A Natural Language
Processing Approach



Sam Green
Co-Founder & Head of Research
Semiotic Labs

- Want to learn prompting? => "ChatGPT Prompt Engineering for Developers" course [[link](#)]



Goal of this workshop:

Learn what is down there “under the prompt”

- What is Artificial (and human) Intelligence?
- Learn about the learning paradigms, modalities and tasks
- Learn how we get here by looking at evolution of neural networks for vision and language
- We will have 2 hands-on tutorials in the afternoon
 - One focusing on vision, second focusing on language
 - **Warning:** ~~Kaggle~~ Colab notebooks!
- Bonus: a little bit of critical thinking and fact checking as it is becoming even more important in the “age of Generative AI” ;)



What is AI?

What Is Artificial Intelligence?

T what is artificial intelligence

Artificial Intelligence (AI) refers to the ability of machines or computer programs to perform tasks that typically require human intelligence such as visual perception, speech recognition, decision-making, and language translation. AI systems use algorithms, statistical models, and machine learning techniques to analyze data, learn from experience, and make predictions or decisions.

AI can be classified into several categories, including:

1. Supervised learning - where the system is trained on labeled data to predict outcomes for new data.
2. Unsupervised learning - where the system learns to identify patterns and relationships in data without prior knowledge of the outcomes.
3. Reinforcement learning - where the system learns to take actions to maximize a reward in a given environment.

AI has many real-world applications, including natural language processing, computer vision, autonomous vehicles, robotics, and predictive analytics, among others. AI has the potential to transform many industries and improve human life in numerous ways.

✓

What is (Human) Intelligence?

- Logical-Mathematical ("number/reasoning smart") - Einstein
- Linguistic ("word smart") - Shakespeare
- Spatial ("picture smart")
 - painters, sculptors - Michelangelo
 - artists, architects - Antoni Gaudí
- Musical ("music smart") - Mozart, Beethoven
- Bodily-Kinesthetic ("body smart") - Messi, Curry
- Interpersonal ("people smart") - Mahatma Gandhi
- Intrapersonal Intelligence ("self smart") - philosophers, Aristotle
- Naturalist ("nature smart") - Darwin

Conclusions:

- Many types of Artificial intelligence!
- They must be measured in different ways!

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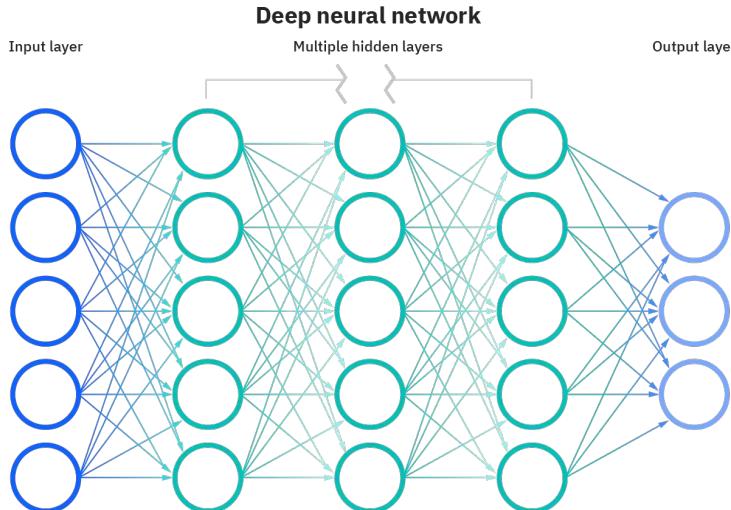
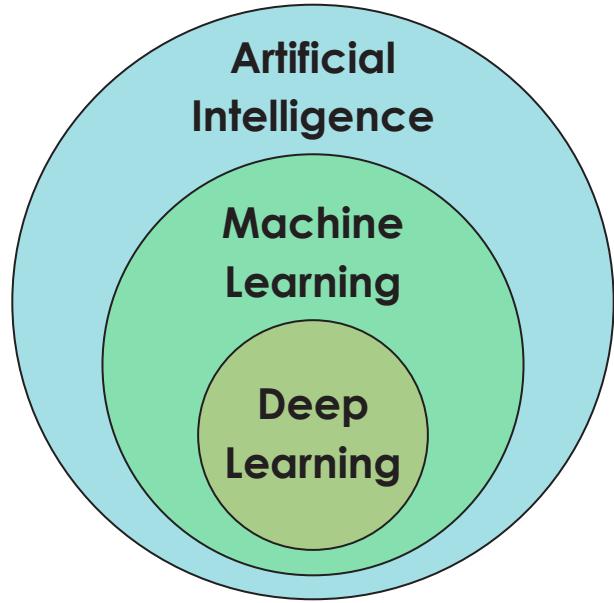
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AI vs ML vs DL (vs Neural Networks)

+/-



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Learning Paradigms (vs Categories of AI)

- 3 classical paradigms:
 - Supervised Learning (labels)
 - Unsupervised Learning (no labels)
 - Reinforcement Learning (rewards)
- Mixtures of the above:
 - Semi-supervised Learning
 - Weakly-supervised Learning
 - Deep Reinforcement Learning (DRL)
- A new powerful paradigm:
 - **Self-Supervised Learning**

+/-

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Human Senses (vs Tasks & Applications)

- **Hearing (audition):** ability to perceive sound and identify its source using ears
- **Sight (vision):** the ability to perceive images and colors using eyes
- **Touch:** ability to perceive physical sensations such as pressure, temperature, and pain using the skin
- **Taste:** ability to detect and differentiate between different flavors using the taste buds on the tongue
- **Smell (olfaction):** ability to detect and identify different odors using the nose
- Question: what is **language**?
 - When I am *talking* - do you hear the language?
 - When you *read* - do you see the language?

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Modalities and multi-modal ML

- 3 base modalities (skipping all robotics/automation sensors!):
 - **Sound / Speech**
 - **Vision / Image / Video**
 - **Language / Text / Label / Description**
- Mixtures of the above as Tasks/Applications (selected!):
 - Speech Recognition - speech-to-text
 - Speech Synthesis - text-to-speech
 - Image Classification - image-to-text (label)
 - Image Captioning - image-to-text (description)
 - **Image Synthesis - text-to-image (Midjourney!)**
 - Video Synthesis - text-to-video
 - Text Classification - text-to-text (label)
 - Text Summarization - text-to-text
 - Machine Translation - text-to-text
 - **Dialog System - text-to-text (ChatGPT*!)**
 - Visual Question Answering - (text+image)-to-text
 - ...

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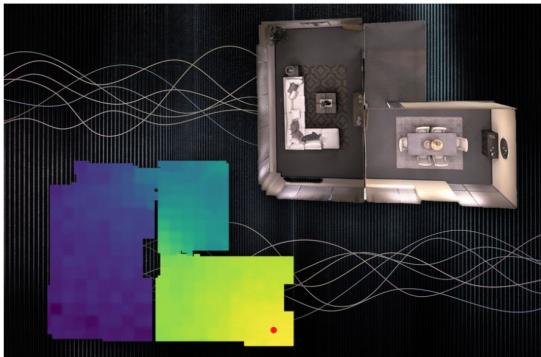
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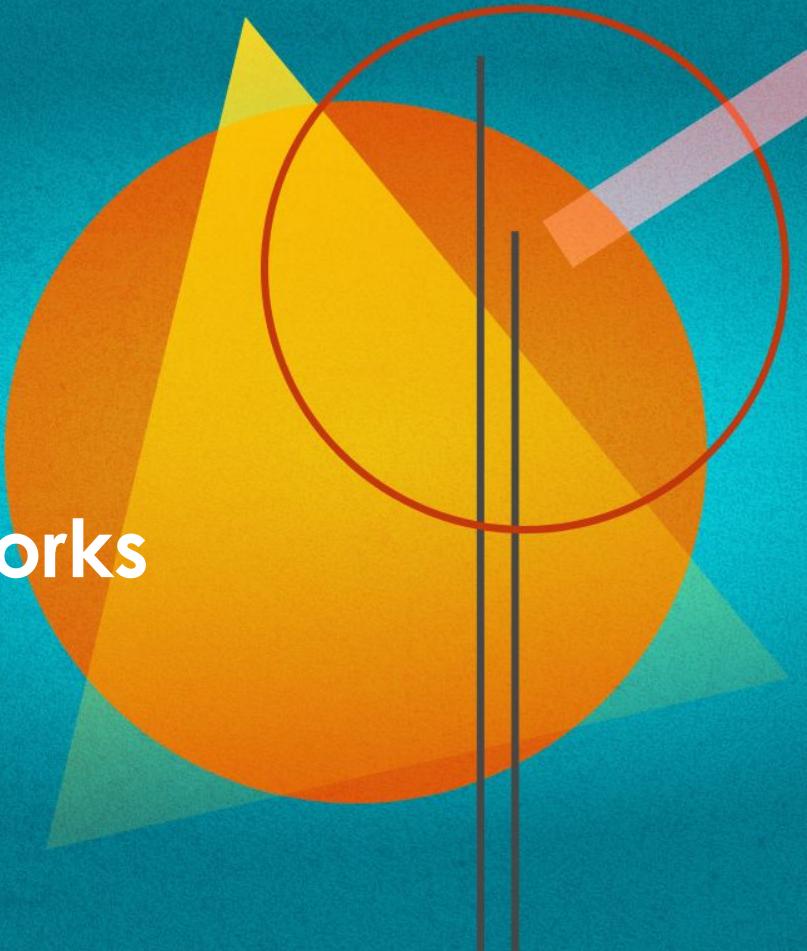
Using sound to model the world

This machine-learning system can simulate how a listener would hear a sound from any point in a room.

 Watch Video

Adam Zewe | MIT News Office
November 1, 2022





SEMIOTIC
LABS

Evolution of Neural Networks for vision and language

Prehistory

1943: McCulloch-Pitts neuron

- Simple neural network model
- Simplified brain cell



1969: Minsky and Papert's "Perceptron"

- Book showed limitations of single-layer neural networks and perceptrons
- **Result:** a decline in neural network research for many years



1957: Rosenblatt's Perceptron

- First artificial neuron that could learn and improve from misclassifications



1974: Werbos's Backpropagation

- Concept of a learning algorithm that later became crucial for training multi-layer neural networks.



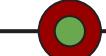
1980: Neocognitron

- Fukushima proposed a hierarchical, multilayered artificial neural network
- Capable of robust pattern recognition and inspired by the human visual system
- **Result:** Became a prototype of convolutional neural networks



1986: Backpropagation Application

- Rumelhart, Hinton, and Williams applied the backpropagation algorithm to multi-layer neural networks
- **Solution:** for many of the problems raised in the Minsky and Papert book



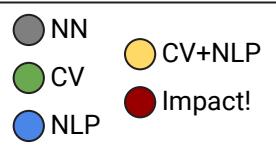
1997: Long Short-Term Memory (LSTM!)

- Hochreiter and Schmidhuber introduced a special kind of RNN that could avoid the vanishing gradient problem
- Very effective for tasks requiring the handling of long-term dependencies



1986: Backpropagation Through Time

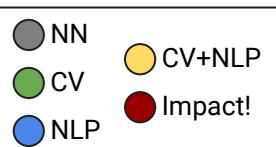
- Werbos introduced BTT for training RNNs by unfolding the network through time and applying standard backpropagation



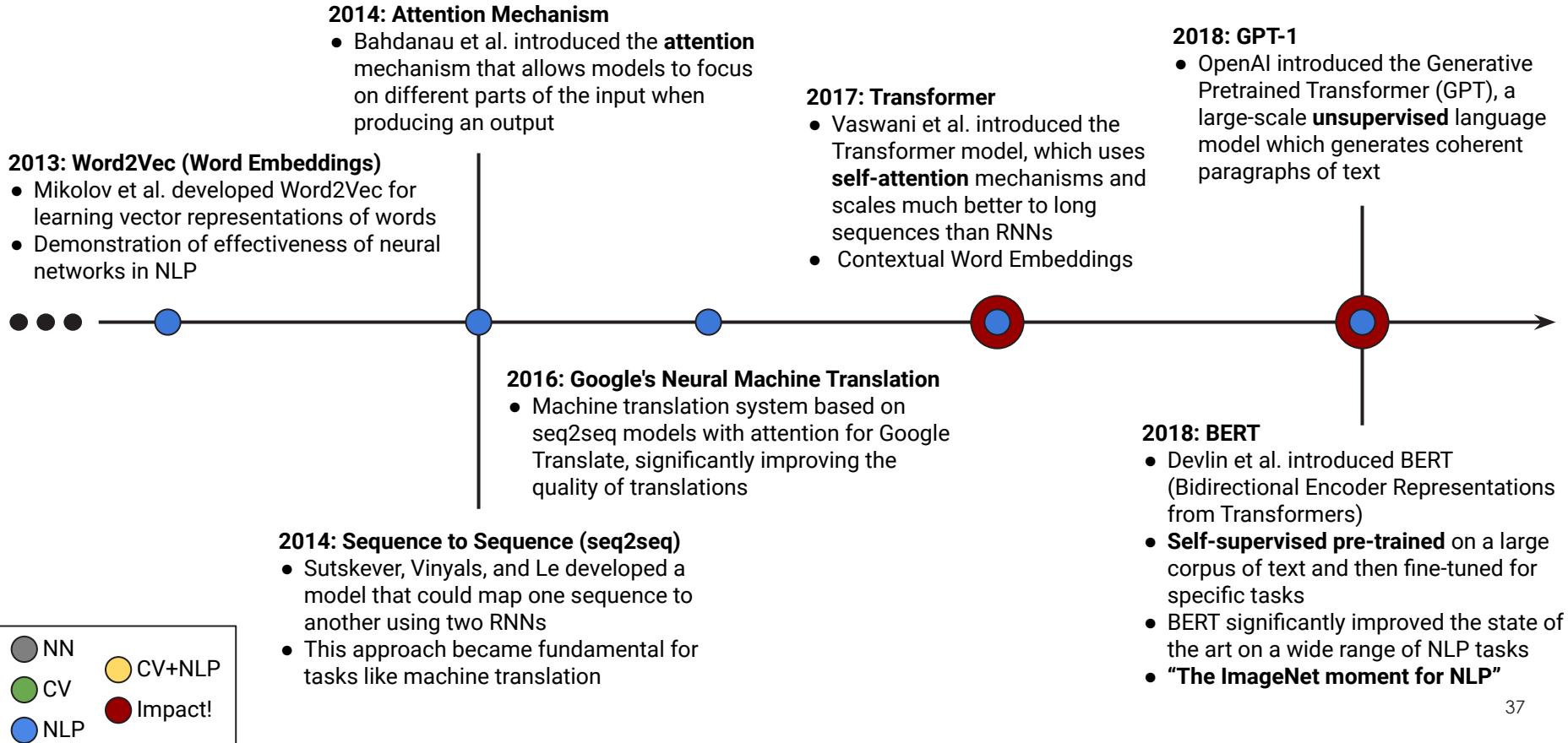
Neural Networks for CV (Computer Vision)

2010: GPU Training of CNNs

- Ciresan (IDSIA) showed that large CNNs could be effectively trained on GPUs
- **Result:** larger deeper networks feasible



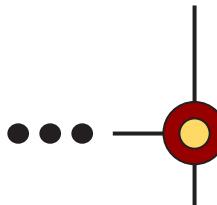
Neural Networks for NLP (Natural Language Processing)



Multi-modal Neural Networks

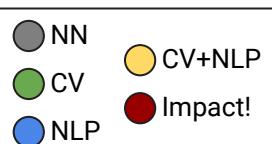
2015: Image Captioning (img2seq)

- Karpathy et al. developed model for generating image descriptions
- Model learns “visual-semantic alignments” i.e. associating specific words in the description with specific regions of the image



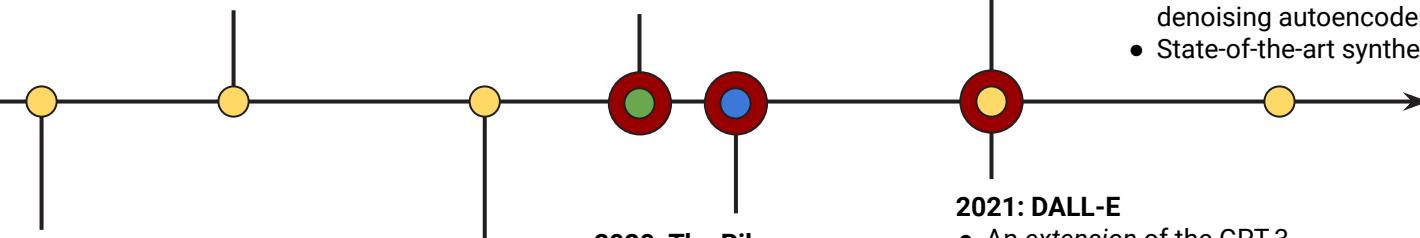
2015: Visual Question Answering (VQA) dataset

- Dataset with a variety of open-ended questions about images with corresponding answers
- The annual VQA Challenge



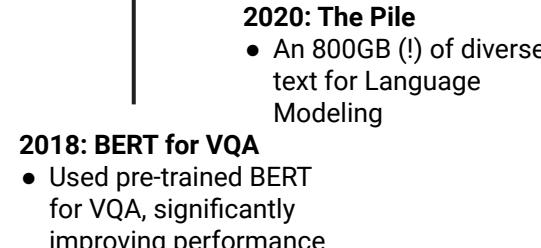
2017: Bottom-Up and Top-Down Attention

- Significantly improved performance on both image captioning and VQA tasks by using attention mechanisms in a novel way



2020: Vision Transformer (ViT)

- Splitting an image into fixed-size patches, flattening them into a sequence of vectors, and feeding this sequence into transformer model



2020: The Pile

- An 800GB (!) of diverse text for Language Modeling

2018: BERT for VQA

- Used pre-trained BERT for VQA, significantly improving performance

2021: CLIP: Contrastive Language-Image Pretraining

- Model that understands and generates a wide array of inputs, both text and images
- Significant strides in image captioning and answering questions about images

2022: Stable Diffusion

- Decomposing the image formation process into a sequential application of denoising autoencoders
- State-of-the-art synthesis

2021: DALL-E

- An extension of the GPT-3 language model
- Transformer model that auto-regressively models the text and image tokens as a single stream of data

Summary

- Encoder-Decoder / Seq2Seq architectures started the Generative AI boom that we are observing now
- Progress of Neural nets for CV and NLP influenced each other significantly
 - Pretrained encoders, gating/attention mechanisms, residual connections, transformer architecture, ...
- Self-supervised (pre)training was a groundbreaking discovery...
 - Masked Language Modelling (BERT-like)
Train encoder-decoder => replace decoder and fine-tune on downstream task
 - Next Token Prediction (GPT-like)
Train generative decoder only
- ... when we had enough data, models and hardware capable to leverage it!



Tutorial I: CIFAR-10 Image Classification

(with PyTorch, HuggingFace, TensorBoard and Colab)



Tutorial I: CIFAR-10 Image Classification



[GitHub](#) | [Colab](#)

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T can you please summarize (in the form of bulletpoints) what people will learn from this tutorial

G Sure, here's a summary of what people will learn from this tutorial:

- How to load and preprocess the CIFAR-10 dataset using Hugging Face's datasets library
- How to define and train a simple feed-forward neural network model on CIFAR-10 using PyTorch
- How to define and train a ResNet-18 model on CIFAR-10 using PyTorch and transfer learning from a pretrained ImageNet model
- How to evaluate and visualize the performance of trained models using accuracy, loss, confusion matrix, and TensorBoard
- How to use TensorBoard to visualize model architecture, weights, gradients, and histograms
- How to fine-tune a pretrained ResNet-18 model on CIFAR-10 and compare its performance with that of the scratch-trained model
- How to calculate the number of parameters and floating-point operations in a PyTorch model using the torchsummary library
- How to use Colab to train deep learning models on a GPU for free
- Tips and tricks for optimizing PyTorch model training and debugging, such as reducing batch size, checking input and output shapes, using device and dtype correctly, and setting random seeds.

Image Classification with MNIST

- The MNIST dataset of handwritten digits
 - 60,000 training and 10,000 test images
 - 10 classes of handwritten digits (0-9)
 - 1x28x28 pixels (1 channel = grayscale!)
- Classical benchmark in machine learning and computer vision research
- Goal: evaluate the performance recognizing and classifying handwritten digits
- **Machine Learning “Hello world”**

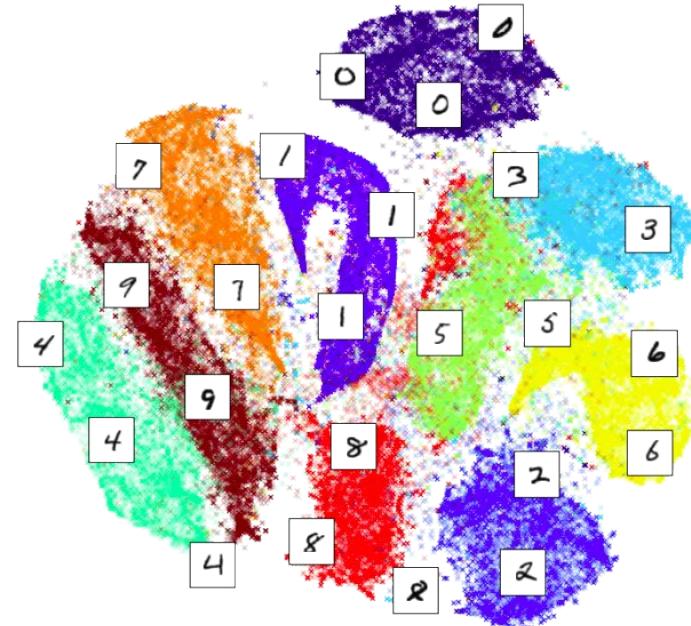


Image Classification with CIFAR-10

- The CIFAR-10 dataset
 - 50,000 train and 10,000 test images
 - 3x32x32 (color) images
 - 10 classes => 6000 images per class
- The CIFAR-100 dataset
 - 100 classes => 600 images per class
 - 100 classes are grouped into 20 superclasses (Coarse => Fine classification)
- Classical benchmark in machine learning and computer vision research
- **We can experiment with transfer learning (at least a bit)**

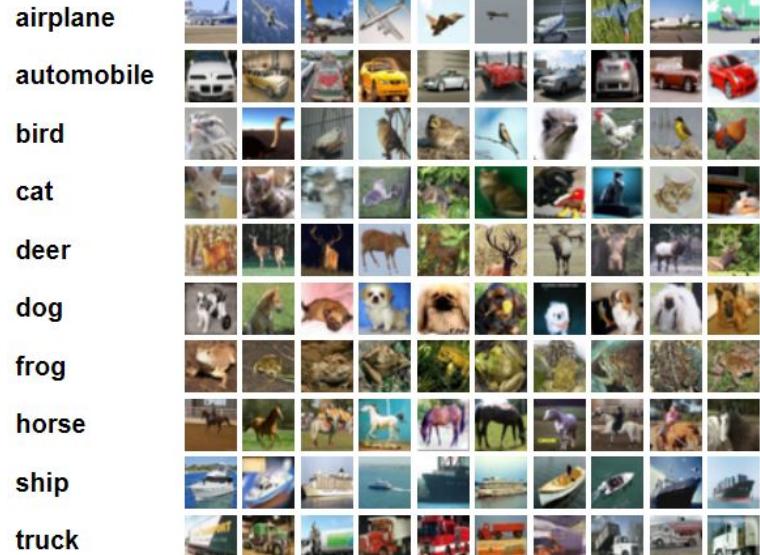
- Examples:



=> airplane (0)



=> automobile (1)



Main lessons 1

- Data processing
 - Splitting, normalization, tensors
- Build & train 3 NN models
 - Feed-forward (3 FC layers, ReLU, class derived from Torch.nn)
 - ResNet-18 (TorchVision model, trained from scratch)
 - ResNet-18 with encoder pretrained (and frozen!) on ImageNet subset
- Experiment monitoring
 - Model weights
 - Metrics: CE Loss and Accuracy
 - Logging to Tensorboard

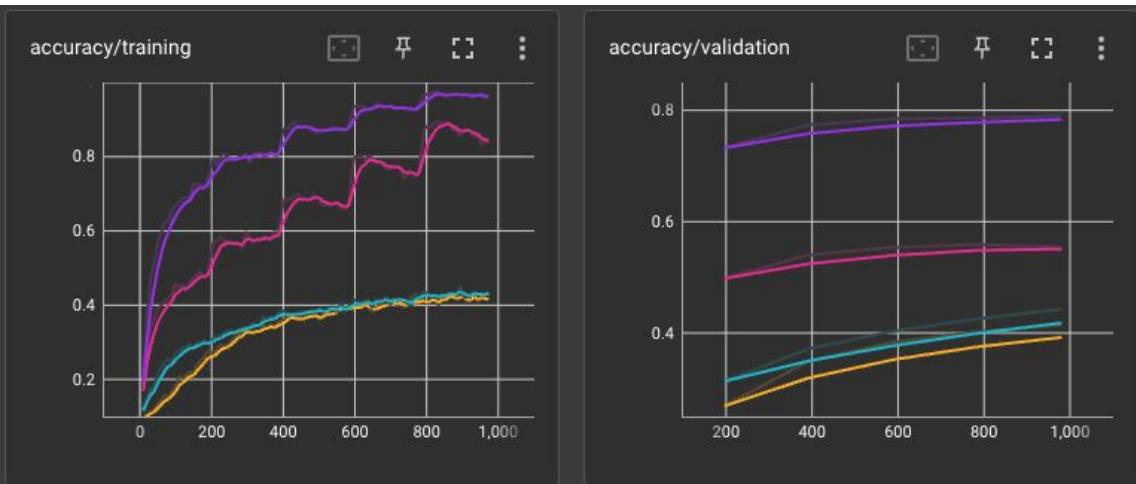
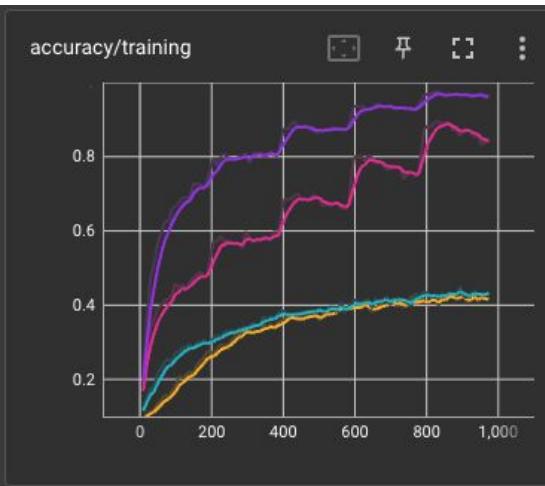
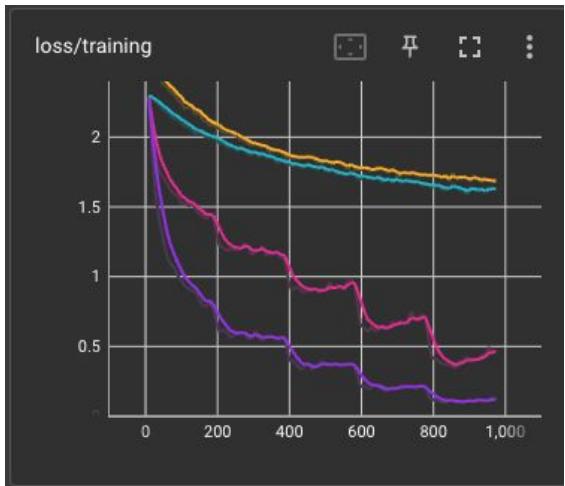
- Main training loop

```
for epoch in range(num_epochs):
    for data in train_loader:
        inputs = data['img'].to(device)
        labels = data['label'].to(device)
        # Reset the gradients.
        optimizer.zero_grad()
        # Forward pass.
        outputs = model(inputs)
        # Calculate loss.
        loss = criterion(outputs, labels)
        # Propagate gradients back.
        loss.backward()
        # Update the model weights.
        optimizer.step()
        # Evaluate the model on the validation set.
```

Main lessons 2

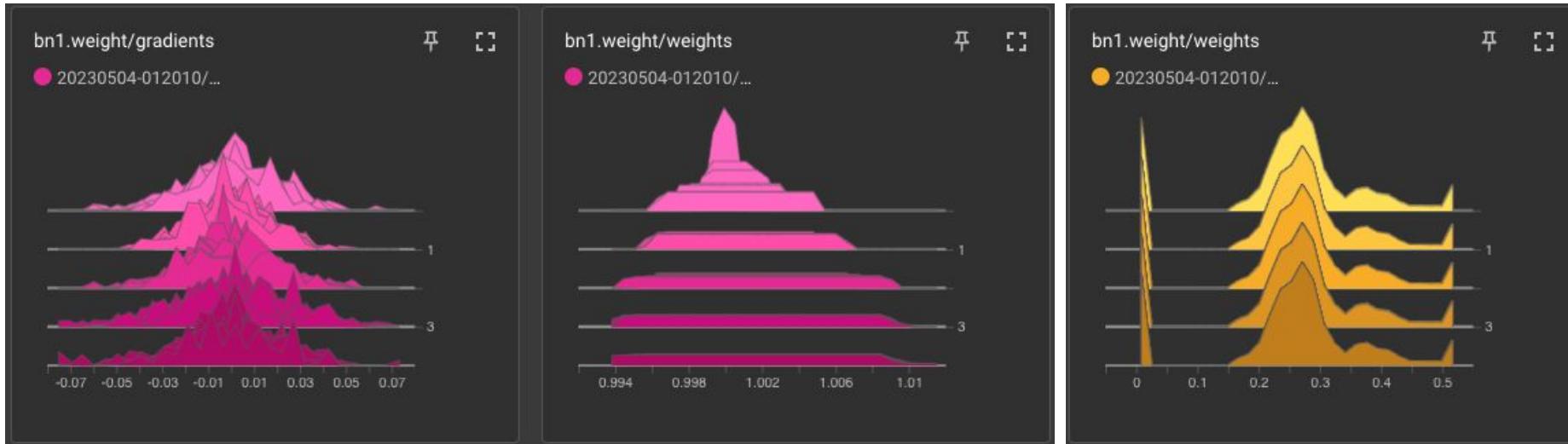
- Training vs Fine-tuning
 - Training (from scratch): 3 FC
 - Training (from scratch): ResNet-18
 - Fine-tuning: Pre-trained **Frozen** ResNet-18 encoder
 - Fine-tuning: Pre-trained ResNet-18 encoder

Run	Smoothed Value	Step	Time	Relative
20230504-012010/ff_model/01:46:36	0.4318	0.4375	973	5/3/23, 7:20 PM 33.75 min
20230504-012010/pretrained_resnet18_model/03:11:50	0.4161	0.4137	973	5/3/23, 8:46 PM 34.7 min
20230504-012010/pretrained_resnet18_model/03:49:12	0.9622	0.9605	973	5/3/23, 9:25 PM 35.62 min
20230504-012010/resnet18_model/02:30:38	0.8433	0.8395	973	5/3/23, 8:06 PM 35.65 min



Main lessons 3

- Model weights (& gradients)
 - Trainable vs frozen weights
 - If gradients & weights are not changing => clear error in model!



Fact checking



[GitHub](#) | [Colab](#)

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- +/- • How to evaluate and visualize the performance of trained models using accuracy, loss, ~~confusion matrix~~, and TensorBoard
- +/- • How to use TensorBoard to visualize ~~model architecture~~, weights, gradients, and histograms
- ✓ • How to fine-tune a pretrained ResNet-18 model on CIFAR-10 and compare its performance with that of the scratch-trained model
- ✓ • How to calculate the number of parameters and floating-point operations in a PyTorch model using the `torchsummary` library
- ✓ • How to use Colab to train deep learning models on a GPU for free
- ✗ • Tips and tricks for optimizing PyTorch model training and debugging, such as reducing batch size, checking input and output shapes, using device and dtype correctly, and setting random seeds.



Tutorial II: AG_NEWS Text Classification

Tutorial II: AG_NEWS Text Classification



[GitHub](#) | [Colab](#)

T

can you please summarize (in the form of bulletpoints) what people will learn from this tutorial



In this tutorial, participants will learn how to:

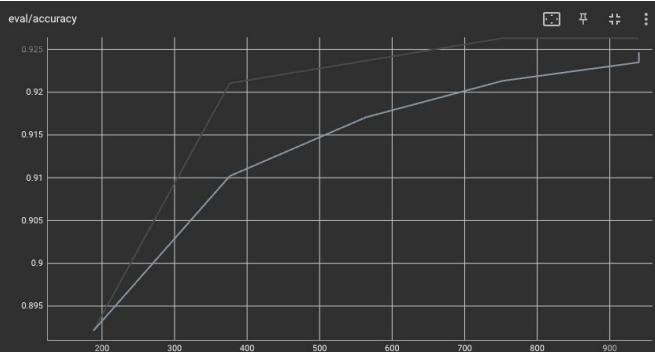
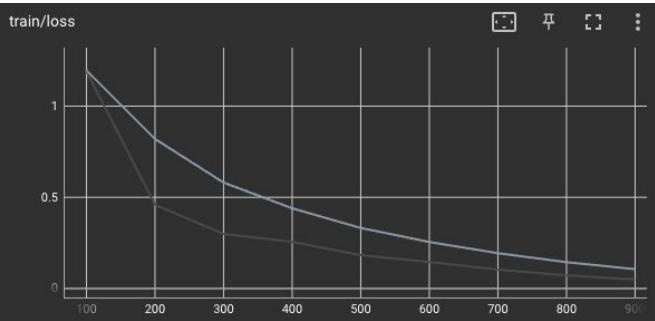
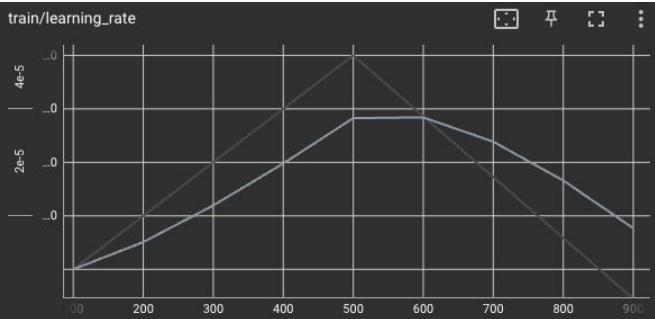
- Load and preprocess a text classification dataset (AG_NEWS) using HuggingFace Datasets.
- Set up and configure a BERT-based model and tokenizer for text classification using HuggingFace Transformers.
- Fine-tune a pretrained BERT model for the specific text classification task.
- Train and validate the model using HuggingFace's Trainer and TrainingArguments.
- Monitor the training and validation accuracy to detect overfitting.
- Use TensorBoard to visualize training progress in a Google Colab environment.
- Apply strategies to mitigate overfitting, if necessary.

Text Classification with AG_NEWS

- AG_NEWS: a large-scale text classification
 - 120,000 training and 7,600 test examples
- News articles split into 4 distinct categories:
 - **World (0)**: international events, politics, and global affairs.
 - **Sports (1)**: various sports events, players, teams, and leagues.
 - **Business (2)**: the economy, finance, stock markets, and business-related events.
 - **Science/Tech (3)**: scientific discoveries, technological advancements, and their applications.
- Examples:
 - "Wall St. Bears Claw Back Into the Black (Reuters) Reuters - Short-sellers, Wall Street's dwindling\\band of ultra-cynics, are seeing green again." => **Business (2)**
 - 'Linux worm targets Sun MySQL systems (CNET) CNET News.com - A new worm spreading over the Internet targets computers running the MySQL open-source database software, anti-virus company Symantec has warned.' => **Science/Tech (3)**

Main lessons 1

- Data processing
 - Tokenization
- Pre-trained BERT-based model
 - Pre-trained Transformer encoder with a new classification layer
- Optimization techniques for Transformers
 - HF Trainer!
 - Impact of a LR scheduler



Fact checking



[GitHub](#) | [Colab](#)

T

can you please summarize (in the form of bulletpoints) what people will learn from this tutorial



In this tutorial, participants will learn how to:

- ✓ • Load and preprocess a text classification dataset (AG_NEWS) using HuggingFace Datasets.
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- ✓ • Monitor the training and validation accuracy to detect overfitting.
- ✓ • Use TensorBoard to visualize training progress in a Google Colab environment.
- ✗ • Apply strategies to mitigate overfitting, if necessary.



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Closing remarks

Closing remarks 1

T

I am hosting a workshop on AI that consists of three elements:

- a talk on Evolution of AI, in which I will start from the news on explosion of generative AI and briefly explain the history of neural networks for CV and NLP that led to that explosion
- a tutorial on image classification based on CIFAR-10
- a tutorial on text classification based on AG-NEWS

Please write a few nice closing remarks, saying thank you for all the participants, express hope that people got more interested in AI and will continue learning on their own. Finally, please express gratitude to E&N for hosting us in this beautiful venue (House of Web3 rocks!) and to Trisha and George for their involvement and hard work with organization of this event.

Closing remarks 2



Ladies and Gentlemen,

As we wrap up today's workshop, I want to extend my sincerest thanks to all of you for your participation and engagement. It's been a privilege to walk through the fascinating journey of AI with you, from the explosion of generative AI to the intricate details of neural networks for Computer Vision and Natural Language Processing. We delved into the past, observed the present, ~~and speculated on the future~~, all while sharing our collective curiosity and passion for this incredible field.

Through our tutorials on image classification using CIFAR-10 and text classification with AG-NEWS, I hope we were able to ignite a spark of interest and give you hands-on insights into the potential of AI. I encourage you to continue exploring and experimenting with these tools, as each step you take further deepens your understanding and ability to innovate in this space.

Closing remarks 3

I want to express my deepest gratitude to E&N for providing us with the beautiful venue of House of Web3. Your generosity greatly enhanced our experience and facilitated a successful and memorable event.

Lastly, I'd like to acknowledge the tireless efforts of Trisha and George. Without your unwavering commitment and hard work, this event would not have been possible. Your dedication to fostering learning and discussion within the AI community is truly inspiring.

As we part ways, I hope you carry forward the knowledge and enthusiasm gained from this workshop, and use it as a springboard for your own exploration in AI. Remember, every great journey begins with a single step. Let's continue to learn, innovate, and shape the future of artificial intelligence together.

Thank you all once again. Safe travels home, and I hope to see you at future events!

Closing remarks 4

T

Thanks, ChatGPT. It was a pleasure co-creating with you! Take care!



Thank you! I'm glad I could assist. It was a pleasure co-creating with you as well. Feel free to return anytime you need help or have more questions. Take care!

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- **AI Researchers** (RL, DL)
- **Cryptographers** (SNARKs, ZKP, FHE)
- **Developers** (general | web3, Rust, Solidity)
- **DevOps Engs** (infrastructure, CI, real-time services, AWS)
- **Data Scientists** (general | arbitrage strategy and capture)
- **BizDev Officers**(general | web3)

contact@semiotic.ai