The ABCDs of a Revolution:

How A.I., Big Data, Computer vision, and Data science are changing the world

Guha Jayachandran
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September 16, 2015

Outline

Context

A Quick Tour

Examples

Future

Questions

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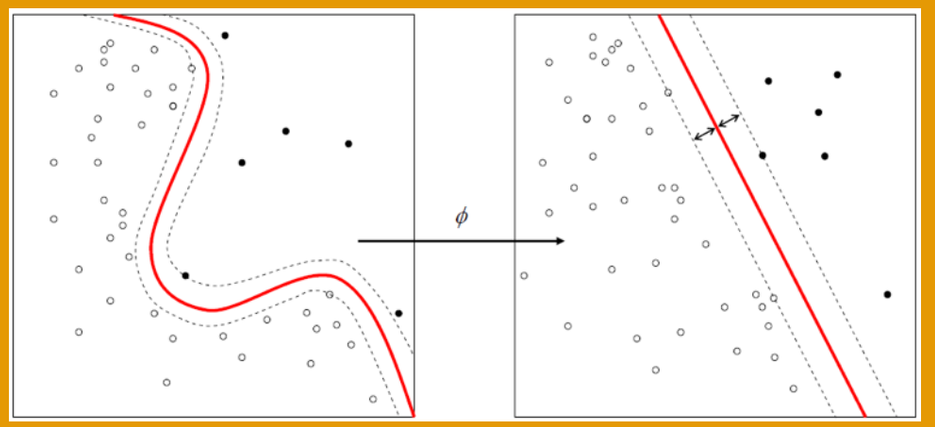
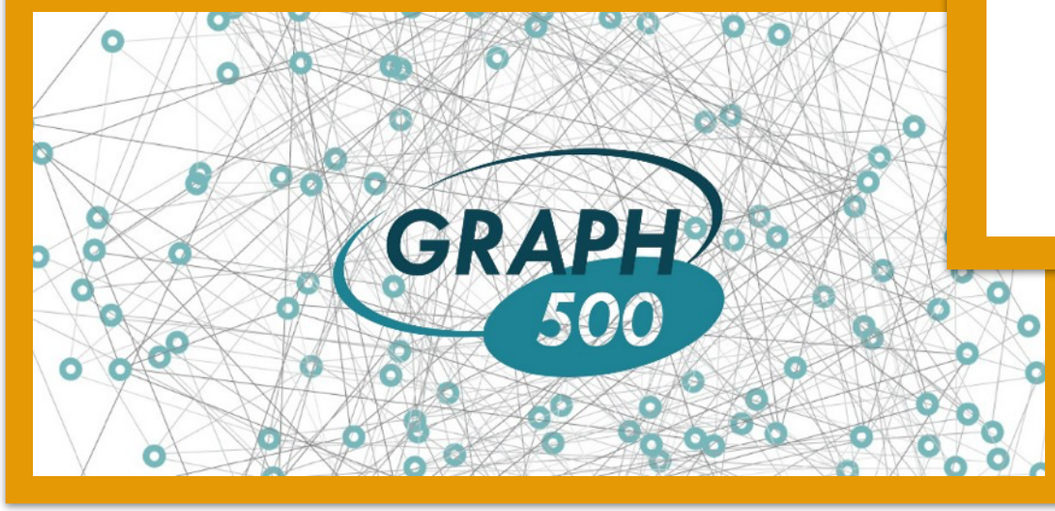
Revolution





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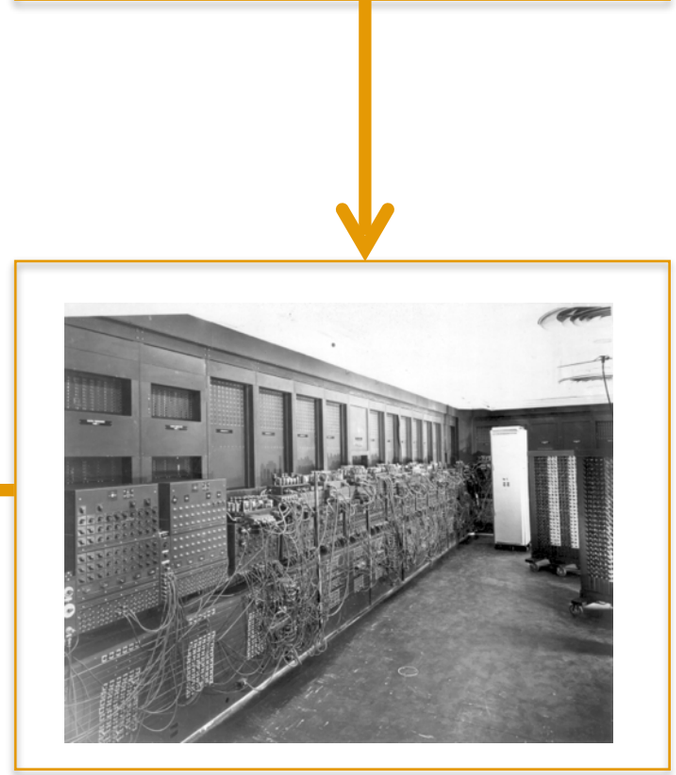
How We Got Here



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Enablers of Today's Revolution: Unprecedented Computation, Unprecedented Data

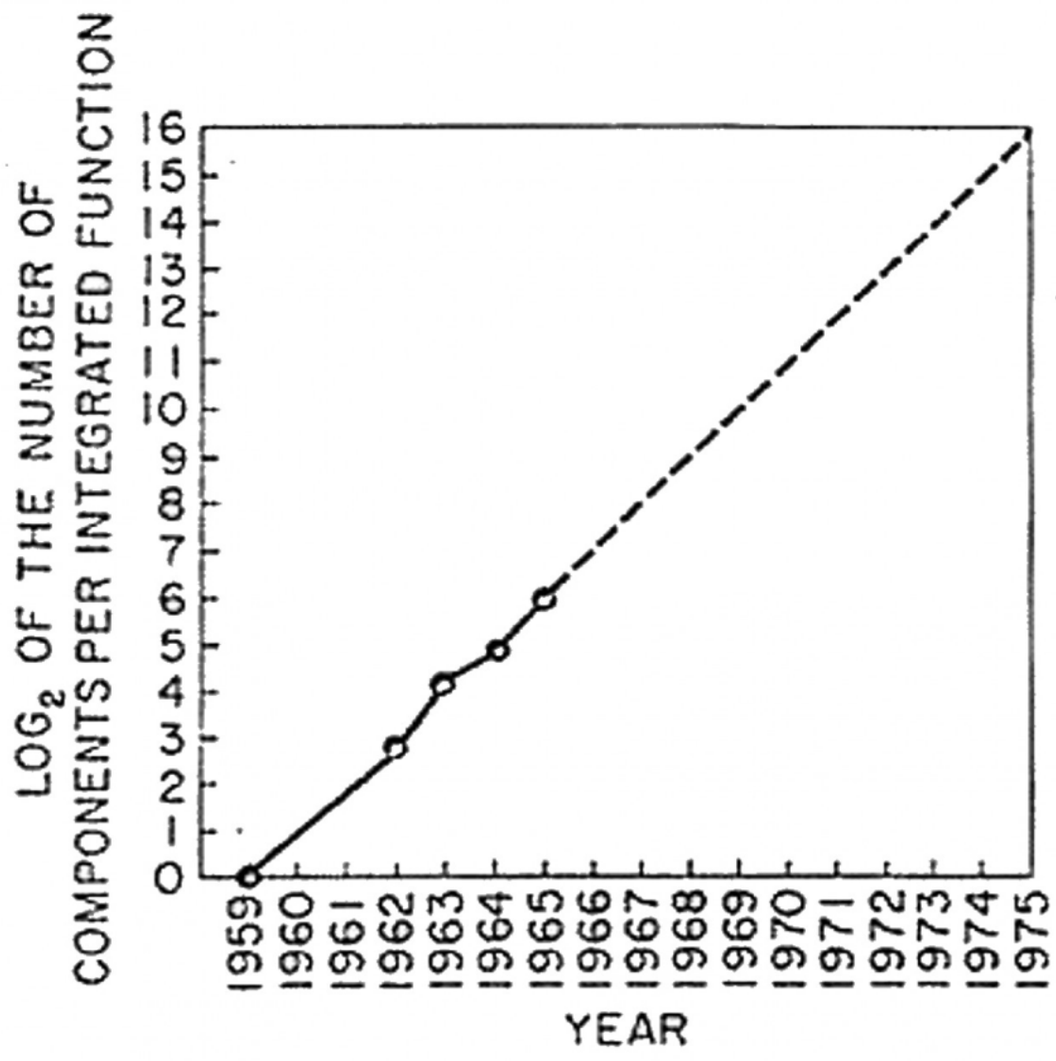
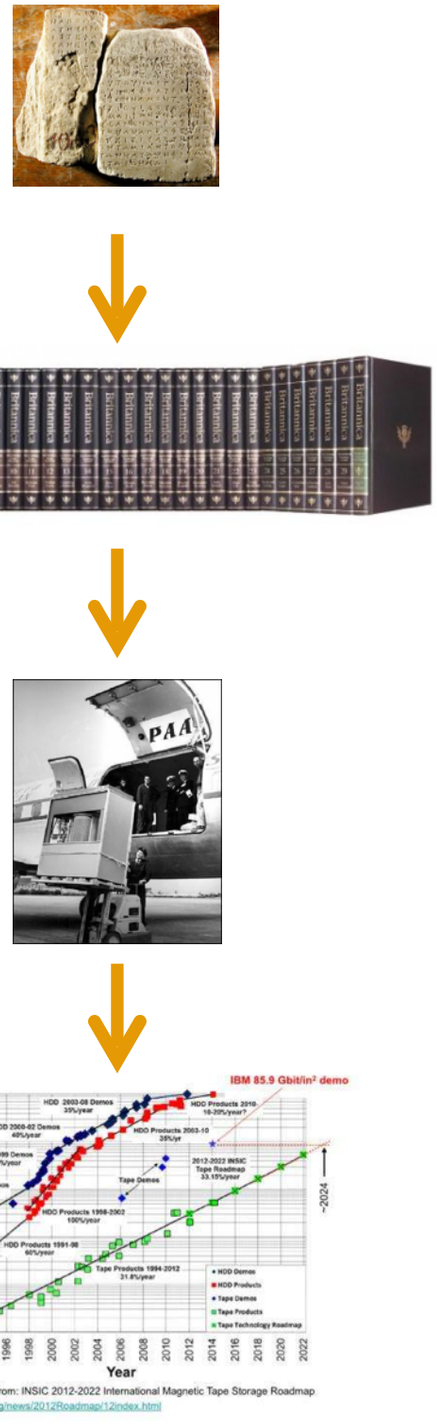


Fig. 2 Number of components per integrated function for minimum cost per component extrapolated vs time.

1965 *Electronics* magazine
From: Fairchild internal document



Source: Modified from: INSIC 2012-2022 International Magnetic Tape Storage Roadmap
http://www.insic.org/news/2012Roadmap/12index.html

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Artificial intelligence

The science and engineering of making intelligent machines

Big Data

Collection and analysis of very large datasets

Computer vision

Processing and understanding images

Data science

Extraction of insight from data

Problems in A.I.

Reasoning

General Intelligence

Knowledge Representation

Learning

Planning

Manipulating Objects

Natural Language Processing

Computer Vision

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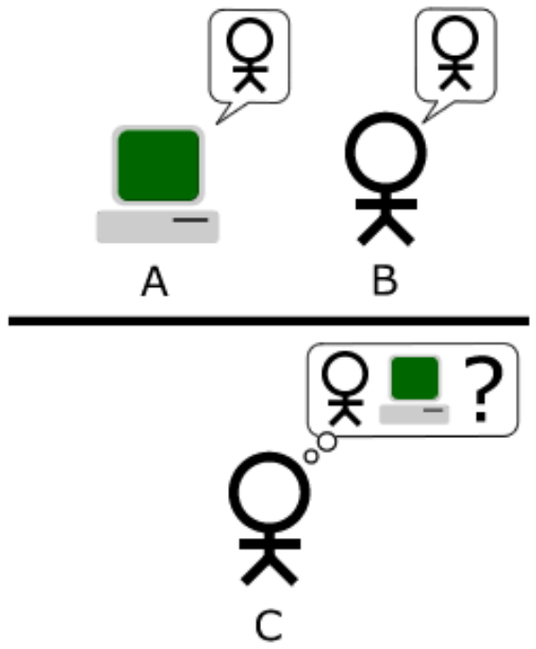
Tests

vs.

Turing Test



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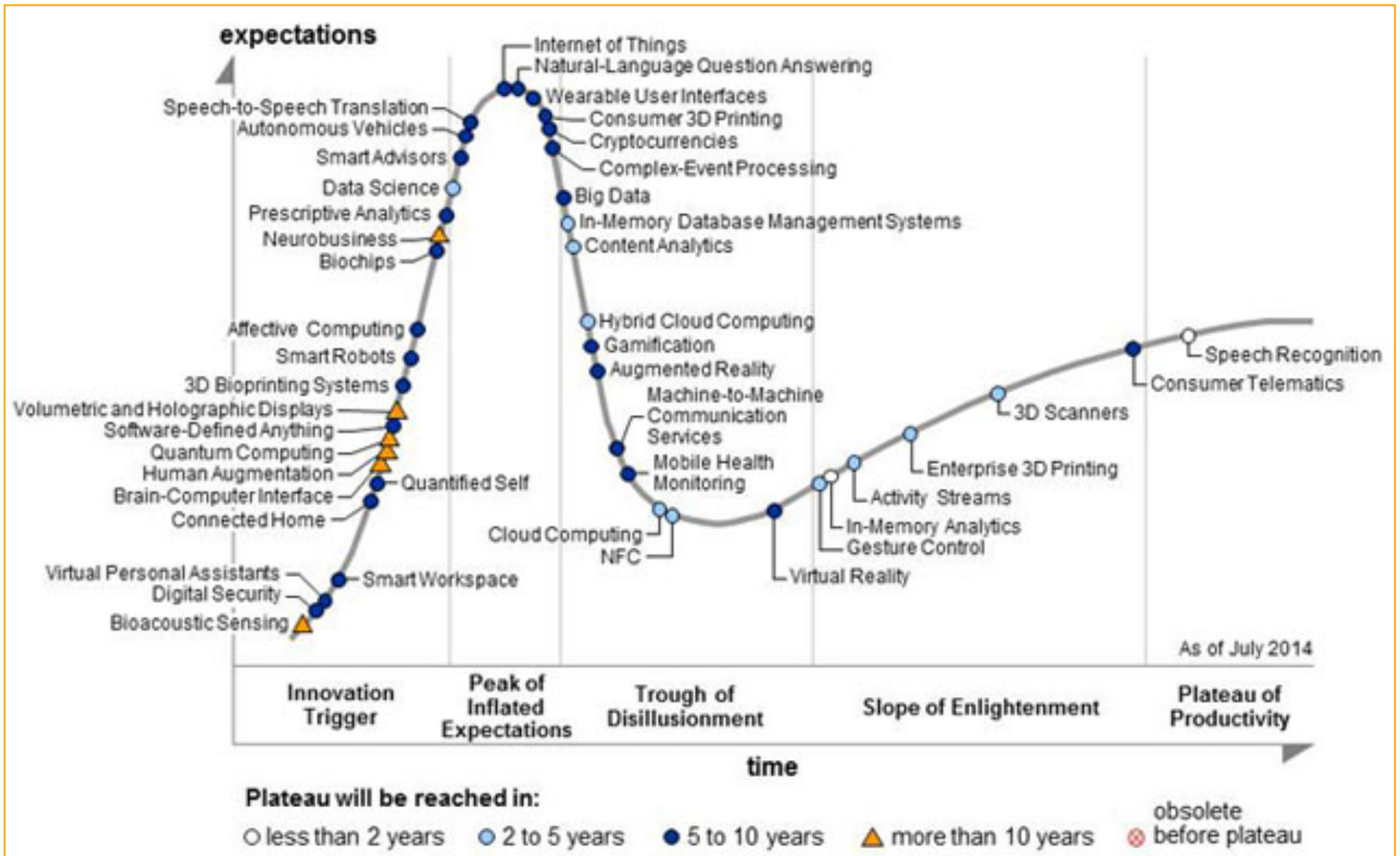
Today's Advances are Real but Hype is Not New

2014 Gartner Hype Cycle



"A.I. Winters" followed previous waves of excitement

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"It is a capital mistake to theorize before one has data."

-Arthur Conan Doyle 

How would you do this analysis?

http://xkcd.com/1140/

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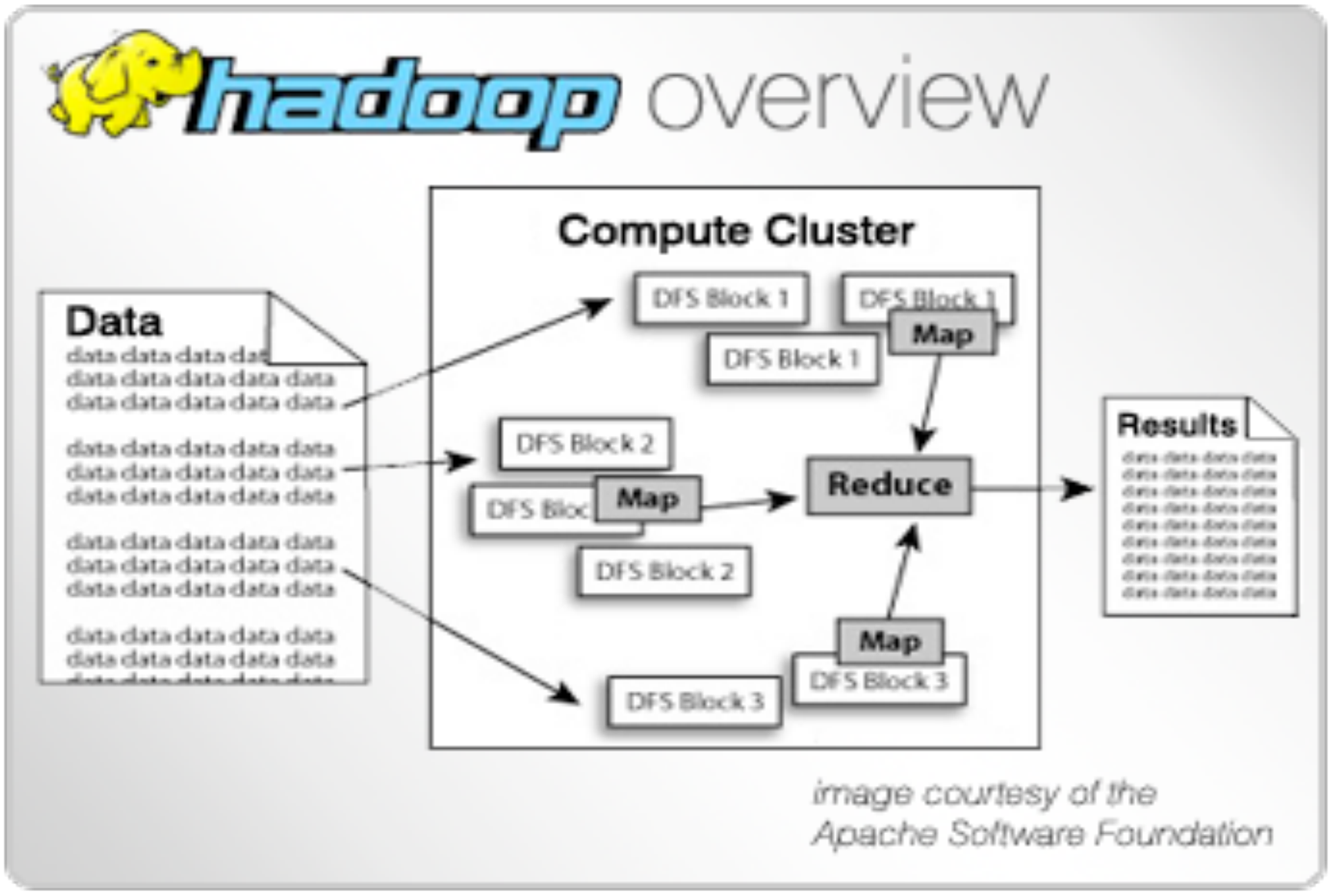
Map/Reduce



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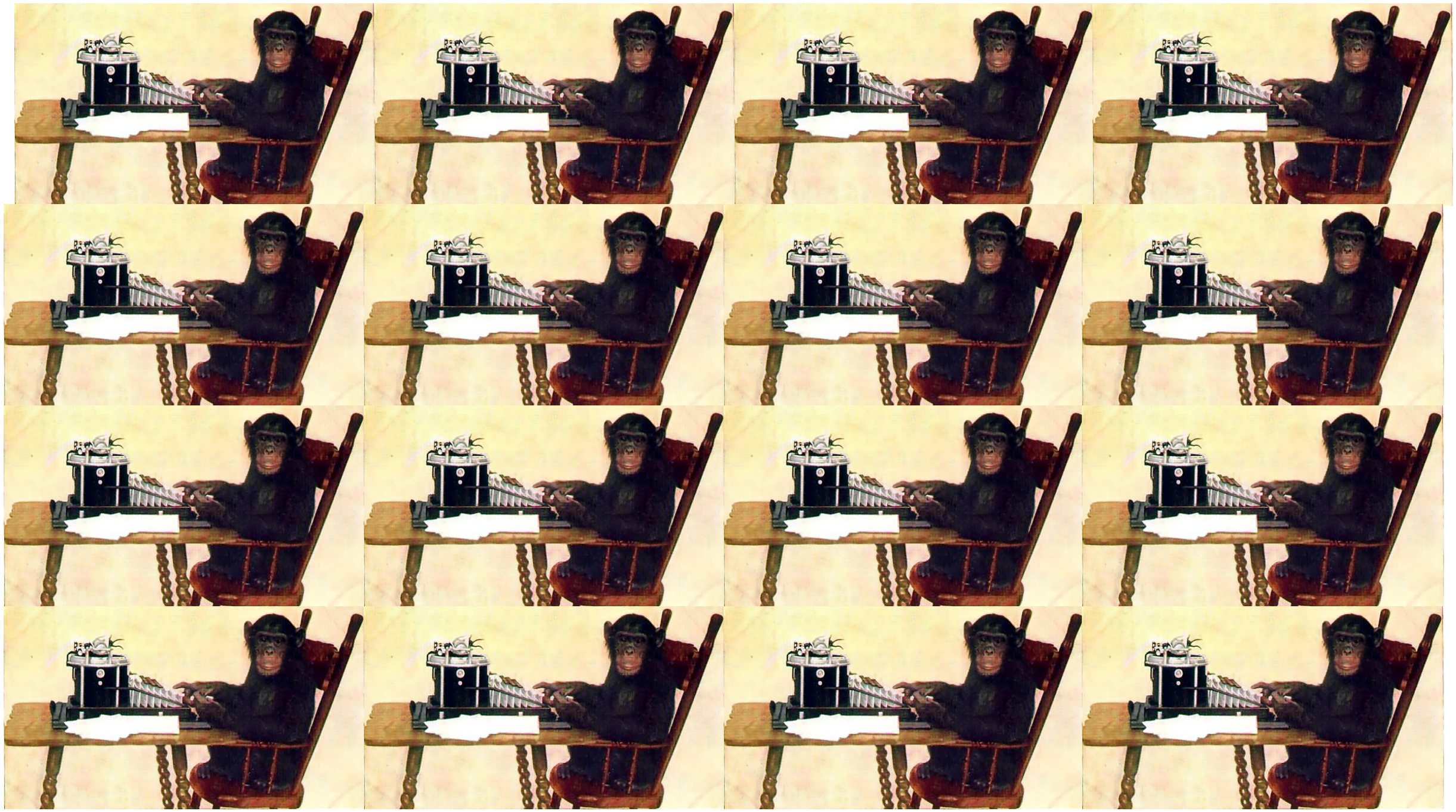
Exploit Parallelism

Exploit Parallelism



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https://marketoonist.com/2014/01/big-data.html

Data, data everywhere…

All of human history until 2004

~5 Exabytes

12:00AM

Today

11:59PM

~5 Exabytes

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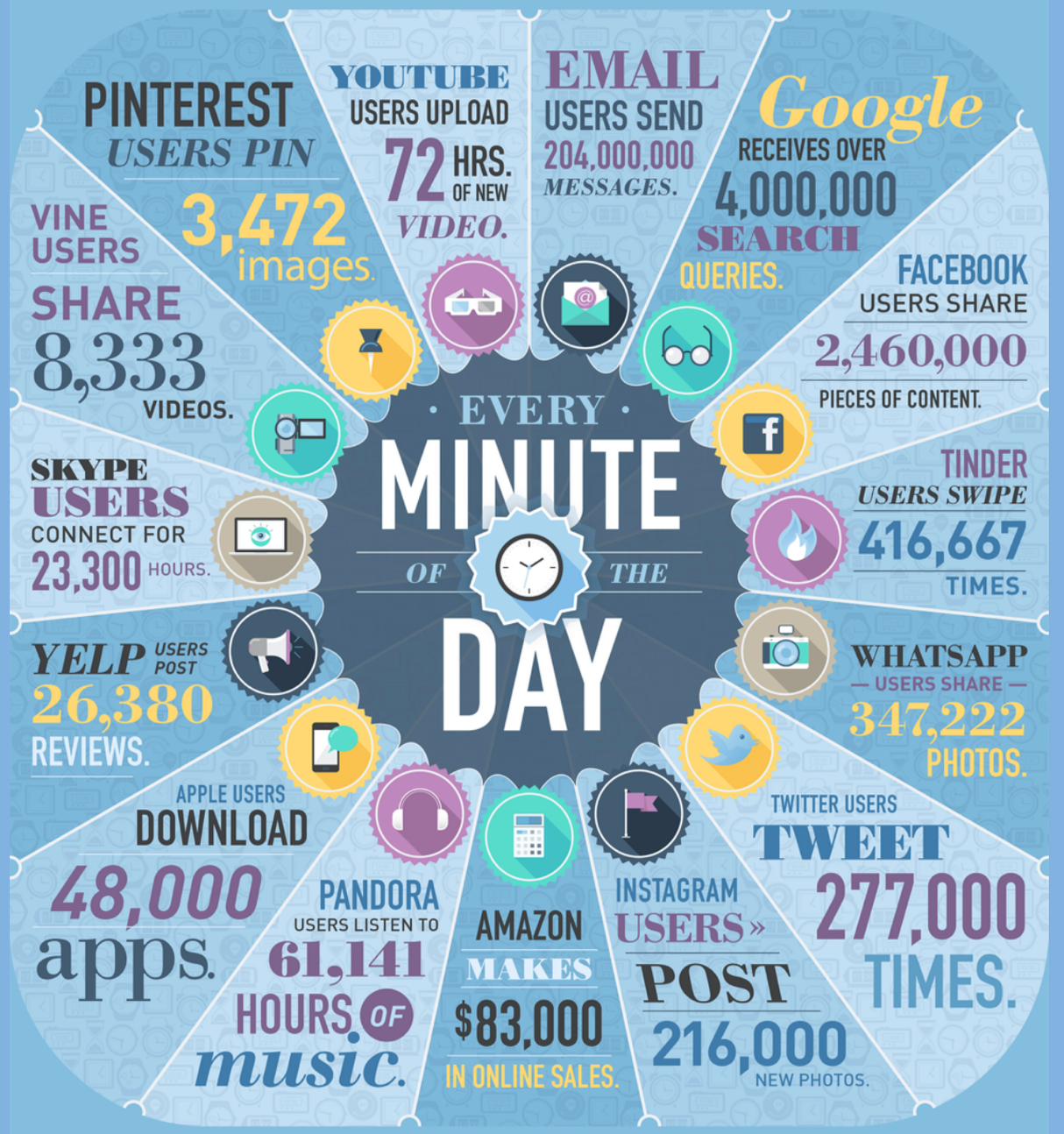
DATA NEVER SLEEPS 2.0

How Much Data is Generated **Every Minute?**

Data is being created every minute of every day without us even noticing it. Given how much information is floating around these days, it's tempting to talk about big data only in terms of size. Big data describes the massive avalanche of digital activity pulsating through cables and airwaves, but it also describes all the things we were never able to measure before. With every status we share, every article we read or every photo we upload, we are creating a digital trail that tells a story. Below, we explore how much data is generated in one minute.



THE GLOBAL INTERNET POPULATION GREW **14.3%** FROM 2011 - 2013 AND NOW REPRESENTS **2.4 BILLION PEOPLE.**

With each click, share and like, the world's data pool is expanding faster than we can comprehend. Businesses today are paying attention to scores of data sources to make crucial decisions about the future. The team at Domo can help your business make sense of this endless stream of data by providing executives with all their critical information in one intuitive platform. Domo delivers the insights you need to transform the way you run your business. Learn more at www.domo.com.

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SOURCES:

BITS.BLOGS.NYTIMES.COM, INTEL.COM, APPLE.COM, TIME.COM, DAILYMAIL.CO.UK, SKYPE.COM, STATISTICBRAIN.COM

How Big is “Big?”

Data so large that
“traditional” data processing
techniques are insufficient.

Virtually the entirety of data
available for a given
“substantial” domain.

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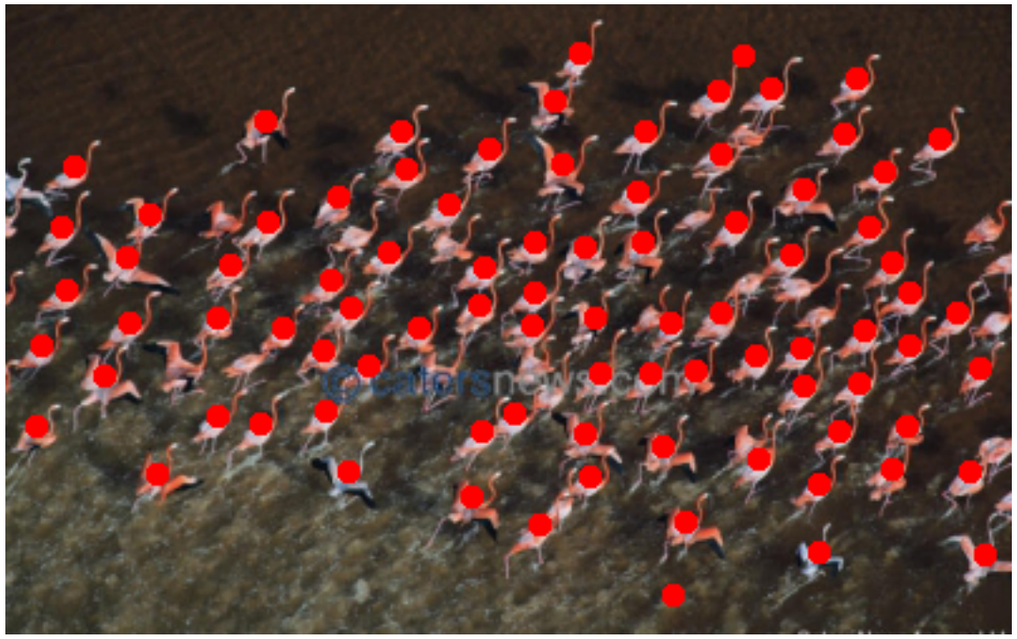
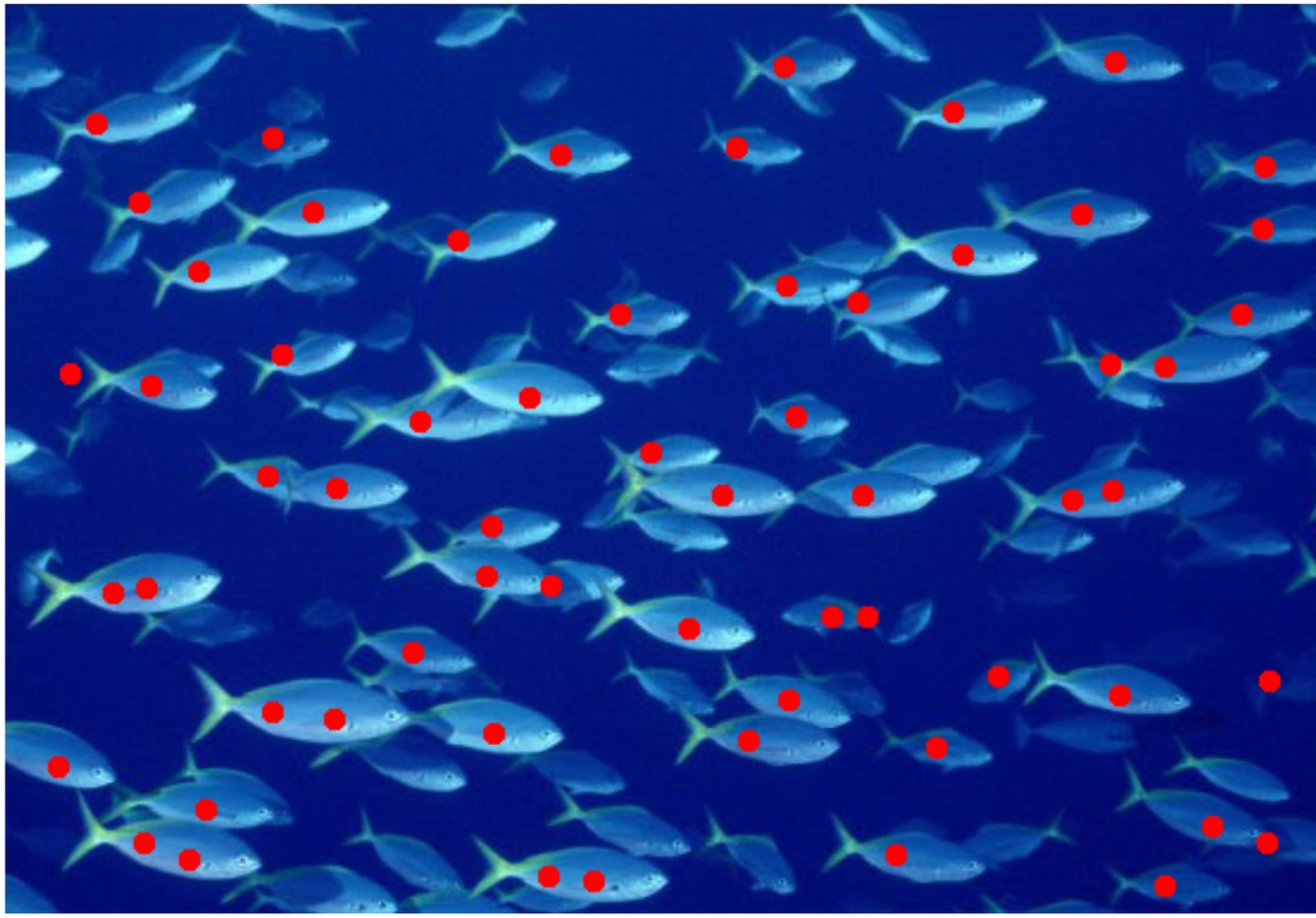
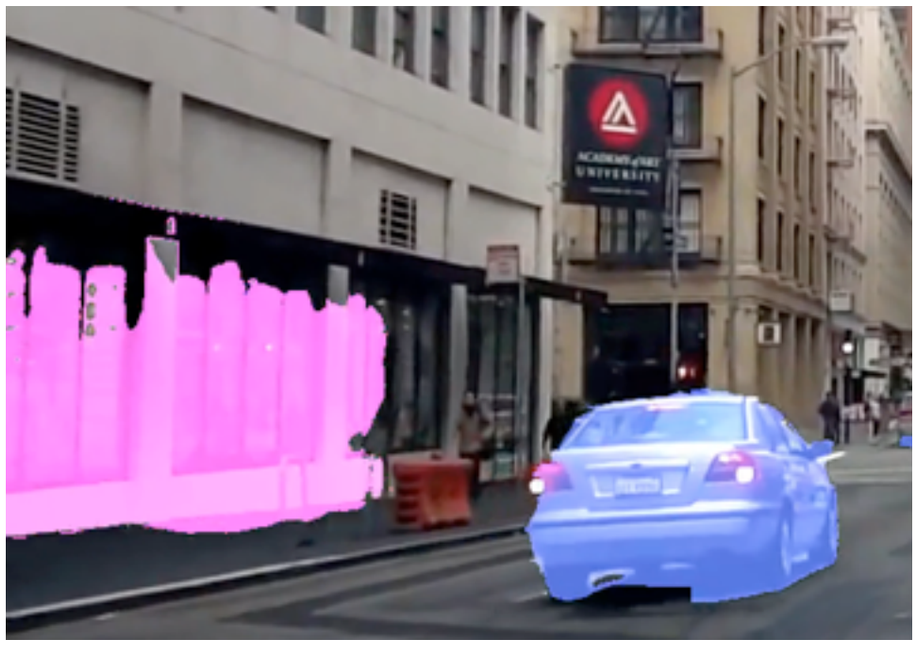





alamy
Alamy E45JRY



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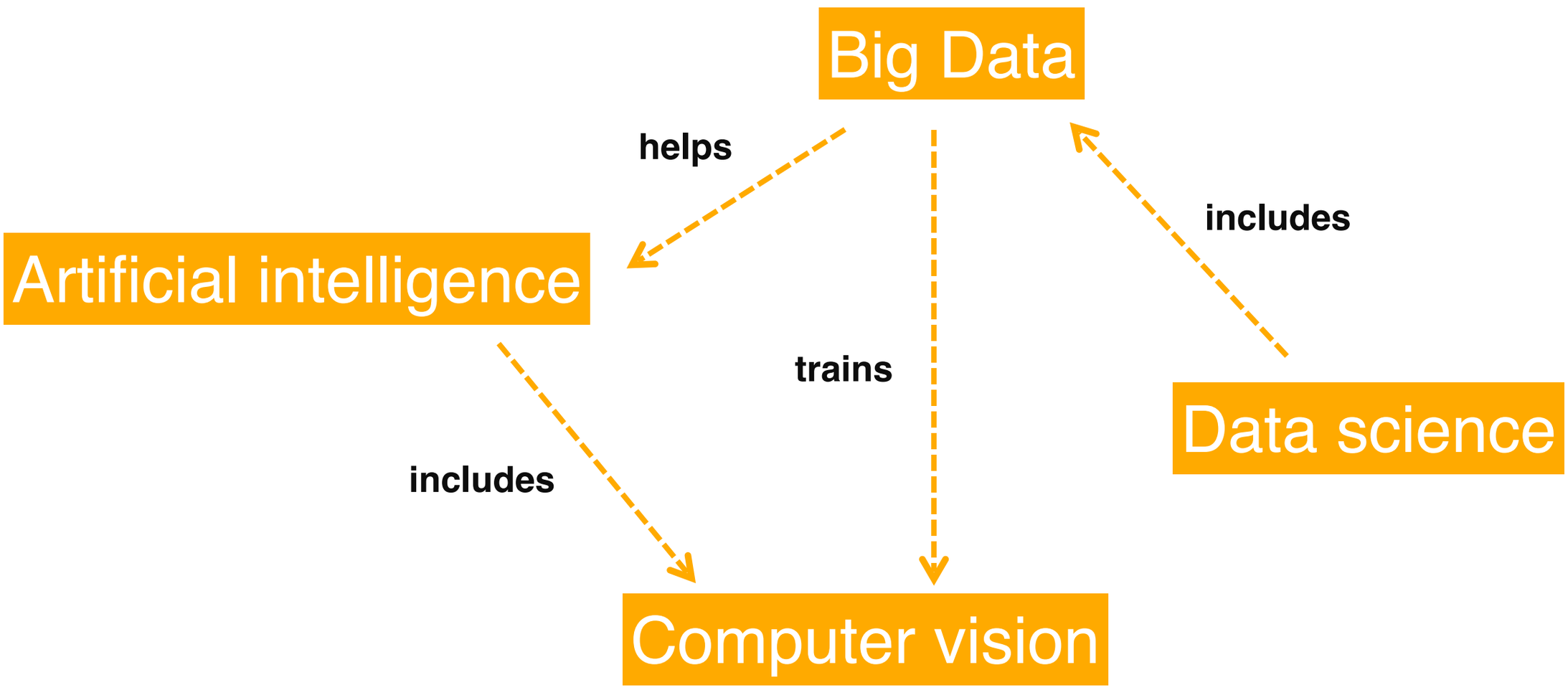
“At the heart of science is an essential balance between two seemingly contradictory attitudes—an openness to new ideas, no matter how bizarre or counterintuitive, and the most ruthlessly skeptical scrutiny of all ideas, old and new. This is how deep truths are winnowed from deep nonsense.”

–Carl Sagan 

Synthesis



What should you care about?

Applications in All Fields

Biology

Medicine

Retail

Security

Physics

Agriculture

Social networks

Simulations

Logistics

Transportation

Media

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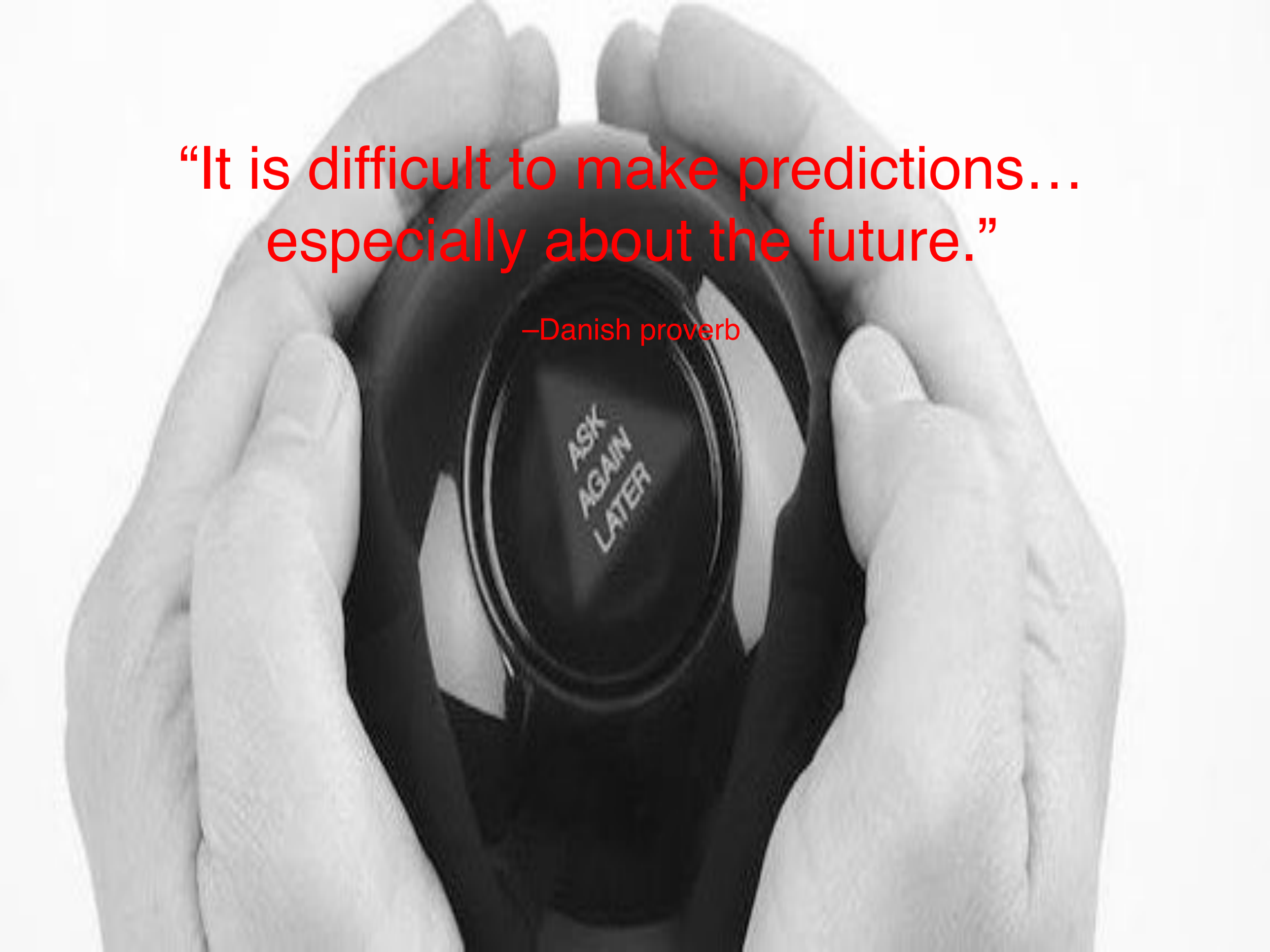

"It is difficult to make predictions…
especially about the future."

–Danish proverb

“We can only see a short distance ahead, but we can see plenty there that needs to be done.”

–Alan Turing 

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Questions

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