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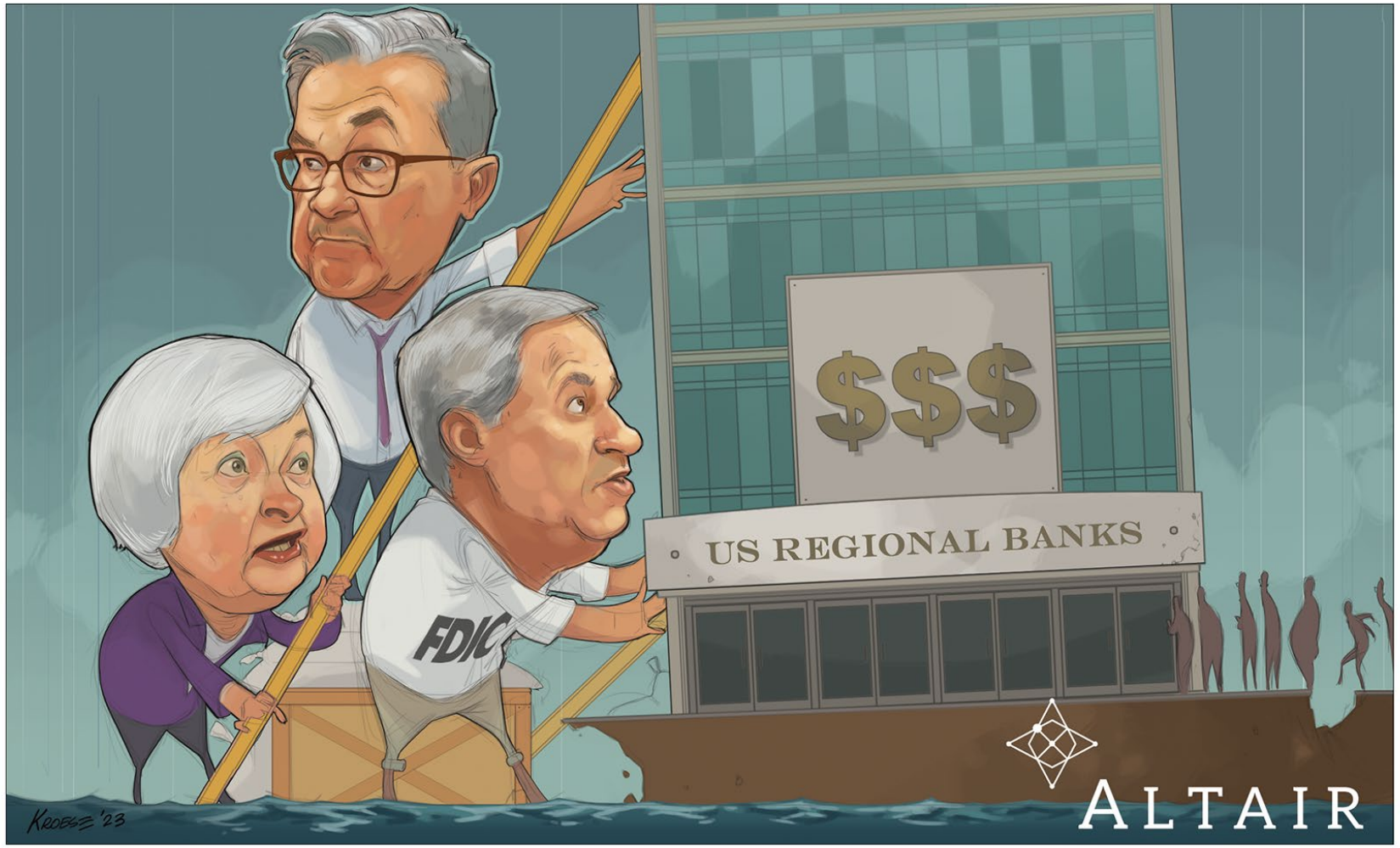
Investment Forum

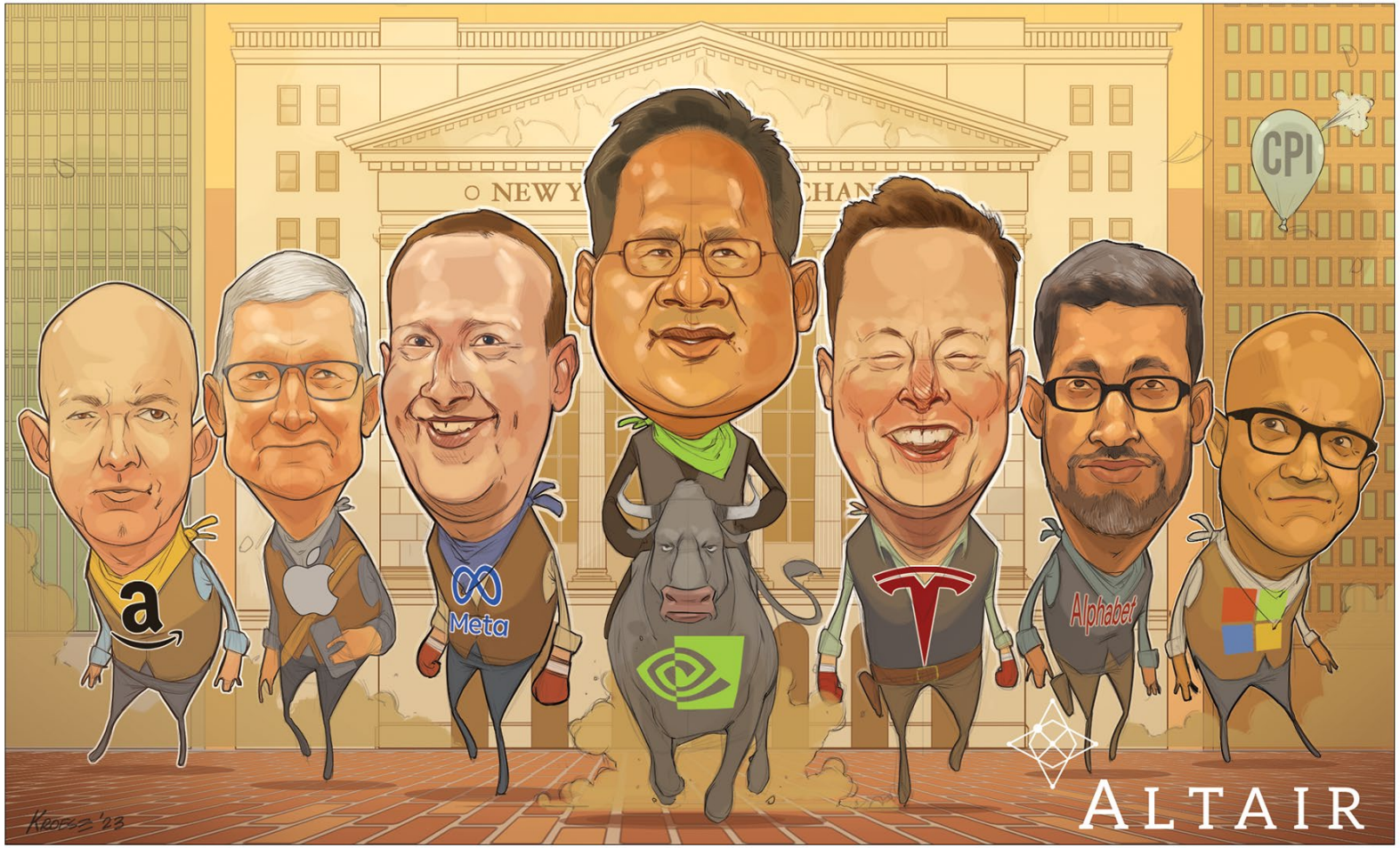
November 8, 2023

Feds to the Rescue



See disclosures at end of document. Sources: Altair Advisers, Noah Kroese Illustration for Altair Advisers

Magnificent (Seven) Rally



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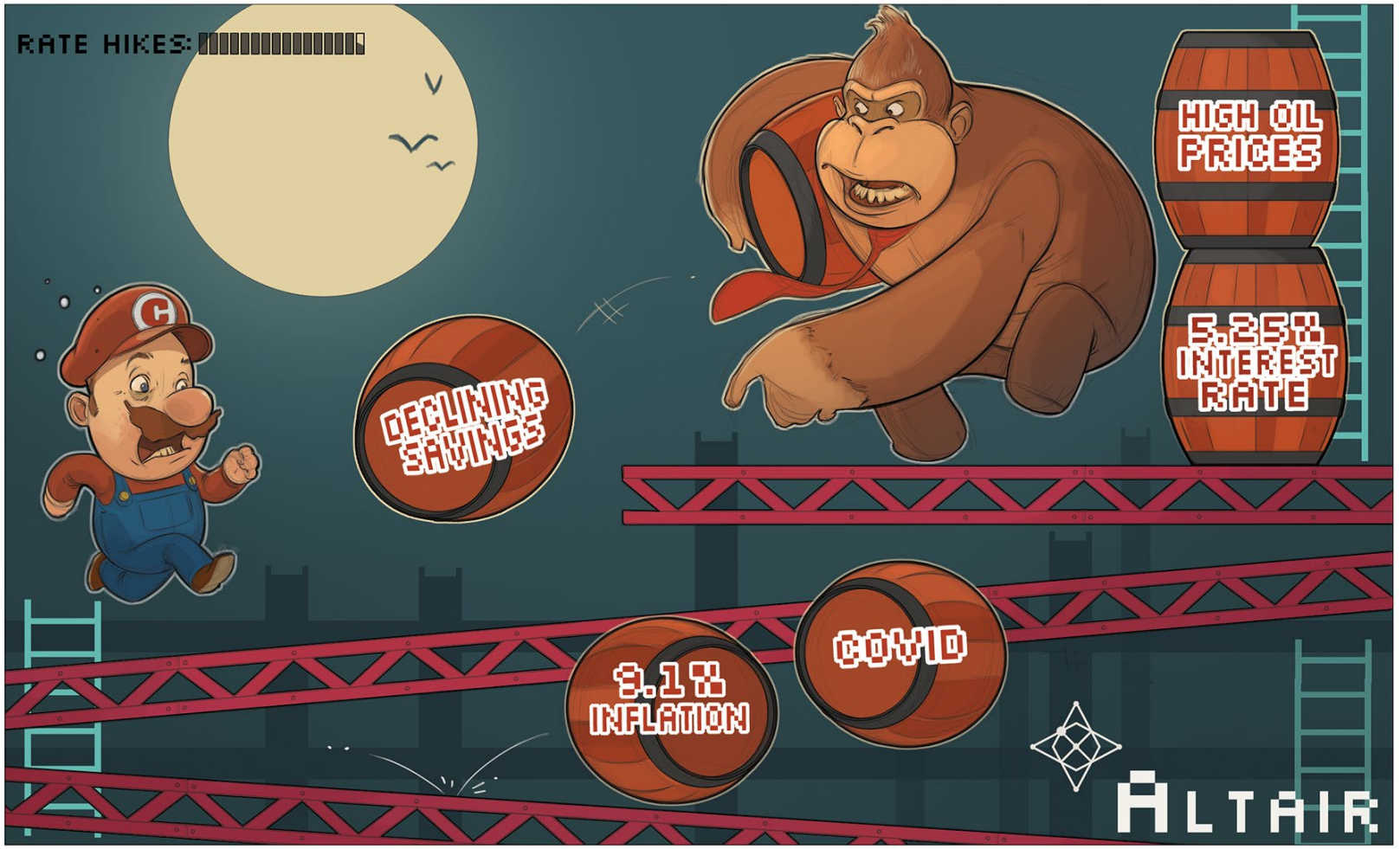
Consumer Continues To Be Tested



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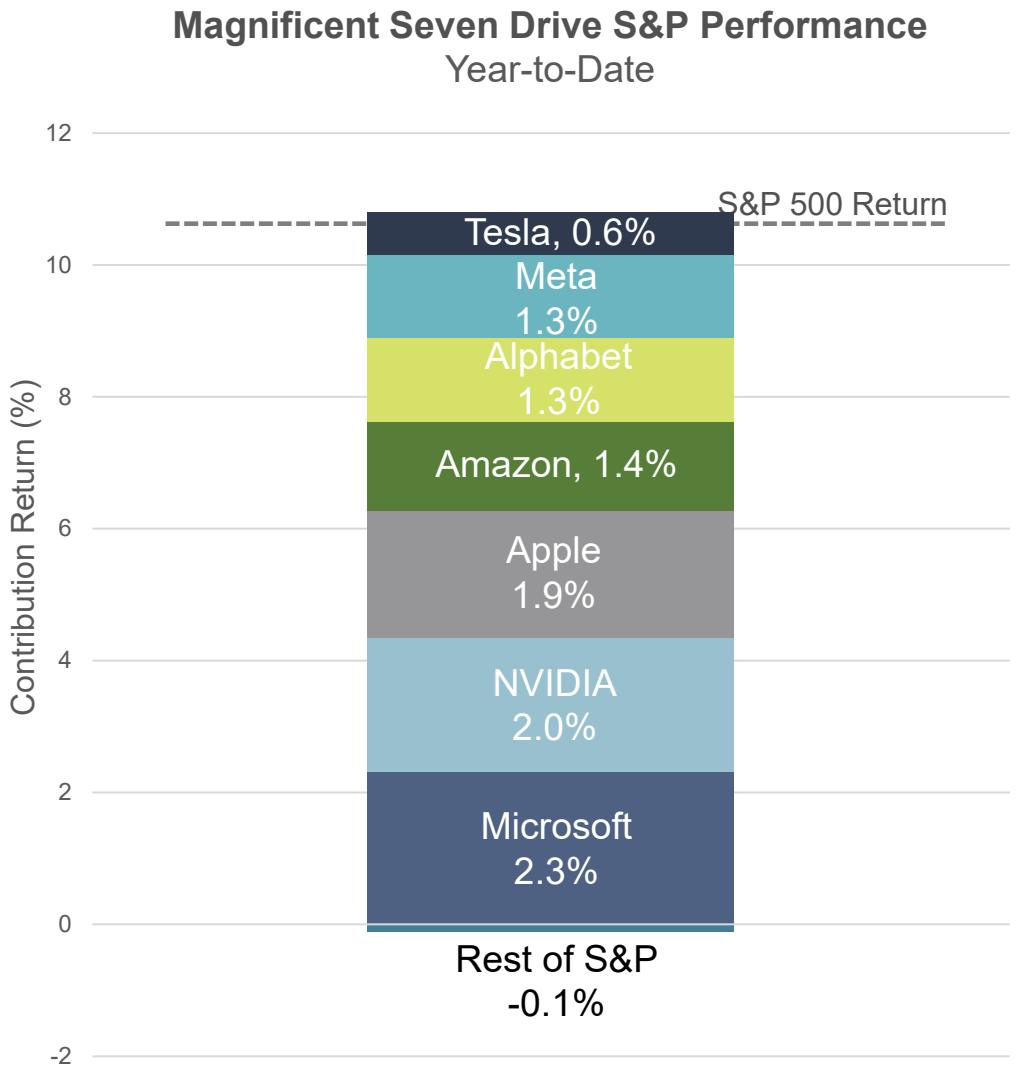
Select Market Returns

Markets	2023 YTD (%)
iShares Core S&P 500 (large cap)	10.6
Russell 1000 Growth ETF (large growth)	23.0
Russell 1000 Value ETF (large value)	-1.9
iShares Russell 2000 (small cap)	-4.6
iShares MSCI EAFE (international)	3.8
iShares MSCI EM (emerging markets)	-2.4
Vanguard REIT Index Fund (real estate)	-8.7
Vanguard Global ex-US REIT Index Fund (real estate)	-10.2
Vanguard Total Bond Market ETF (taxable)	-2.4
Market Vectors Sh/Inter Muni ETF (municipal)	-1.0

As of October 31, 2023

See disclosures at end of document. Sources: Altair Advisers, Morningstar

Technology, Growth and Mega-Caps are Powering the Market



As of October 31, 2023

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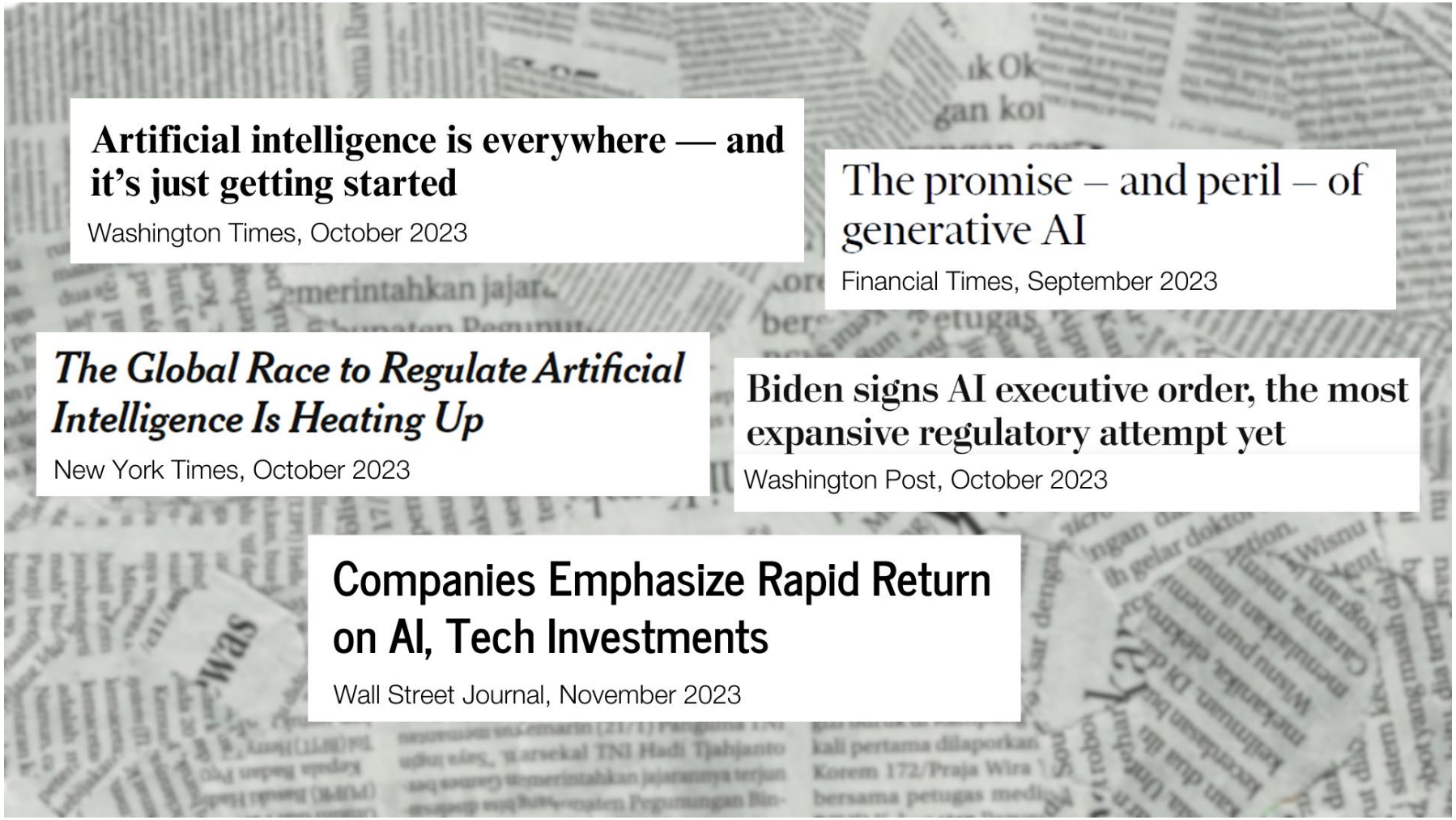
Artificial Intelligence in the News



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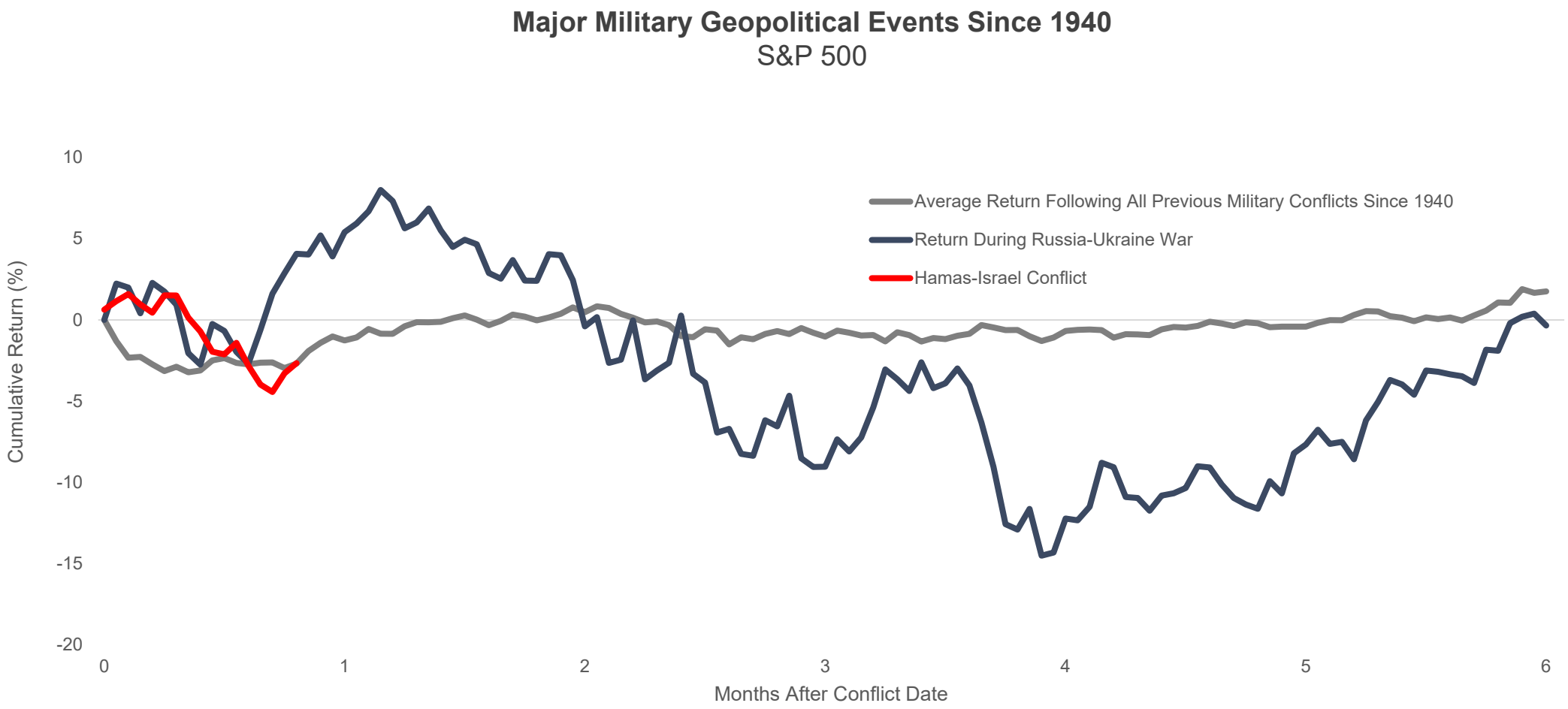
Market Disruption From Wars Usually Short-Lived



As of October 31, 2023

See disclosures at end of document. Source: Altair Advisers, Morningstar

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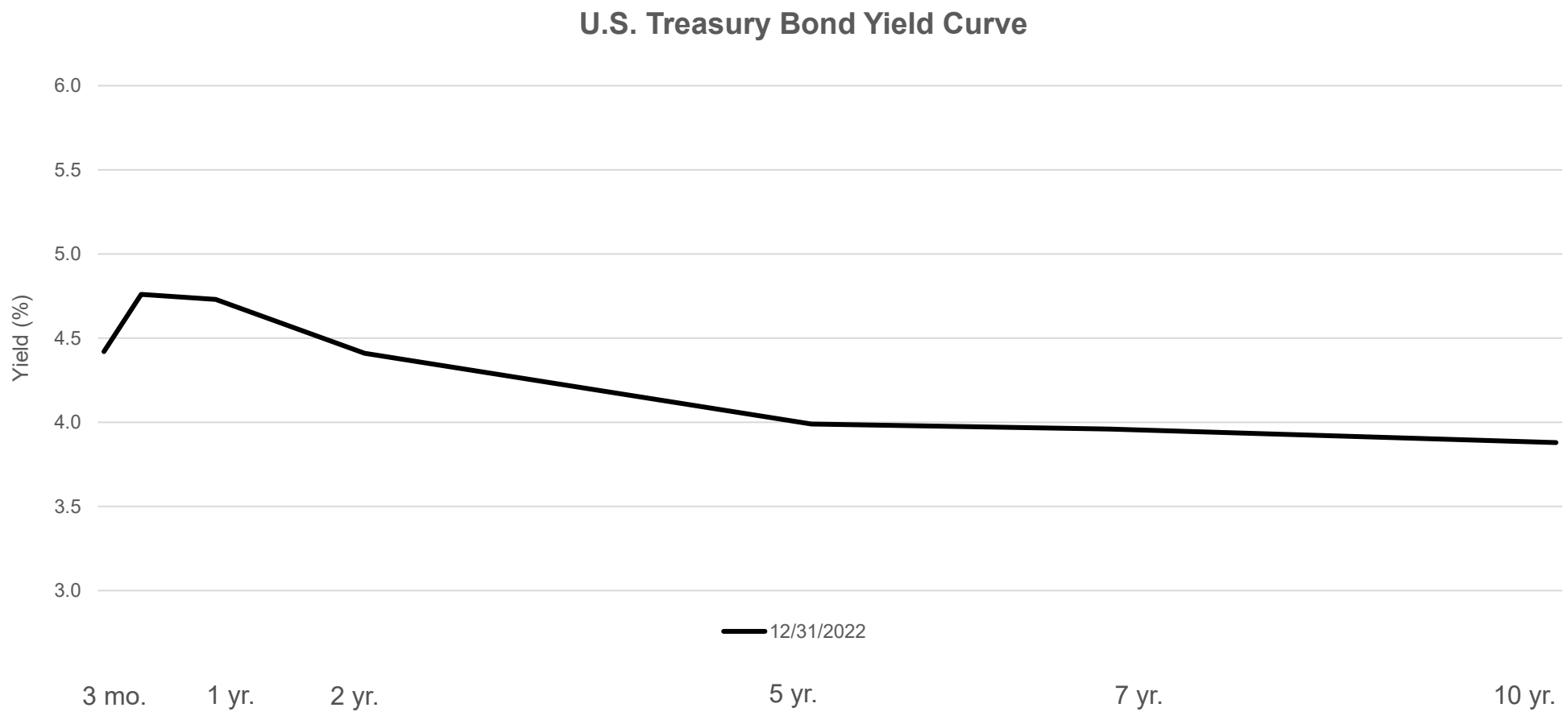
… And Oil Price Surges Tend to Reverse Within Months

Major Military Geopolitical Events Since 1990
WTI Crude Oil

	Start Date	1-Week	1-Month	6-Month
Iraq Invades Kuwait	8/2/1990	8.4%	23.6%	1.6%
Gulf War I	1/17/1991	19.3%	-6.5%	-0.2%
Gorbachev Coup	8/19/1991	-2.3%	-3.2%	-11.5%
9/11 Attacks	9/11/2001	-8.0%	-20.4%	-13.7%
Gulf War II	3/20/2003	5.9%	4.5%	2.8%
Russia Invades Georgia	8/1/2008	-7.7%	-12.5%	-63.9%
Russia Invades Crimea	2/20/2014	-0.5%	-3.1%	-5.7%
Russia Invades Ukraine	2/24/2022	16.1%	15.9%	-10.3%
Average		**3.9%**	**-0.2%**	**-12.6%**
Hamas-Israel Conflict	10/7/2023	5.8%	?	?

See disclosures at end of document. Source: Altair Advisers, Morningstar

Bond Yields Have Risen Substantially



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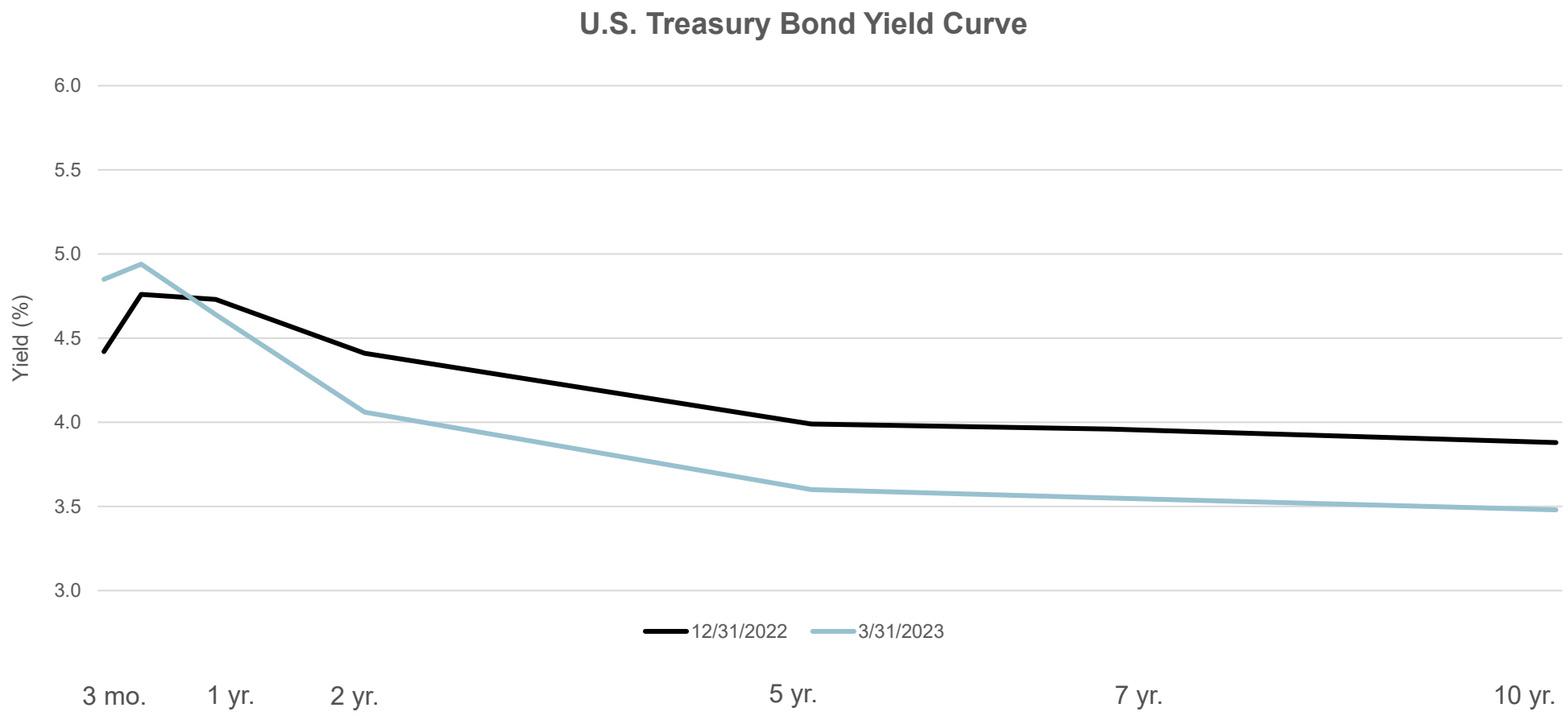

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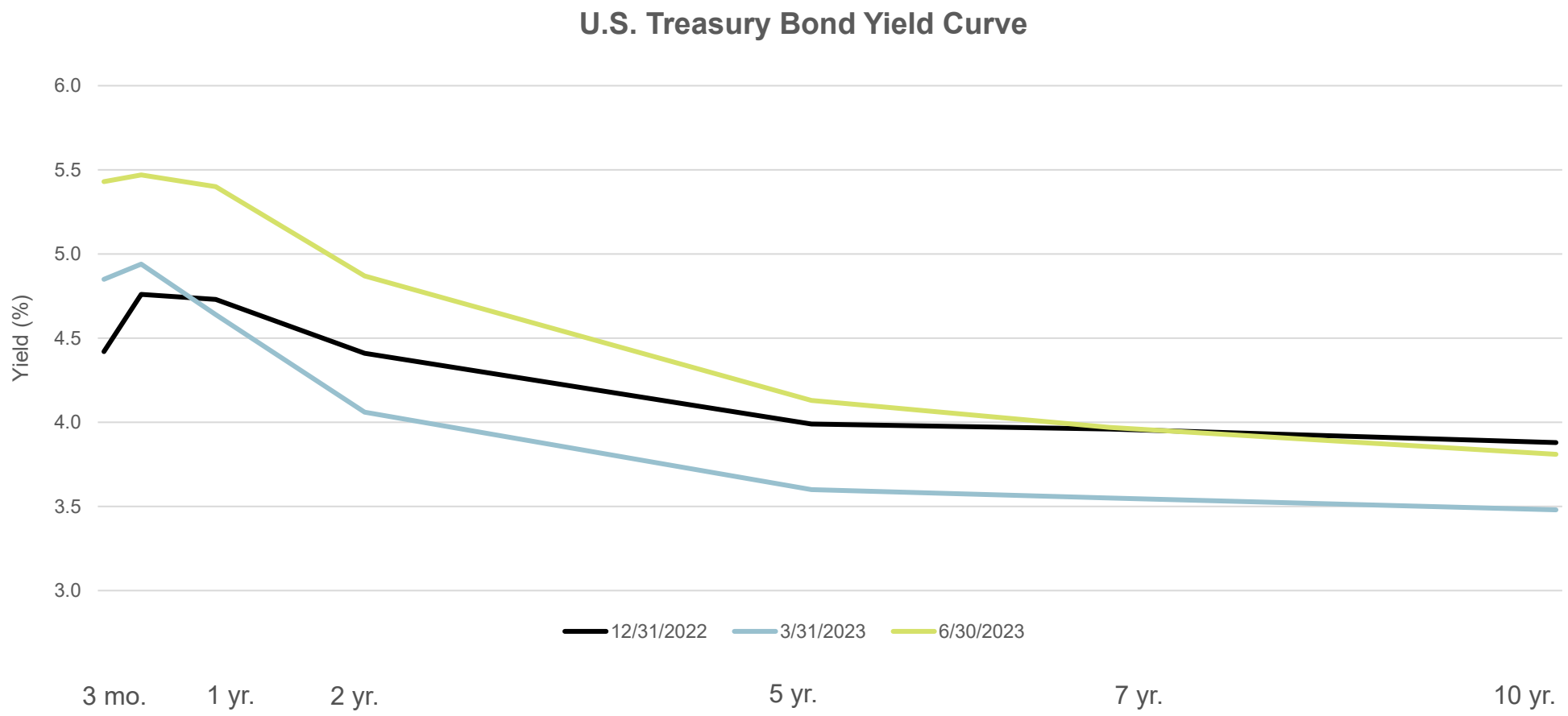
Bond Yields Have Risen Substantially



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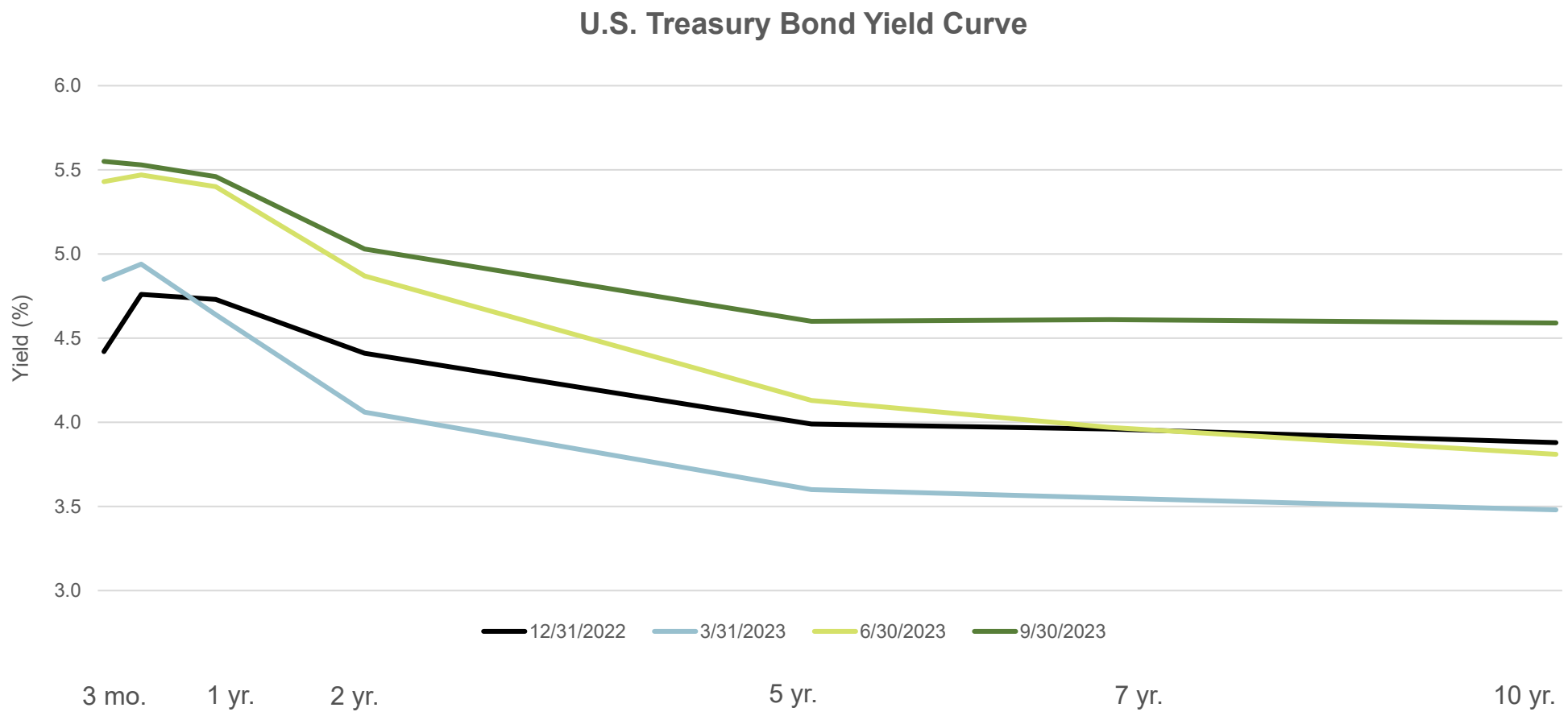
Bond Yields Have Risen Substantially



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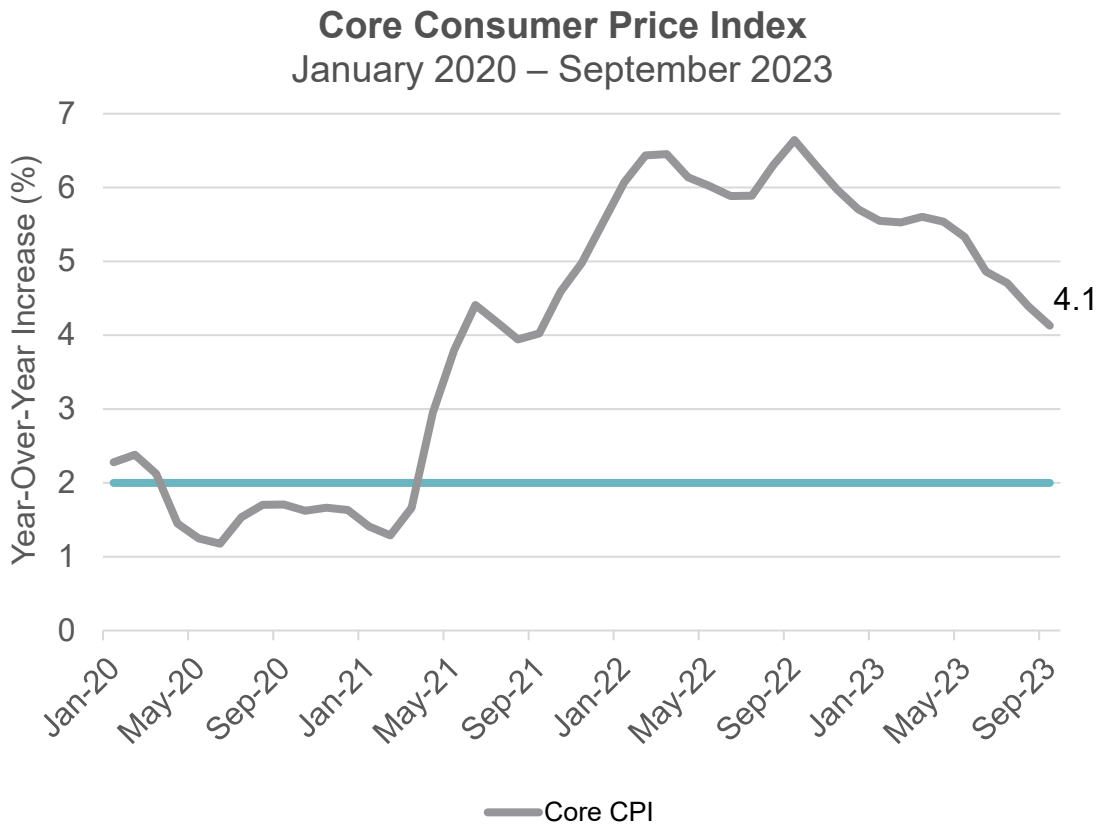
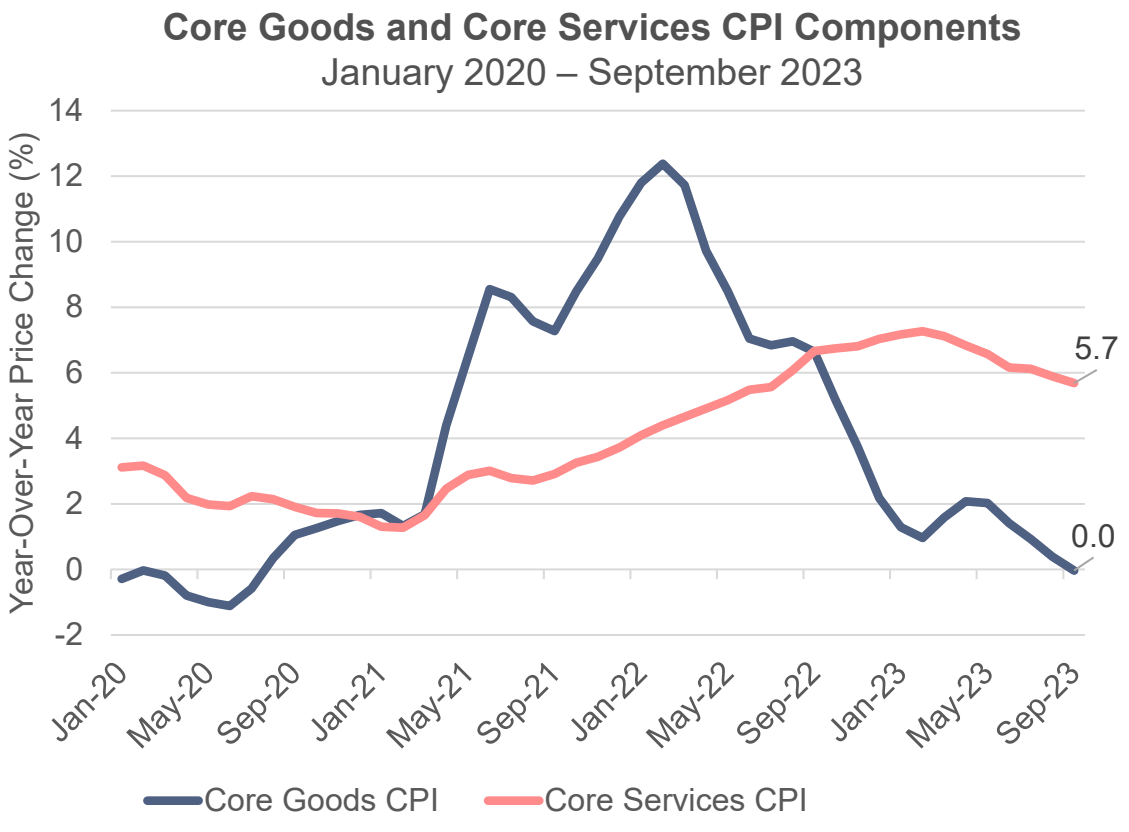
Inflation's Downward Trend is Bumpy But Progressing





See disclosures at end of document. Sources: St. Louis Federal Reserve

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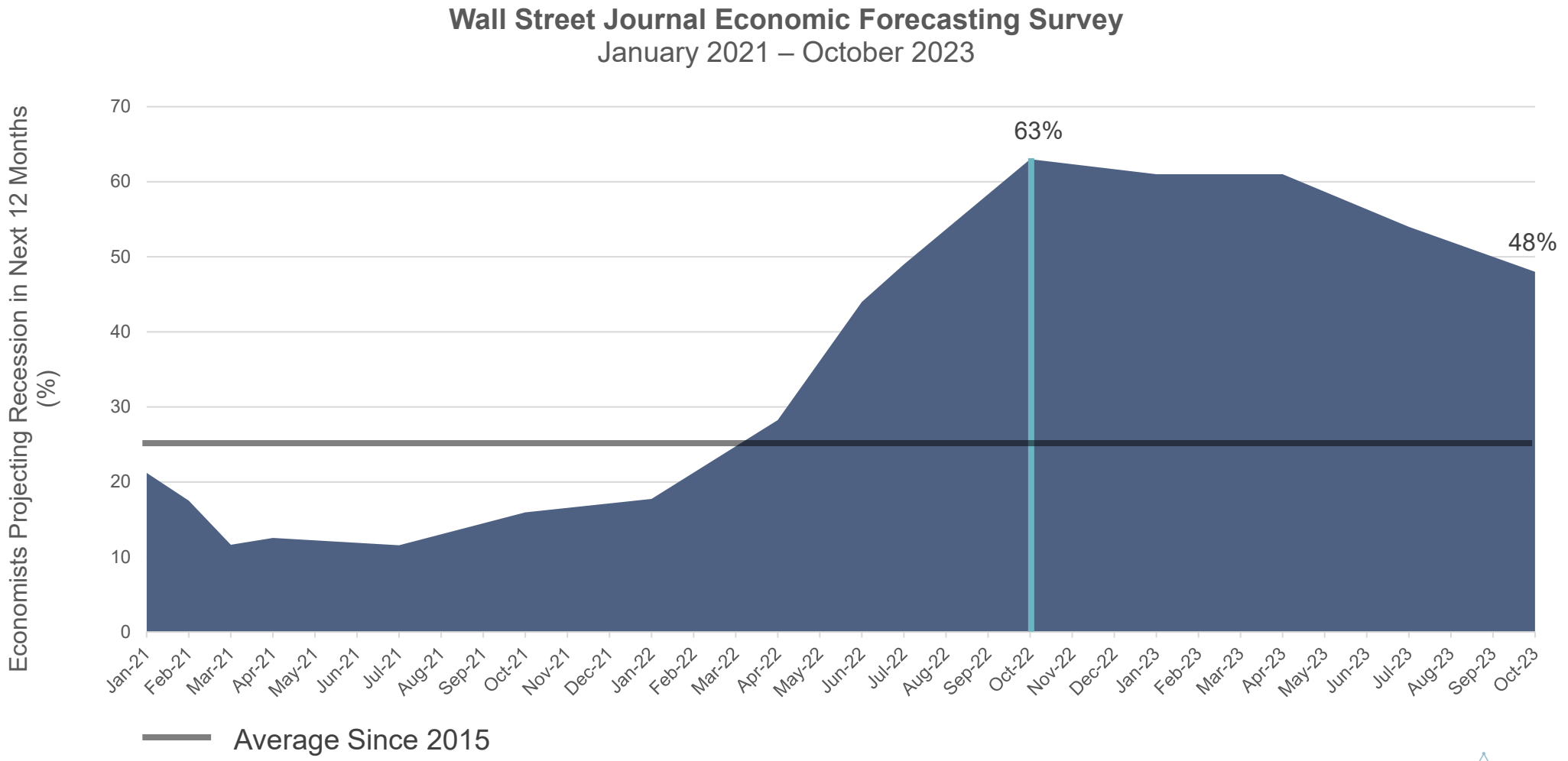
The Experts Aren't Always Right



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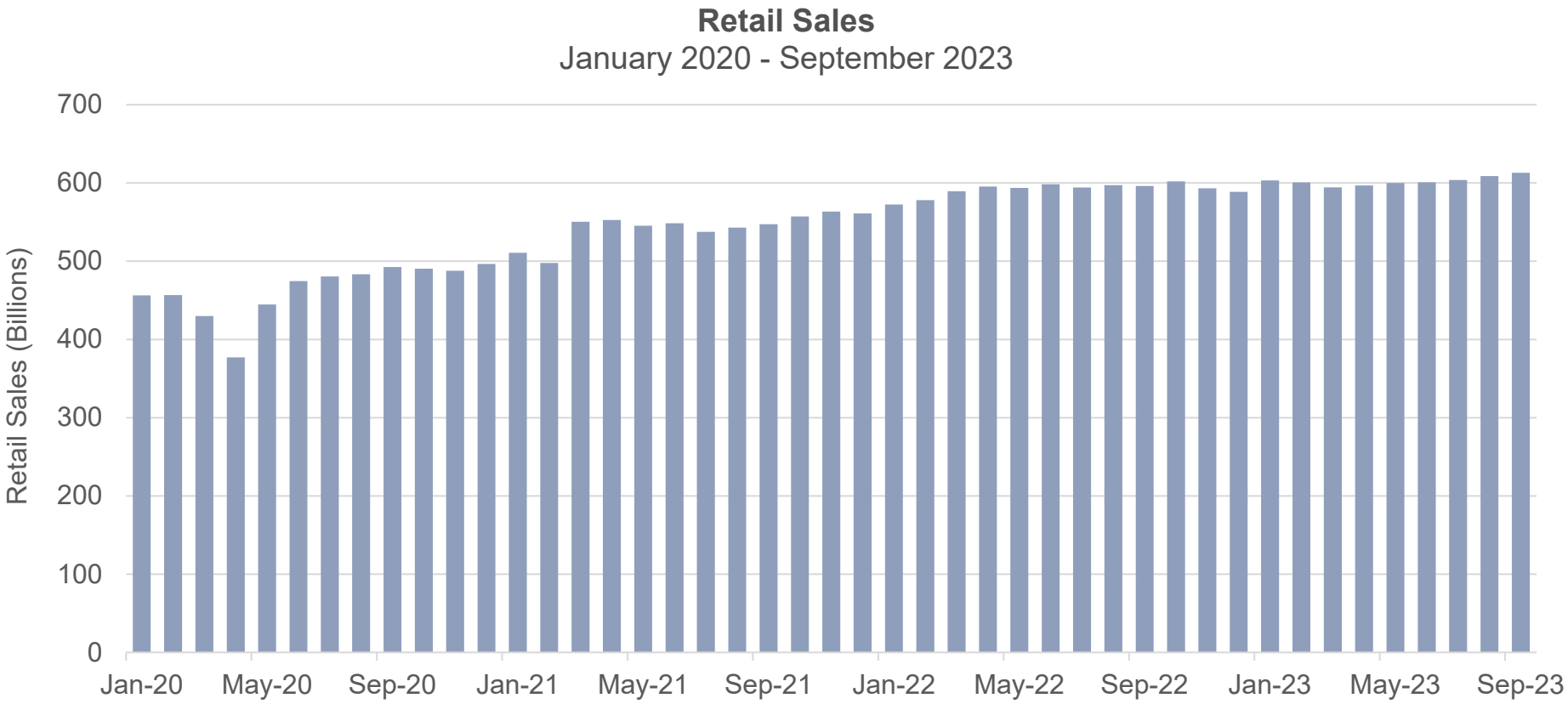
Consumers Have Kept Spending



See disclosures at end of document. Sources: St. Louis Federal Reserve

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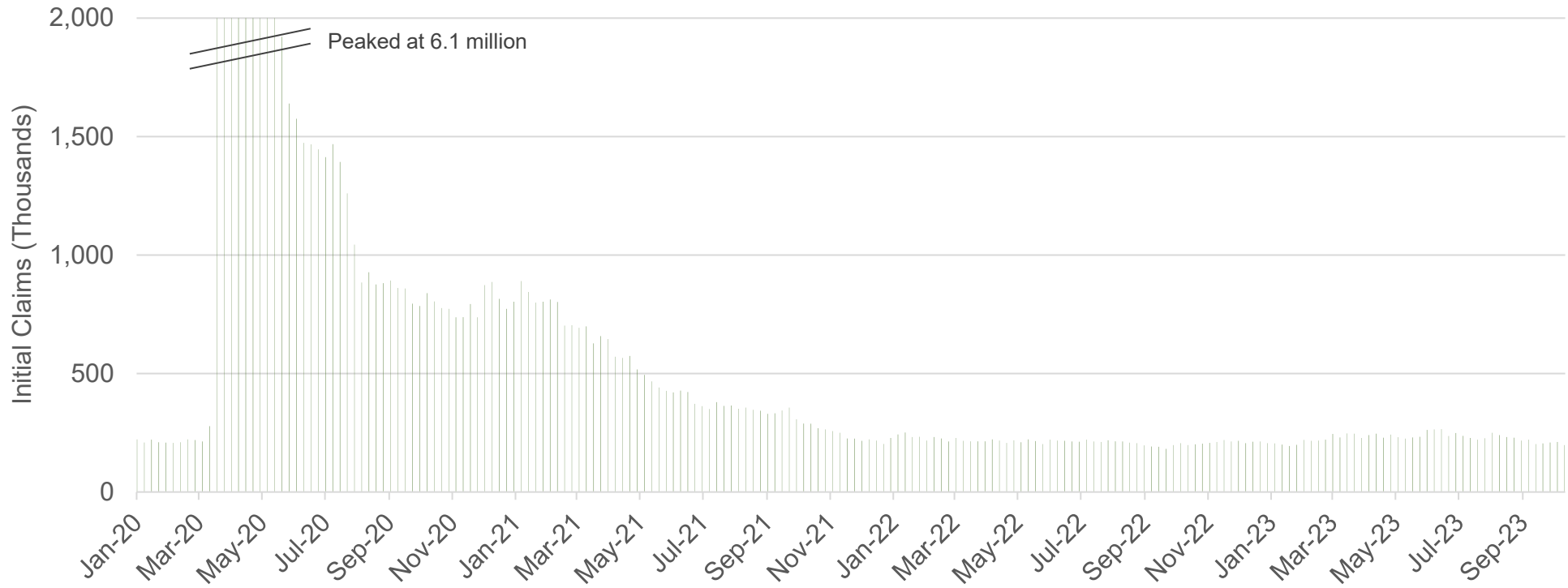
Job Market's Resilience Has Surpassed Expectations

Initial Jobless Claims
January 2020 - October 2023



See disclosures at end of document. Source: St. Louis Federal Reserve

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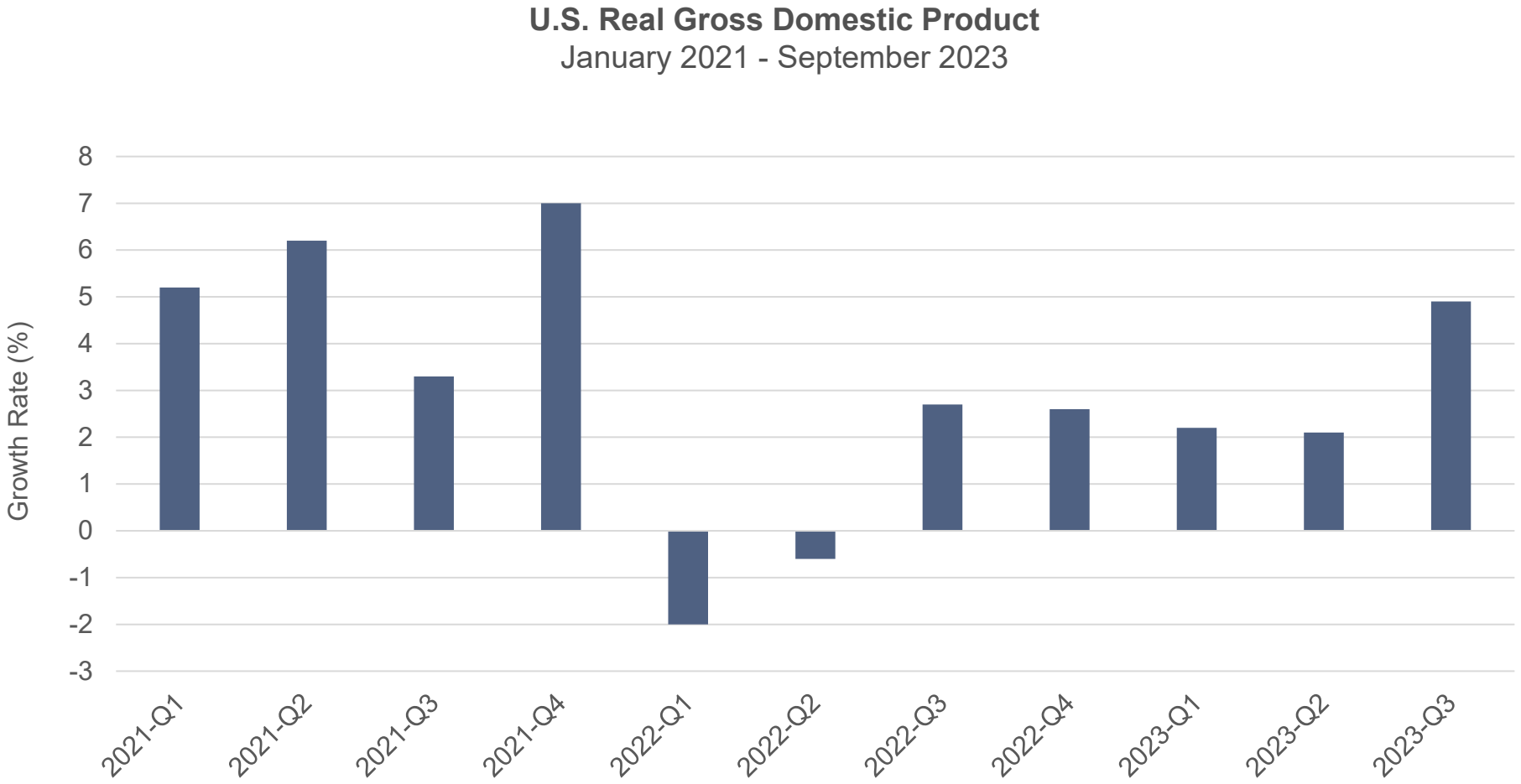
Strong U.S. Economic Growth Persists



See disclosures at end of document. Source: Bureau of Economic Analysis

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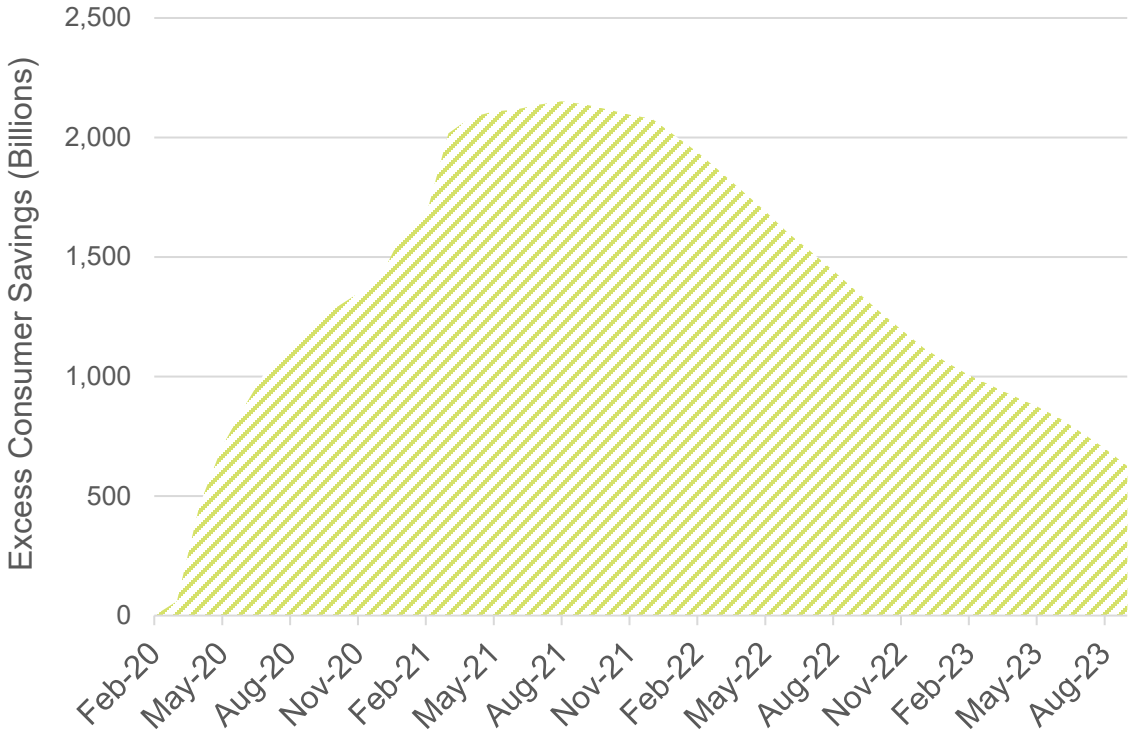
Consumers Starting to Feel the Pressure

Mortgage Rates Hit Highest Level Since 2001
January 2000 - October 2023

Excess Savings Dwindle
February 2020 - September 2023



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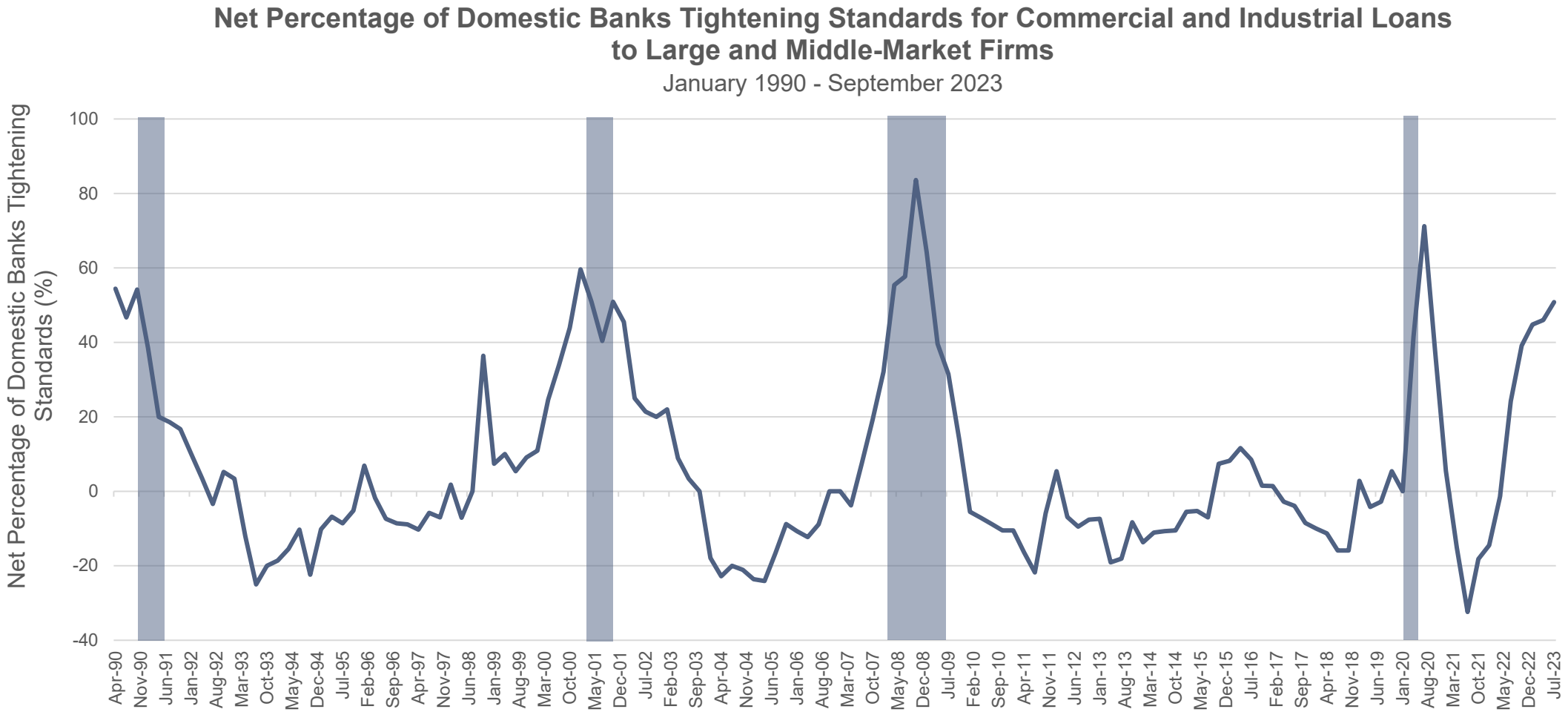
Credit Conditions Are Tightening



See disclosures at end of document. Source: St. Louis Federal Reserve

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Return To Positive Earnings Growth Expected

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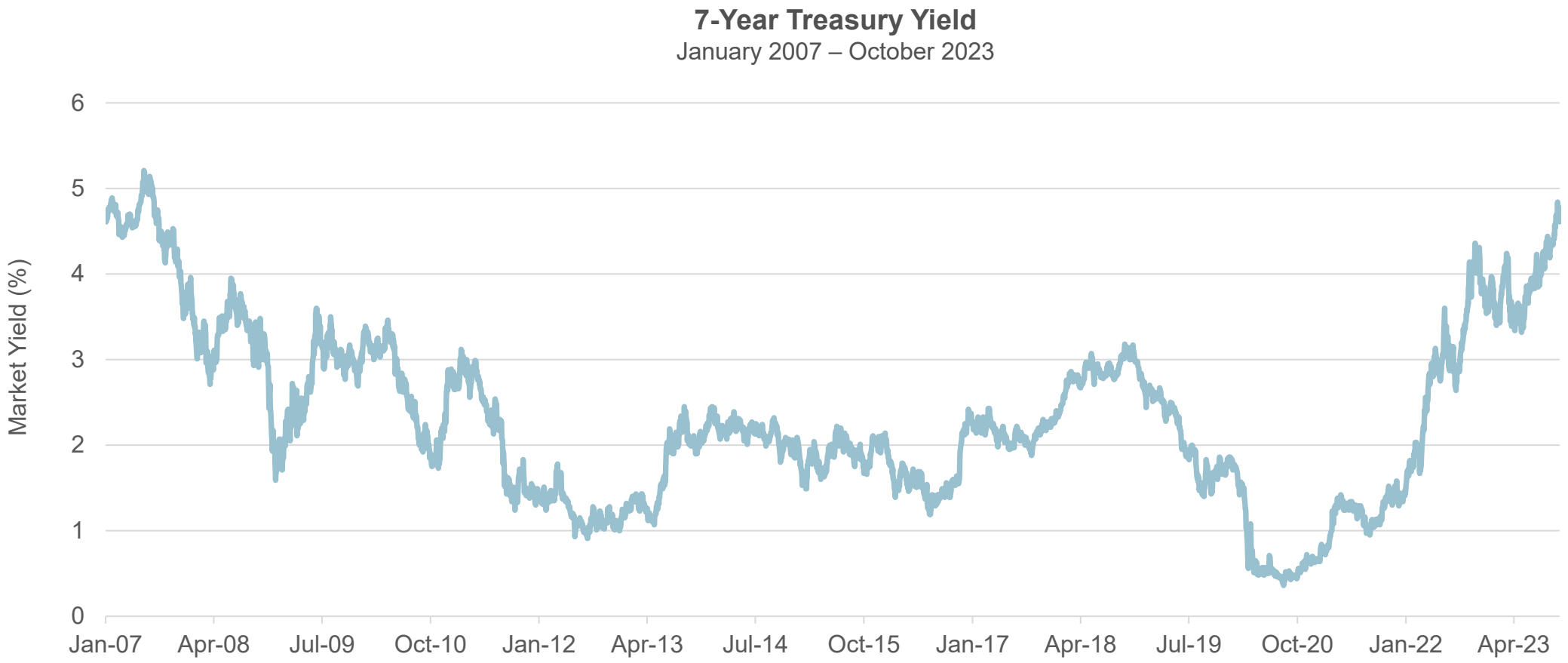
Treasury Yields Are Near 20-Year Highs



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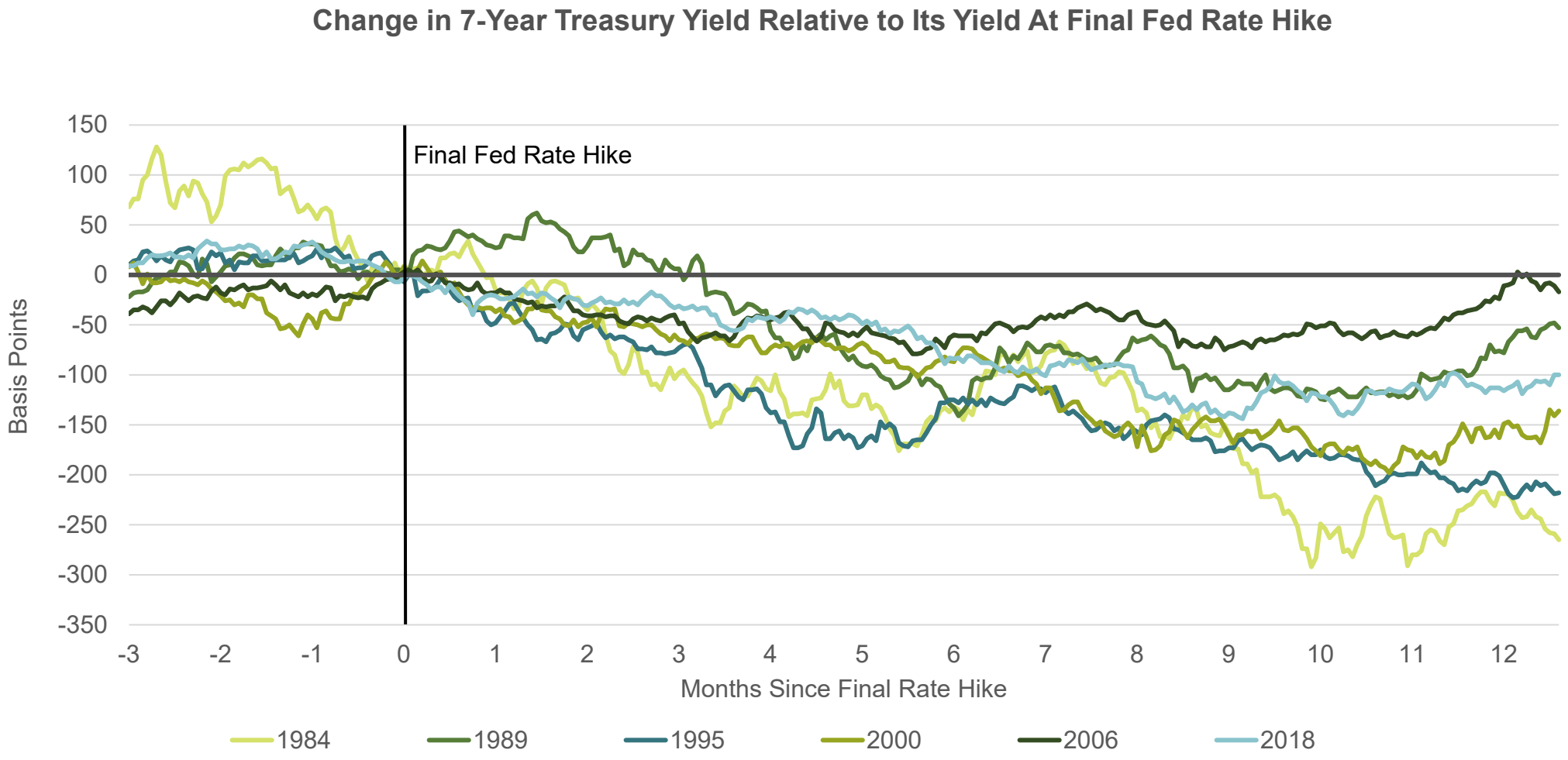
Treasury Yields Historically Peak Around the Last Rate Hike



Forward-looking statements may not come true. See disclosures at end of document.
Sources: Treasury.gov, St. Louis Federal Reserve

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Recap

A first-half market rally driven by enthusiasm for AI and ‘Magnificent 7’ stocks has since faltered.

The Israel-Hamas war has raised global risk. Markets have historically held mostly stable in conflicts.

The Fed’s interest rate hikes have caused a surge in bond yields that may finally be easing.

Inflation has slowed its downward progress but is trending gradually back toward a normal level.

Consumers and the job market have buoyed the economy, but tightening conditions pose tests ahead.

The sharp rise in yields has created an opportunity for bond investors to lock in higher long-term rates.

Forward-looking statements may not come true. See disclosures at end of document. Source: Altair Advisers

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ETFs and mutual funds selected by Altair are intended to approximate the performance of the respective asset class in lieu of an established index. An ETF or mutual fund is generally managed by an adviser and, therefore, can be subject to human judgment while an index is typically comprised of an unmanaged basket of instruments designed to measure the performance attributes of a specific investment category. Unlike indices, the ETFs and mutual funds selected incorporate fees into their performance calculations. There can be no assurance that an ETF or mutual fund will yield the same result as an index. Altair has no relationship with the ETFs and mutual funds selected.

The Municipal Bonds Benchmark consists of 65% VanEck Short Muni ETF and 35% VanEck Intermediate Muni ETF.

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CENTER FOR **ADVANCING SAFETY OF MACHINE INTELLIGENCE**

Artificial Intelligence

Kristian Hammond
Computer Science
Northwestern University

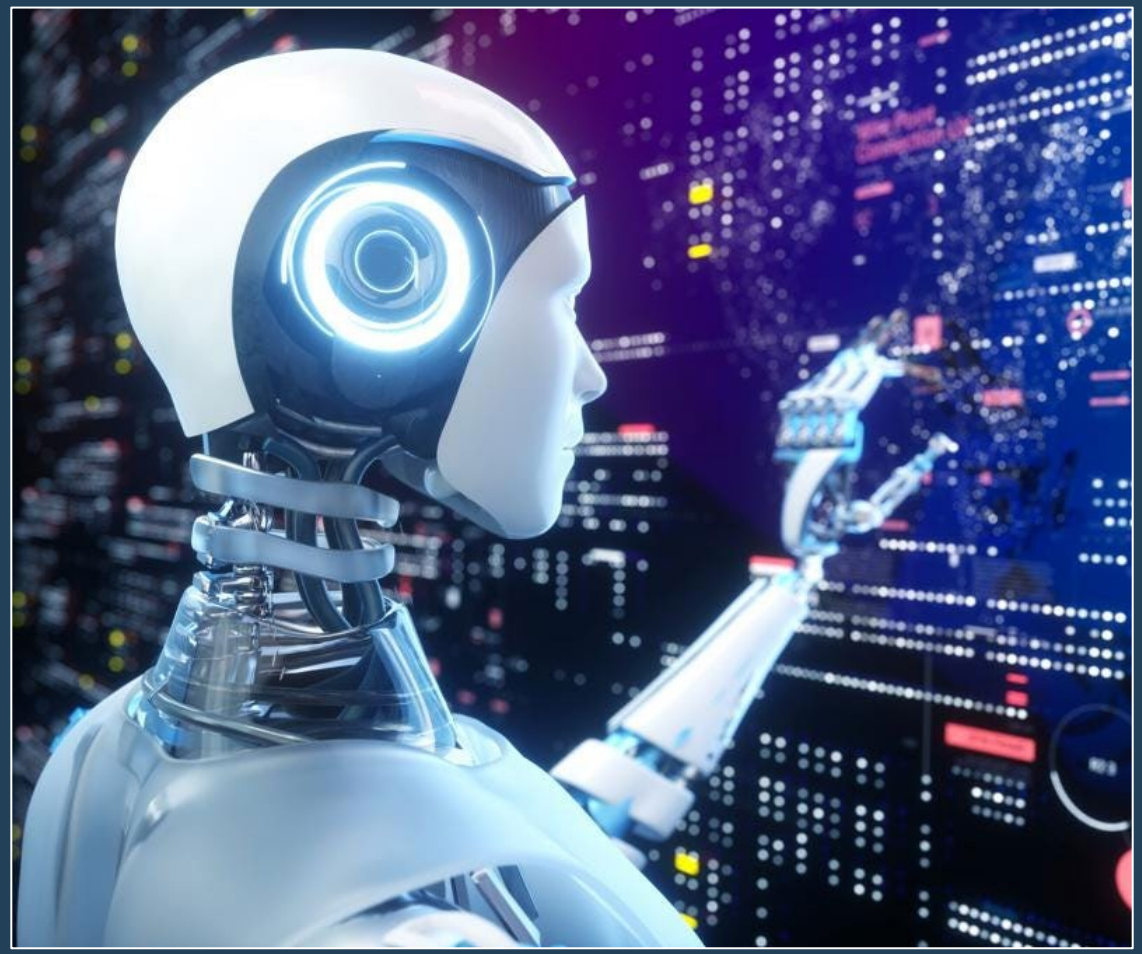
Northwestern | McCORMICK SCHOOL OF ENGINEERING

Professor, Computer Science

narrative science

Co-Founder, Chief Scientist

UNIDIR
UNITED NATIONS INSTITUTE FOR DISARMAMENT RESEARCH



- The Landscape
- The New Landscape
- The Impact

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Framing: The Questions

How reliable are the emerging technologies, products, and companies?

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Framing: The Questions

Are you going to fall behind?

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Framing: The Questions

Are you going to misstep by moving too quickly?

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Framing: The Questions

How to navigate this rapidly changing world of AI?

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Dealing with the possibilities

Don’t focus on the technology

Focus on the functionality

- The functionality is driven by business needs
- The functionality is supported by algorithms & data
- The algorithms are instrumental to business

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The Landscape

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AI has become an integral part of our business eco-system

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- Machine Learning
- Natural Language Processing
- Deep Learning
- Facial Recognition
- Voice Recognition
- Language Generation
- Speech Generation
- Recommendation Systems
- Robotics
- Self Driving Vehicles
- Personal Assistants
- Predictive Systems

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Why now?

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All of this is driven by the ability machine's ability to learn from the past to characterize the present and predict the future.

Nearly all of the work in AI we see today is based on successes in Machine Learning

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Why today?

We finally have the data required for our machines to learn.

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Big Data succeeded!

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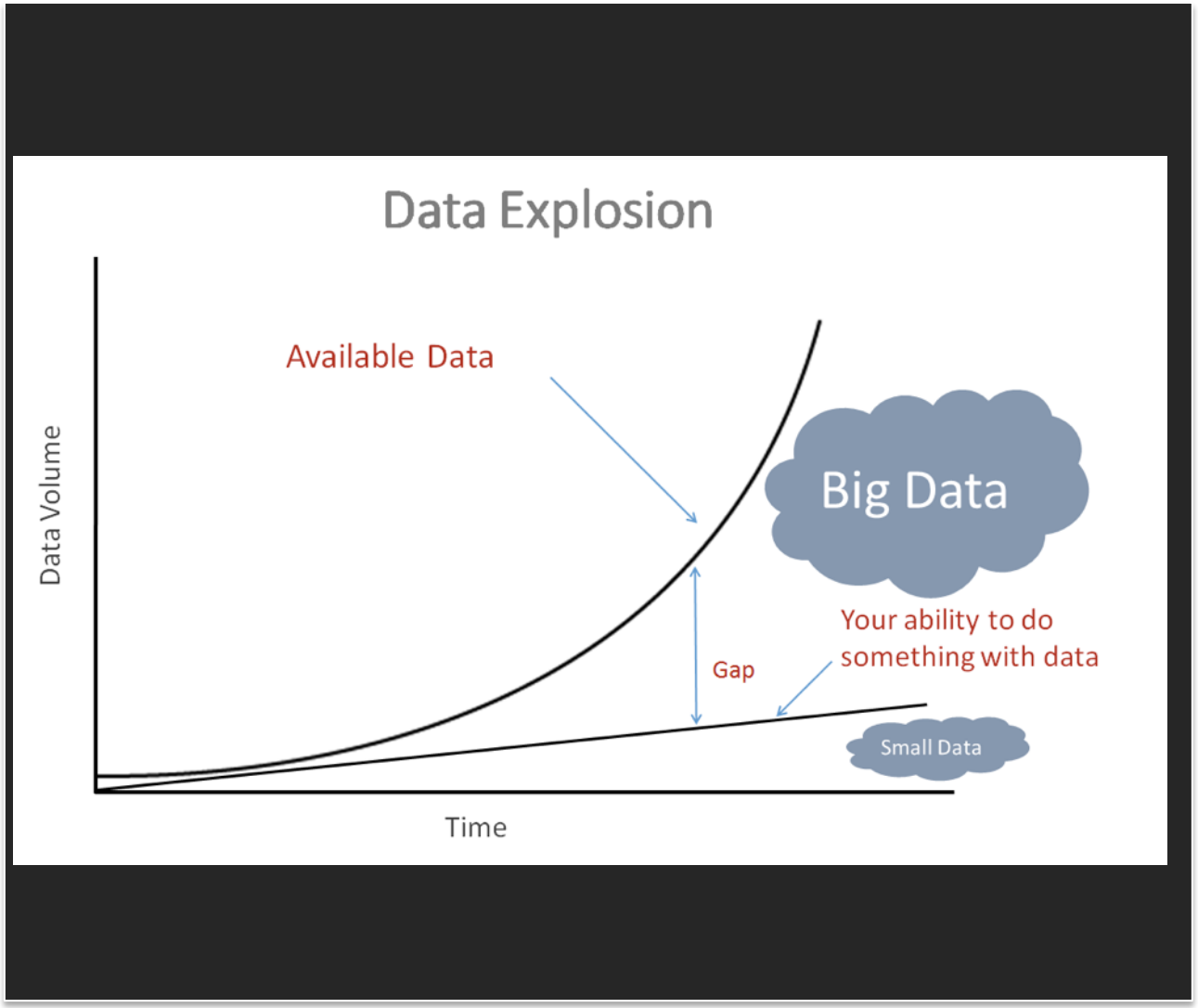

Big Data Failed!

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The problem empowered the solution

Data became the problem

DEEP LEARNING

EVIDENCE-BASED REASONING

STATISTICAL MACHINE LEARNING

RECOMMENDATION SYSTEMS

TEXT ANALYSIS

NATURAL LANGUAGE GENERATION

ROBOTIC PROCESS AUTOMATION

CHAT/CONVERSATIONAL INTERFACES

AI has become an integral part of our business eco-system

All of you have interacted with AI at least a few times already today

Machine Learning

Natural Language Processing

Facial Recognition

Voice Recognition

Language Generation

Speech Generation

Recommendation Systems

Robotics

Self Driving Vehicles

Personal Assistants

Predictive Systems

Amazon Aurora
Amazon Kinesis
AWS Lambda
talend
rapidminer
Stream Analytics
ECLIPSE FOUNDATION
Azure Data Catalog
mongoDB
KNIME
hadoop HDFS
Grafana
jupyter
cassandra
confluent
APACHE STORM
Azure Data Explorer
Azure ML
Solr
DATASTAX
Amazon RDS
databricks
Azure Analysis Services
Amazon SNS
Amazon CloudWatch
HDInsight
SQL Data Warehouse
alteryx
Cloud Spanner
Amazon S3
Amazon SageMaker
sas
AWS Lake Formation
TensorFlow
Amazon API Gateway
IBM MQ
Amazon Firehose
NVIDIA
H2O.ai
TIBCO
Search
Amazon DynamoDB
Azure Event Hubs
tableau
OOZIE
kafka
Apache Ambari
DOMO
DataRobot
Azure Data Lake
HIVE
AWS IoT Events
Azure Blob
MicroStrategy
skymind
cloudera
APACHE Spark
Azure Data Lake
AWS IoT
Amazon SQS
Azure Data Factory
Amazon CloudFront
Qlik
AWS CloudTrail
Elastic Load Balancing
HORTONWORKS
AWS CloudFormation

That was yesterday

But that was yesterday

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This is today

- **Launched** - November 30th, 2022
- **1 Million Users** - December 4th, 2022
- **100 Million Users** - January 31st, 2023
- **1 billion** monthly visitors in under 3 months

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The Hype

Inc.

LEADING TECH

ChatGPT's Conversation
Will Change the Way Bus
Operate Why OpenAI's product

BY MARC EMMER, STRATEGY AND STRATEGIC PLANNING EXPERT @MARCEM

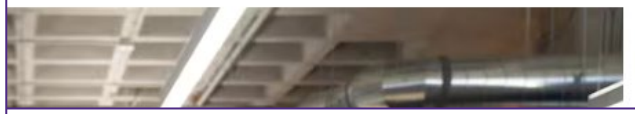
The New York Times

OPINION
DAVID BROOKS

'Human Beings Are Soon Going to Be Eclipsed'

July 13, 2023

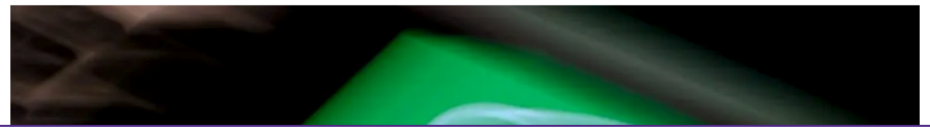
or not, AI is coming



OPINION
MAS L. FRIEDMAN

omethean Moment

March 21, 2023



MIT Technology Review

Featured Topics New

ARTIFICIAL INTELLIGENCE

ChatGPT is about to revolutionize the economy. We need to decide what that looks like.

New large language models will transform many jobs. Whether they will lead to widespread prosperity or not is up to us.

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The skeptics

Bloomberg

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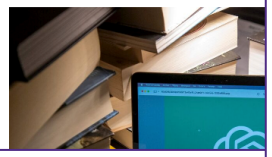
Opinion
Columnist

There's No Such Intelligence

The term breeds misunderstanding a



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A theoretical physicist says AI is just a 'glorified tape recorder' and people's fears about it are overblown

Sawdah Bhaimiya Aug 14, 2023, 6:33 AM CDT

Advertisement

The New York Times

OPINION
GUEST ESSAY

y: The False Promise ChatGPT

March 8, 2023

HOME · COMPUTING · NEWS

The AI expert at Meta harsh criticism of Cha

By Alan Truly
January 23, 2023

Listen to article 3 minutes

Yann LeCun, Meta's chief AI scientist, is not impressed by ChatGPT, the wildly popular artificial intelligence technology that is making headlines daily.

Newsletter

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GPT is not the "holy

Silicon Valley is agog over the capabilities of ChatGPT. They shouldn't be

By JEFFREY LEE FUNK - GARY N. SMITH

PUBLISHED MARCH 19, 2023 10:00AM (EDT)

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The fear mongers

STEPHEN THOMAS IDEAS APR 21, 2023 9:00 AM

Who Will You Be After ChatGPT Takes Your Job?

Generative AI is coming for white-collar roles. If your sense of worth comes from work—what's left to hold on to?

'The Godfather of A.I.' Leaves Google and Warns of Danger

A.I. and Chatbots › | How Schools Can Survive A.I. | When Will the U.S. Regulate A.I.? | Smart Ways to Use Chatbots | Can A.I. Be Fooled?

A.I. Poses 'Risk of Extinction,' Industry Leaders Warn

Leaders from OpenAI, Google DeepMind, Anthropic and other A.I. labs warn that future systems could be as deadly as pandemics and nuclear weapons.

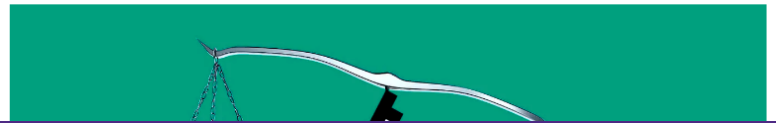
AXIOS

SIGN IN

Silicon Valley is knowingly violating ethical A.I. principles. Society can't respond if we let disagreements poison the debate

BY WENDELL WALLACH

May 23, 2023 at 6:43 AM CDT



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There are Two Sides to Every Story

Somewhere in the middle lies the truth.

But…

ChatGPT is not:

- Smarter than you
- The answer to all problems
- An existential threat to humanity

ChatGPT is:

- An incredibly useful language tool

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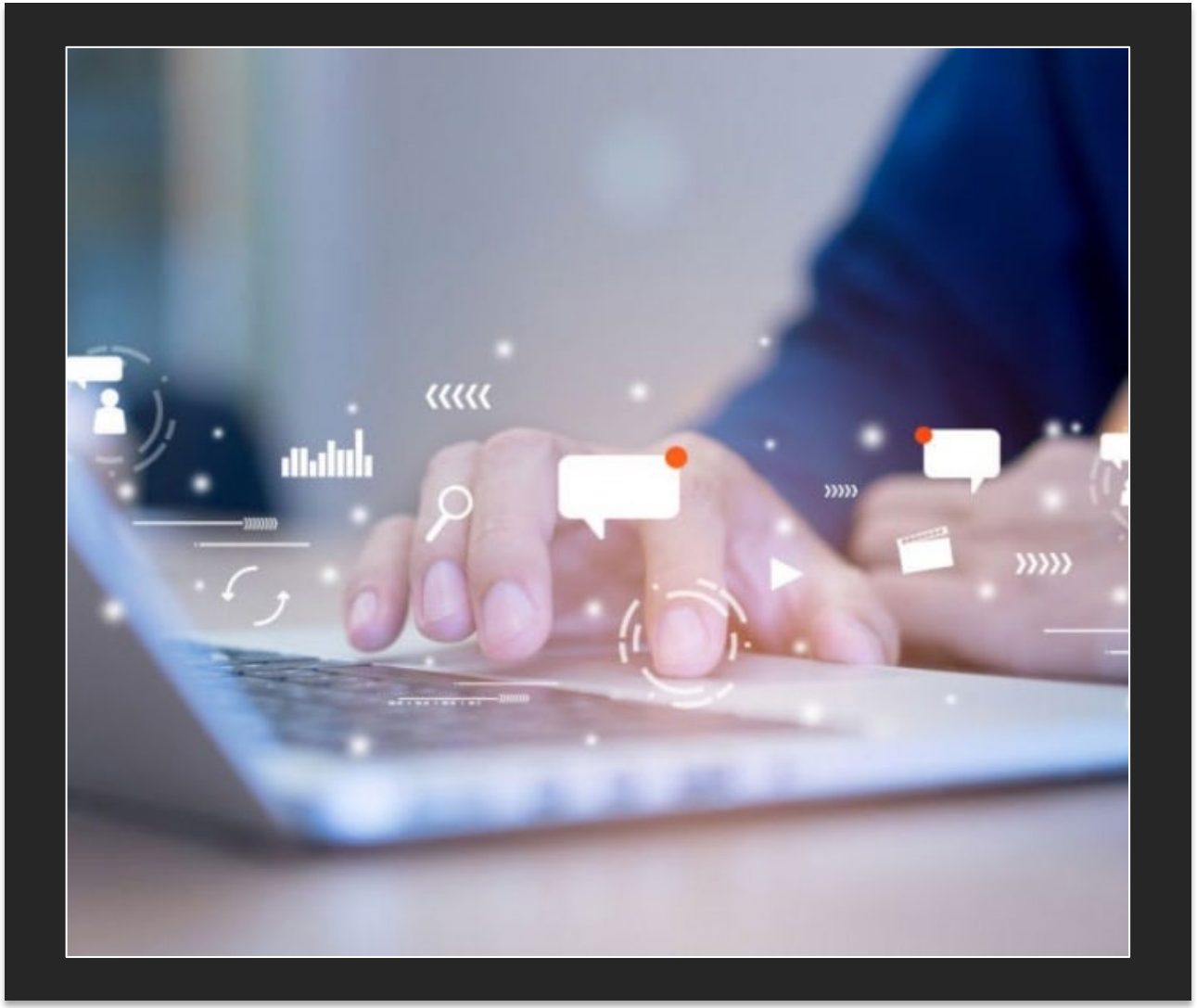
The reality



A powerful tool that can be used by those who understand it

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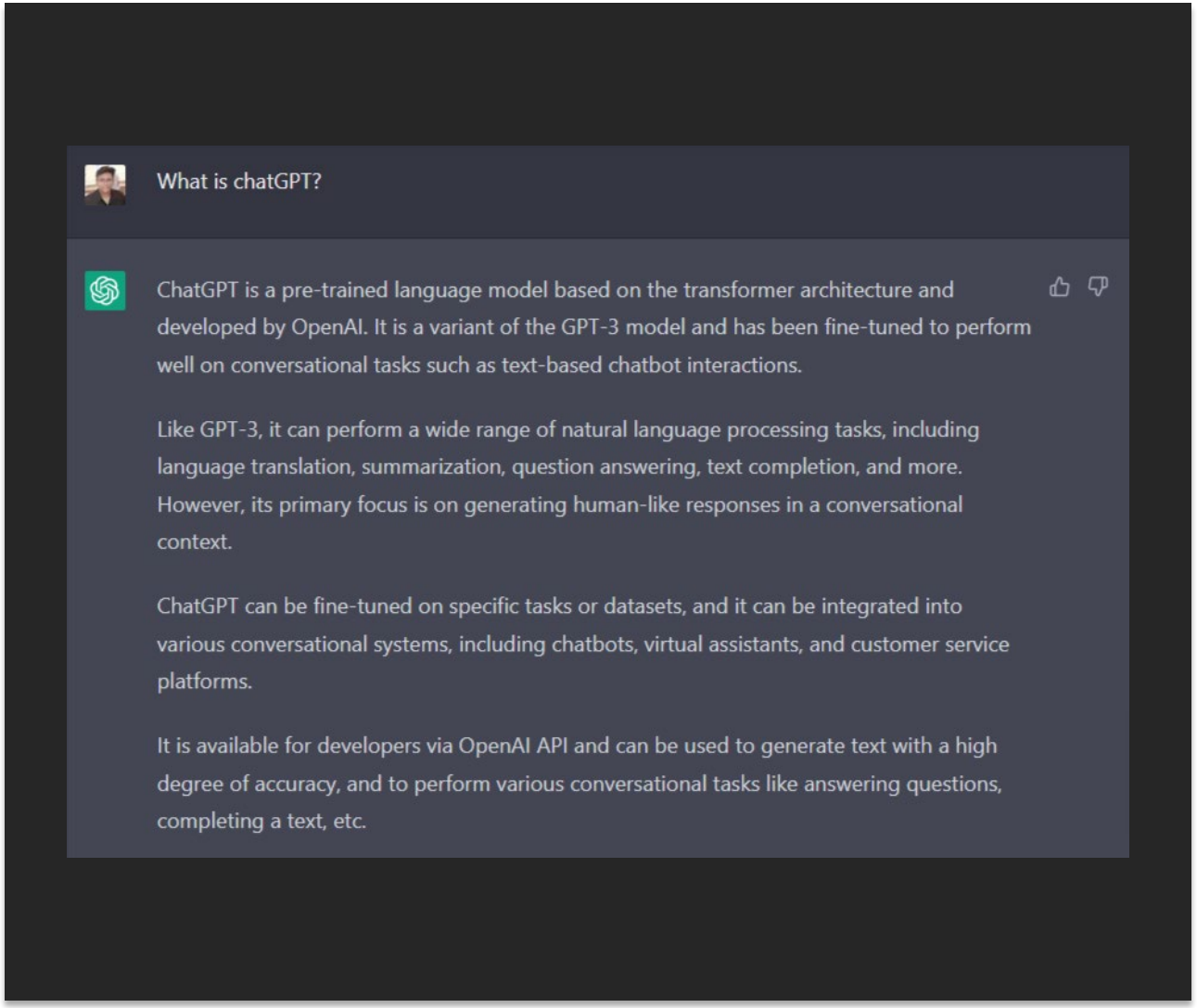
Language Generators



ChatGPT was designed to generate language

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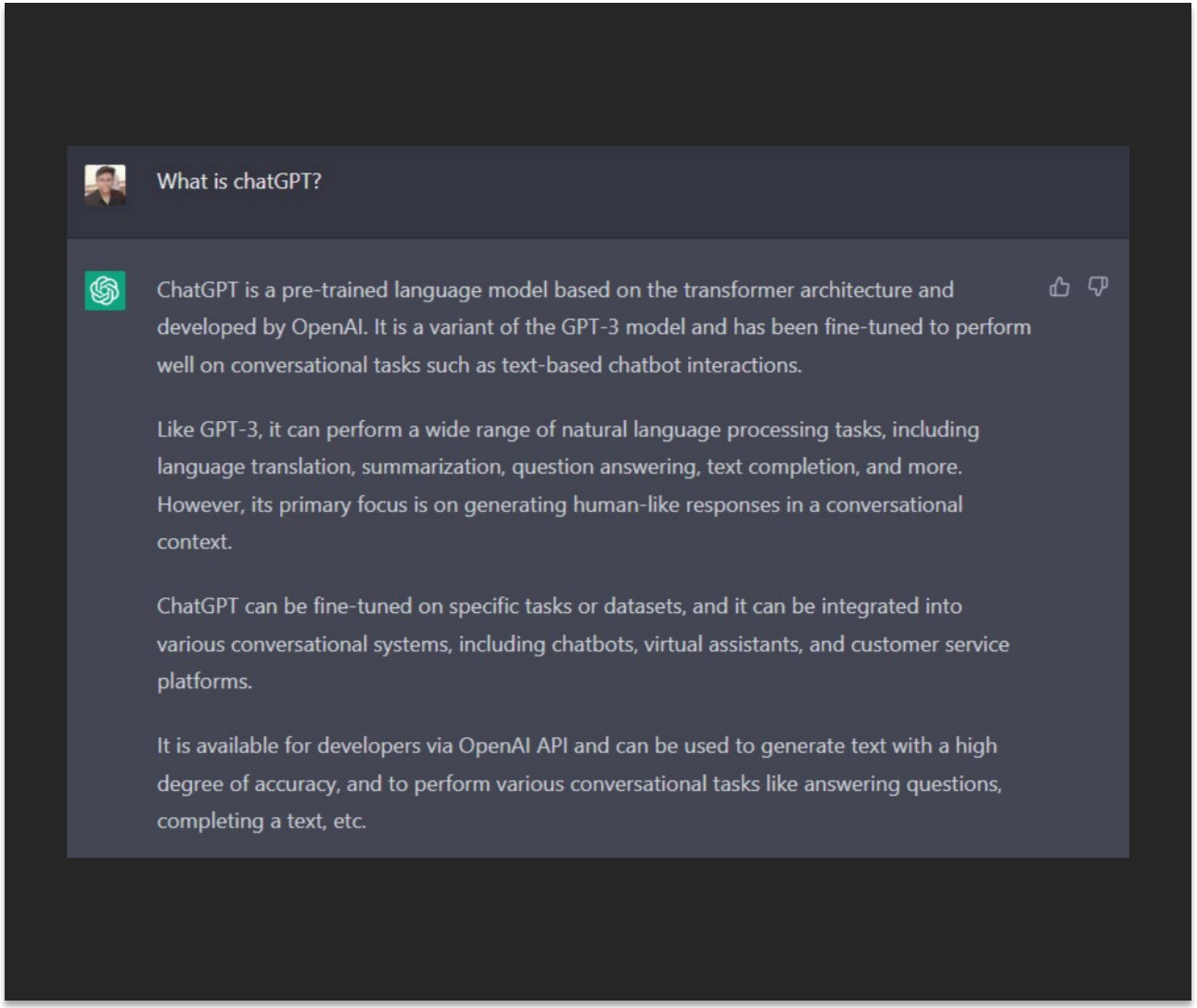
Language Generators



And be seductively easy to use

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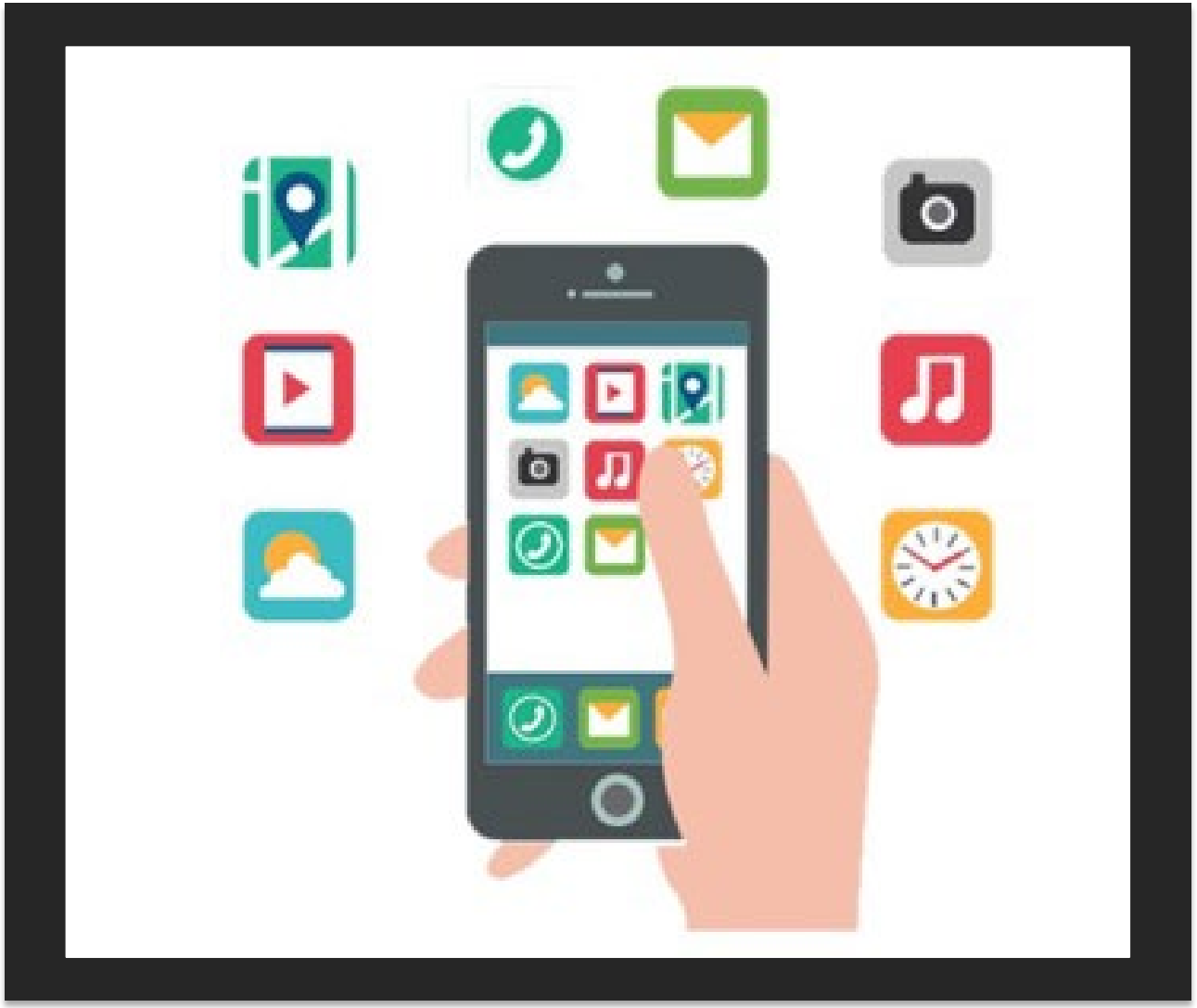
ChatGPT is a consumer app



Designed to appeal to a massive range of end users

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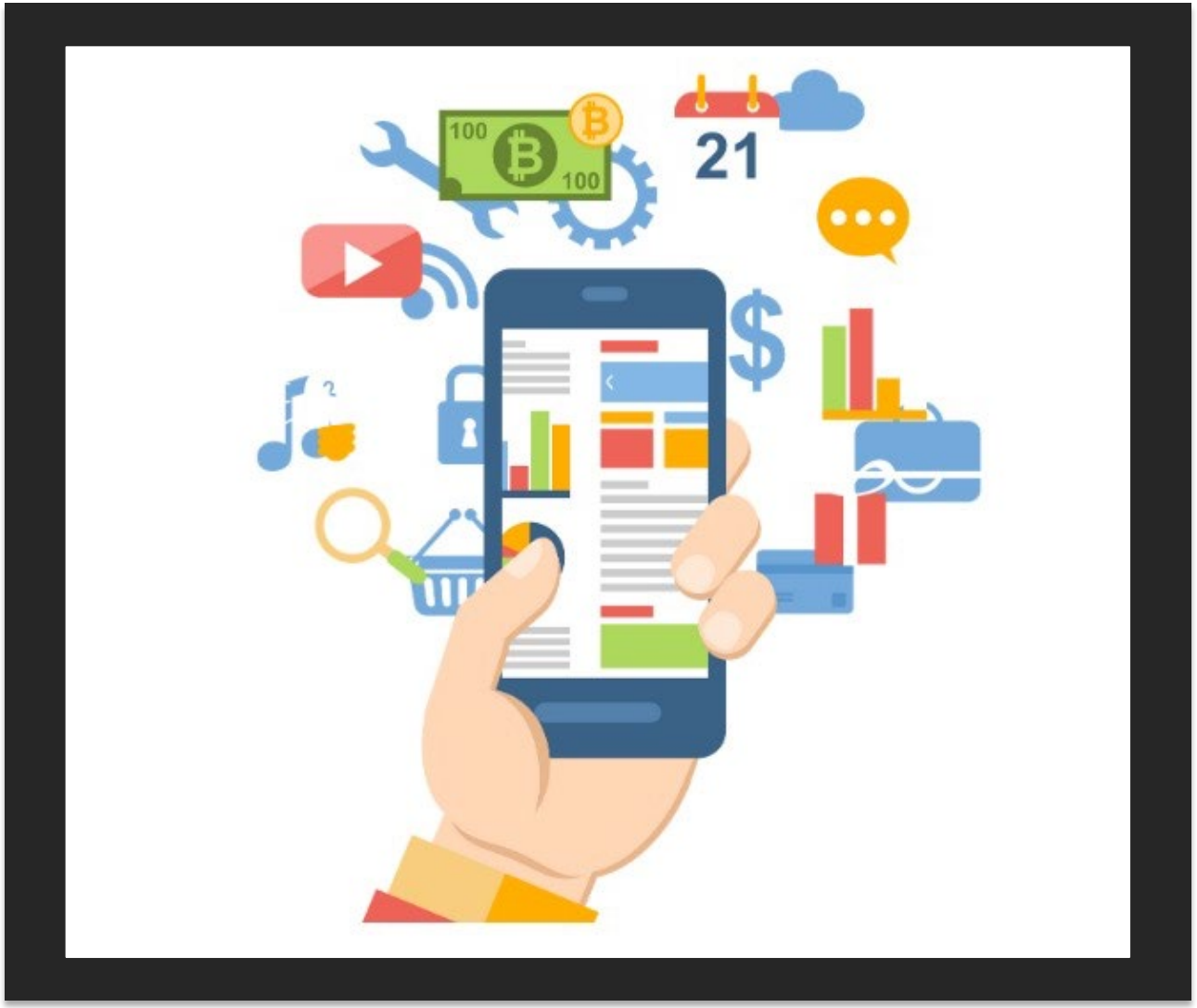
ChatGPT is not an enterprise product



It was not designed to be robust, scalable, integrated, or data safe

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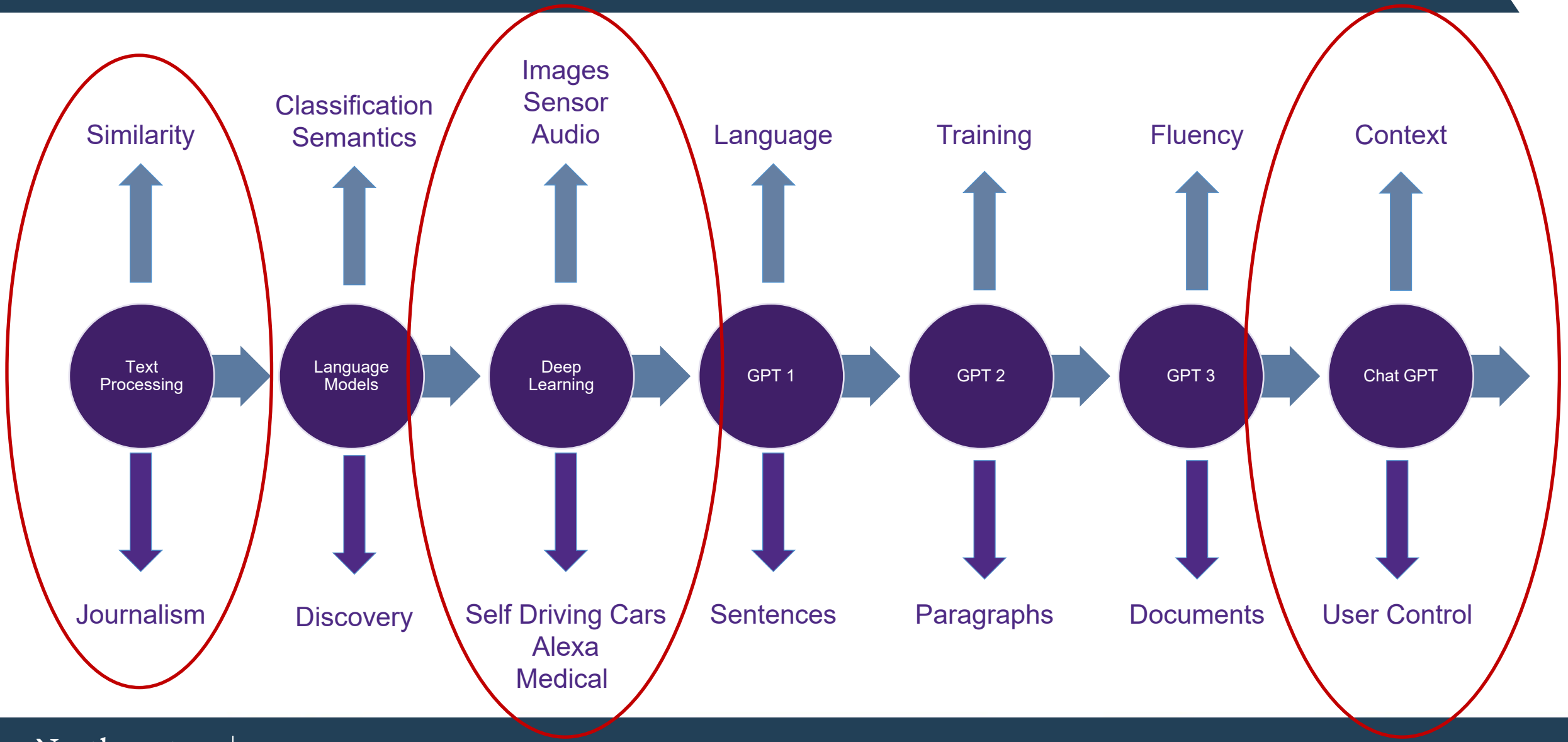
It is a transformational technology



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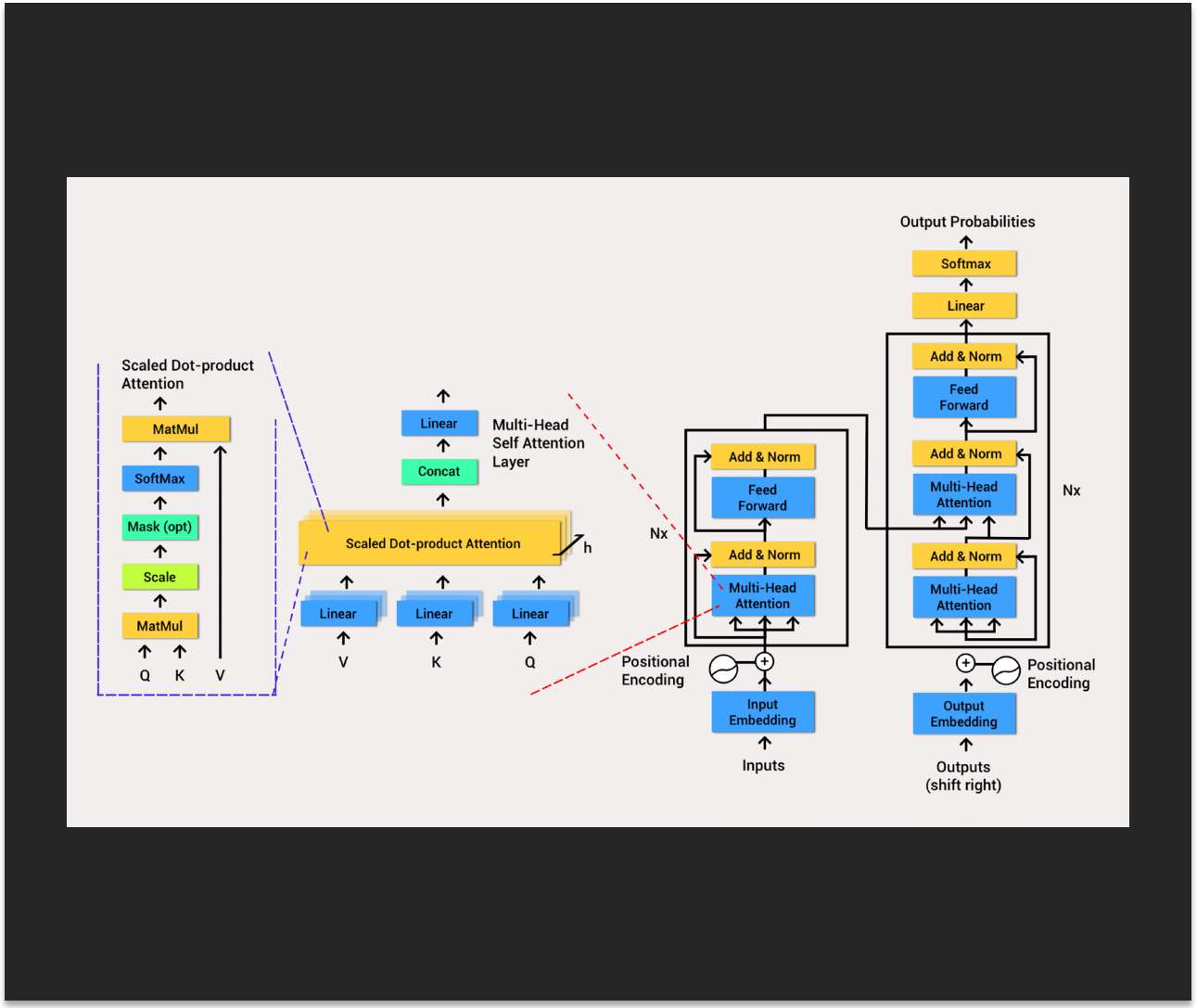
Step One



What does ChatGPT (and other Large Language Models) really do

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LLMs are designed to do one thing…

Chicago is often referred to as the “Windy _____

Guess the next word

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LLMs are designed to do one thing…

Chicago is often referred to as the "Windy City" due to the strong winds that blow off Lake Michigan, particularly in the downtown area. However, the nickname is also believed to have originated from the city's history of boasting and self-promotion by its politicians, journalists, and promoters, which metaphorically refers to the "windy" nature of their claims and speeches.

Astoundingly well

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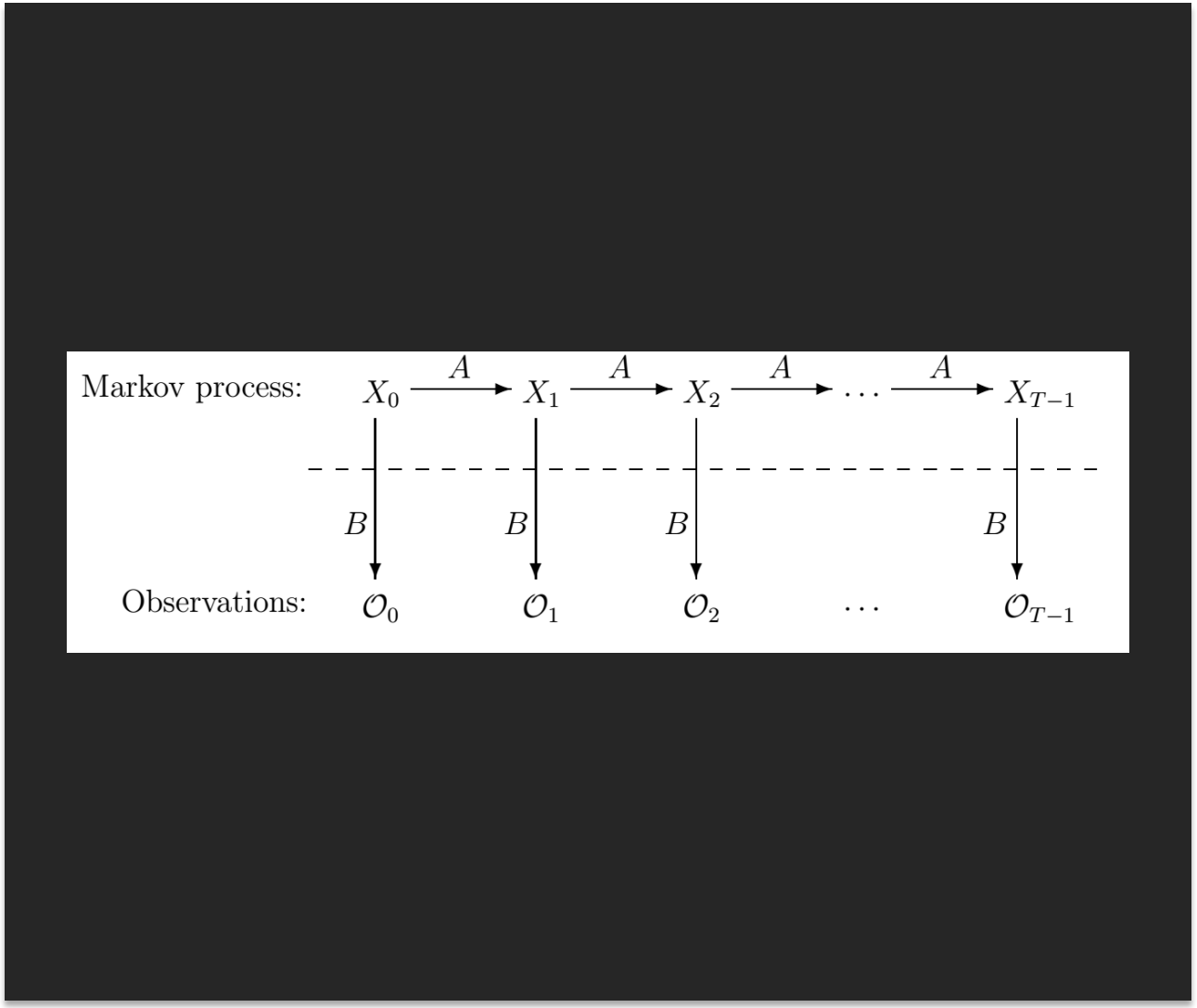
They are part of a long-term approach



The core idea is the words that have seen so far can be used to predict the words that follow

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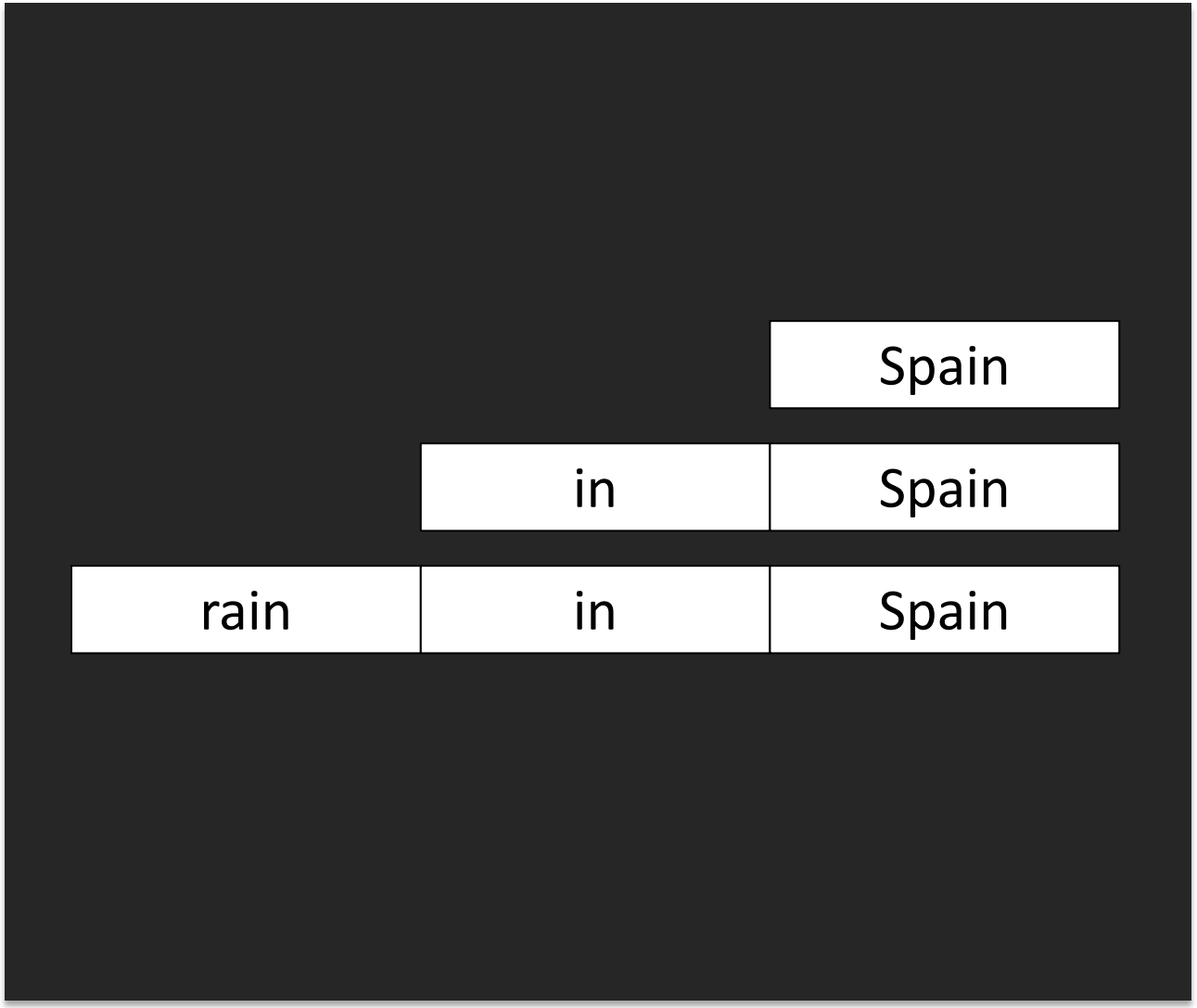

The more words, the better the prediction

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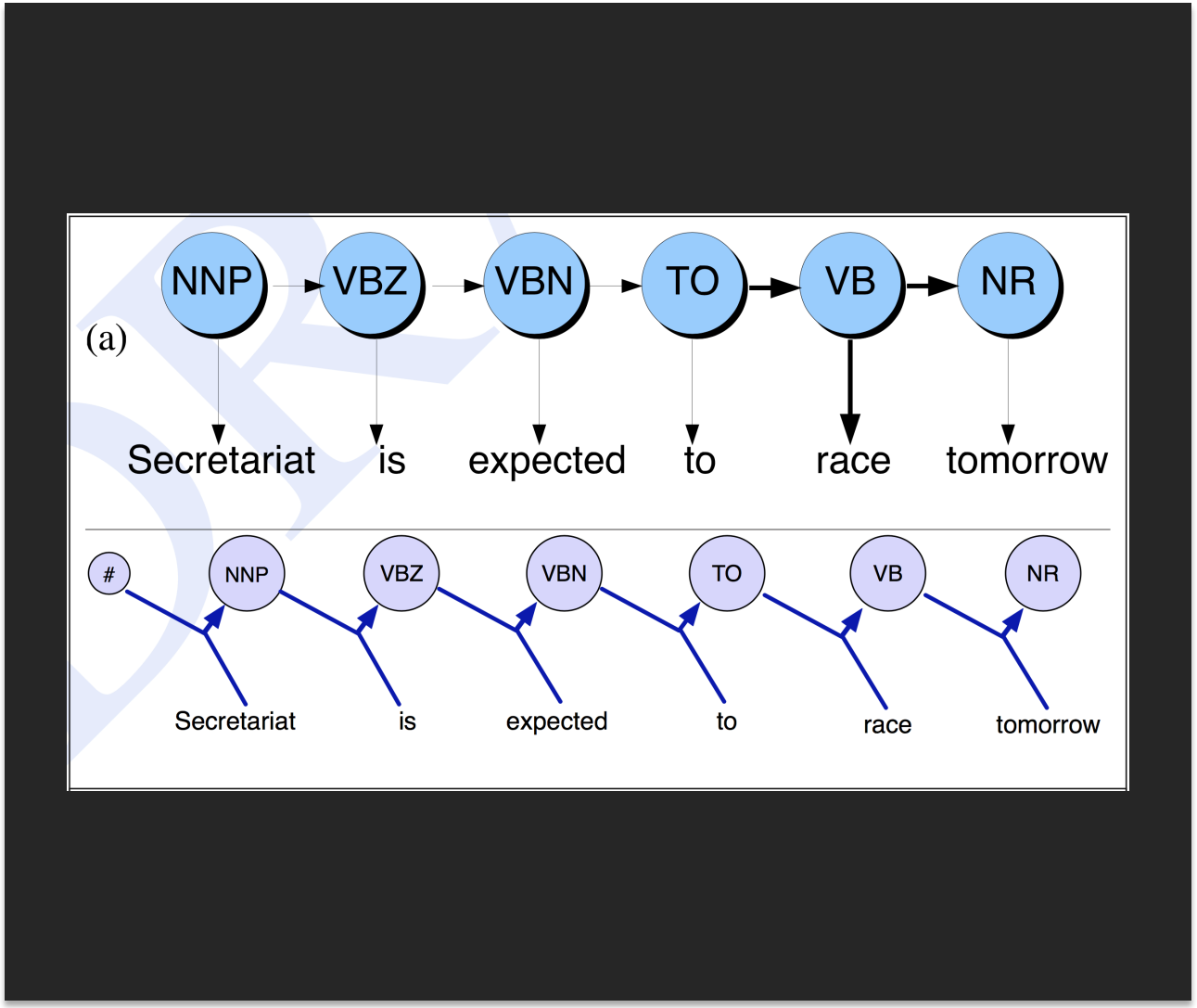
They are part of a long-term approach



For years, we lived in the world of short pieces of text

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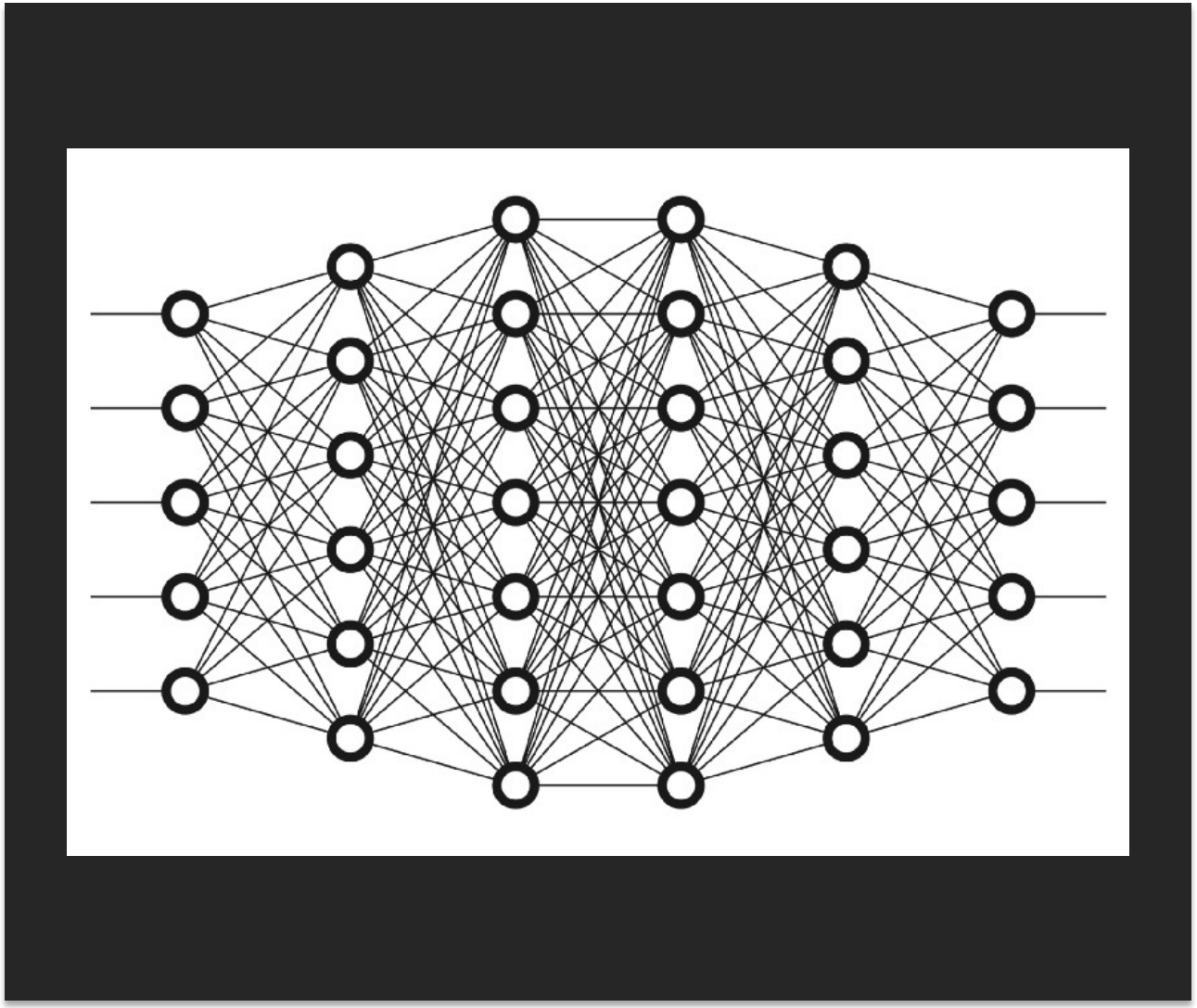
They are part of a long-term approach



Then we figured out Deep Learning

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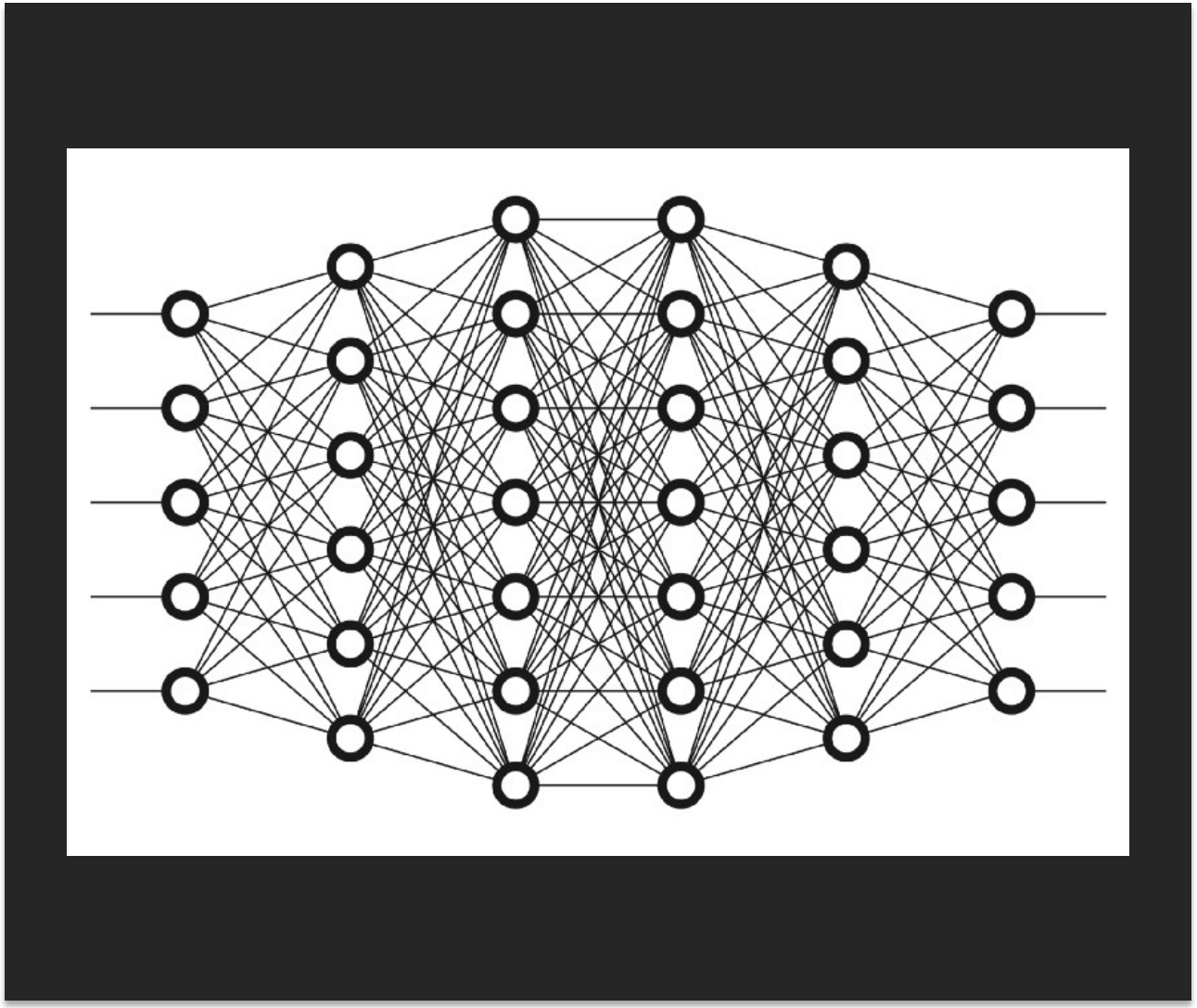
They are part of a long-term approach



Deep Learning expanded our ability to look at larger example sets with each example having more data

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Enabling processing of documents

The new superhero movie broke box office records, grossing over $500 million worldwide in its opening weekend.
Tag: Entertainment

The Prime Minister's recent speech on the economy received mixed reviews, with some praising her proposals while others criticized them as inadequate.
Tag: Politics

The sudden hailstorm caught many motorists off guard, causing widespread damage to cars and other vehicles.
Tag: Weather

The star quarterback suffered a serious injury during the game, forcing him to sit out the rest of the season.
Tag: Sports

In general, Deep Learn approaches require *tagged* data

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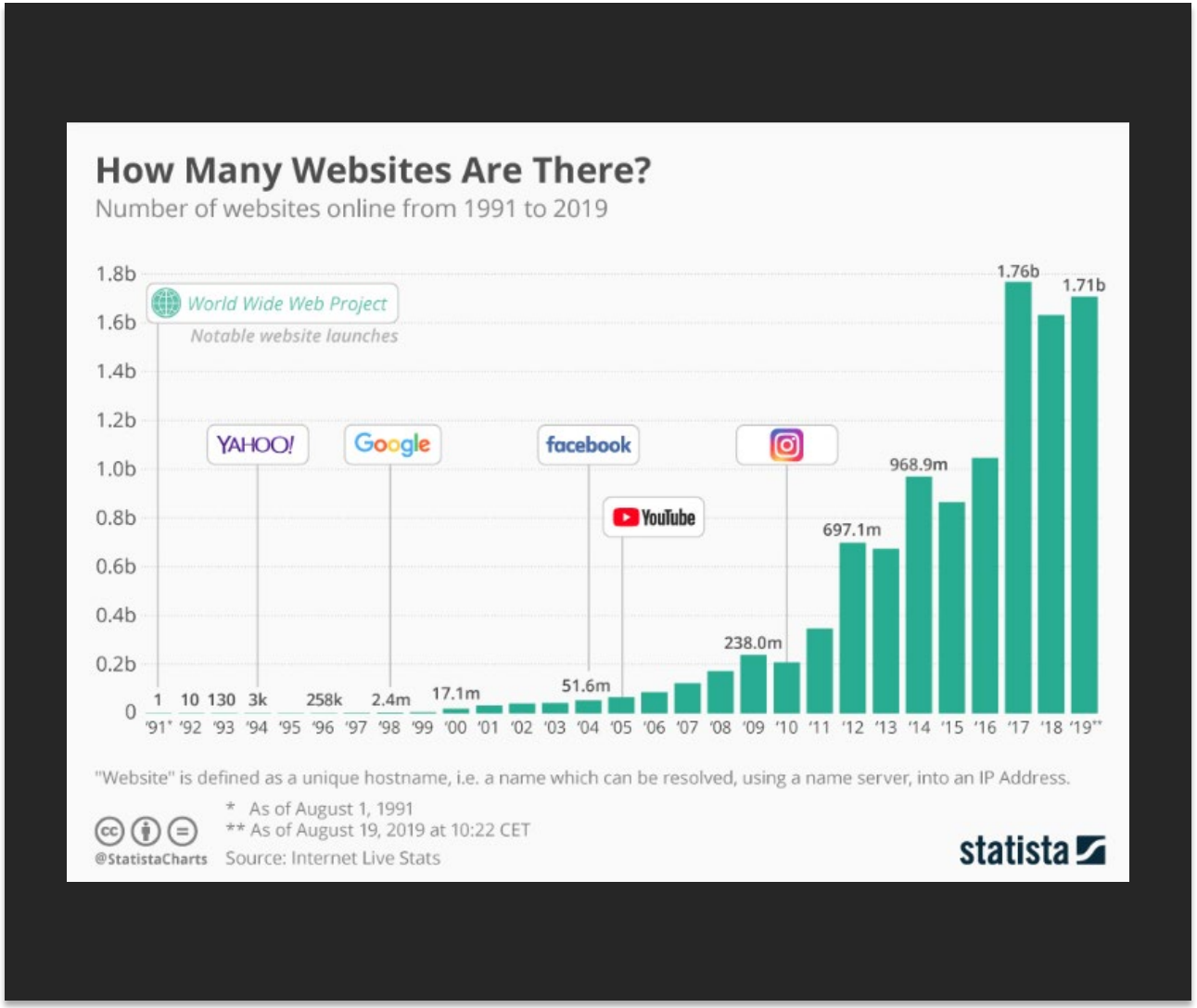
How to learn when there is no target?



But most of the 6.2 billion pages indexed on the web are not tagged

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Turn the source into the target

The Eiffel Tower is a wrought-iron lattice tower located in Paris, France. It was designed and built by Gustave Eiffel for the 1889 World's Fair, and it has since become one of the most recognizable landmarks in the world. The tower stands at a height of 324 meters, making it the tallest structure in Paris. Visitors can climb the tower to enjoy panoramic views of the city, or they can dine at one of the tower's two restaurants. The tower is illuminated at night with a stunning display of lights, making it a popular destination for tourists and locals alike.

But if you are predicting the next word, you can use the words in the document that precede it as the input and the word itself as the tag

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The beginning as source, the next word as target

The Eiffel Tower is a wrought-iron lattice tower located in Paris, France. It was designed and built by Gustave Eiffel for the 1889 World's Fair, and it has since become one of the most recognizable landmarks in the world. The tower stands at a height of 324 meters, making it the tallest structure in Paris. Visitors can climb the tower to enjoy panoramic views of the city, or they can dine at one of the tower's two restaurants. The tower is illuminated at night with a stunning display of lights, making it a popular destination for tourists and locals alike.

Why not use the documents to train systems to guess the next word!

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Why not use the documents to train systems to guess the next word!

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We are at a turning point

Id	Name	AccountId	StageName	Amount	Probability	ExpectedRev	CreateDate	CloseDate	LastActivityD	FiscalQuarte	FiscalYear	Type	LeadSource	OwnerId
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0017000000iw11kAAA	Astra International tbk PT	North America	Other
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0017000000iw12CAAQ	Petrol Slovenska energetska druzba d.d.	North America	Healthcare
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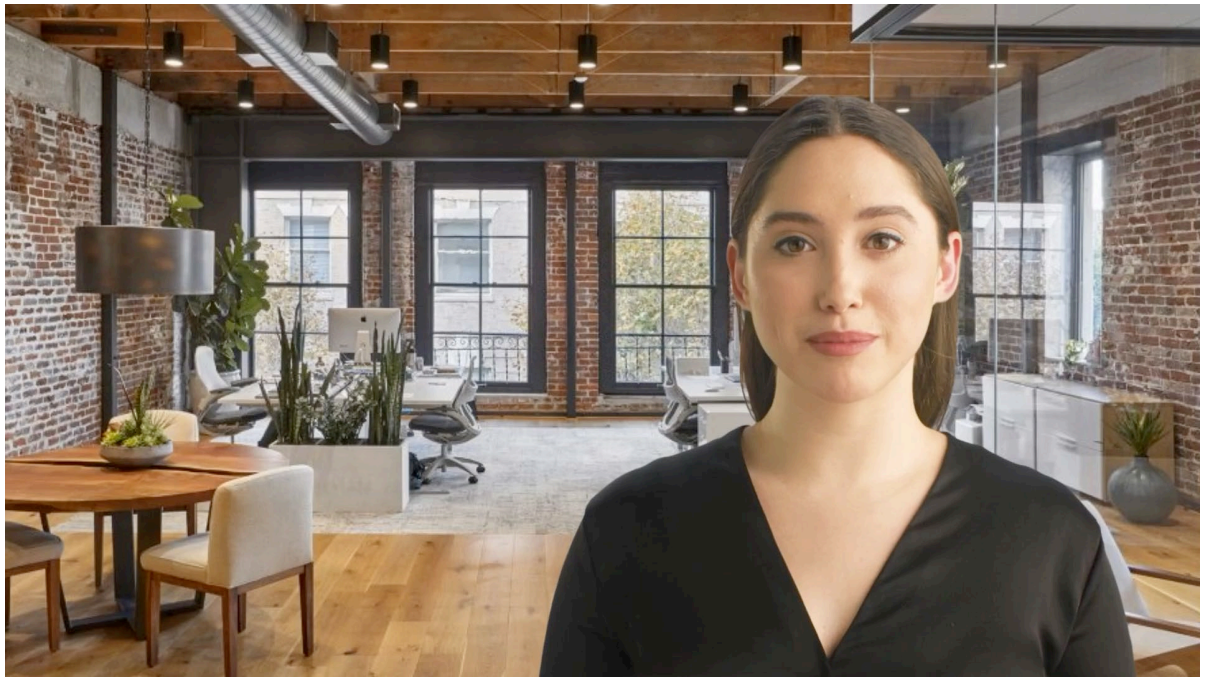

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Data from sensors up and down the beach front

Beach Name	Timestamp	Water Temperature	Turbidity	Transducer Depth	Wave Height	Wave Period	Battery Life	Measurement ID
Montrose Beach	8/30/13 8:00	20.3	1.18	0.891	0.08	3	9.4	MontroseBeach201308300800
Ohio Street Beach	5/26/16 13:00	14.4	1.23		0.111	4	12.4	OhioStreetBeach201605261300
Calumet Beach	9/3/13 16:00	23.2	3.63	1.201	0.174	6	9.4	CalumetBeach201309031600
Calumet Beach	5/28/14 12:00	16.2	1.26	1.514	0.147	4	11.7	CalumetBeach201405281200
Montrose Beach	5/28/14 12:00	14.4	3.36	1.388	0.298	4	11.9	MontroseBeach201405281200
Montrose Beach	5/28/14 13:00	14.5	2.72	1.395	0.306	3	11.9	MontroseBeach201405281300
Calumet Beach	5/28/14 13:00	16.3	1.28	1.524	0.162	4	11.7	CalumetBeach201405281300
Montrose Beach	5/28/14 14:00	14.8	2.97	1.386	0.328	3	11.9	MontroseBeach201405281400
Calumet Beach	5/28/14 14:00	16.5	1.32	1.537	0.185	4	11.7	CalumetBeach201405281400
Calumet Beach	5/28/14 15:00	16.8	1.31	1.568	0.196	4	11.7	CalumetBeach201405281500
Montrose Beach	5/28/14 15:00	14.5	4.3	1.377	0.328	3	11.9	MontroseBeach201405281500
Calumet Beach								
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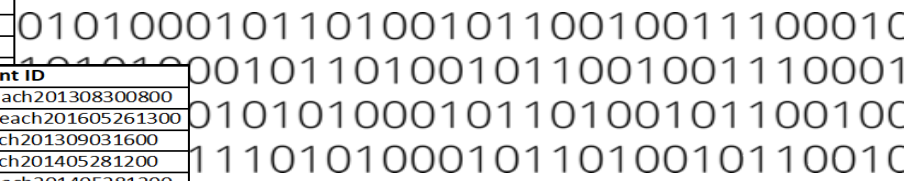
Beach Name	Timestamp	Water Temperature	Turbidity	Transducer Depth	Wave Height	Wave Period	Battery Life	Measurement ID
Montrose Beach	8/30/13 8:00	20.3	1.18	0.891	0.08	3	9.4	MontroseBeach201308300800
Ohio Street Beach	5/26/16 13:00	14.4	1.23		0.111	4	12.4	OhioStreetBeach201605261300
Calumet Beach	9/3/13 16:00	23.2	3.63	1.201	0.174	6	9.4	CalumetBeach201309031600
Calumet Beach	5/28/14 12:00	16.2	1.26	1.514	0.147	4	11.7	CalumetBeach201405281200
Montrose Beach	5/28/14 12:00	14.4	3.36	1.388	0.298	4	11.9	MontroseBeach201405281200
Montrose Beach	5/28/14 13:00	14.5	2.72	1.395	0.306	3	11.9	MontroseBeach201405281300
Calumet Beach	5/28/14 13:00	16.3	1.28	1.524	0.162	4	11.7	CalumetBeach201405281300
Montrose Beach	5/28/14 14:00	14.8	2.97	1.386	0.328	3	11.9	MontroseBeach201405281400
Calumet Beach	5/28/14 14:00	16.5	1.32	1.537	0.185	4	11.7	CalumetBeach201405281400
Calumet Beach	5/28/14 15:00	16.8	1.31	1.568	0.196	4	11.7	CalumetBeach201405281500
Montrose Beach	5/28/14 15:00	14.5	4.3	1.377	0.328	3	11.9	MontroseBeach201405281500
Calumet Beach	5/28/14 16:00	17.1	1.37	1.52	0.194	4	11.7	CalumetBeach201405281600
Montrose Beach	5/28/14 16:00	14.4	4.87	1.366	0.341	3	11.9	MontroseBeach201405281600
Calumet Beach	5/28/14 17:00	17.2	1.48	1.525	0.203	4	11.7	CalumetBeach201405281700
Montrose Beach	5/28/14 17:00	14.1	5.06	1.382	0.34	4	11.9	MontroseBeach201405281700
Montrose Beach	5/28/14 18:00	14.2	5.76	1.415	0.356	3	11.9	MontroseBeach201405281800
Calumet Beach	5/28/14 18:00	17.1	1.8	1.501	0.188	4	11.7	CalumetBeach201405281800
Calumet Beach	5/28/14 19:00	17	1.82	1.487	0.194	4	11.7	CalumetBeach201405281900
Montrose Beach	5/28/14 19:00	14.2	6.32	1.386	0.346	3	11.9	MontroseBeach201405281900
Montrose Beach	5/28/14 20:00	14.4	6.89	1.401	0.38	4	11.9	MontroseBeach201405282000
Calumet Beach	5/28/14 20:00	17	1.83	1.488	0.196	4	11.7	CalumetBeach201405282000
Montrose Beach	5/28/14 21:00	14.5	7.11	1.374	0.361	5	11.9	MontroseBeach201405282100
Calumet Beach	5/28/14 21:00	16.8	1.9	1.494	0.181	4	11.7	CalumetBeach201405282100
Montrose Beach	5/28/14 22:00	14.5	6.88	1.413	0.345	4	11.9	MontroseBeach201405282200
Calumet Beach	5/28/14 22:00	16.7	1.83	1.467	0.18	4	11.7	CalumetBeach201405282200
Montrose Beach	5/28/14 23:00	14.3	7.32	1.406	0.331	4	11.9	MontroseBeach201405282300
Calumet Beach	5/28/14 23:00	16.5	1.69	1.548	0.177	4	11.7	CalumetBeach201405282300
Calumet Beach	5/29/14 1:00	16.3	1.62	1.519	0.159	4	11.7	CalumetBeach201405290100
Montrose Beach	5/29/14 1:00	14.2	7.18	1.46	0.305	4	11.9	MontroseBeach201405290100
Montrose Beach	5/29/14 2:00	14.2	6.35	1.45	0.321	3	11.9	MontroseBeach201405290200
Calumet Beach	5/29/14 2:00	16.2	1.57	1.535	0.154	4	11.7	CalumetBeach201405290200
Calumet Beach	5/29/14 3:00	16.1	1.8	1.557	0.163	4	11.7	CalumetBeach201405290300
Montrose Beach	5/29/14 3:00	14.1	6.78	1.468	0.285	4	11.8	MontroseBeach201405290300
Calumet Beach	5/29/14 4:00	16.1	1.82	1.507	0.156	4	11.7	CalumetBeach201405290400
Montrose Beach	5/29/14 4:00	14.1	6.27	1.456	0.306	3	11.8	MontroseBeach201405290400
Montrose Beach	5/29/14 5:00	14	5.63	1.421	0.282	3	11.8	MontroseBeach201405290500



Temperature

Time and Date

Wave Height

Turbidity

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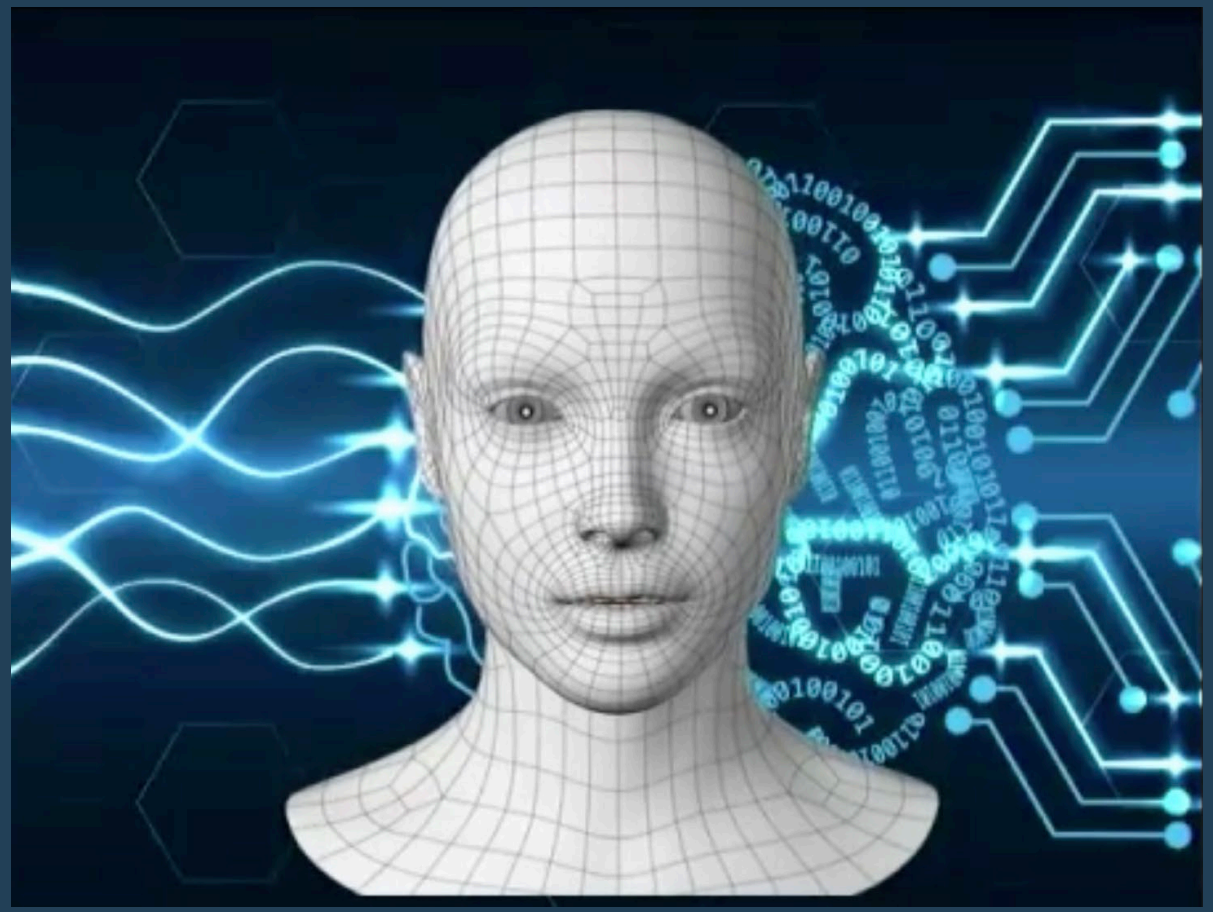

And then there is Elizabeth

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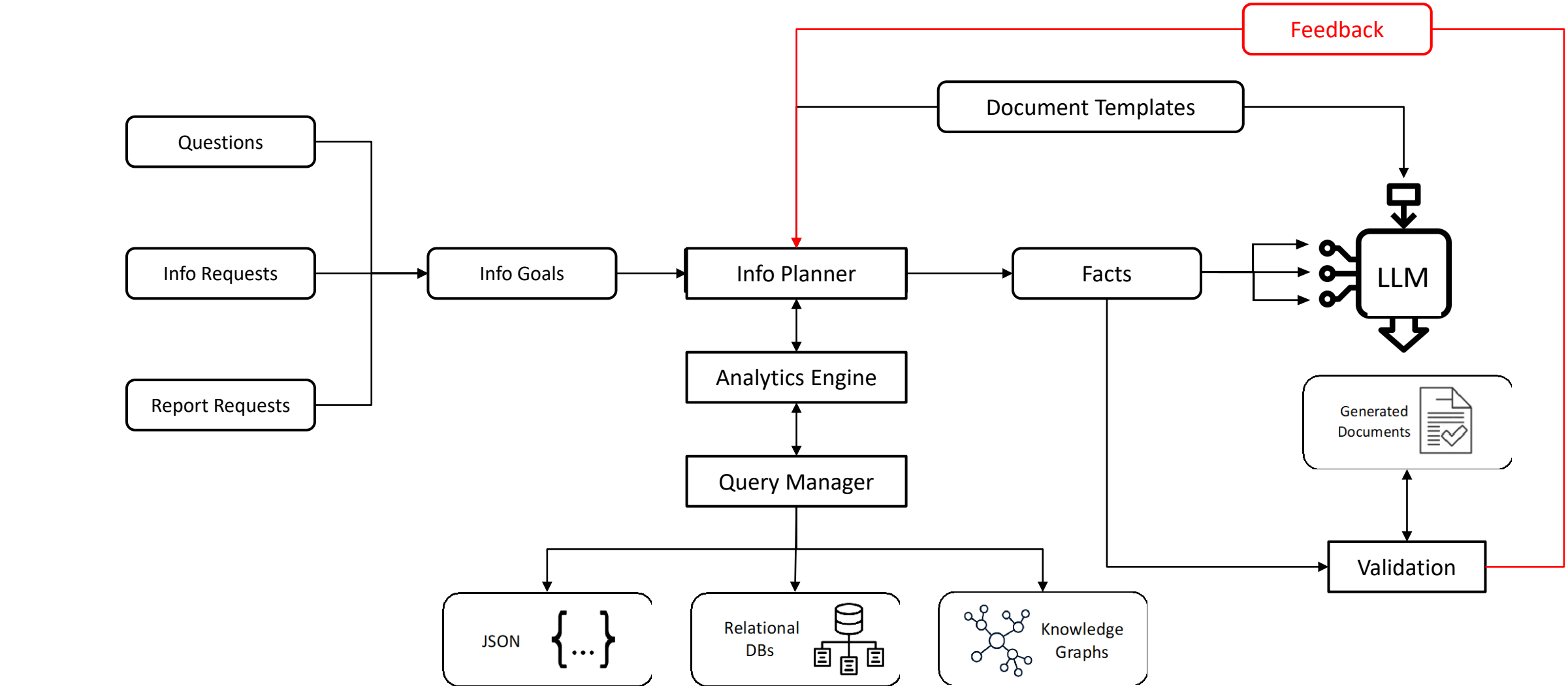
*Except me

Communication at scale
with fluency and accuracy

Integration



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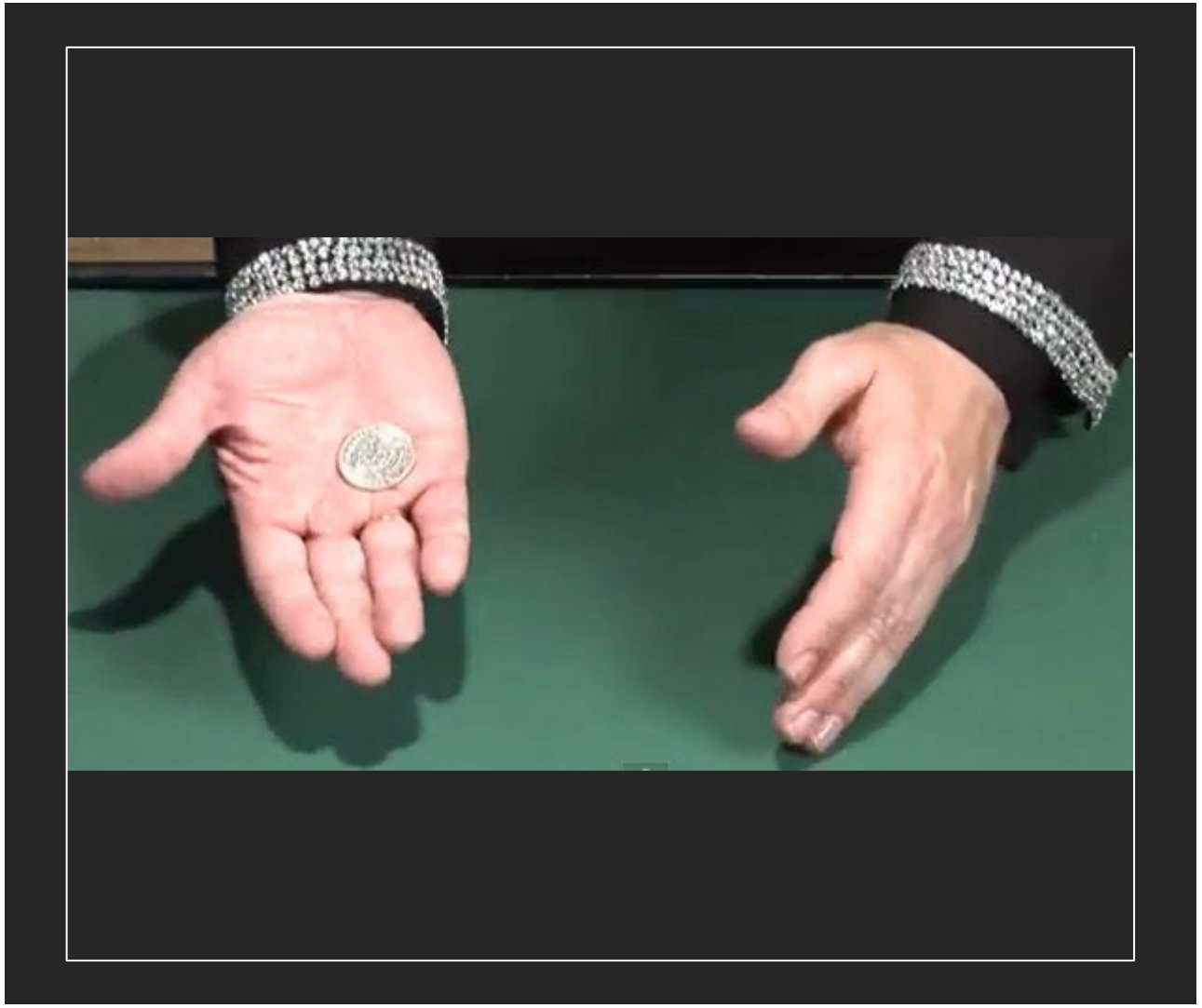


On the other

Northwestern | McCORMICK SCHOOL OF ENGINEERING

Professor, Computer Science

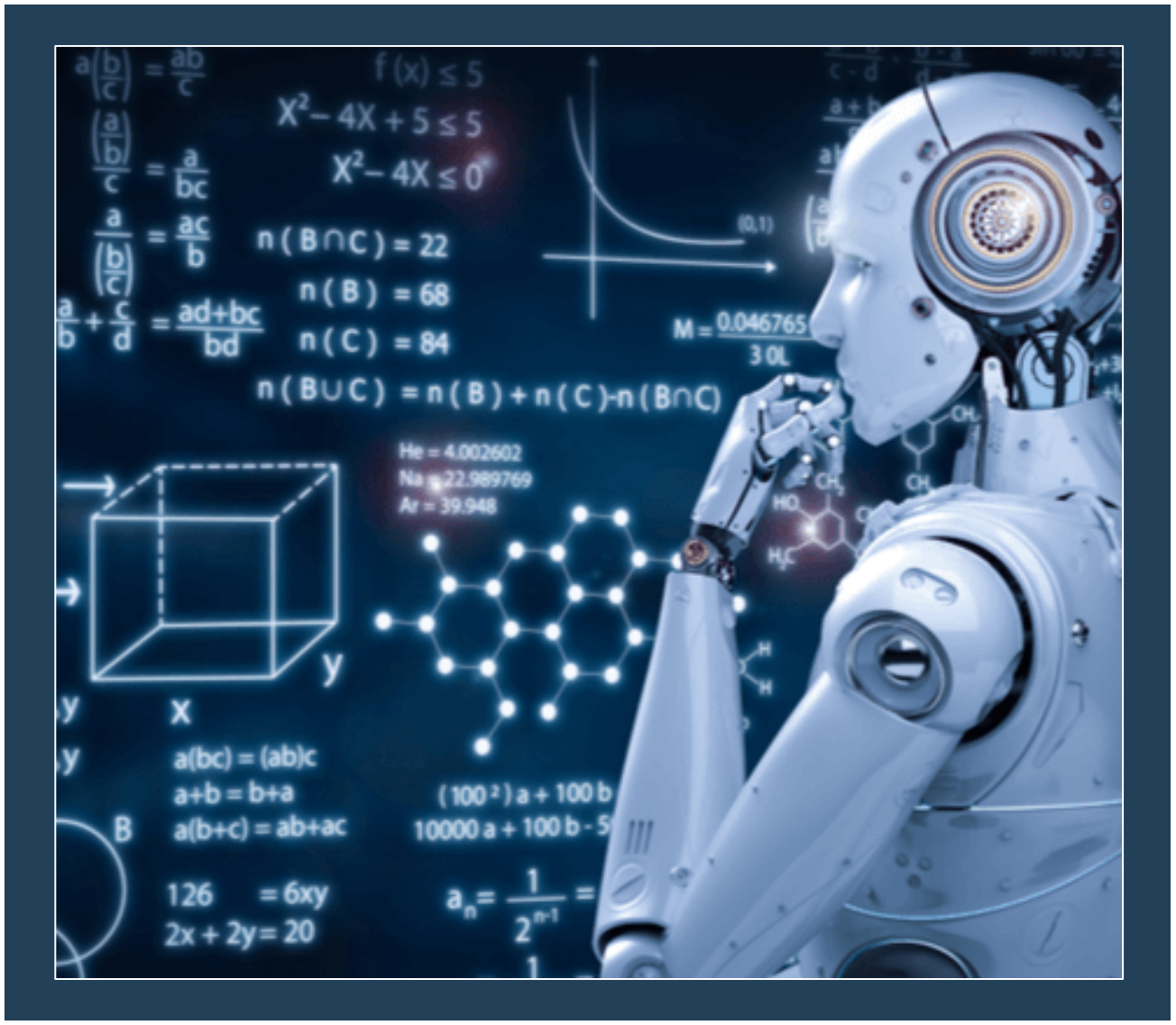
narrative science

Co-Founder, Chief Scientist

UNIDIR
UNITED NATIONS INSTITUTE FOR DISARMAMENT RESEARCH

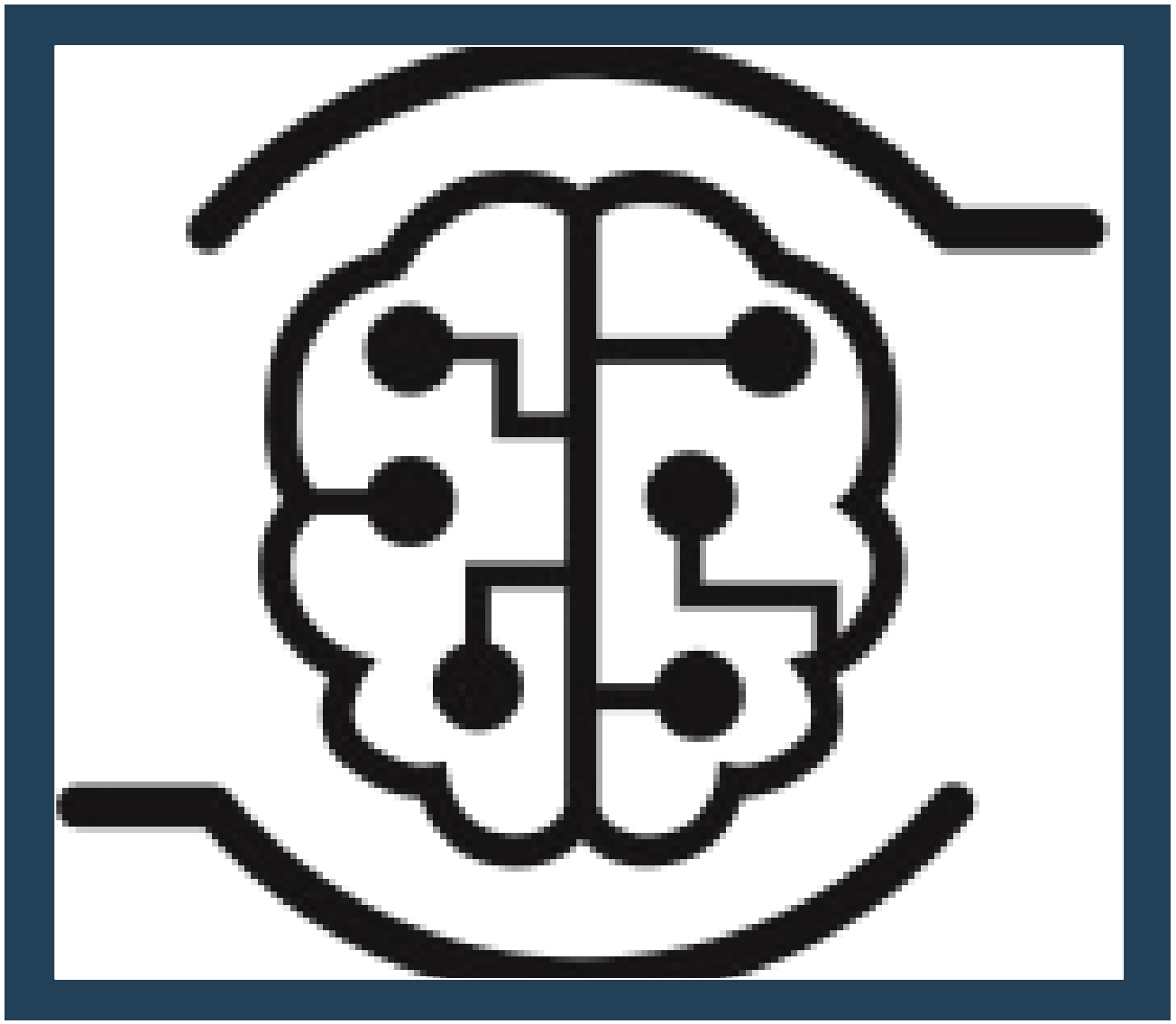
Problems

Bias
Fairness
Accountability
Transparency
Explainability
Trustworthiness
Privacy
Future of work



Specifically

Social media/depression
Digital Addiction
Dark Patterns
Job Recommendation
Resume Review
Parole Bias
Information Balkanization
Erosion of agency



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CASMI‘s mission is to develop best practices for safety in the design and development of machine intelligence

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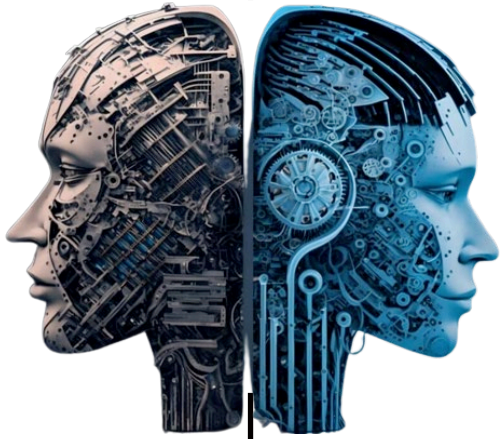

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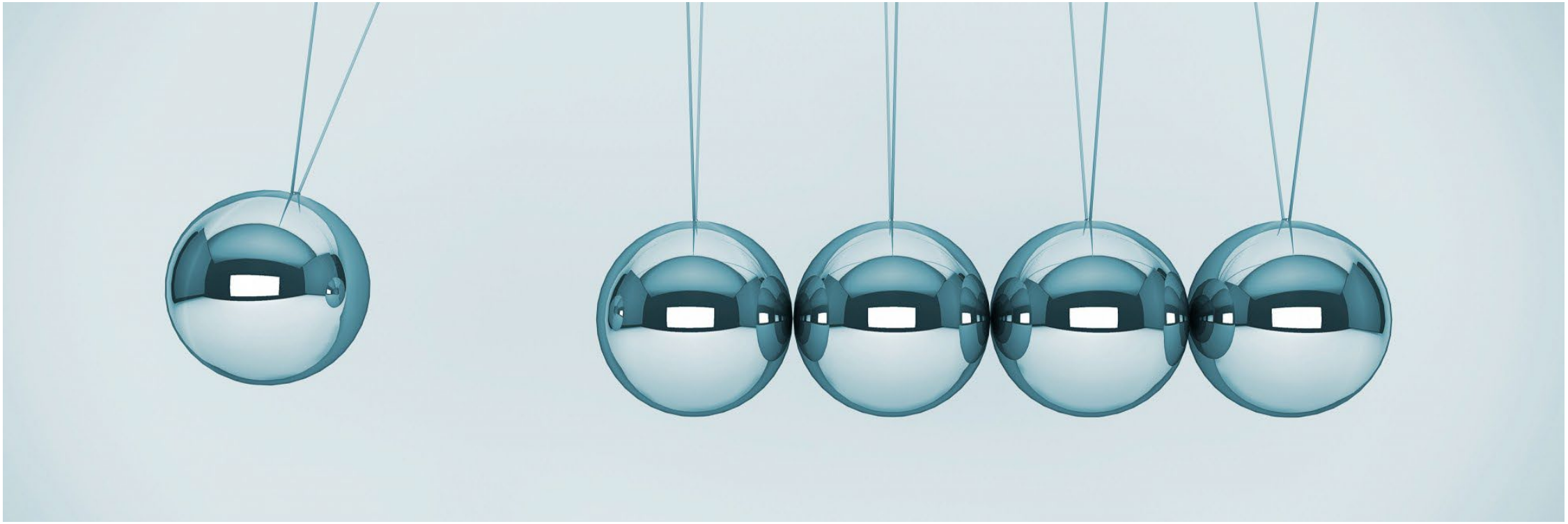
The science of Impact



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- Responsibility
- Opportunity
- Community

Exploiting the possibilities

Don’t focus on the technology

Focus on the functionality

- The functionality is driven by business needs
- The functionality is supported by algorithms & data
- The algorithms are instrumental to business

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By understanding the functionalities at our disposal

Generate

Transform

Cluster

Test

= yes/no

Rewrite

Extract

Structure

Illuminate

Summarize

Classify

Collect

www

Retrieve

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ALTAIR

WEALTH GUIDANCE FOR LIFE