

Big Data Analysis

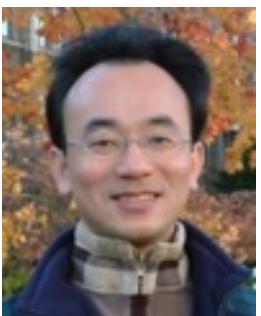
Introduction to Big Data Analysis

1112BDA01

MBA, IM, NTPU (M6031) (Spring 2023)
Tue 2, 3, 4 (9:10-12:00) (B8F40)



[https://meet.google.com/
paj-zhji-mya](https://meet.google.com/paj-zhji-mya)



Min-Yuh Day, Ph.D,
Associate Professor

Institute of Information Management, National Taipei University

<https://web.ntpu.edu.tw/~myday>





Min-Yuh Day, Ph.D.



Accredited
Educator



aws certified
Solutions
Architect
Associate



aws certified
Cloud
Practitioner

Associate Professor, Information Management, NTPU

Visiting Scholar, IIS, Academia Sinica

Ph.D., Information Management, NTU

Director, Intelligent Financial Innovation Technology, IFIT Lab, IM, NTPU

**Artificial Intelligence, Financial Technology, Big Data Analytics,
Data Mining and Text Mining, Electronic Commerce**

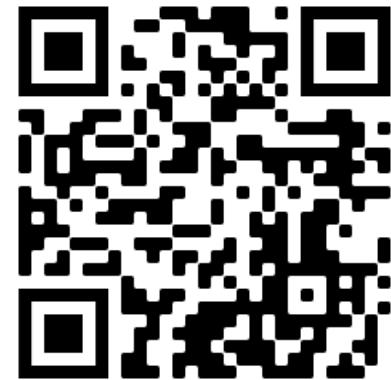


Course Syllabus

National Taipei University

Academic Year 111, 2nd Semester (Spring 2023)

- Course Title: **Big Data Analysis**
- Instructor: Min-Yuh Day
- Course Class: MBA, IM, NTPU (3 Credits, Elective)
- Details
 - In-Class and Distance Learning EMI Course (3 Credits, Elective, One Semester) (M6031)
- Time & Place: Tue, 2, 3, 4, (9:10-12:00) (B8F40)
- Google Meet: <https://meet.google.com/paj-zhhj-mya>



<https://meet.google.com/paj-zhhj-mya>



Course Objectives

1. Understand the **fundamental concepts and research issues** of **Big Data Analysis**.
2. Equip with **Hands-on practices** of **Big Data Analysis**.
3. Conduct **information systems research** in the context of **Big Data Analysis**.

Course Outline

- This course introduces the **fundamental concepts, research issues, and hands-on practices of Big Data Analysis.**
- Topics include:
 1. Introduction to Big Data Analysis
 2. AI, Data Science and Big Data Analysis
 3. Foundations of Big Data Analysis in Python
 4. Machine Learning: SAS Viya, Data Preparation and Algorithm Selection
 5. Machine Learning: Decision Trees and Ensembles of Trees
 6. Machine Learning: Neural Networks (NN) and Support Vector Machines (SVM)
 7. Machine Learning: Model Assessment and Deployment
 8. ChatGPT and Large Language Models (LLM) for Big Data Analysis
 9. Deep Learning for Finance Big Data Analysis
 10. Case Study on Big Data Analysis

Core Competence

- Exploring new knowledge in information technology, system development and application 80 %
- Internet marketing planning ability 10 %
- Thesis writing and independent research skills 10 %

Four Fundamental Qualities

- Professionalism
 - Creative thinking and Problem-solving 40 %
 - Comprehensive Integration 40 %
- Interpersonal Relationship
 - Communication and Coordination 10 %
 - Teamwork 5 %
- Ethics
 - Honesty and Integrity 0 %
 - Self-Esteem and Self-reflection 0 %
- International Vision
 - Caring for Diversity 0 %
 - Interdisciplinary Vision 5 %

College Learning Goals

- Ethics/Corporate Social Responsibility
- Global Knowledge/Awareness
- Communication
- Analytical and Critical Thinking

Department Learning Goals

- **Information Technologies and System Development Capabilities**
- Internet Marketing Management Capabilities
- Research capabilities

Syllabus

Week Date Subject/Topics

1 2023/02/21 Introduction to Big Data Analysis

2 2023/02/28 (Day Off)

3 2023/03/07 AI, Data Science and Big Data Analysis

4 2023/03/14 Foundations of Big Data Analysis in Python

5 2023/03/21 Case Study on Big Data Analysis I

6 2023/03/28 Machine Learning: SAS Viya, Data Preparation and Algorithm Selection

Syllabus

Week Date Subject/Topics

7 2023/04/04 (Children's Day) (Day off)

8 2023/04/11 Midterm Project Report

9 2023/04/18 Machine Learning: Decision Trees and Ensembles of Trees

10 2023/04/25 Machine Learning: Neural Networks (NN) and
Support Vector Machines (SVM)

11 2023/05/02 Case Study on Big Data Analysis II

12 2023/05/09 Machine Learning: Model Assessment and Deployment

Syllabus

Week Date Subject/Topics

13 2023/05/16 ChatGPT and Large Language Models (LLM)
for Big Data Analysis

14 2023/05/23 Deep Learning for Finance Big Data Analysis

15 2023/05/30 Final Project Report I

16 2023/06/06 Final Project Report II

17 2023/06/13 Self-learning

18 2023/06/20 Self-learning

Teaching Methods and Activities

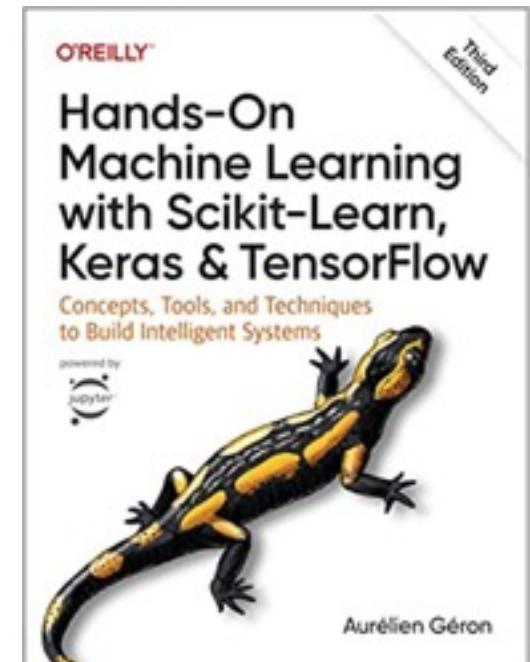
- Lecture
- Discussion
- Practicum

Evaluation Methods

- Individual Presentation 60 %
- Group Presentation 10 %
- Case Report 10 %
- Class Participation 10 %
- Assignment 10 %

Required Texts

- Aurélien Géron (2022),
**Hands-On Machine Learning with Scikit-Learn, Keras,
and TensorFlow: Concepts, Tools, and Techniques to
Build Intelligent Systems,
3rd Edition, O'Reilly Media.**



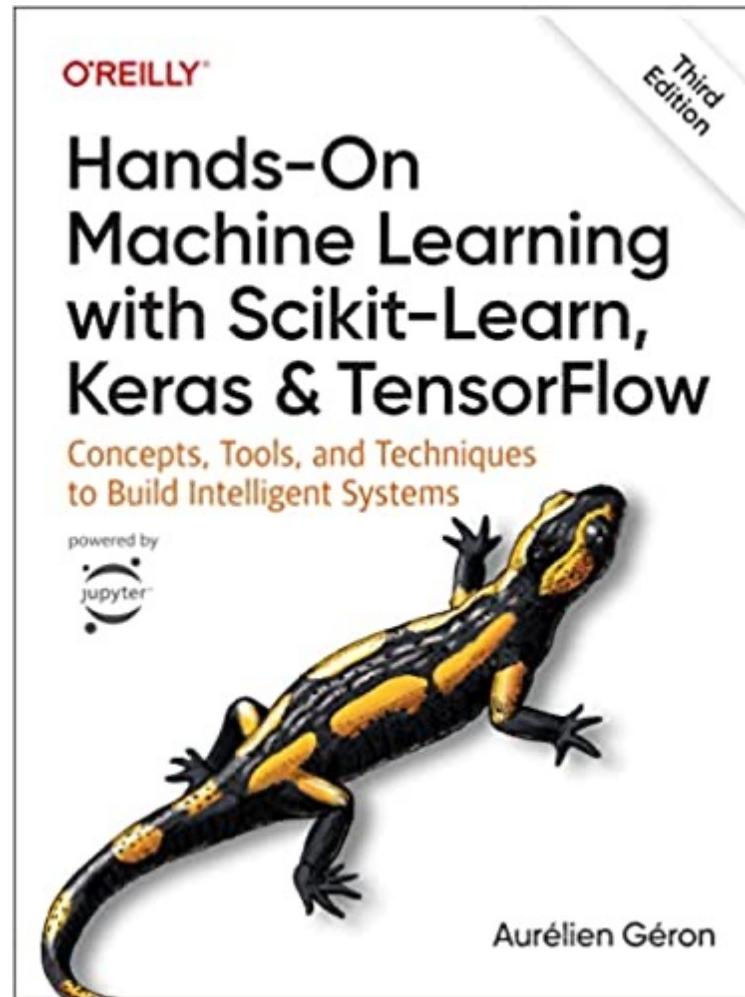
Reference Books

- Yves Hilpisch (2018),
Python for Finance: Mastering Data-Driven Finance, 2nd Edition, O'Reilly Media.
- Yuxing Yan (2017),
Python for Finance: Apply powerful finance models and quantitative analysis with Python, Second Edition, Packt Publishing

Other References

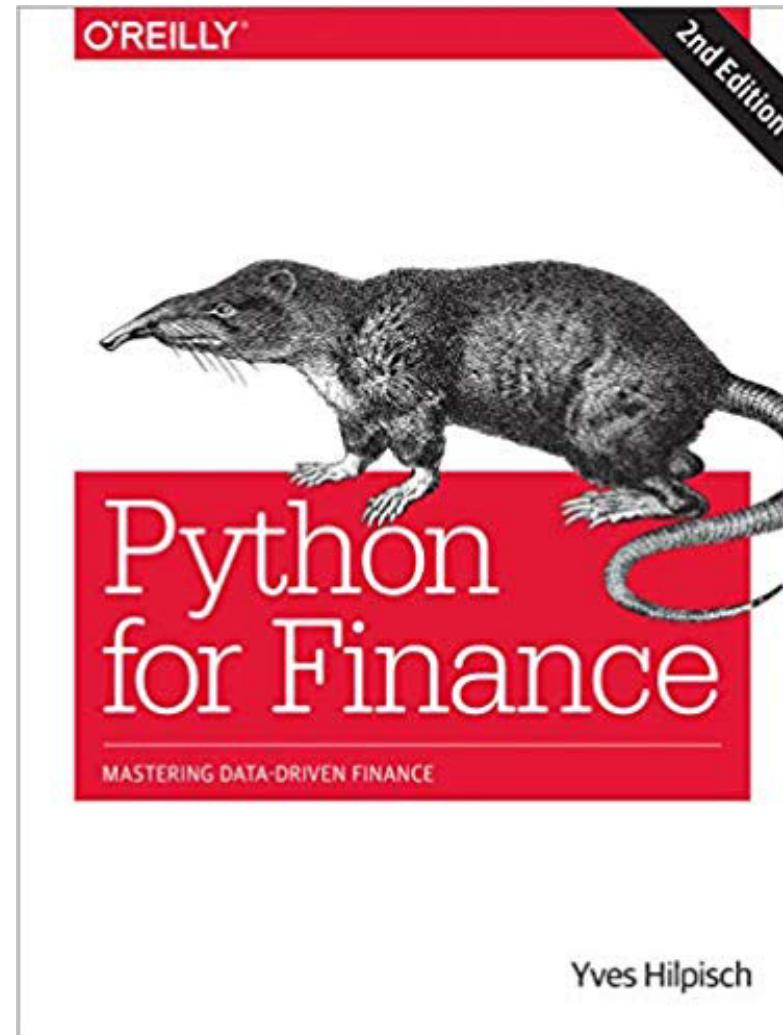
- SAS (2023), Machine Learning Using SAS Viya
- SAS (2023), 2023 SAS Machine Learning Academic Certification Program

Aurélien Géron (2022),
Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow:
Concepts, Tools, and Techniques to Build Intelligent Systems,
3rd Edition, O'Reilly Media.



Source: <https://www.amazon.com/Hands-Machine-Learning-Scikit-Learn-TensorFlow/dp/1098125975>

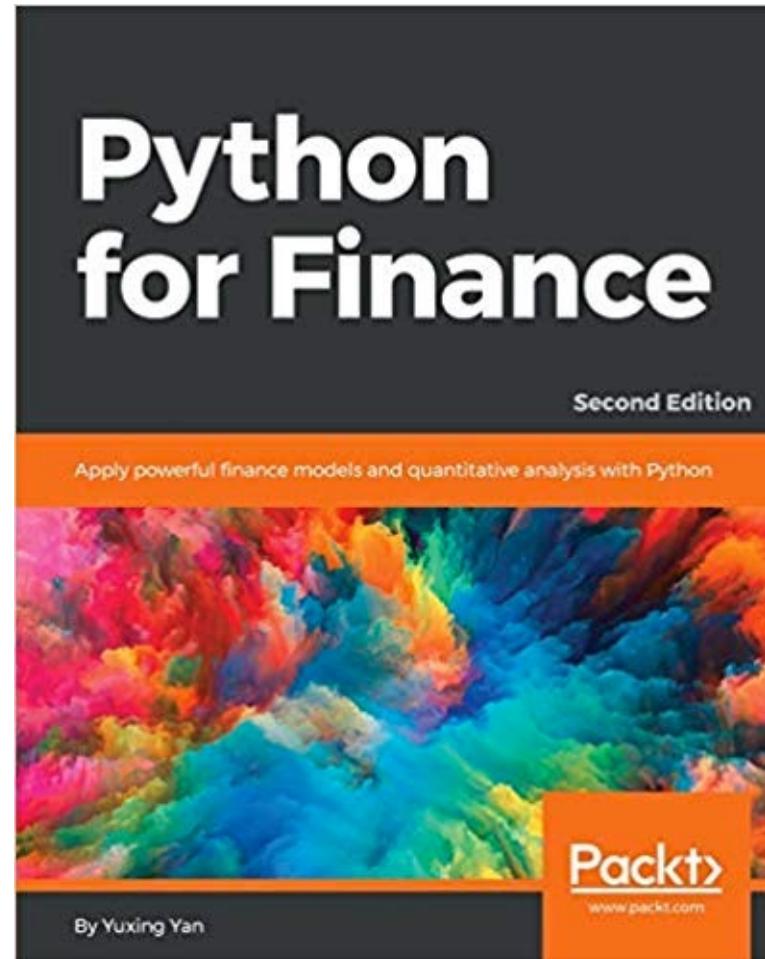
Yves Hilpisch (2018),
Python for Finance: Mastering Data-Driven Finance,
O'Reilly



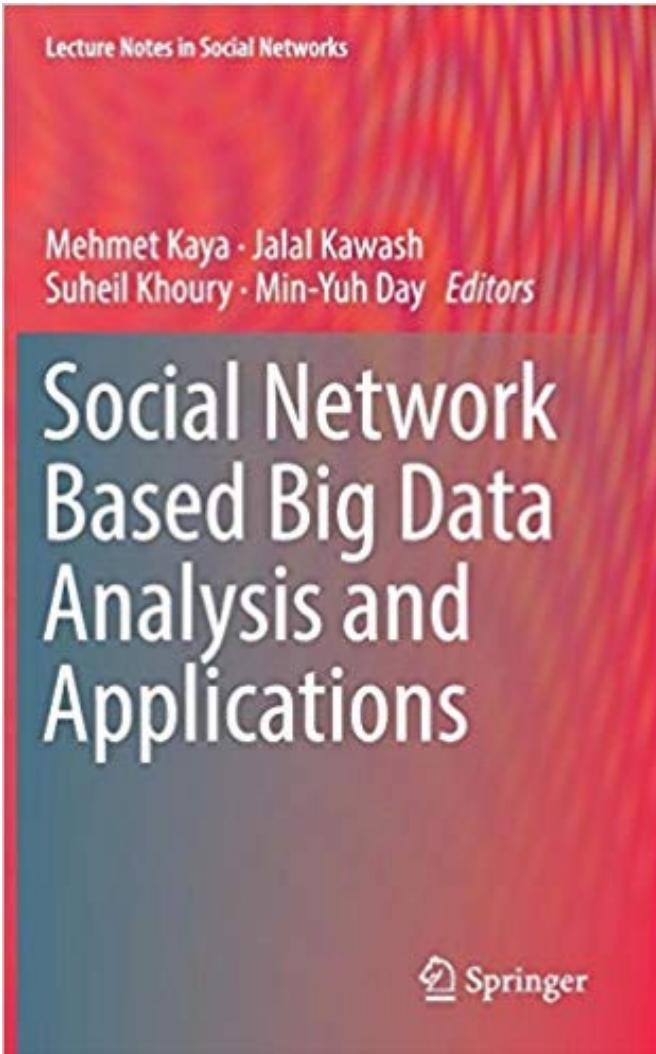
Yuxing Yan (2017),

**Python for Finance: Apply powerful finance models
and quantitative analysis with Python, Second Edition,**

Packt Publishing



**Social Network Based Big Data Analysis and Applications,
Lecture Notes in Social Networks,
Mehmet Kaya, Jalal Kawash, Suheil Khoury, Min-Yuh Day,
Springer International Publishing, 2018.**



Source: <https://www.amazon.com/Network-Analysis-Applications-Lecture-Networks/dp/3319781952>



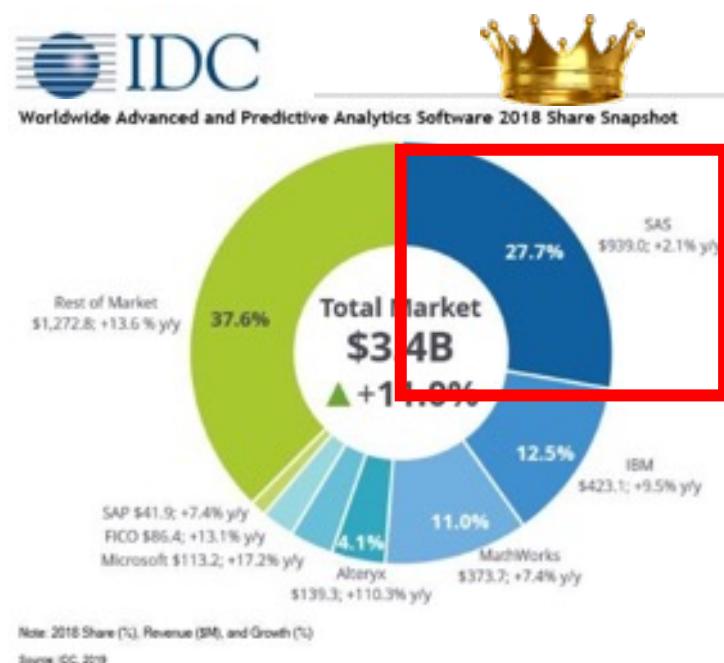
2023 SAS Machine Learning Academic Certification Program SAS Viya

SAS · Leader in Analytics and AI

About SAS

- SAS was founded in 1976
- SAS has customers in nearly 150 countries
- 96 of the Top 100 of the 2017 Fortune 500 list are SAS customers or their affiliates.
- 12,170 total employees
- SAS is investing \$1 billion in artificial intelligence (AI) through software innovation, education, expert services and more.

SAS ranks number one for market share, according to the IDC report



Gartner

- For the 16th consecutive year, Gartner has positioned SAS as a Leader in the Magic Quadrant for Data Quality Solutions.



2023 SAS Machine Learning Academic Certification Program

Why SAS Certification?

SAS IS AMONG THE **TOP 10 MOST IMPORTANT BIG DATA AND ANALYTICS CERTIFICATIONS IN 2021.** – CIO Magazine



Easier Job Searches

According to Pearson Vue's "Value of IT Certification" report, nearly **50%** of certification holders said it was easier to find new jobs, enter new career fields and land job interviews.



Higher Salaries

The SAS Certified Specialist: Base Programming certification often appears on Certification Magazine's Annual IT Salary survey, listing an average base salary of more than **\$92k.**



Specialized Skills

65% of certified individuals report the ability to apply their skills within four months of earning a certification, validating their expertise and ability to **excel** in a job.



Secure Futures

More than **219,000** jobs nationwide requested a SAS skill according to the leading labor market data company Lightcast - suggesting bright futures for those with SAS certifications.

2023 SAS Machine Learning Academic Certification Program

SAS AI Certification – Learning Path



2023 SAS Machine Learning Academic Certification Program

Teaching and Learning Resource



For Teacher

- Access to SAS Viya
- Dataset
- Tutorial
- Instructor Materials



For Student

- Access to SAS Viya
- Dataset
- Machine Learning Online Course (10h)
- Exam Preparation Online Training (6h)

The screenshot shows the SAS Viya for Learners landing page. At the top, it says "SAS® VIYA® FOR LEARNERS". Below that, the text "Teach and learn leading-edge data science skills." is displayed. There are two buttons at the bottom: "Access for educators" and "Access for students". A URL is provided at the bottom: https://www.sas.com/en_us/software/viya-for-learners.html.



2023 SAS Machine Learning Academic Certification Program

Teaching and Learning Resource



1. Online Courses

Lesson 1: Introduction to SAS Visual Data Mining and Machine Learning

Lesson 2: Machine Learning Algorithms

Lesson 3: Ensemble Machine Learning Algorithms

Lesson 4: Model Assessment and Implementation

Lesson 5: Factorization Machines

The screenshot shows the course navigation menu on the left and five lesson cards on the right:

- Lesson 1: Introduction to SAS® Visual Data Mining and Machine Learning
- Lesson 2: Data Preparation
- Lesson 3: Overview of Data Preprocessing
- Lesson 4: Exploring the Data
- Lesson 5: Data Preprocessing with Model Studio



2. Exam Preparation Training

Sample Questions

The following sample questions are not inclusive and do not necessarily represent all of the types of questions that comprise the exams. The questions are not designed to assess an individual's readiness to take a certification exam.

SAS Viya 3.5 Supervised Machine Learning Pipelines Exam

Question 1:

A project has been created and a pipeline has been defined.

Which project setting can you edit?

- A. Advisor Options for missing
- B. Rules for model comparison
- C. Partition Data percentages
- D. Event-based Sampling prior

Answer: B

Bonferroni adjustment

conservative way to adjust the raw p-values from multiple tests

Split criteria using the p-value (Chi-square, CHAID or F Test) can request a Bonferroni adjustment to the p-value for a variable after the split has been determined.

A Bonferroni adjustment can be applied to both CHAID and FTEST criteria.

VARIANCE uses the change in response variance to split each variable and then to determine the split.

Because each split point corresponds to a statistical test, Bonferroni corrections are automatically applied to the logworth calculations for an input. These corrections, also called Bonferroni adjustments, penalize inputs with many split points by reducing the logworth of a split by an amount equal to the log of the number of distinct input values. This is equivalent to the Bonferroni correction because subtracting this constant from logworth is equivalent to multiplying the corresponding chi-squared p-value by the number of split points. The adjustment enables a fairer comparison of inputs with many and few levels later in the split-search algorithm.

如何限制樹的成長 (可以同時設定 depth 和 leaf node 指可以)

針對不同目標類型透過修剪減少錯誤

-- 分類目標：評估指標是錯誤分類率 (Misclassification Rate)。

-- 當開目標：評估指標是平均平方誤差 (Average Squared Error - ASE)

如何得到一顆最大的樹 (Pruning 設定 largest)

The resulting partition of the input space is known as the maximal tree. Development of the maximal tree is based exclusively on statistical measures of split worth on the training data. It is likely that the maximal tree fails to generalize well on an independent set of validation data. The maximal tree is the starting place for how complexity of the model will be optimized. Optimizing the complexity of a tree is done through pruning, and this is covered in the next section.

2023 SAS Machine Learning Academic Certification Program

Content

-  10-hour Machine Learning Online Courses
-  6-hour Exam Preparation Online Training
-  Access to SAS Viya
-  Practice Exam
-  Certification Exam

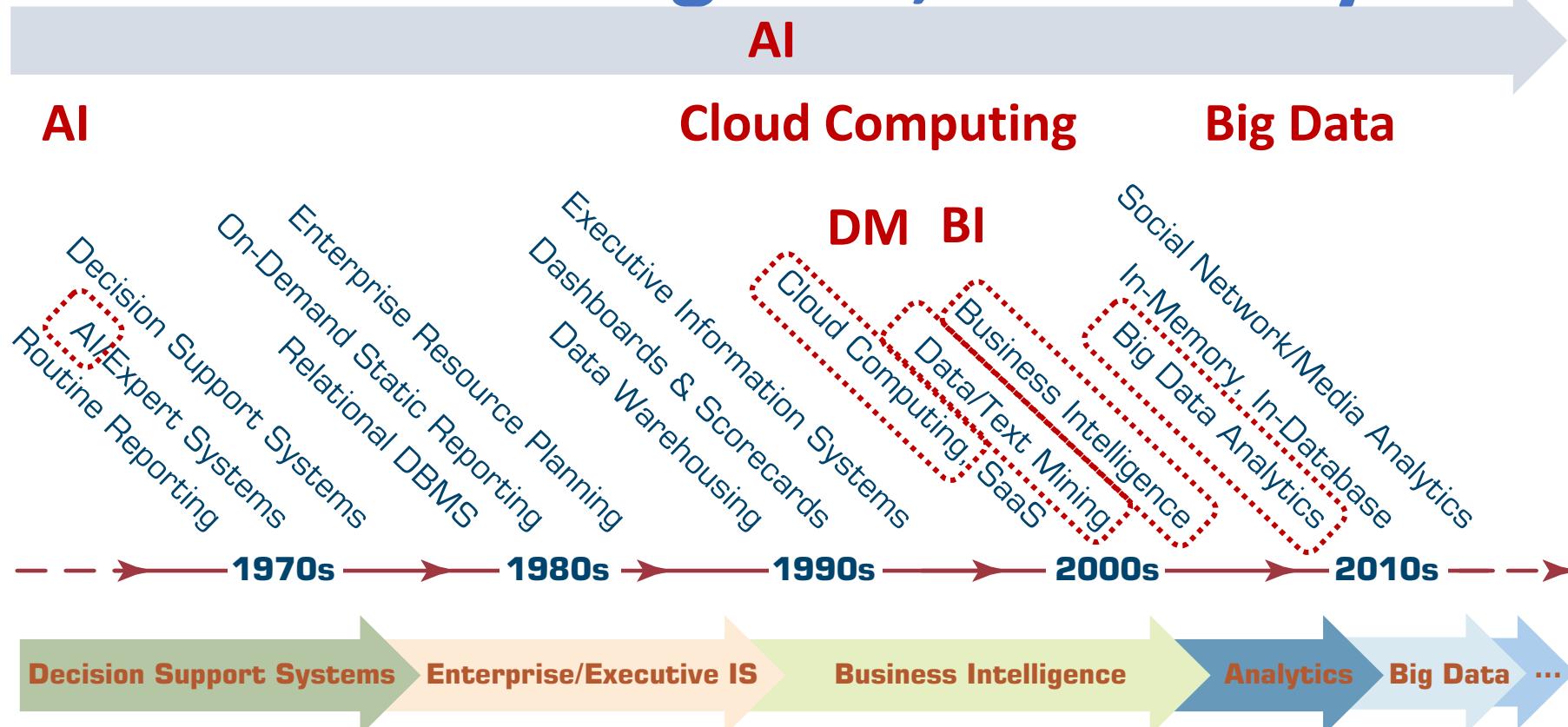


Academic Discount NT\$ 2,700

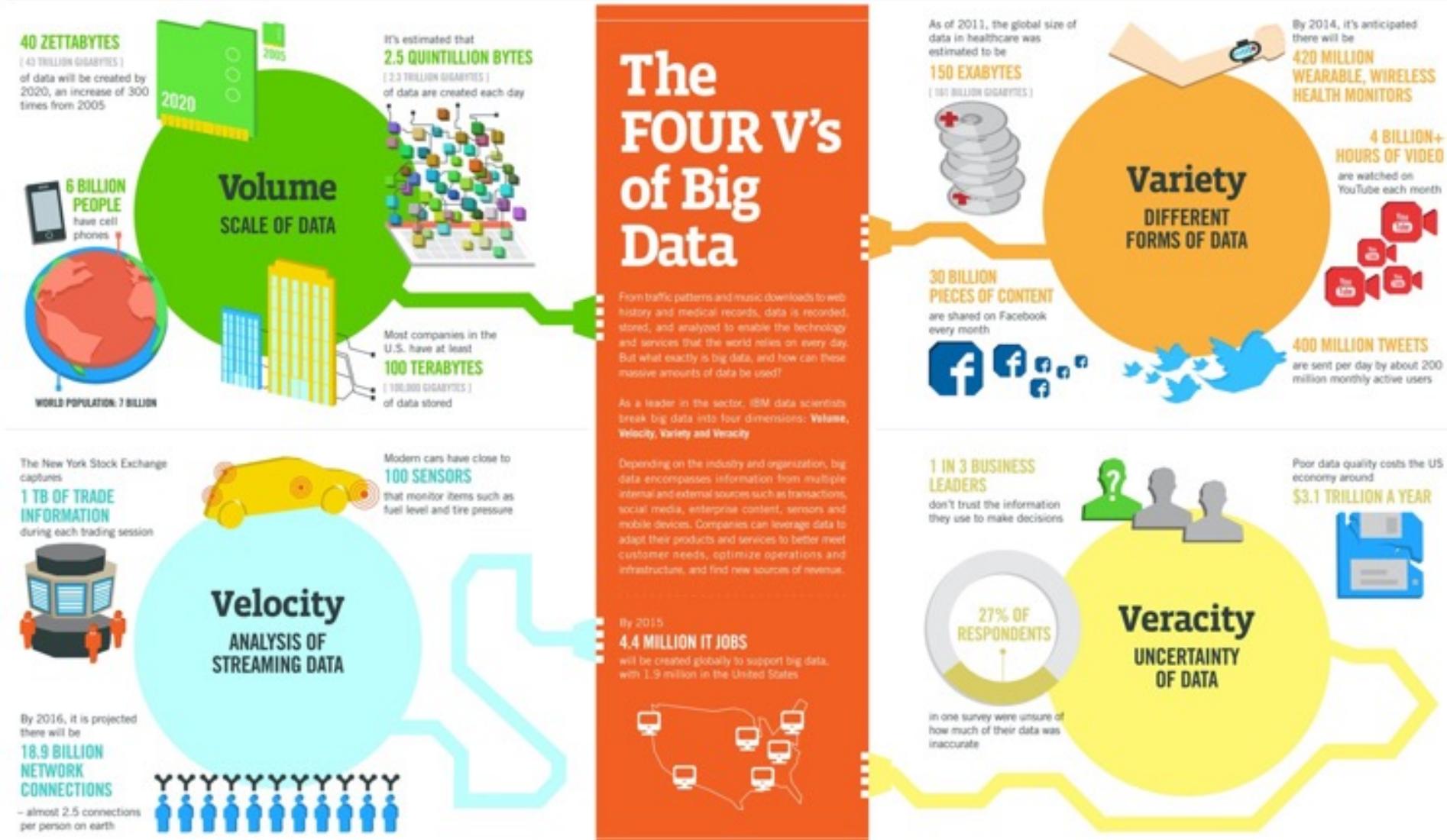
Big Data Analysis

AI, Big Data, Cloud Computing

Evolution of Decision Support, Business Intelligence, and Analytics



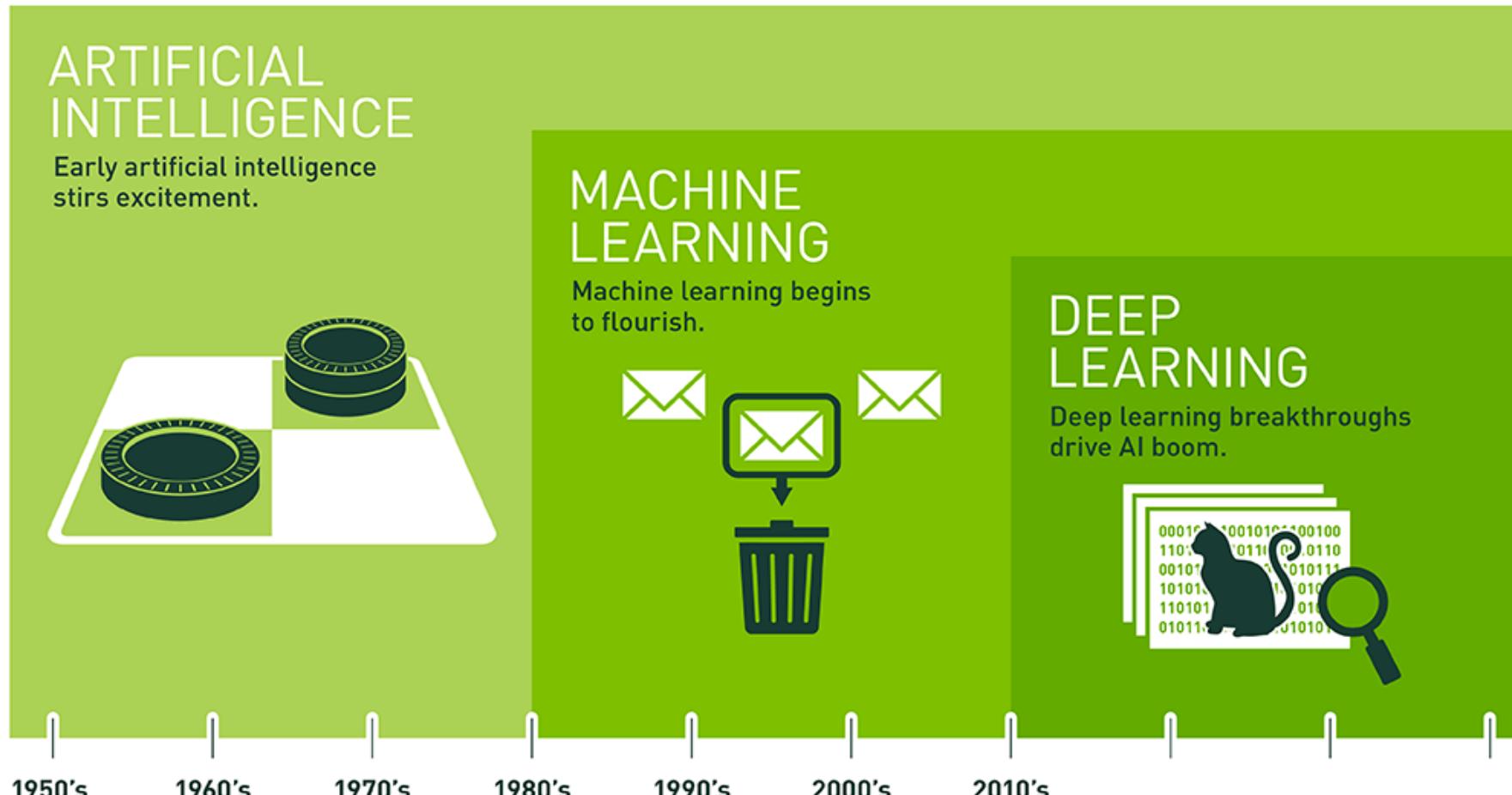
Big Data 4 V



Value

Artificial Intelligence

Machine Learning & Deep Learning



Since an early flush of optimism in the 1950s, smaller subsets of artificial intelligence – first machine learning, then deep learning, a subset of machine learning – have created ever larger disruptions.

AI, ML, DL

Artificial Intelligence (AI)

Machine Learning (ML)

Supervised
Learning

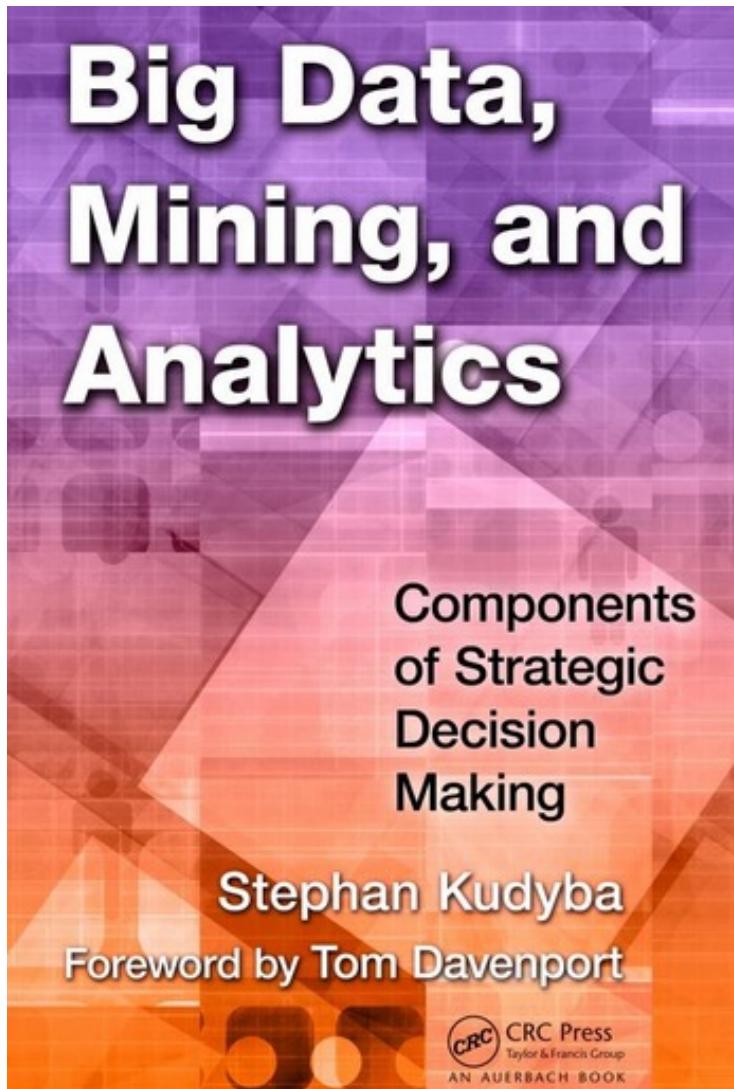
Unsupervised
Learning

Deep Learning (DL)
CNN
RNN LSTM GRU
GAN

Semi-supervised
Learning

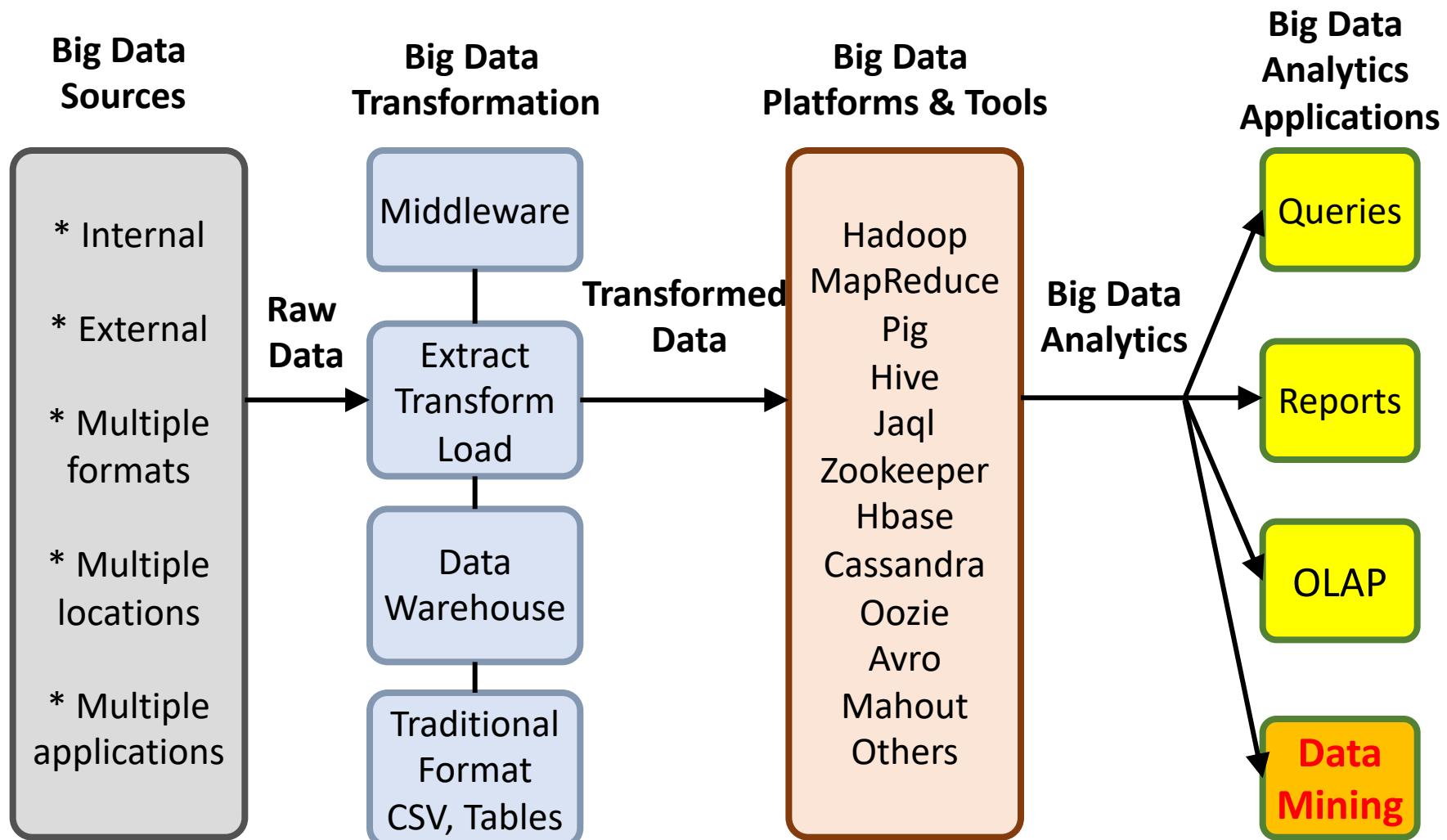
Reinforcement
Learning

Stephan Kudyba (2014),
Big Data, Mining, and Analytics:
Components of Strategic Decision Making, Auerbach Publications



Source: <http://www.amazon.com/gp/product/1466568704>

Architecture of Big Data Analytics

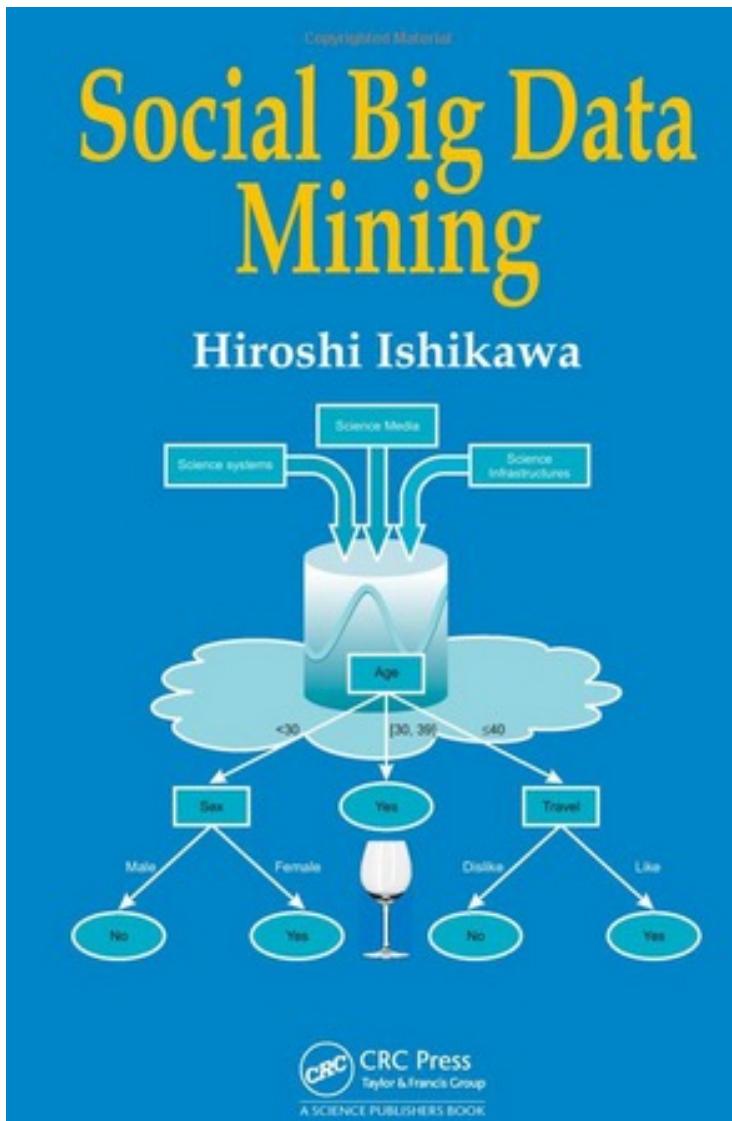


Architecture of Big Data Analytics



Social Big Data Mining

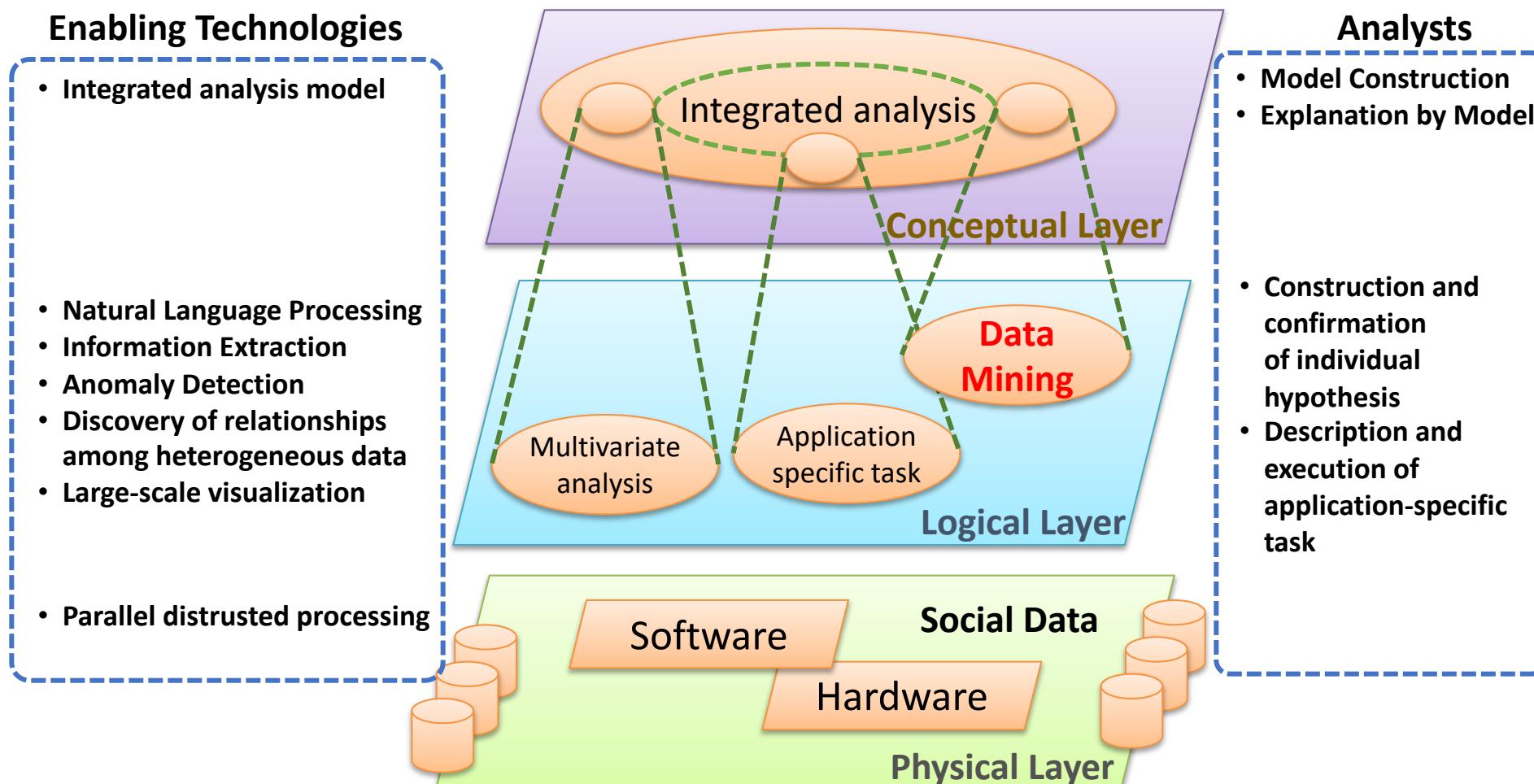
(Hiroshi Ishikawa, 2015)



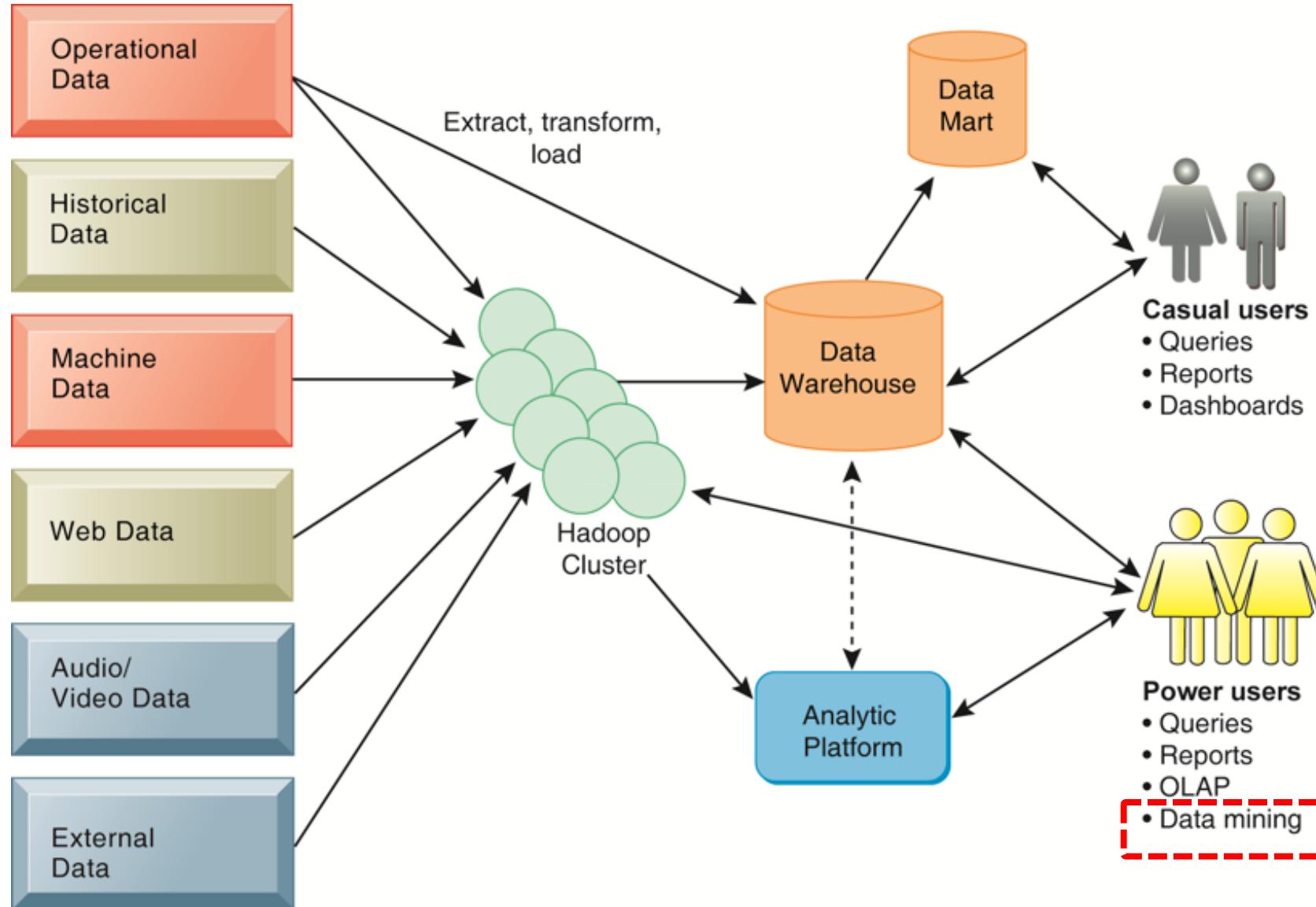
Source: <http://www.amazon.com/Social-Data-Mining-Hiroshi-Ishikawa/dp/149871093X>

Architecture for Social Big Data Mining

(Hiroshi Ishikawa, 2015)

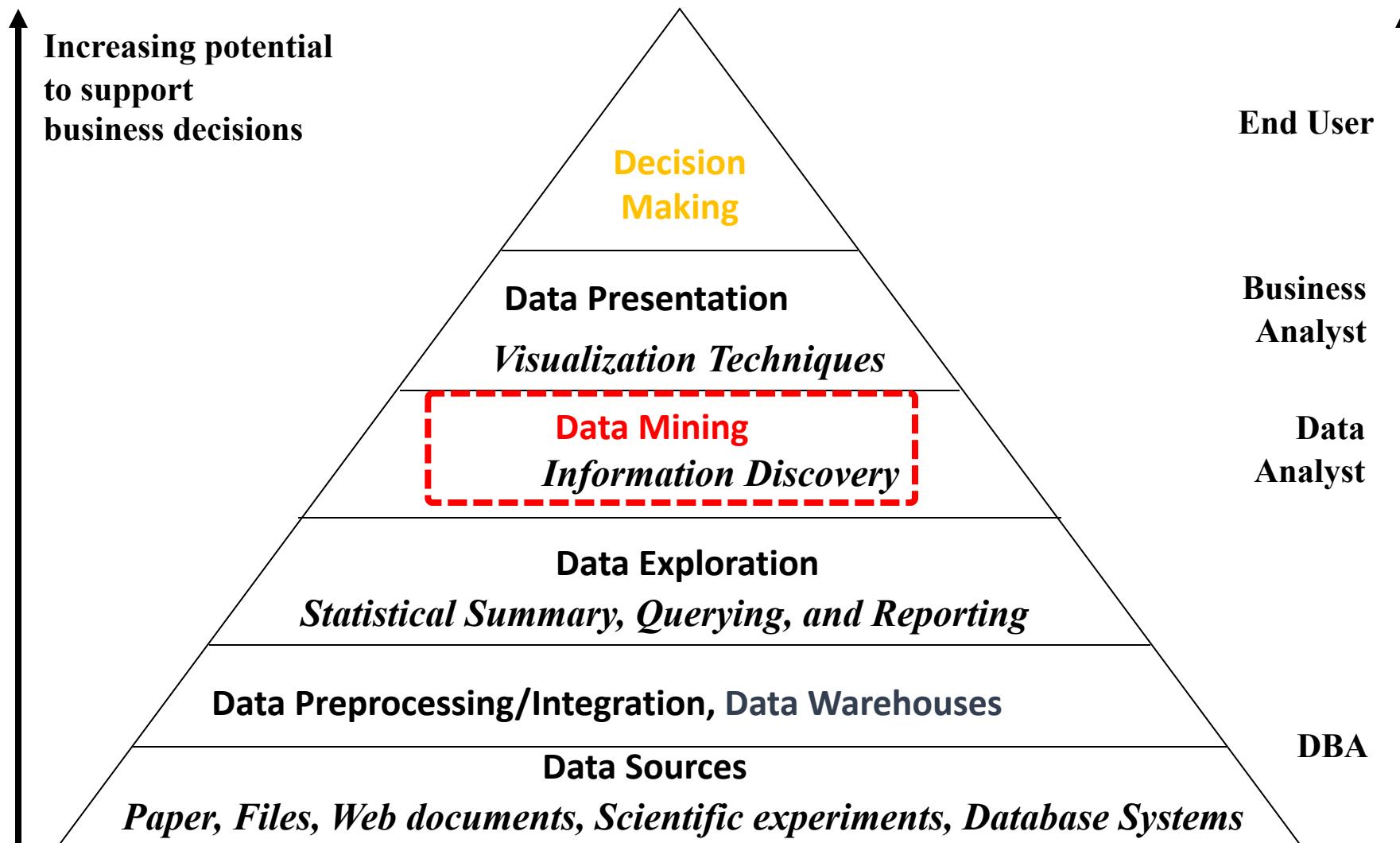


Business Intelligence (BI) Infrastructure



Data Warehouse

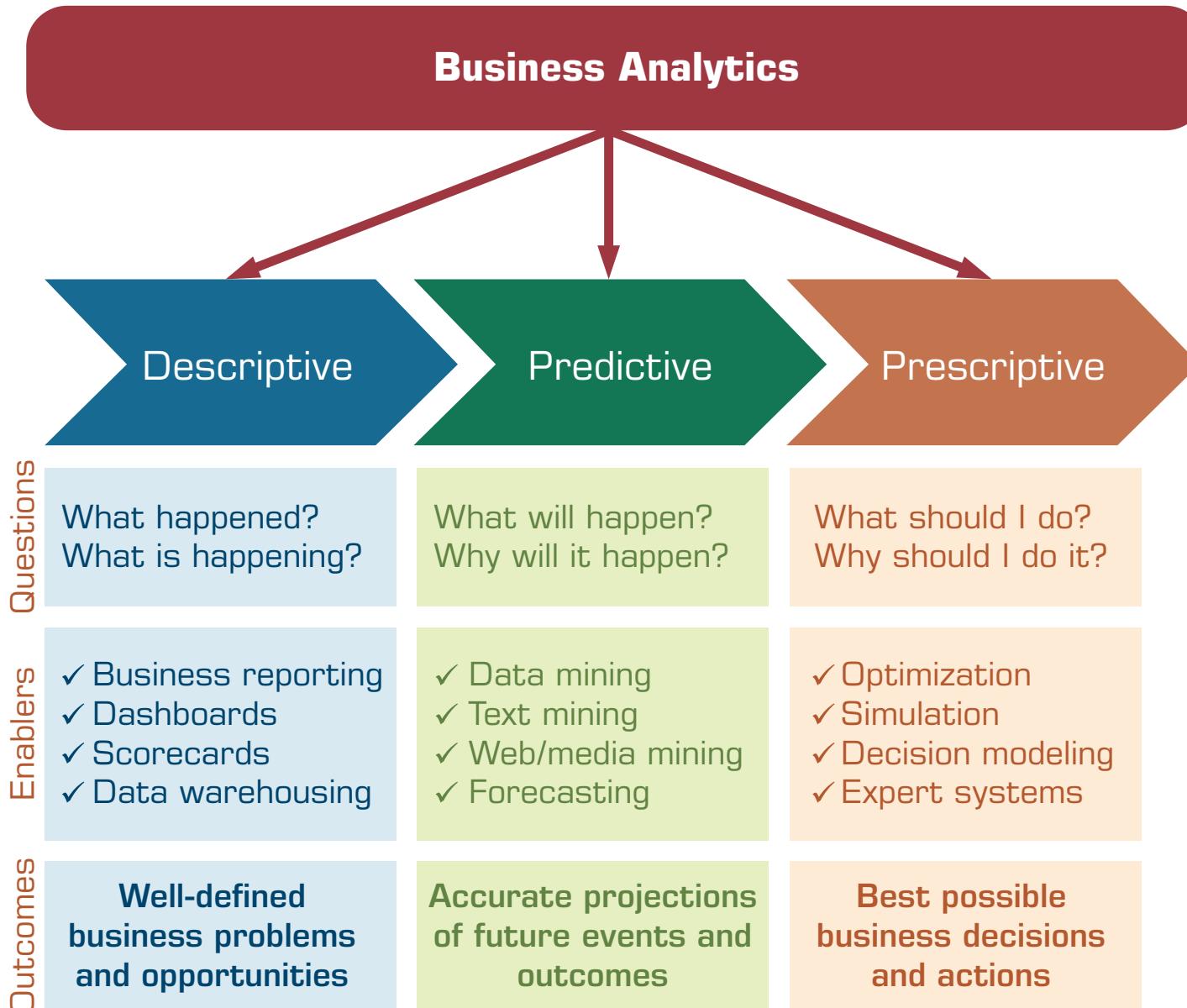
Data Mining and Business Intelligence



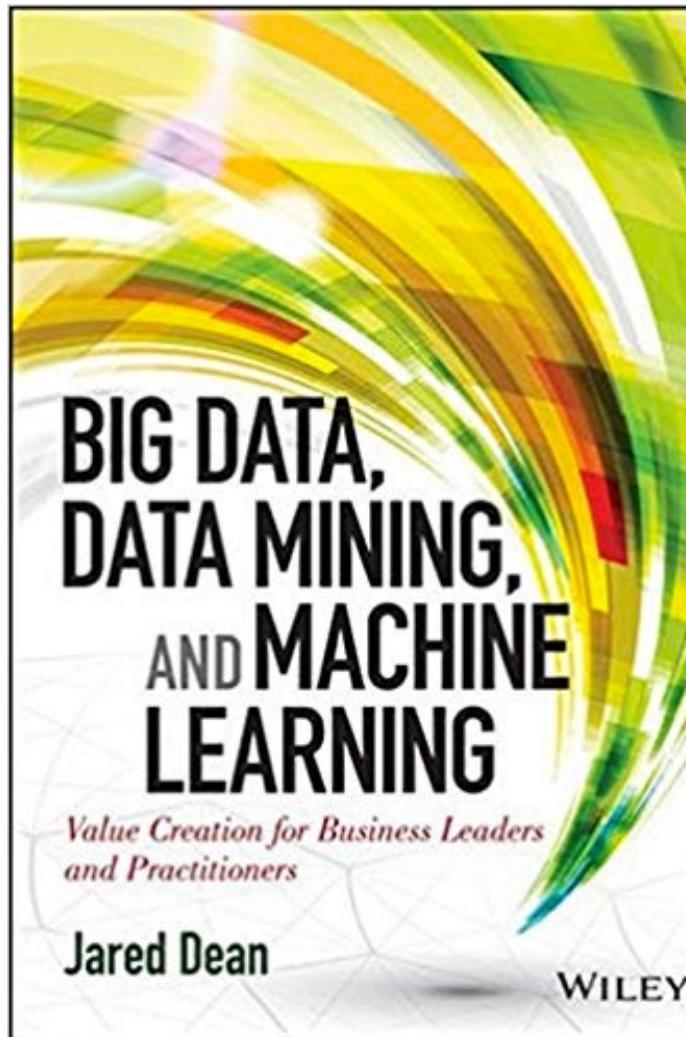
The Evolution of BI Capabilities



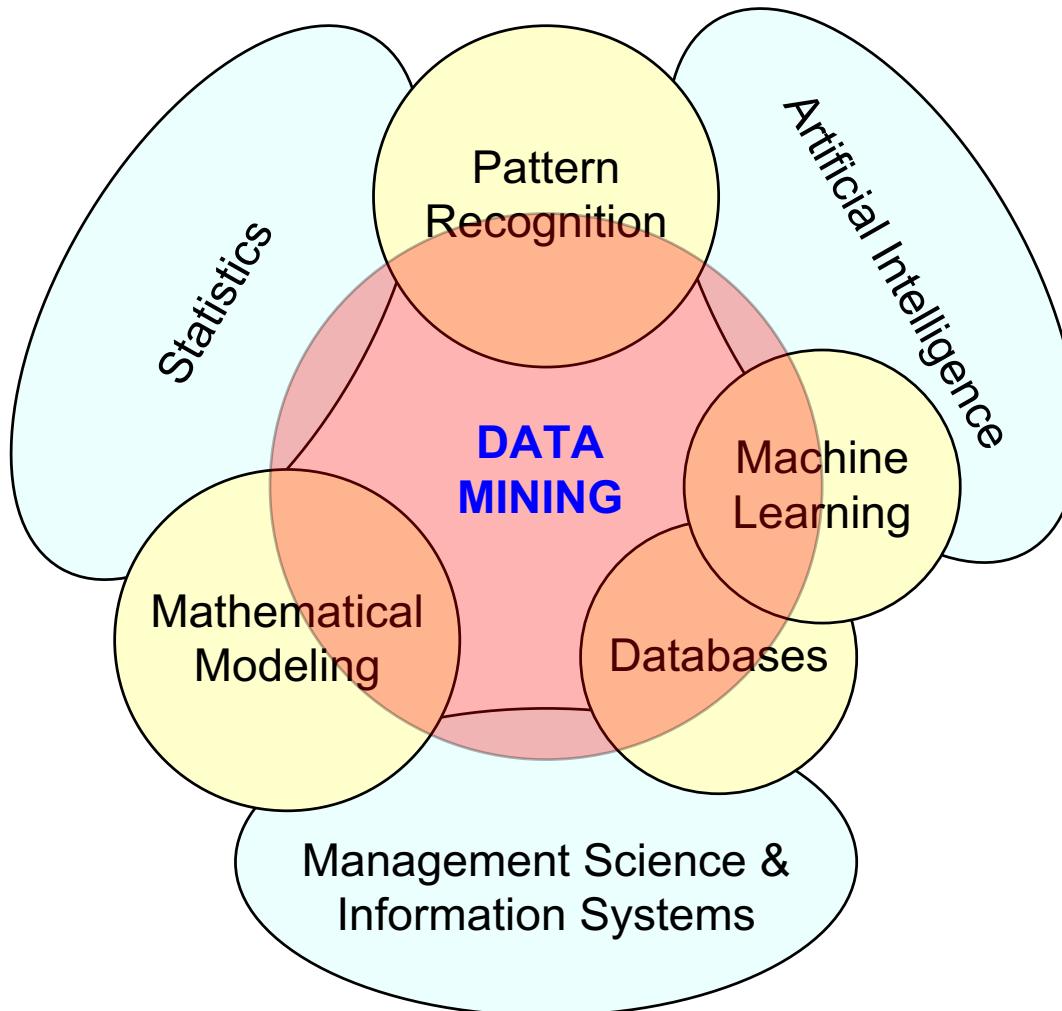
Three Types of Analytics

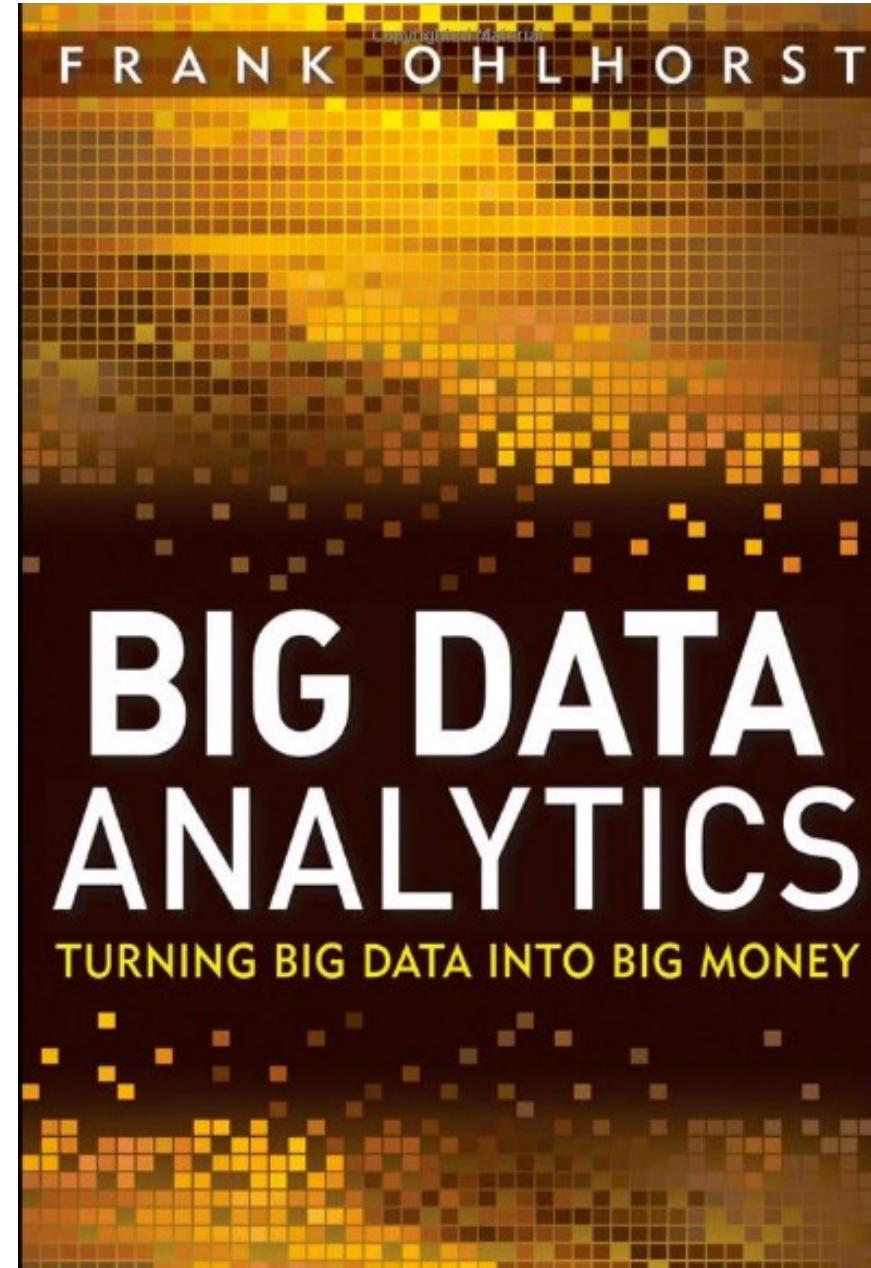


**Big Data, Data Mining, and Machine Learning: Value Creation for
Business Leaders and Practitioners,
Jared Dean,
Wiley, 2014.**



Data Mining at the Intersection of Many Disciplines

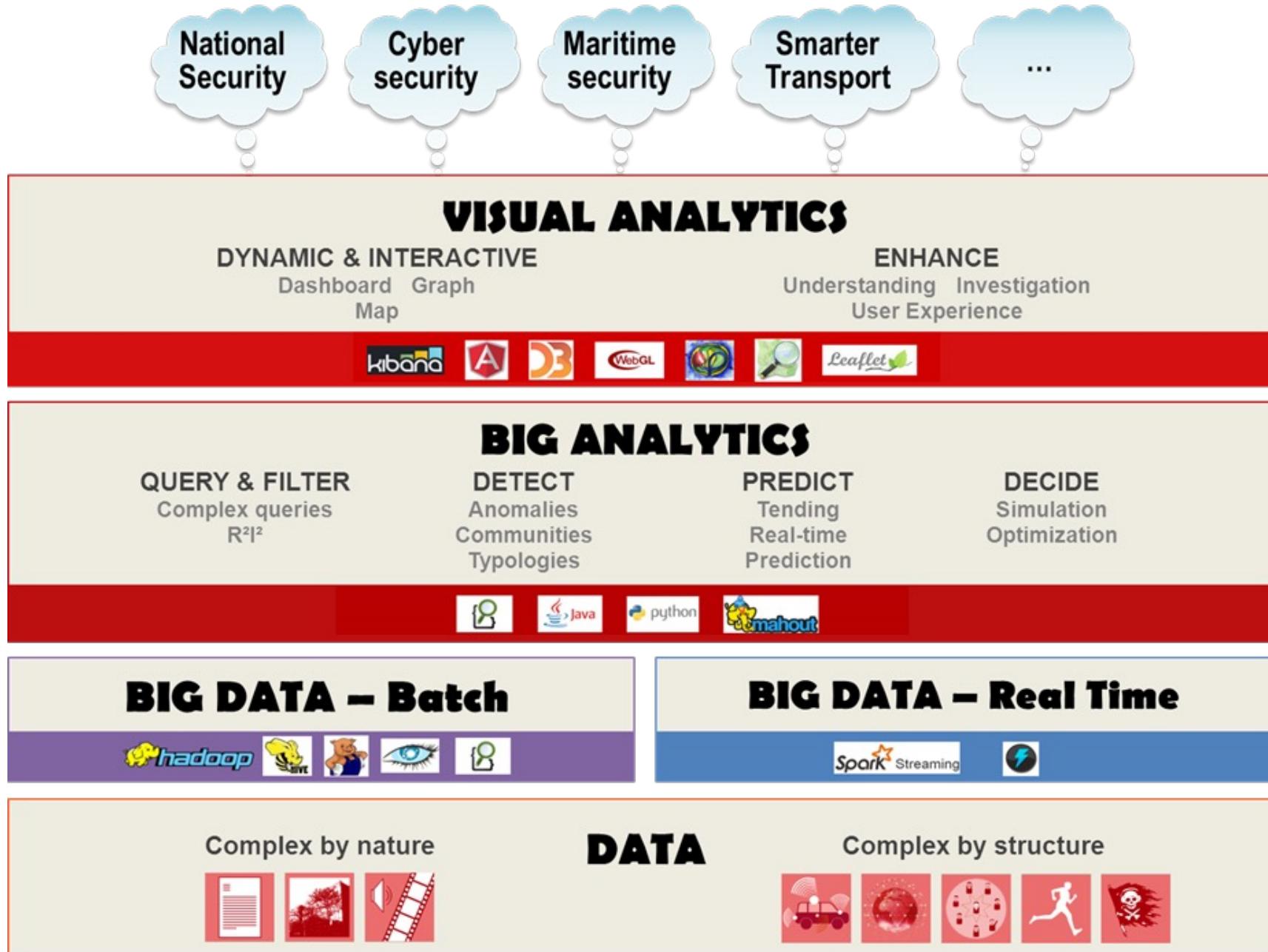




Source: <http://www.amazon.com/Big-Data-Analytics-Turning-Money/dp/1118147596>

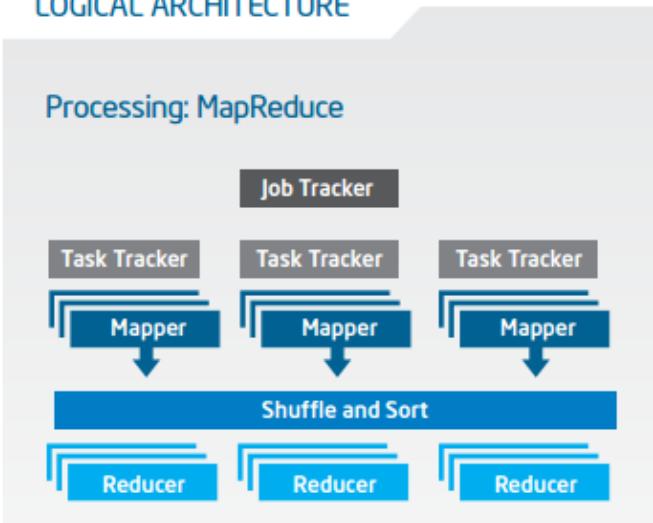


Source: <http://www.amazon.com/Big-Data-Revolution-Transform-Mayer-Schonberger/dp/B00D81X2YE>

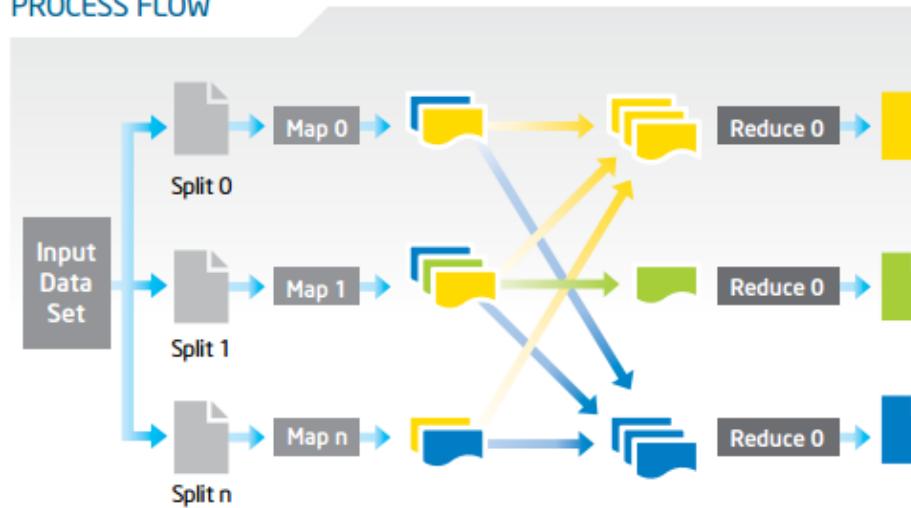


Big Data with Hadoop Architecture

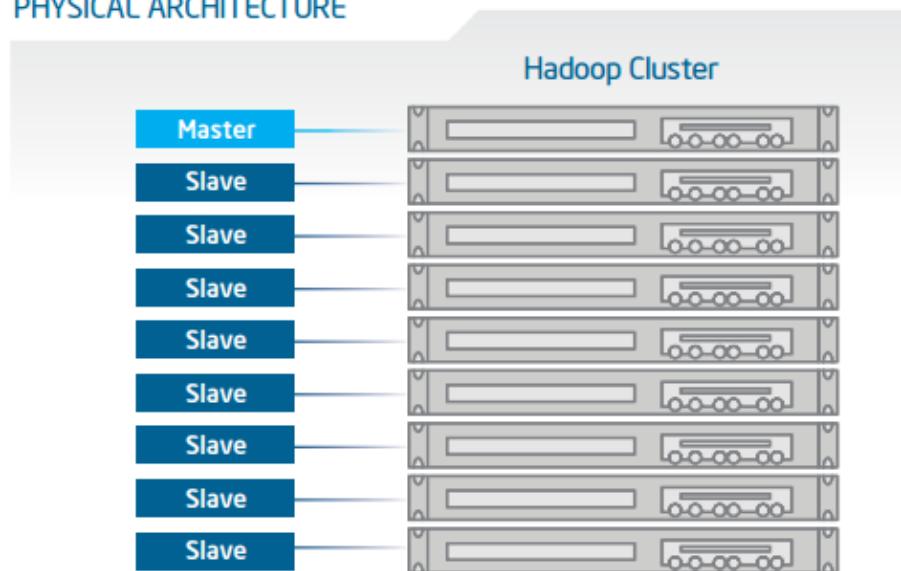
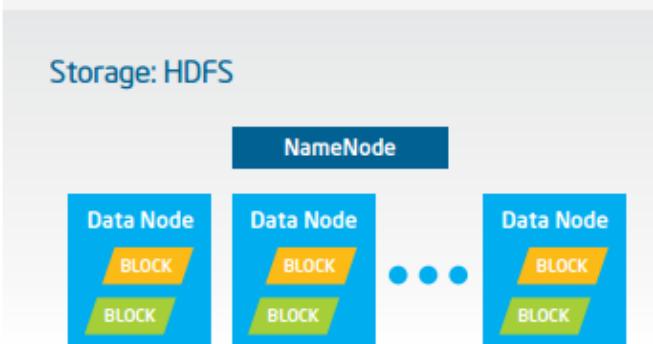
LOGICAL ARCHITECTURE



PROCESS FLOW



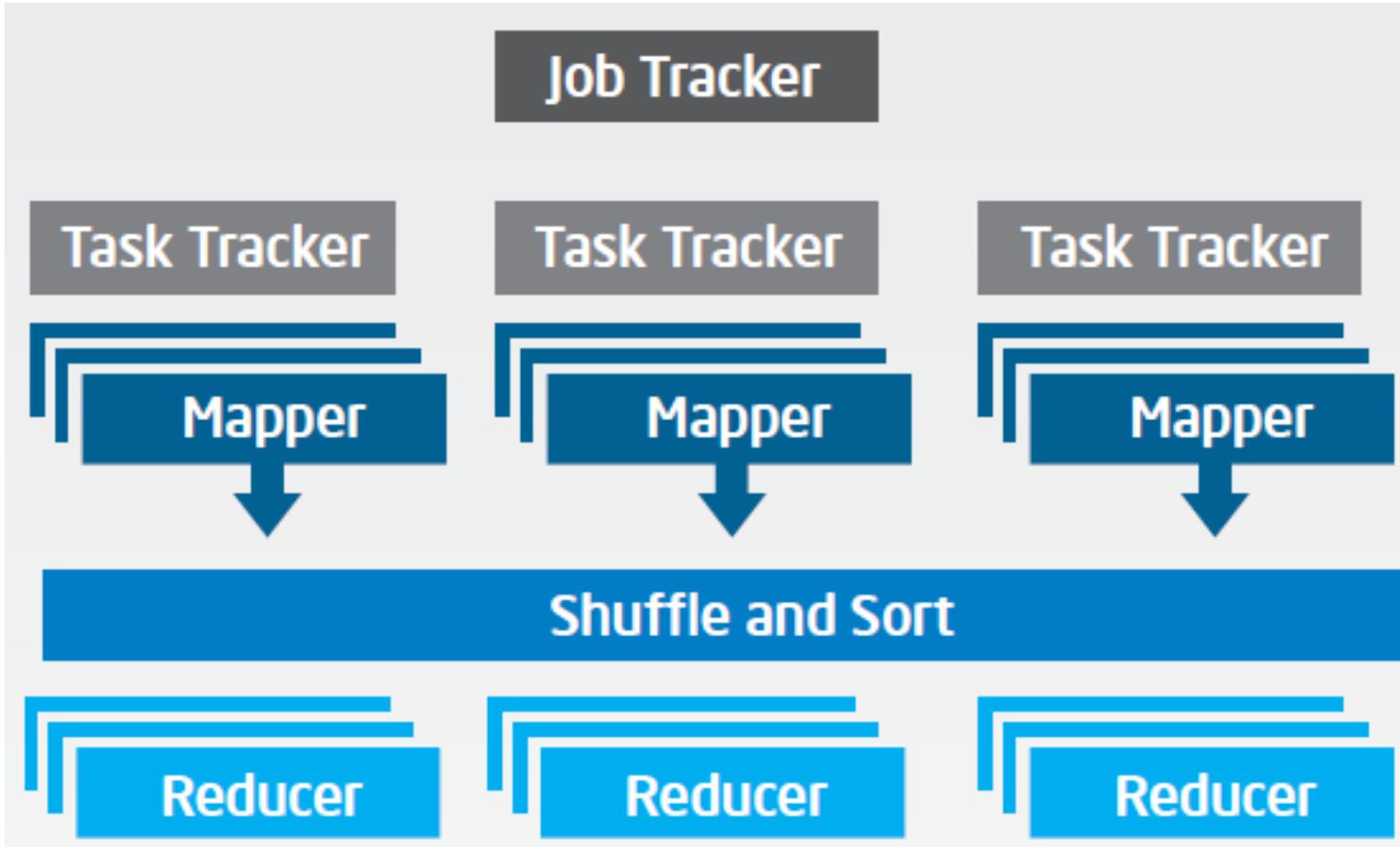
PHYSICAL ARCHITECTURE



Big Data with Hadoop Architecture

Logical Architecture

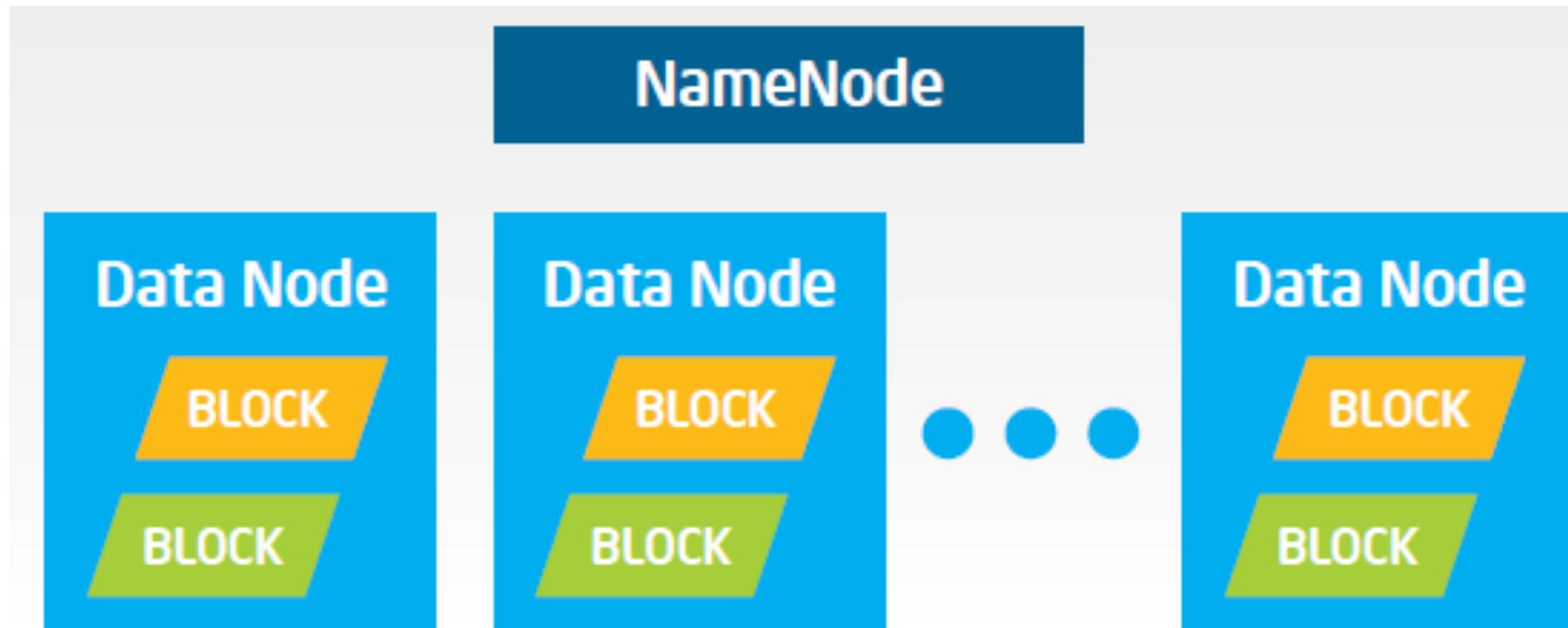
Processing: MapReduce



Big Data with Hadoop Architecture

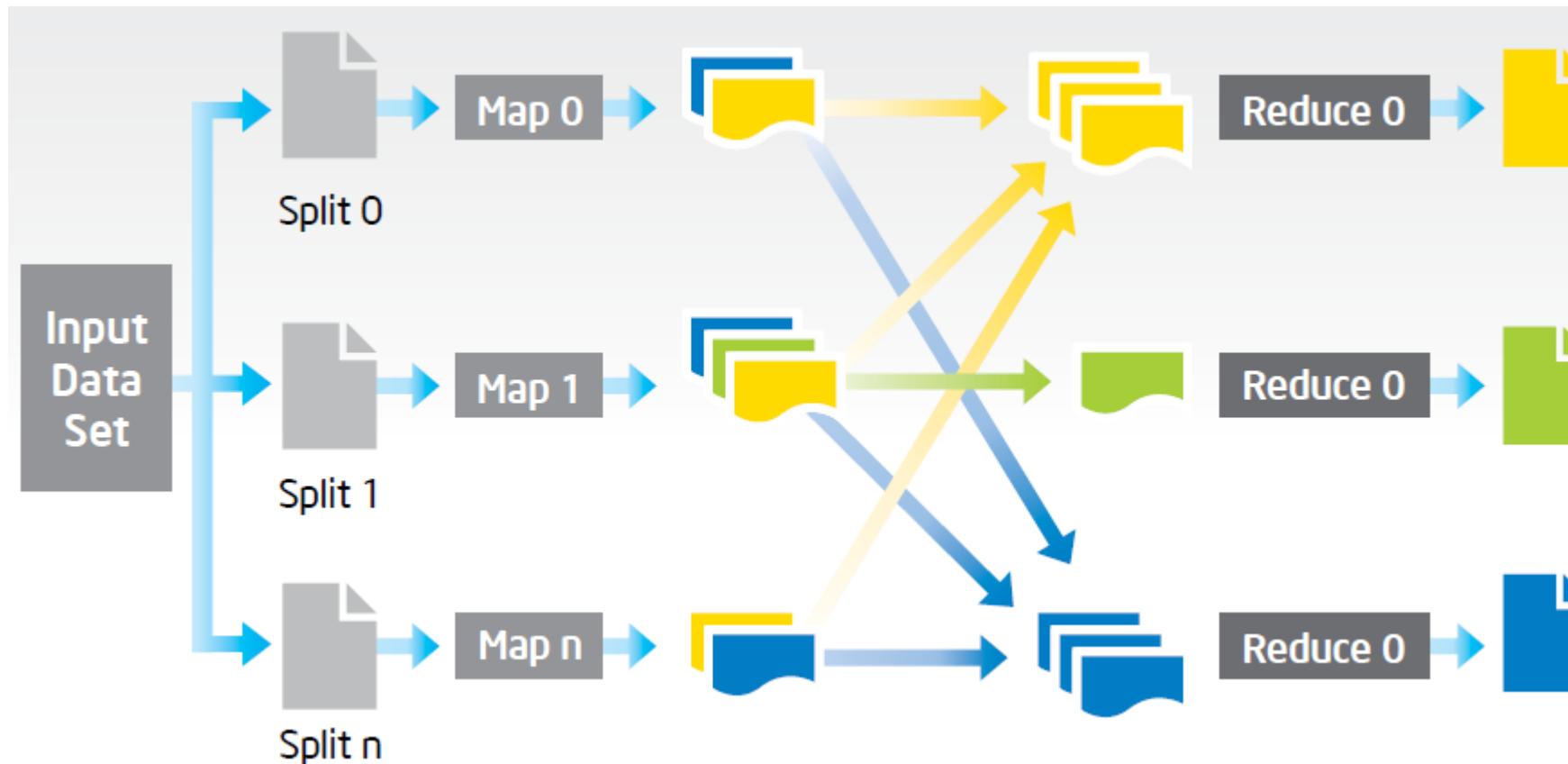
Logical Architecture

Storage: HDFS



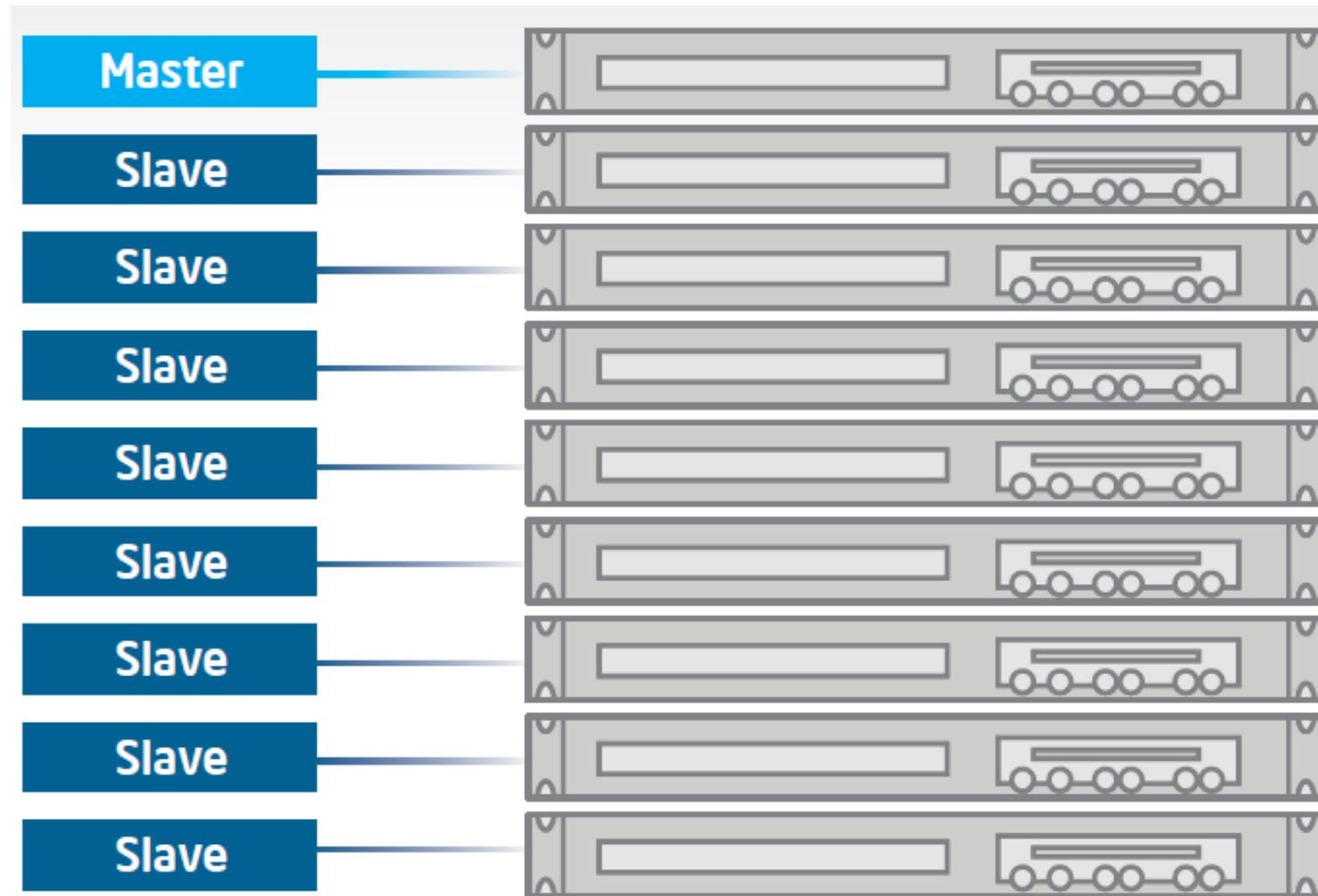
Big Data with Hadoop Architecture

Process Flow

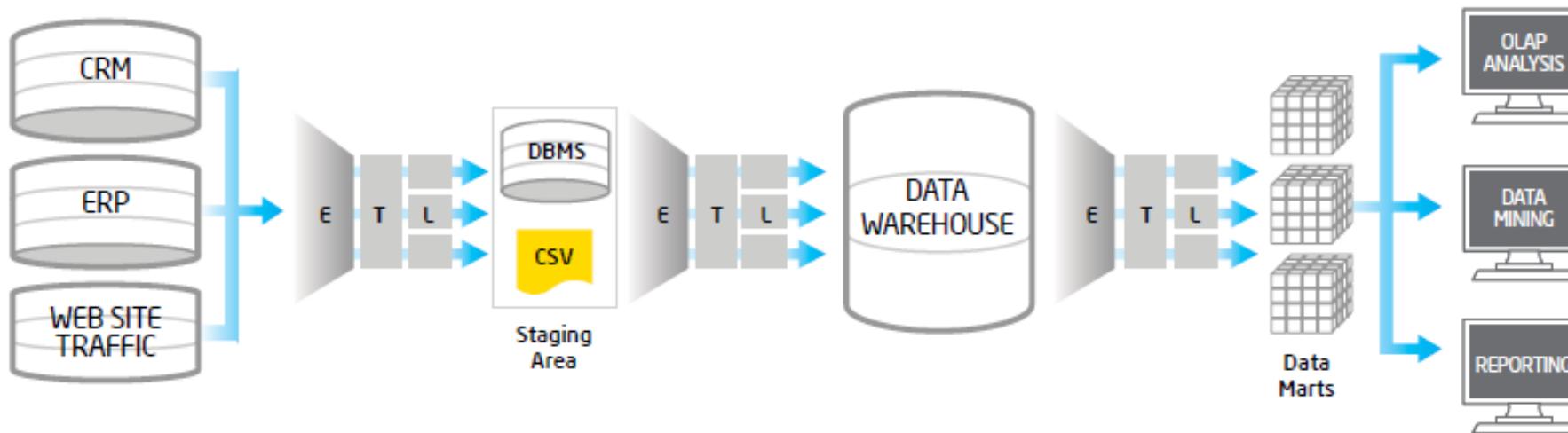


Big Data with Hadoop Architecture

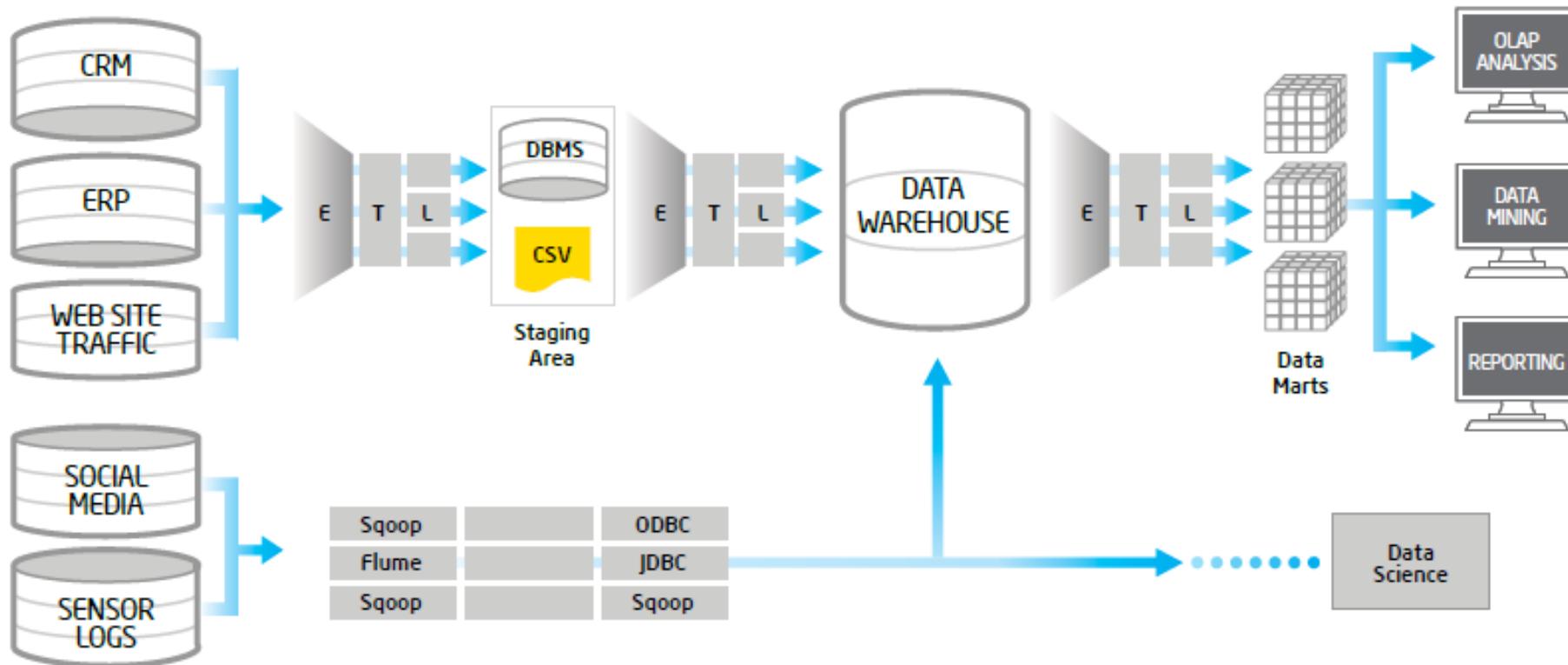
Hadoop Cluster



Traditional ETL Architecture



Offload ETL with Hadoop (Big Data Architecture)



Spark and Hadoop



Spark Ecosystem

Spark
SQL

Spark
Streaming

MLlib
(machine
learning)

GraphX
(graph)

Apache Spark

OpenAI ChatGPT

[API](#)[RESEARCH](#)[BLOG](#)[ABOUT](#)

ChatGPT: Optimizing Language Models for Dialogue

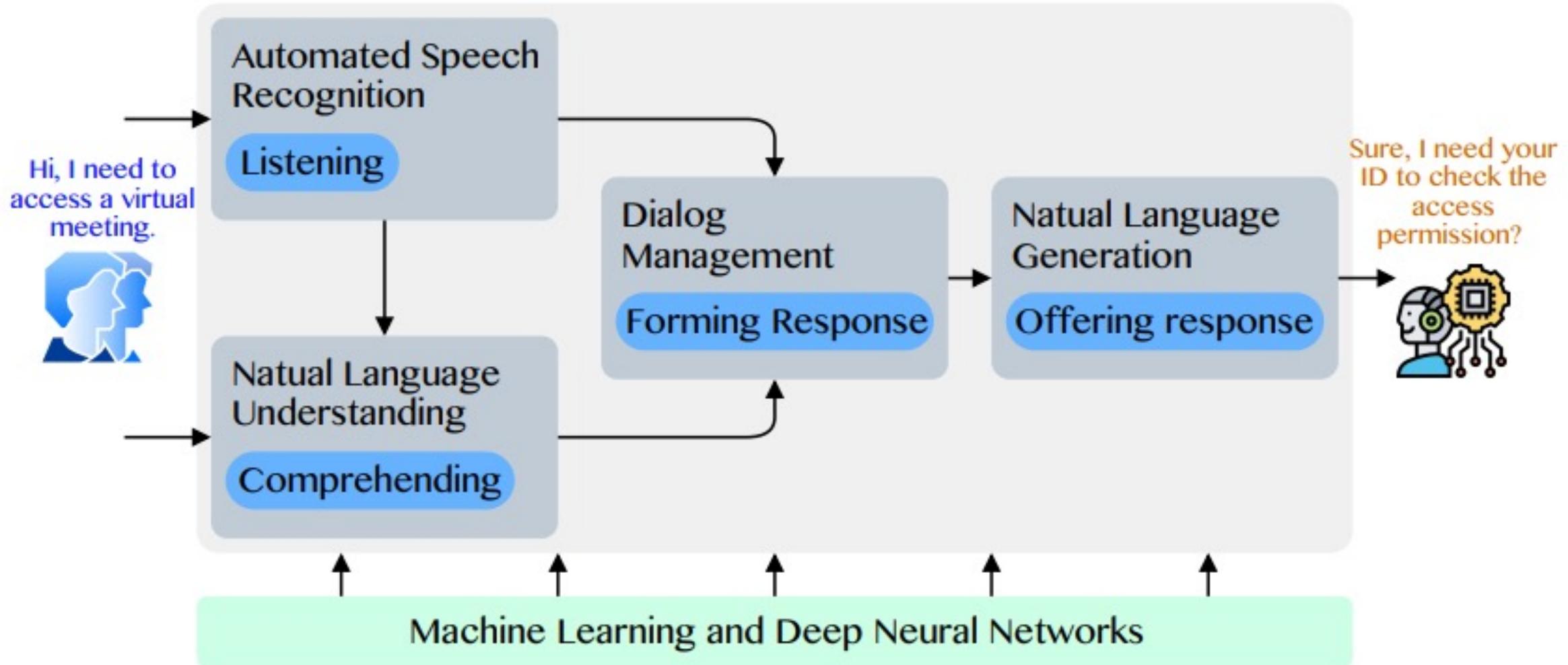
We've trained a model called ChatGPT which interacts in a conversational way. The dialogue format makes it possible for ChatGPT to answer followup questions, admit its mistakes, challenge incorrect premises, and reject inappropriate requests. ChatGPT is a sibling model to InstructGPT, which is trained to follow an instruction in a prompt and provide a detailed response.



Source: <https://openai.com/blog/chatgpt/>

Conversational AI

to deliver contextual and personal experience to users



Source: Huynh-The, Thien, Quoc-Viet Pham, Xuan-Qui Pham, Thanh Thi Nguyen, Zhu Han, and Dong-Seong Kim (2022).

"Artificial Intelligence for the Metaverse: A Survey." arXiv preprint arXiv:2202.10336.

OpenAI ChatGPT

ChatGPT



Examples

"Explain quantum computing in simple terms" →



Capabilities

Remembers what user said earlier in the conversation



Limitations

May occasionally generate incorrect information

"Got any creative ideas for a 10 year old's birthday?" →

Allows user to provide follow-up corrections

May occasionally produce harmful instructions or biased content

"How do I make an HTTP request in Javascript?" →

Trained to decline inappropriate requests

Limited knowledge of world and events after 2021



Free Research Preview: ChatGPT is optimized for dialogue. Our goal is to make AI systems more natural to interact with, and your feedback will help us improve our systems and make them safer.

Source: <https://chat.openai.com/chat>

OpenAI ChatGPT

IM

What is the future of AI?



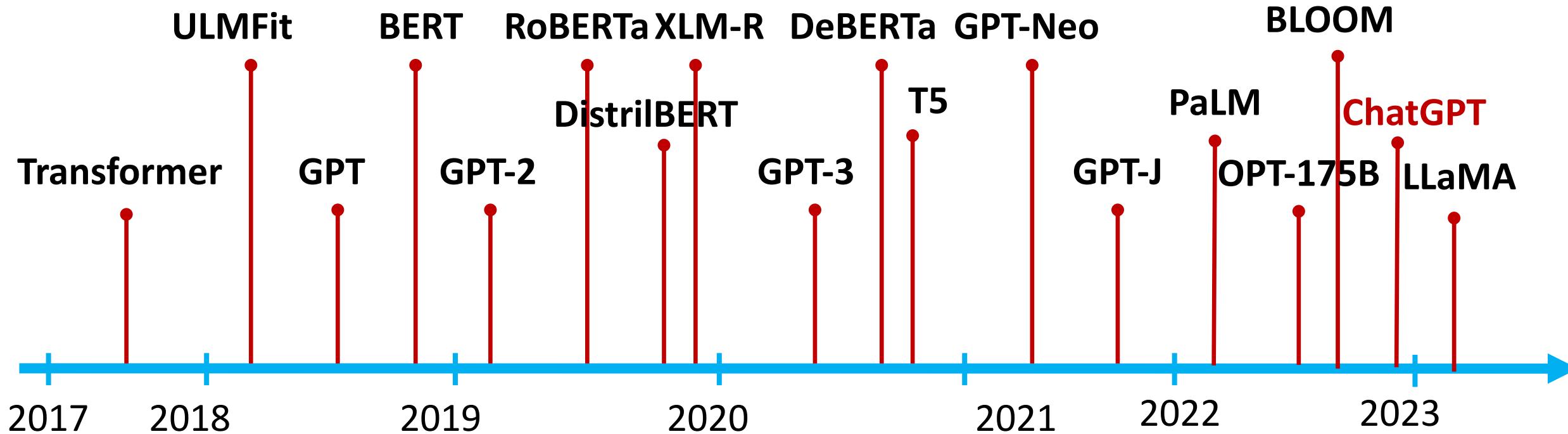
It is difficult to predict the exact future of AI, but many experts believe that it will continue to play an increasingly important role in our lives. Some potential future developments in the field of AI include:

- Improved natural language processing, allowing AI systems to better understand and respond to human speech and writing.
- Enhanced ability to learn and adapt, allowing AI systems to become more autonomous and capable of handling a wider range of tasks.
- Greater integration with the internet of things (IoT), allowing AI systems to control and interact with a wide range of connected devices in the home and workplace.
- Continued advances in machine learning, allowing AI systems to make more accurate predictions and decisions based on data.
- Increased use of AI in healthcare, transportation, and other industries, leading to more efficient and effective processes and services.
- Continued development of ethical and regulatory frameworks to ensure that AI is developed and used responsibly.

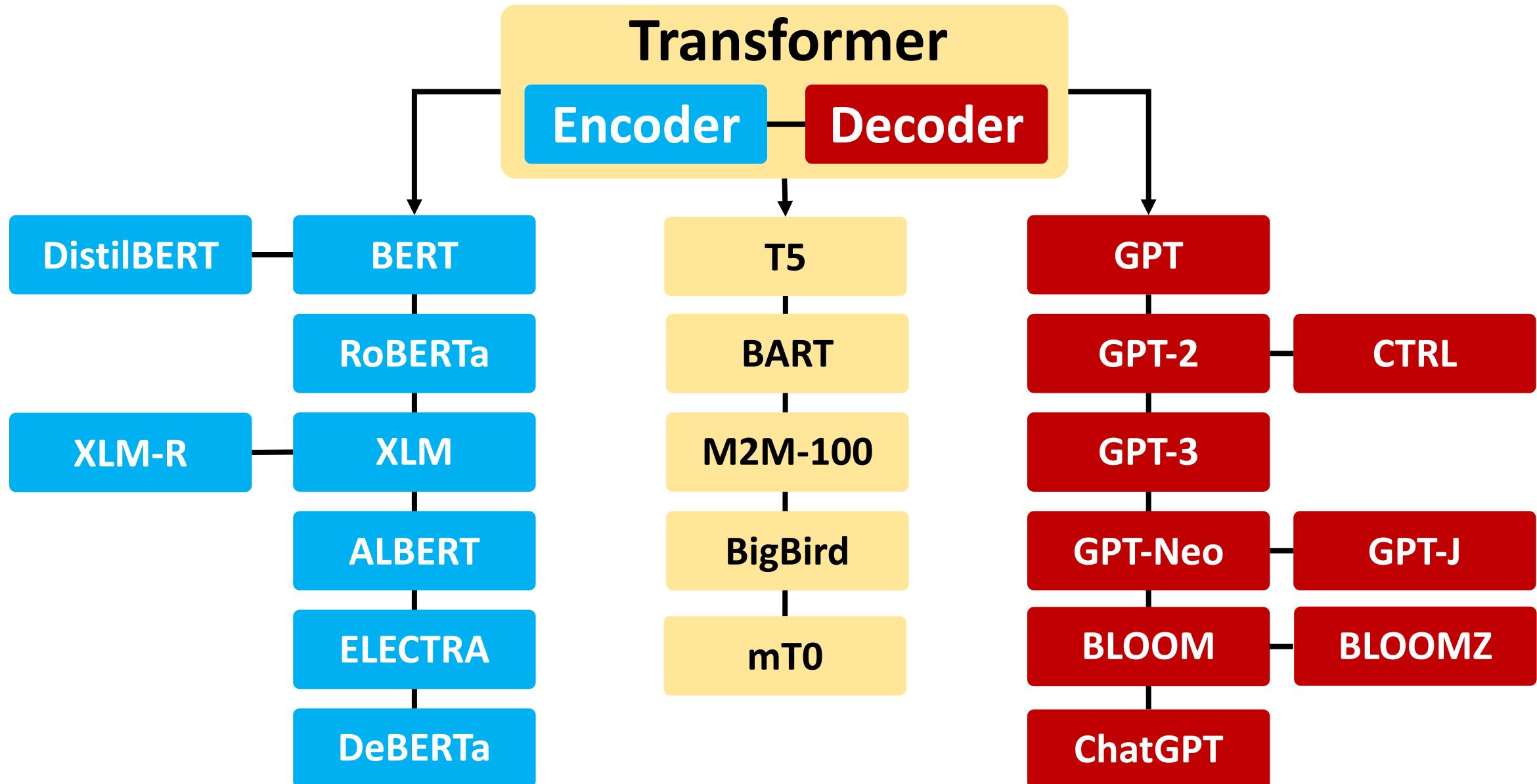
Ultimately, the future of AI will depend on how it is developed and used by individuals, organizations, and society as a whole.



The Transformers Timeline

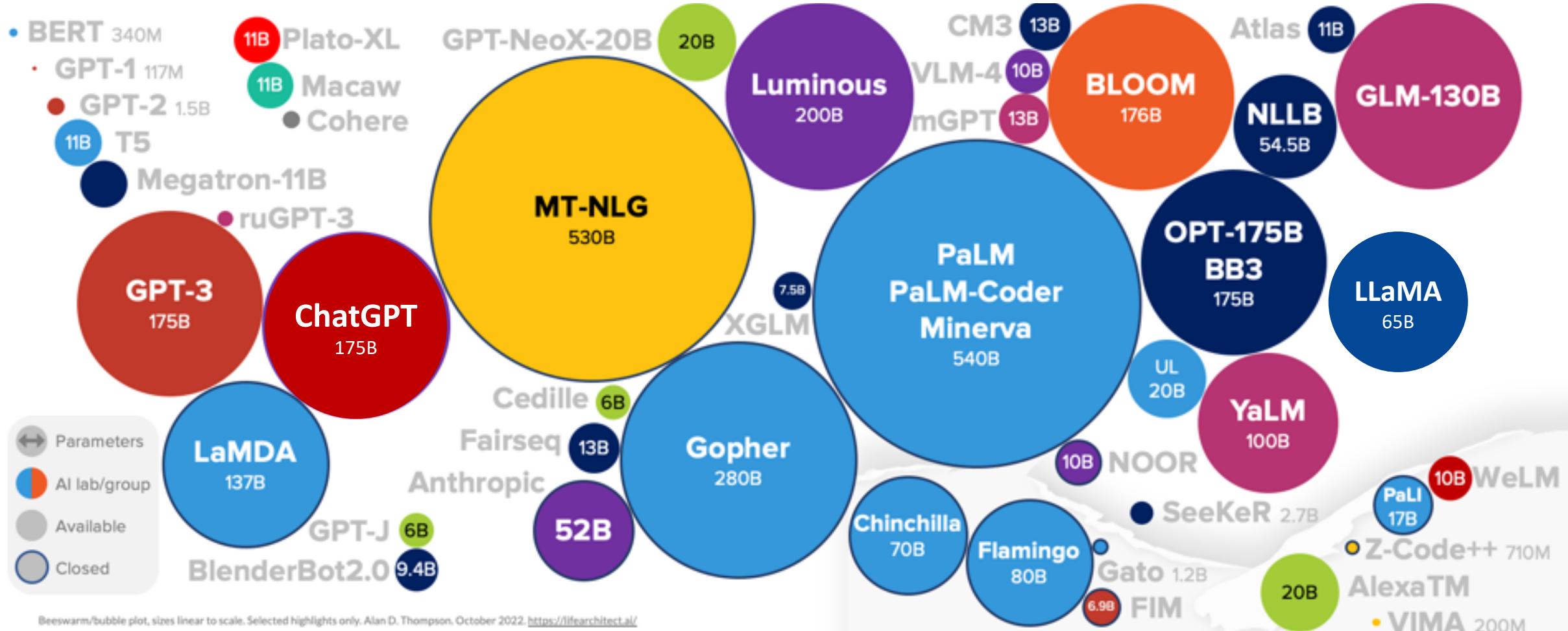


Transformer Models



Large Language Models (LLM)

(GPT-3, ChatGPT, PaLM, BLOOM, OPT-175B, LLaMA)



ChatGPT: Optimizing Language Models for Dialogue

Step 1

Collect demonstration data and train a supervised policy.

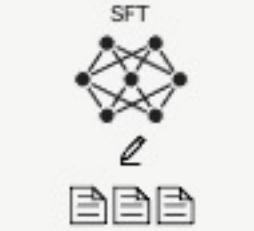
A prompt is sampled from our prompt dataset.



A labeler demonstrates the desired output behavior.



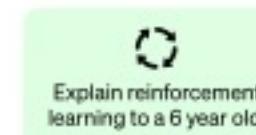
This data is used to fine-tune GPT-3.5 with supervised learning.



Step 2

Collect comparison data and train a reward model.

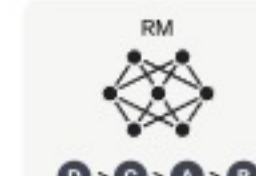
A prompt and several model outputs are sampled.



A labeler ranks the outputs from best to worst.



This data is used to train our reward model.



Step 3

Optimize a policy against the reward model using the PPO reinforcement learning algorithm.

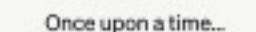
A new prompt is sampled from the dataset.



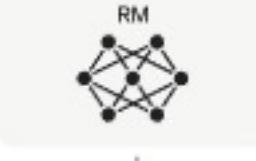
The PPO model is initialized from the supervised policy.



The policy generates an output.



The reward model calculates a reward for the output.



The reward is used to update the policy using PPO.

r_k

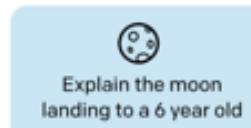
Training language models to follow instructions with human feedback

InstructGPT and GPT 3.5

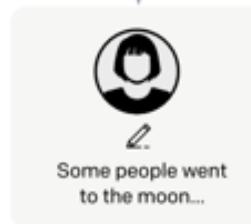
Step 1

Collect demonstration data, and train a supervised policy.

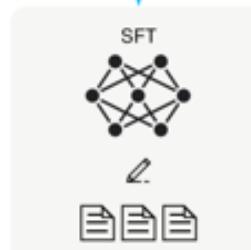
A prompt is sampled from our prompt dataset.



A labeler demonstrates the desired output behavior.



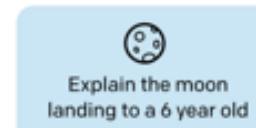
This data is used to fine-tune GPT-3 with supervised learning.



Step 2

Collect comparison data, and train a reward model.

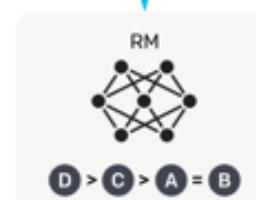
A prompt and several model outputs are sampled.



A labeler ranks the outputs from best to worst.



This data is used to train our reward model.



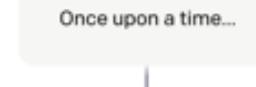
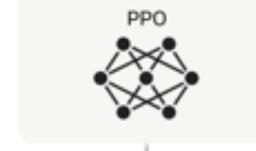
Step 3

Optimize a policy against the reward model using reinforcement learning.

A new prompt is sampled from the dataset.



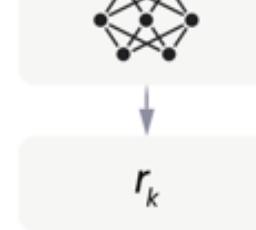
The policy generates an output.



The reward model calculates a reward for the output.



The reward is used to update the policy using PPO.

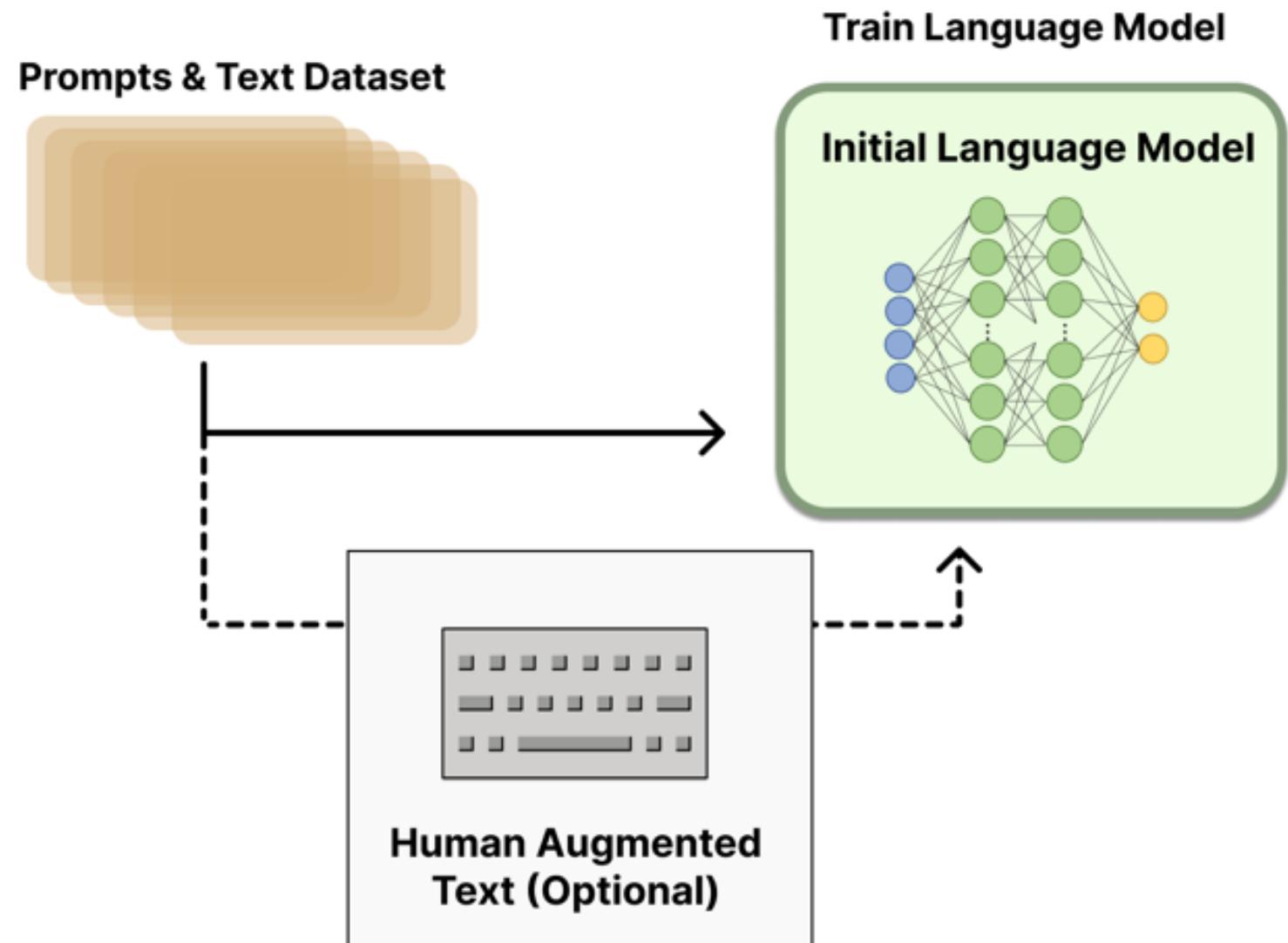


Reinforcement Learning from Human Feedback (RLHF)

- 1. Pretraining a Language Model (LM)**
- 2. Gathering Data and Training a Reward Model**
- 3. Fine-tuning the LM with Reinforcement Learning**

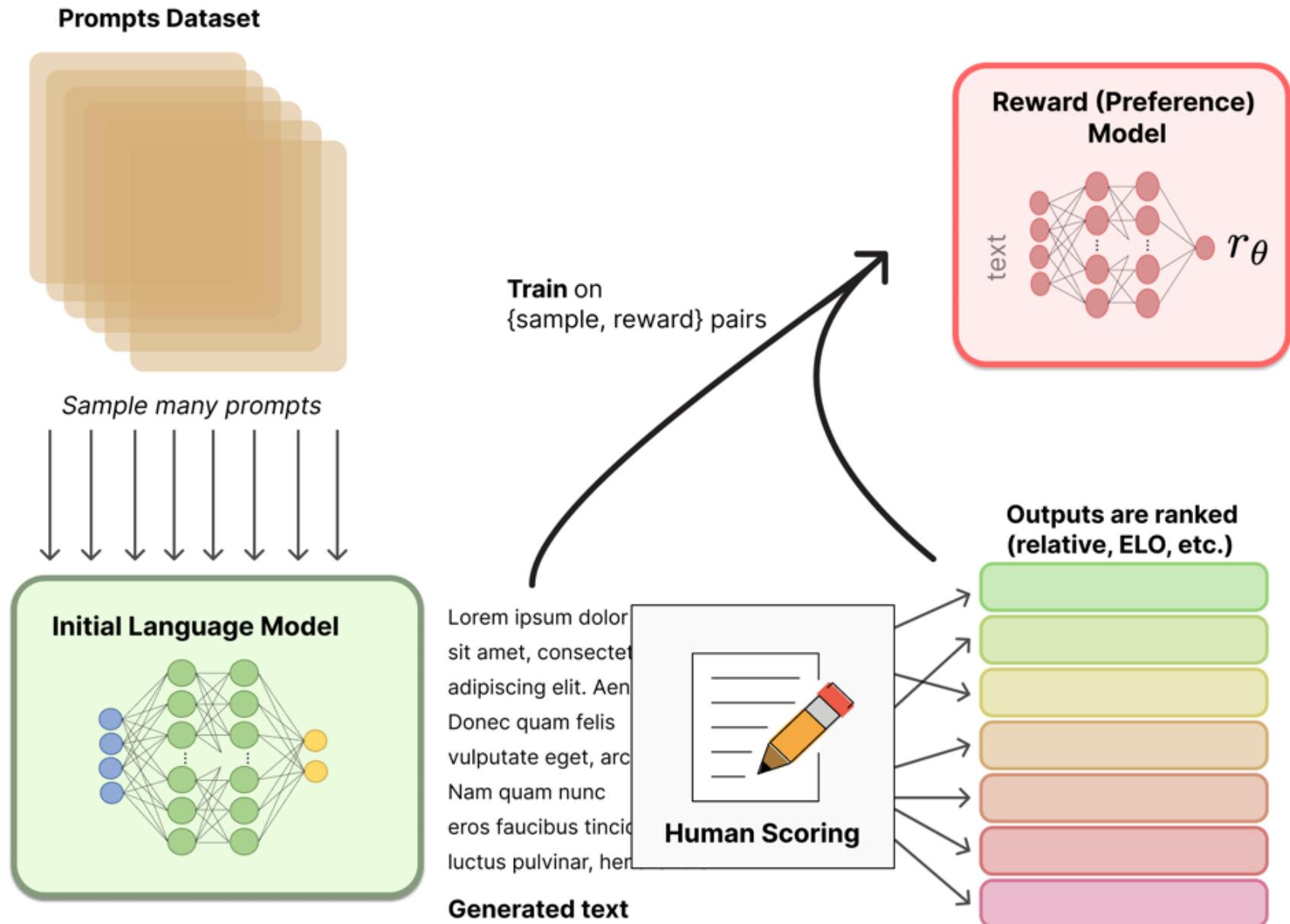
Reinforcement Learning from Human Feedback (RLHF)

**Step 1. Pretraining
a Language Model
(LM)**



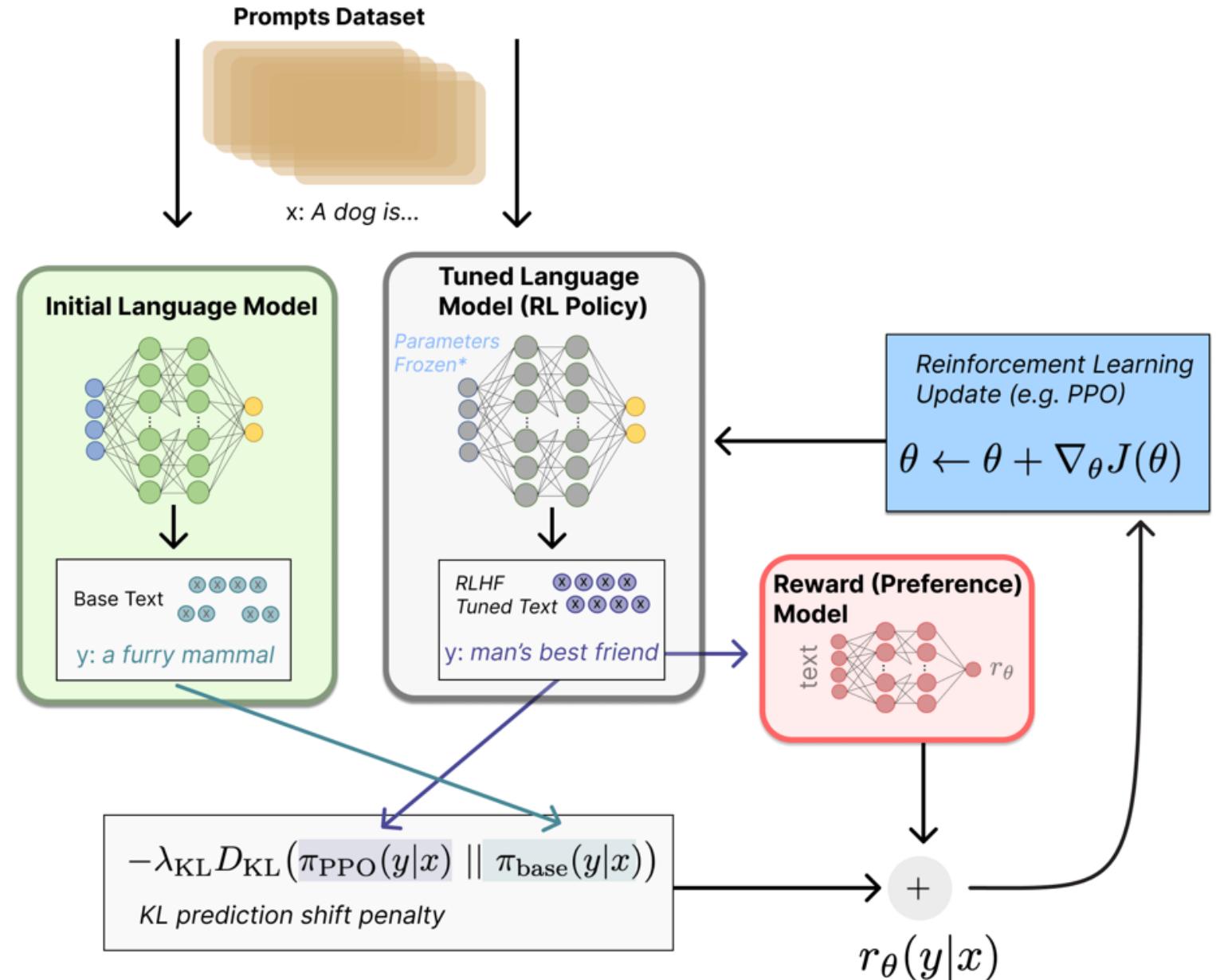
Reinforcement Learning from Human Feedback (RLHF)

Step 2. Gathering Data and Training a Reward Model



Reinforcement Learning from Human Feedback (RLHF)

Step 3. Fine-tuning the LM with Reinforcement Learning



Generative AI

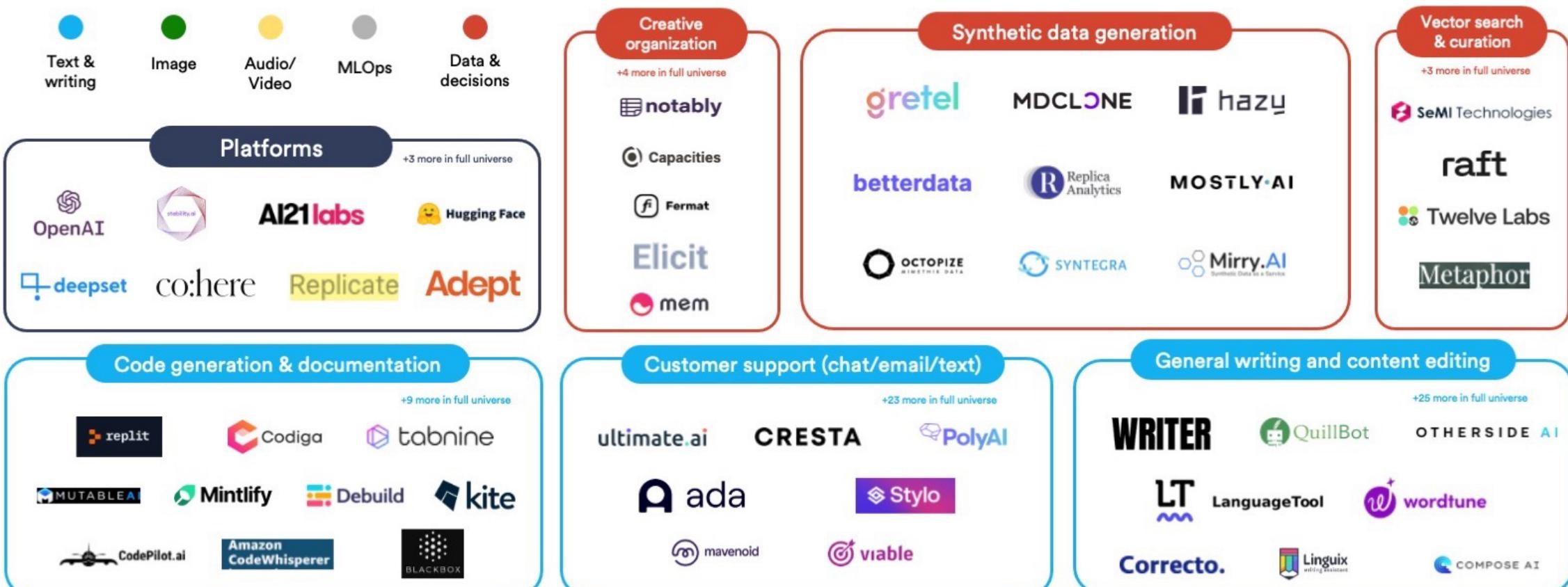
Gen AI

Generative AI

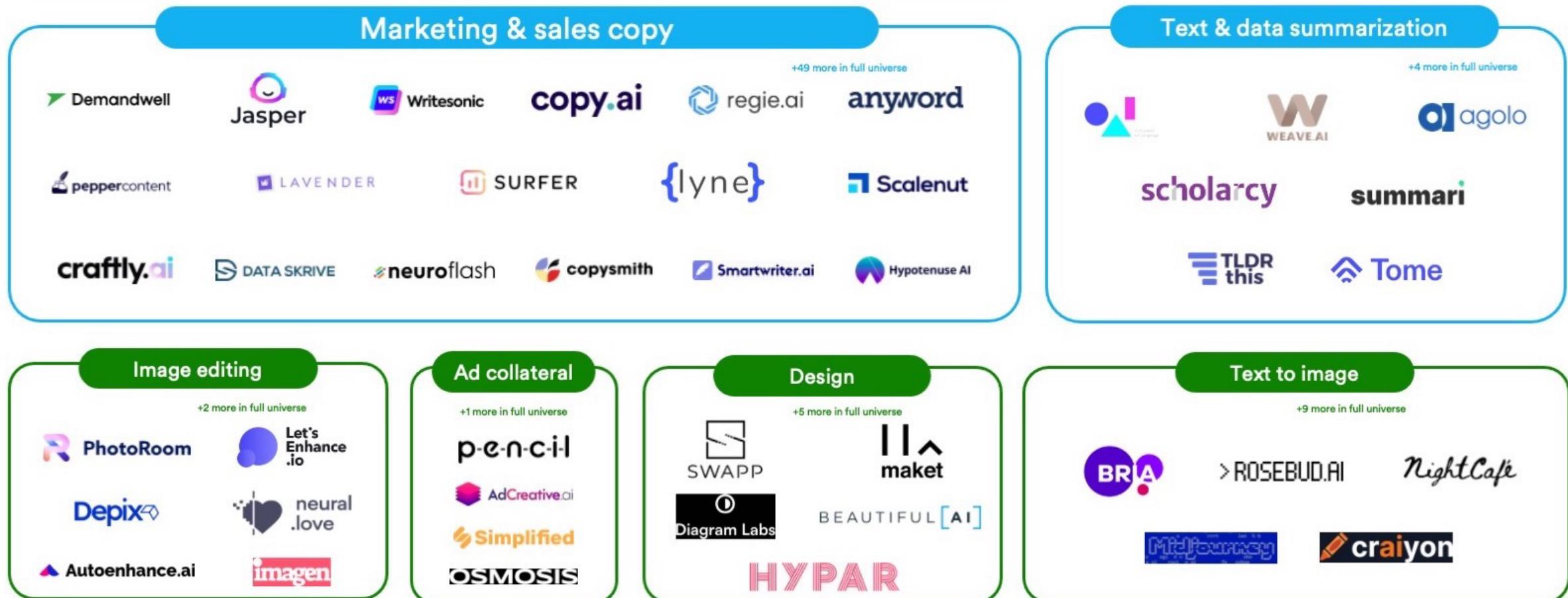
Base10

BASE10 TREND MAP: GENERATIVE AI

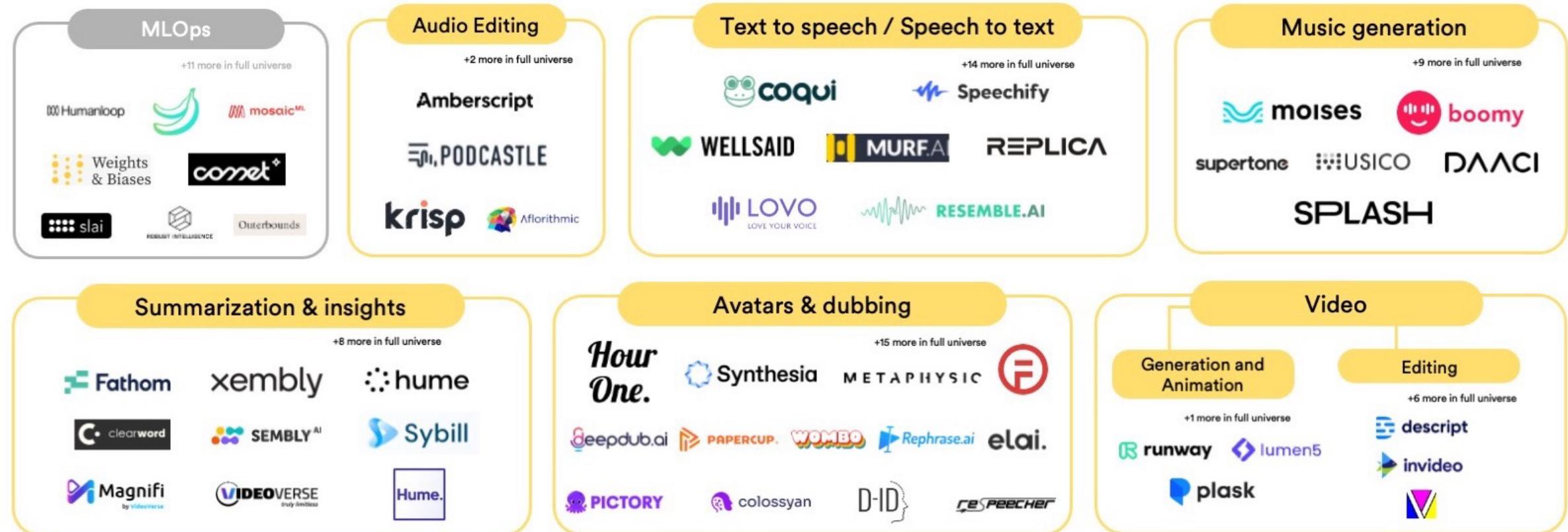
Companies are grouped based on medium produced and segmented by use case within each medium. Companies that offer products across segments are grouped in the segment of the core product offering.



Generative AI



Generative AI



DALL·E 2

Create original, realistic images and art from a text description.
It can combine concepts, attributes, and styles.

TEXT DESCRIPTION

An astronaut Teddy bears A
bowl of soup

riding a horse lounging in a
tropical resort in space playing
basketball with cats in space

in a photorealistic style in the
style of Andy Warhol as a pencil
drawing

DALL·E 2



Stable Diffusion

Hugging Face Search models, datasets, users...

Models Datasets Spaces Docs Solutions Pricing

Spaces: stabilityai/stable-diffusion like 1.89k Running

App Files Community 241 Linked Models

Stable Diffusion Demo

Stable Diffusion is a state of the art text-to-image model that generates images from text.

For faster generation and forthcoming API access you can try [DreamStudio Beta](#)

an insect robot preparing a delicious meal

Generate image



<https://huggingface.co/spaces/stabilityai/stable-diffusion>

Stable Diffusion Colab

wocitezuma / stable-diffusion-colab Public

Notifications Fork 7 Star 31

<> Code Issues Pull requests Actions Projects Wiki Security Insights

main ▾ 1 branch 0 tags Go to file Code ▾

wocitezuma README: add a reference for sampler schedules 37bc02d 24 days ago 18 commits

LICENSE Initial commit 27 days ago

README.md README: add a reference for sampler schedules 24 days ago

stable_diffusion.ipynb Allow to choose the scheduler 25 days ago

☰ README.md

Stable-Diffusion-Colab

The goal of this repository is to provide a Colab notebook to run the text-to-image "Stable Diffusion" model [1].

Usage

- Run [stable_diffusion.ipynb](#) 

About

Colab notebook to run Stable Diffusion.

[github.com/CompVis/stable-diffusion](#)

deep-learning colab image-generation
text-to-image diffusion text2image
colaboratory google-colab
colab-notebook google-colaboratory
google-colab-notebook
text-to-image-synthesis huggingface
diffusion-models
text-to-image-generation latent-diffusion
stable-diffusion huggingface-diffusers
diffusers stable-diffusion-diffusers

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<https://github.com/wocitezuma/stable-diffusion-colab>

Lexica Art: Search Stable Diffusion images and prompts

Lexica

Search images

Search

Lexica

The Stable Diffusion search engine

Join the Discord

Search for an image

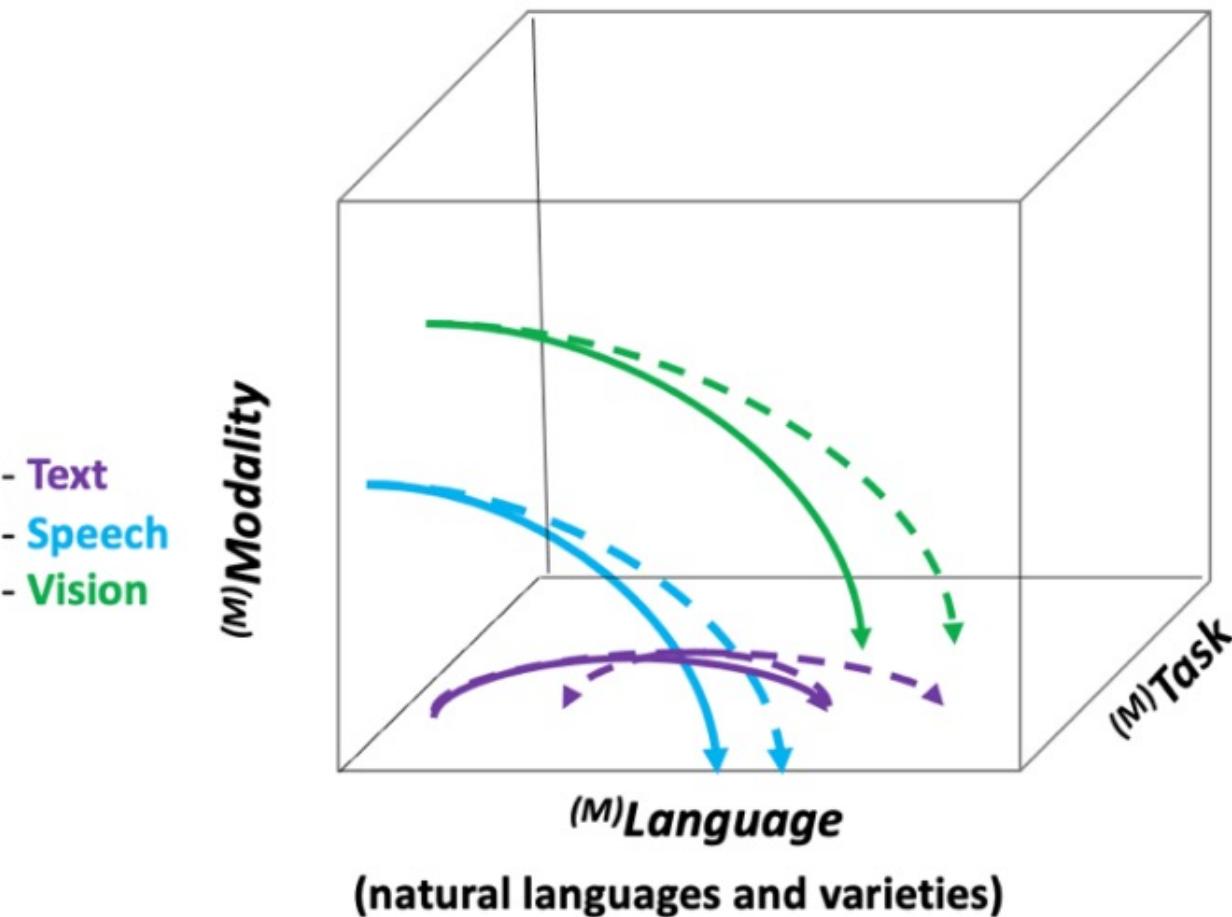
Columns: 10

The Lexica Art website features a dark-themed interface. At the top, there's a navigation bar with the brand name "Lexica" and a search bar labeled "Search images". Below the header is a large, bold "Lexica" logo followed by the tagline "The Stable Diffusion search engine". A "Join the Discord" button is also present. The main area contains a search bar with placeholder text "Search for an image", a "Search" button, and a "Columns: 10" slider. Below this, a grid of 20 generated images is displayed in two rows of ten. The images are diverse, including portraits, landscapes, abstract art, and various fantastical and futuristic scenes.

<https://lexica.art/>

NLG from a Multilingual, Multimodal and Multi-task perspective

Multi³(Natural Language) Generation

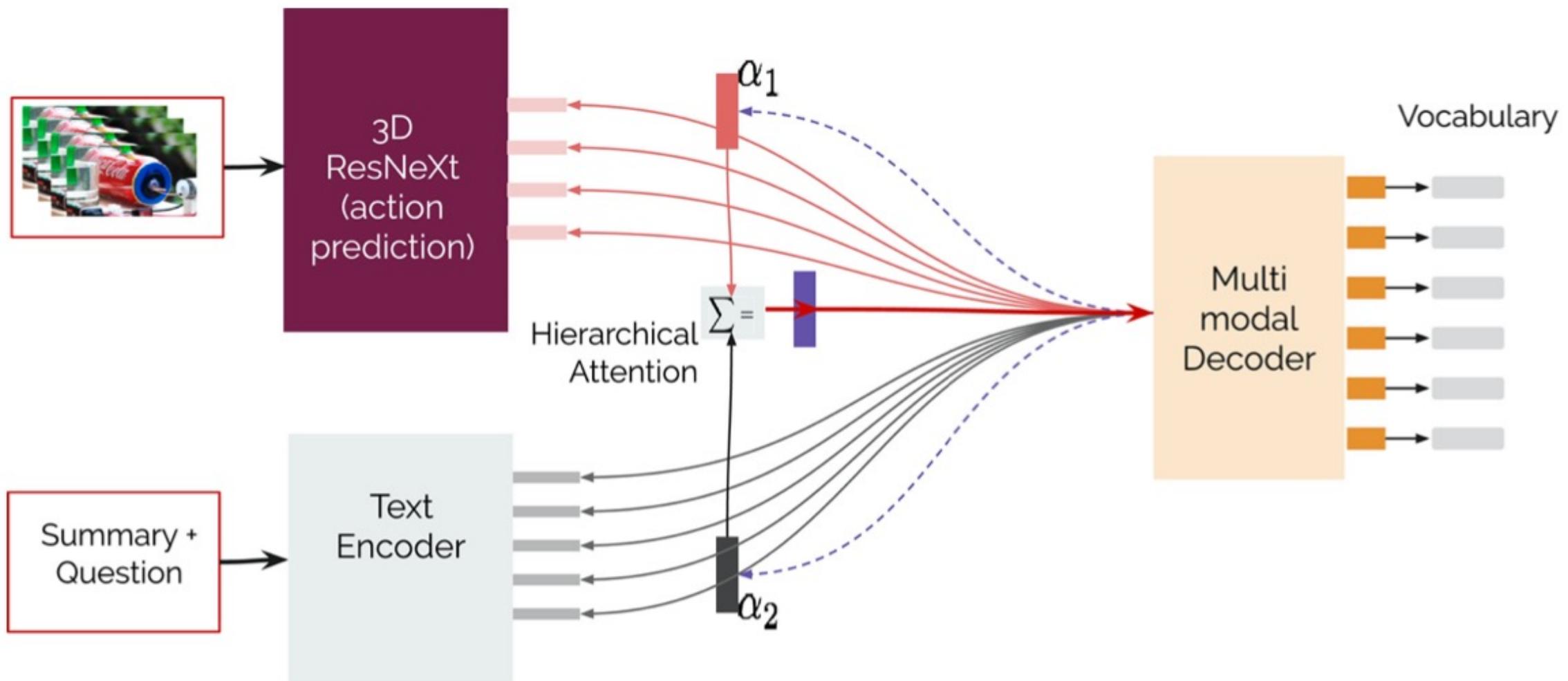


- Recognize and transcribe speech (ASR)
- Translate from one language to another (MT)
- Describe, ask or answer questions or converse about visual objects (Captioning, VQA, Visual Dialogue, ...)

Source: Erdem, Erkut, Menekse Kuyu, Semih Yagcioglu, Anette Frank, Letitia Parcalabescu, Barbara Plank, Andrii Babii et al.

"Neural Natural Language Generation: A Survey on Multilinguality, Multimodality, Controllability and Learning." Journal of Artificial Intelligence Research 73 (2022): 1131-1207.

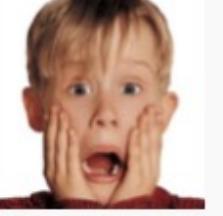
Text-and-Video Dialog Generation Models with Hierarchical Attention



Source: Erdem, Erkut, Menekse Kuyu, Semih Yagcioglu, Anette Frank, Letitia Parcalabescu, Barbara Plank, Andrii Babii et al.

"Neural Natural Language Generation: A Survey on Multilinguality, Multimodality, Controllability and Learning." Journal of Artificial Intelligence Research 73 (2022): 1131-1207.

Multimodal Few-Shot Learning with Frozen Language Models

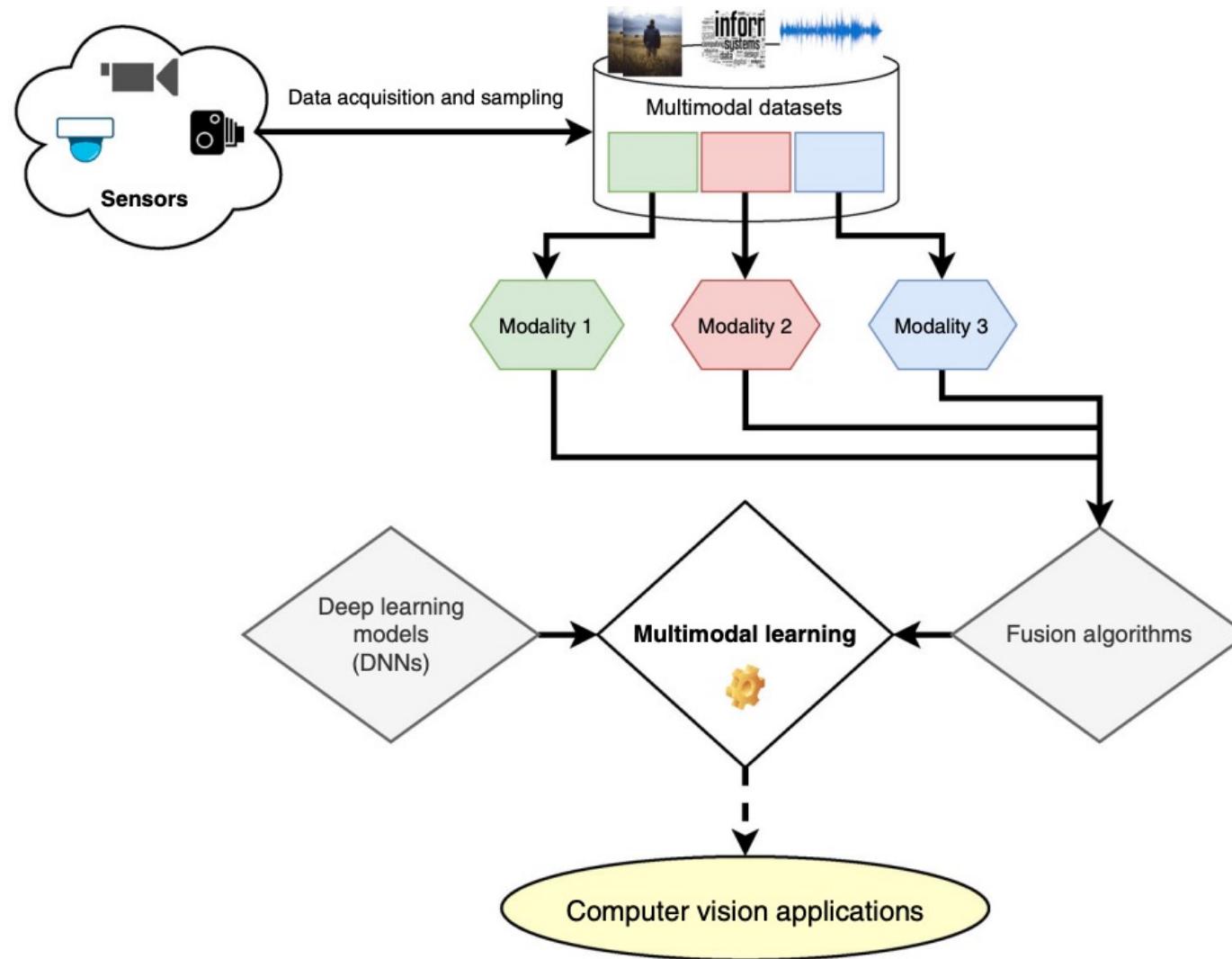
	This person is like 😊.		This person is like 😒.		This person is like	Model Completion 选拨. <EOS>
	This was invented by Zacharias Janssen.		This was invented by Thomas Edison.		This was invented by	Model Completion the Wright brothers. <EOS>
	With one of these I can drive around a track, overtaking other cars and taking corners at speed		With one of these I can take off from a city and fly across the sky to somewhere on the other side of the world		With one of these I can	Model Completion break into a secure building, unlock the door and walk right in <EOS>

Curated samples with about five seeds required to get past well-known language model failure modes of either repeating text for the prompt or emitting text that does not pertain to the image.

These samples demonstrate the ability to generate open-ended outputs that adapt to both images and text, and to make use of facts that it has learned during language-only pre-training.

Multimodal Pipeline

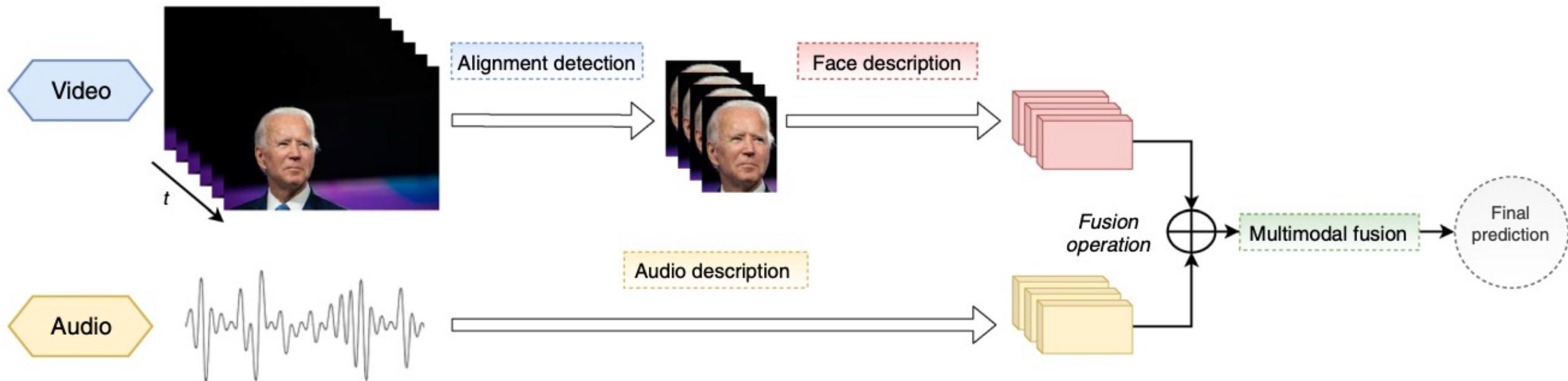
that includes three different modalities (Image, Text, Audio)



Source: Bayoudh, Khaled, Raja Knani, Fayçal Hamdaoui, and Abdellatif Mtibaa (2022).

"A survey on deep multimodal learning for computer vision: advances, trends, applications, and datasets." The Visual Computer 38, no. 8: 2939-2970.

Video and Audio Multimodal Fusion



Source: Bayoudh, Khaled, Raja Knani, Fayçal Hamdaoui, and Abdellatif Mtibaa (2022).

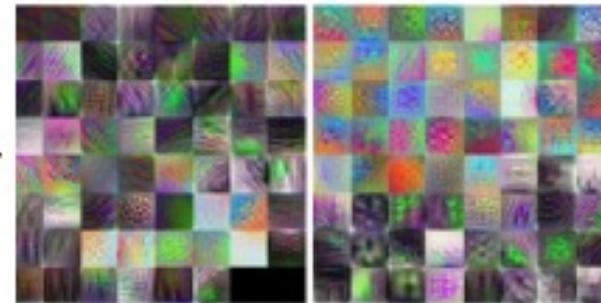
"A survey on deep multimodal learning for computer vision: advances, trends, applications, and datasets." The Visual Computer 38, no. 8: 2939-2970.

Visual and Textual Representation

Image



Visual representations (Dense)



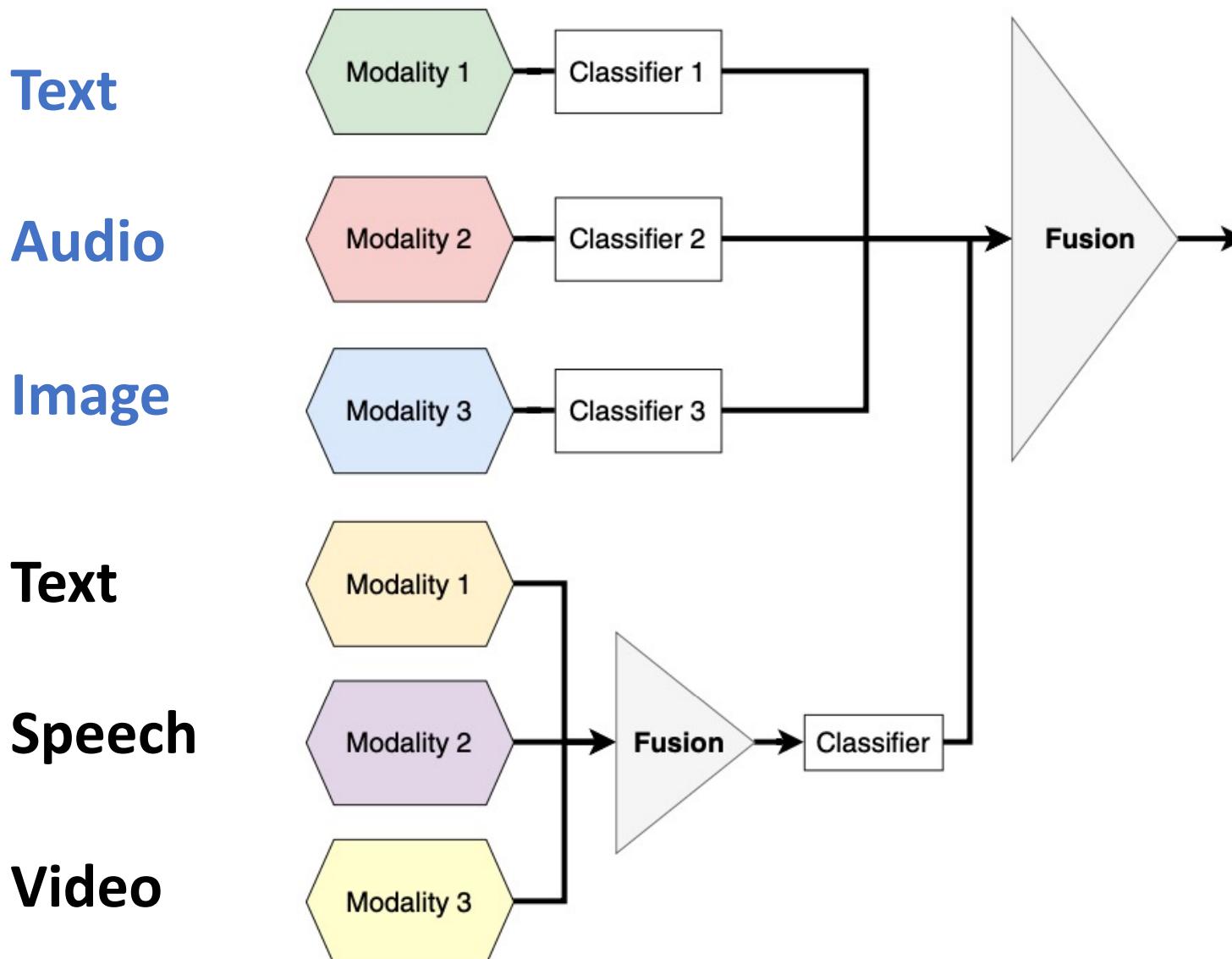
Text

This is the oldest and most important defensive work to have been built along the North African coastline by the Arab conquerors in the early days of Islam. Founded in 796, this building underwent several modifications during the medieval period. Initially, it formed a quadrilateral and then was composed of four buildings giving onto two inner courtyards.

Textual representations (Sparse)



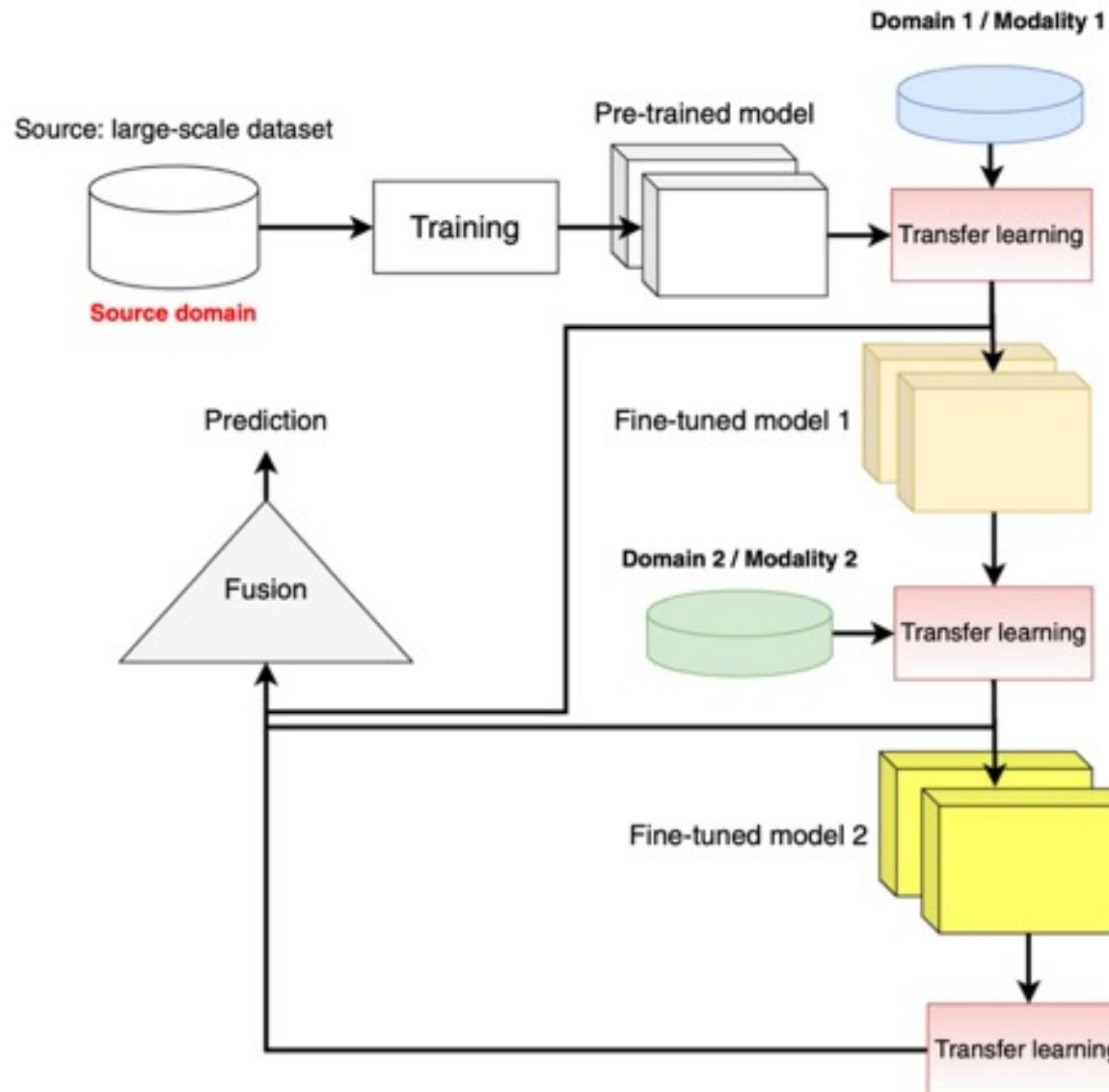
Hybrid Multimodal Data Fusion



Source: Bayoudh, Khaled, Raja Knani, Fayçal Hamdaoui, and Abdellatif Mtibaa (2022).

"A survey on deep multimodal learning for computer vision: advances, trends, applications, and datasets." The Visual Computer 38, no. 8: 2939-2970.

Multimodal Transfer Learning

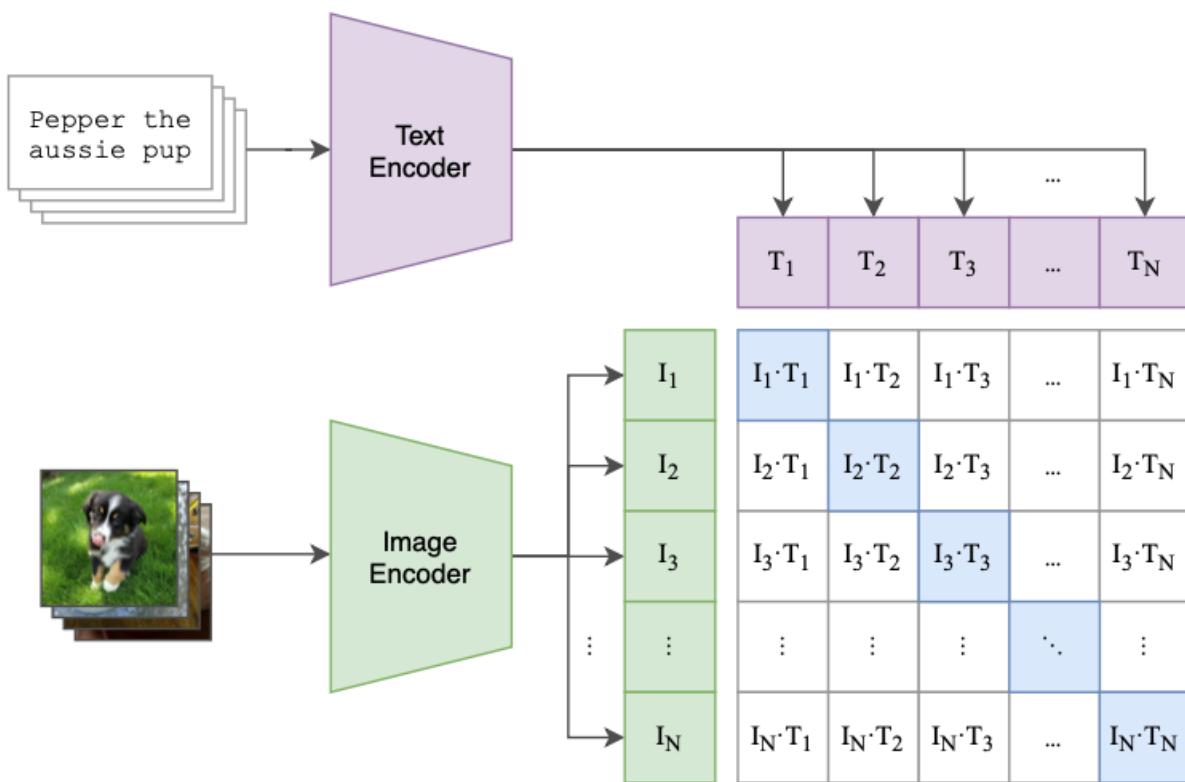


Source: Bayoudh, Khaled, Raja Knani, Fayçal Hamdaoui, and Abdellatif Mtibaa (2022).

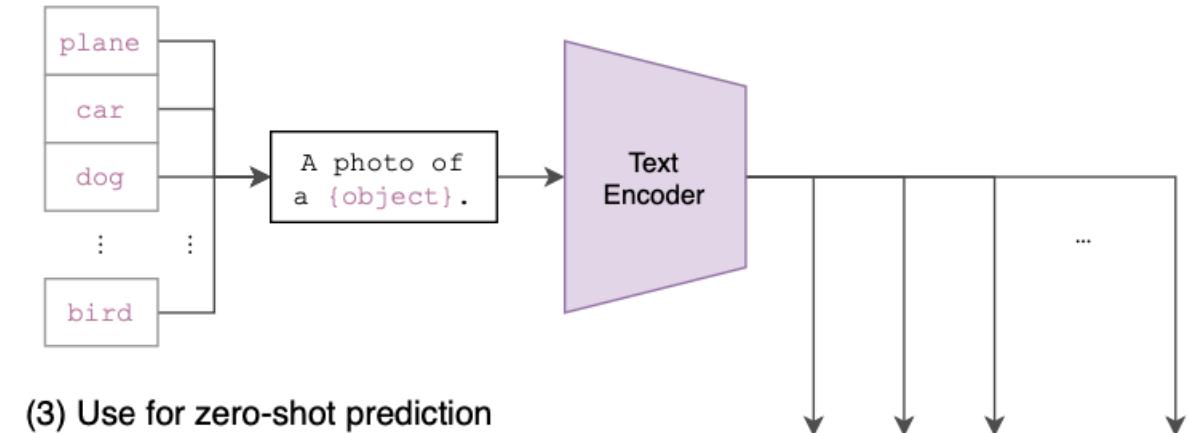
"A survey on deep multimodal learning for computer vision: advances, trends, applications, and datasets." The Visual Computer 38, no. 8: 2939-2970.

CLIP: Learning Transferable Visual Models From Natural Language Supervision

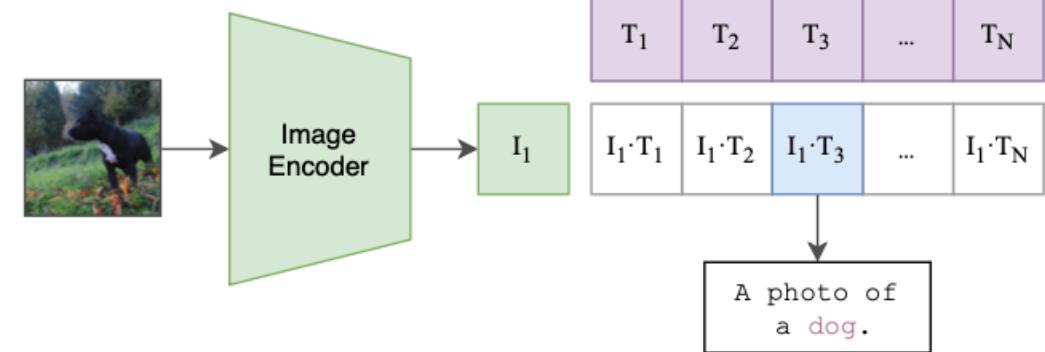
(1) Contrastive pre-training



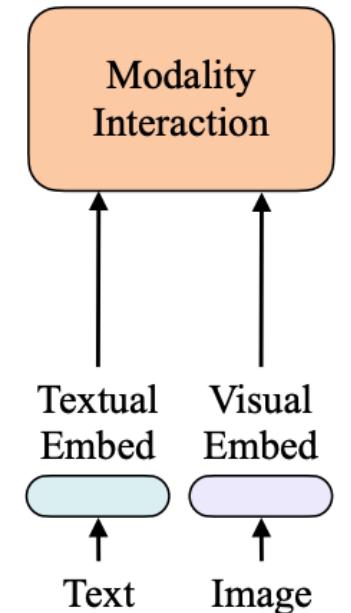
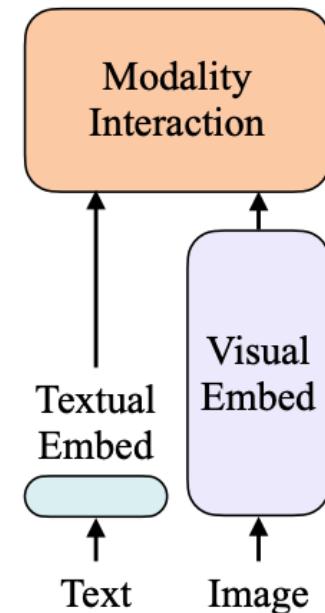
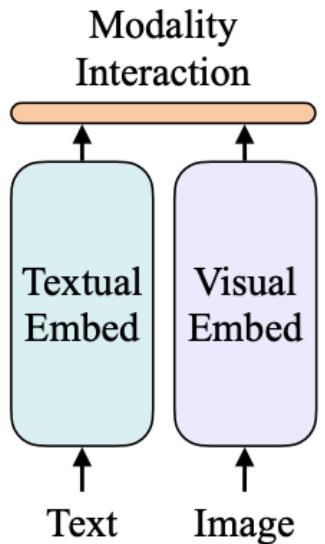
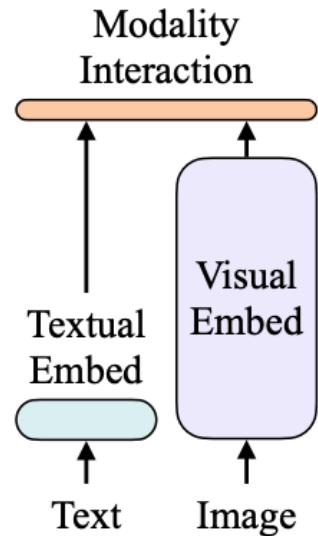
(2) Create dataset classifier from label text



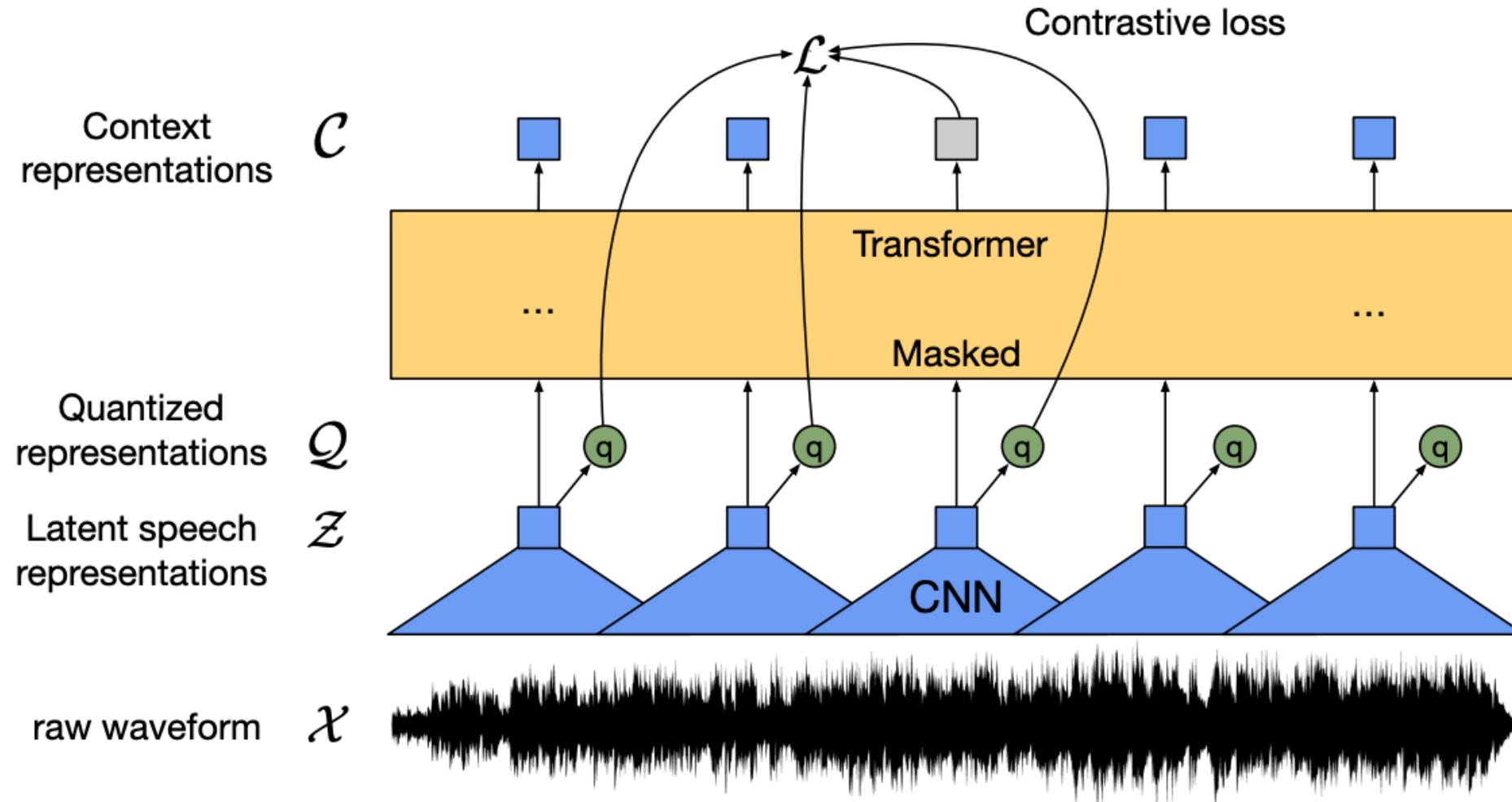
(3) Use for zero-shot prediction



ViLT: Vision-and-Language Transformer Without Convolution or Region Supervision



wav2vec 2.0: A framework for self-supervised learning of speech representations

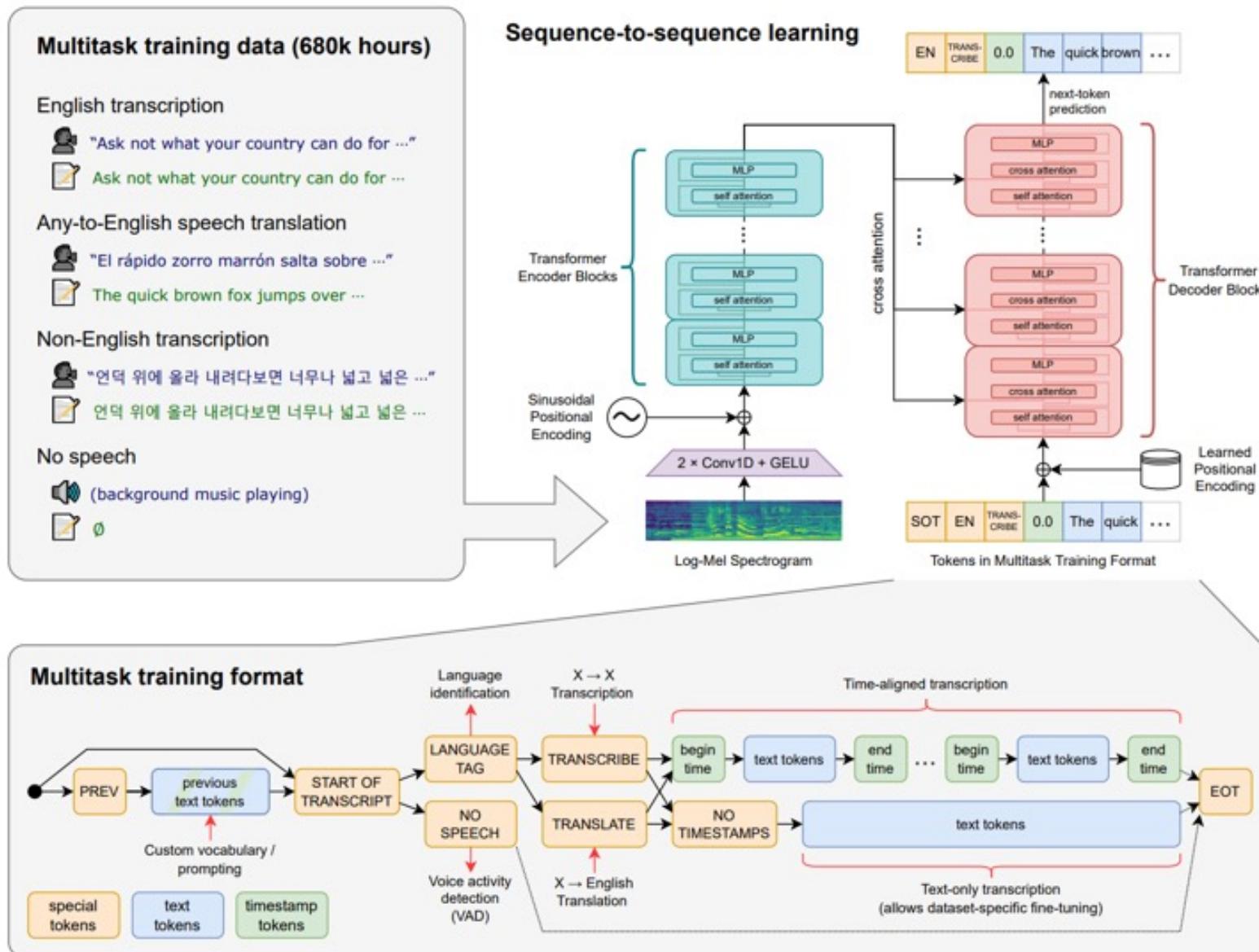


Source: Baevski, Alexei, Yuhao Zhou, Abdelrahman Mohamed, and Michael Auli.

"wav2vec 2.0: A framework for self-supervised learning of speech representations." Advances in Neural Information Processing Systems 33 (2020): 12449-12460.

Whisper:

Robust Speech Recognition via Large-Scale Weak Supervision



Microsoft Azure

Text to Speech (TTS)

Text SSML

You can replace this text with any text you wish. You can either write in this text box or paste your own text here.

Try different languages and voices. Change the speed and the pitch of the voice. You can even tweak the SSML (Speech Synthesis Markup Language) to control how the different sections of the text sound. Click on SSML above to give it a try!

Enjoy using Text to Speech!

Language

English (United States)

Voice

Jenny (Neural)

Speaking style

General

Speaking speed: 1.00



Pitch: 0.00



Play

Hugging Face



Search models, datasets

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The AI community building the future.

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

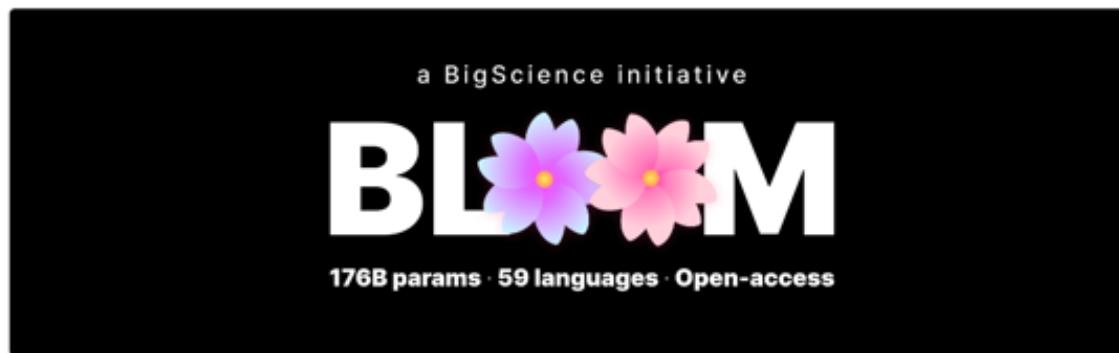
Star

58,696

<https://huggingface.co/>

BLOOM

BigScience Large Open-science Open-access Multilingual Language Model



BigScience Large Open-science Open-access Multilingual Language Model

Version 1.3 / 6 July 2022

Current Checkpoint: **Training Iteration 95000**

Total seen tokens: **366B**

Downloads last month
12,875



⚡ Hosted inference API ⓘ

🖨 Text Generation

Groups

Examples

I love bloom. Super simple, but so effective! I went through a similar process a couple of years ago when!

sampling greedy

ⓘ [BLOOM prompting tips](#)

Switch to "greedy" for more accurate completion e.g. math/history/translations (but which may be repetitive/less inventive)

Compute

⌘+Enter

1.3

OpenAI Whisper



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Spaces: openai/whisper □ like 422 Running

App

Files

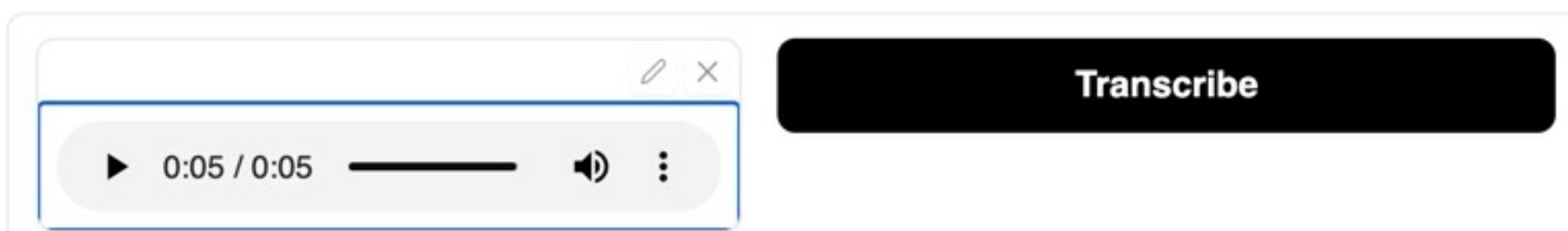
Community 49

Whisper

Whisper is a general-purpose speech recognition model. It is trained on a large dataset of diverse audio and is also a multi-task model that can perform multilingual speech recognition as well as speech translation and language identification. This demo cuts audio after around 30 secs.

You can skip the queue by using google colab for the space:

Open in Colab



Source: <https://huggingface.co/spaces/openai/whisper>



Teaching

- **Big Data Analytics**
 - Fall 2020, Spring 2023
- **Software Engineering**
 - Fall 2020, Fall, 2021, Spring 2022, Spring 2023
- **Artificial Intelligence in Finance and Quantitative**
 - Fall 2021, Fall 2022
- **Artificial Intelligence**
 - Spring 2021, Fall 2022
- **Artificial Intelligence for Text Analytics**
 - Spring 2022
- **Data Mining**
 - Spring 2021
- **Foundation of Business Cloud Computing**
 - Spring 2021, Spring 2022, Spring 2023

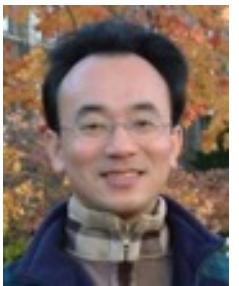
Research Project



1. **Applying AI technology to construct knowledge graphs of cryptocurrency anti-money laundering: a few-shot learning model**
 - MOST, 110-2410-H-305-013-MY2, 2021/08/01~2023/07/31
2. **Fintech Green Finance for Carbon Market Index, Corporate Finance, and Environmental Policies.** Carbon Emission Sentiment Index with AI Text Analytics
 - NTPU, 112-NTPU_ORDA-F-003 , 2023/01/01~2024/12/31
3. **Research on speech processing, synthesis, recognition, and sentence construction of people with language disabilities.** Multimodal Cross-lingual Task-Oriented Dialogue System
 - NTPU, 112-NTPU_ORDA-F-004, 2023/01/01~2025/12/31
4. **Use deep learning to identify commercially dental implant systems - observational study**
 - USTP-NTPU-TMU, USTP-NTPU-TMU-112-01, 2023/01/01~2023/12/31
5. **Metaverse Avatar Automatic Metadata Generation Module**
 - FormosaVerse x NTPU, NTPU-111A413E01, 2022/12/01~2023/11/30
6. **Establishment and Implement of Smart Assistive Technology for Dementia Care and Its Socio-Economic Impacts.** Intelligent, individualized and precise care with smart AT and system integration
 - MOST, 111-2627-M-038-001-, 2022/08/01~2023/07/31

Summary

- This course introduces the **fundamental concepts, research issues, and hands-on practices of Big Data Analysis.**
- Topics include:
 1. Introduction to Big Data Analysis
 2. AI, Data Science and Big Data Analysis
 3. Foundations of Big Data Analysis in Python
 4. Machine Learning: SAS Viya, Data Preparation and Algorithm Selection
 5. Machine Learning: Decision Trees and Ensembles of Trees
 6. Machine Learning: Neural Networks (NN) and Support Vector Machines (SVM)
 7. Machine Learning: Model Assessment and Deployment
 8. ChatGPT and Large Language Models (LLM) for Big Data Analysis
 9. Deep Learning for Finance Big Data Analysis
 10. Case Study on Big Data Analysis



Big Data Analysis

aws educate | Cloud Ambassador

2020 Cohort

aws academy

Accredited Educator

aws certified

Solutions Architect
Associate

aws certified

Cloud Practitioner

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[Institute of Information Management, National Taipei University](#)

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