



# Digital Systems

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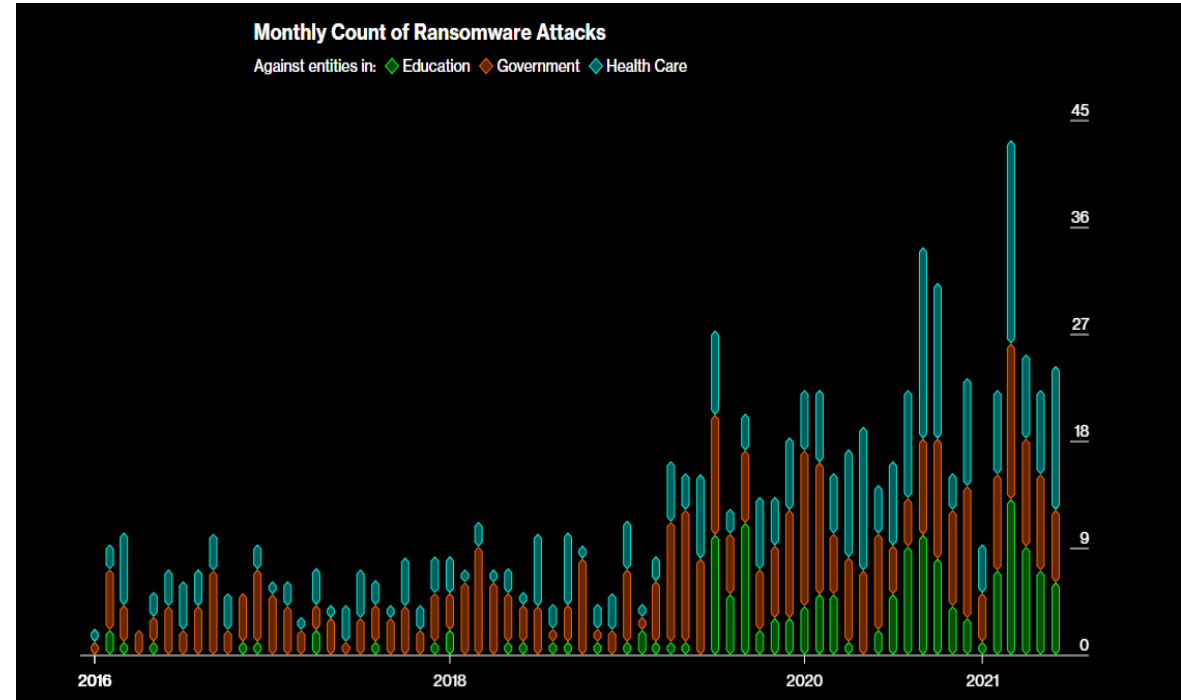
8.1 Cybersecurity & AI

**FOX**  
**MIS**

# Cybersecurity

# What are the biggest risks to an organization?

- ❖ Malware
- ❖ Ransomware
- ❖ Data leaks
- ❖ Phishing
- ❖ Inside threat
- ❖ Hacking-Denial of Service



<https://www.bloomberg.com/graphics/corporate-hacks-cyber-attacks/>

# Case Study: Hospitals

## Ransomware forces shutdown

- The incident led to the cancellation of 2,800 patient appointments at the NHS Trust.
- Took 3 days to resolve
- Hospitals are an appealing target for cyberwar...why?



Source: Getty Images/iStockphoto

<https://www.zdnet.com/article/ransomware-blamed-for-cyber-attack-which-forced-hospitals-to-cancel-operations-and-shut-down-systems/>

# Case Study: Hospitals

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Up-to-date information about patients



Source: Getty Images/iStockphoto

<https://www.zdnet.com/article/ransomware-blamed-for-cyber-attack-which-forced-hospitals-to-cancel-operations-and-shut-down-systems/>

# Phishing Scams

## Case Study

- Google and Facebook targeted
- Lost \$100 million

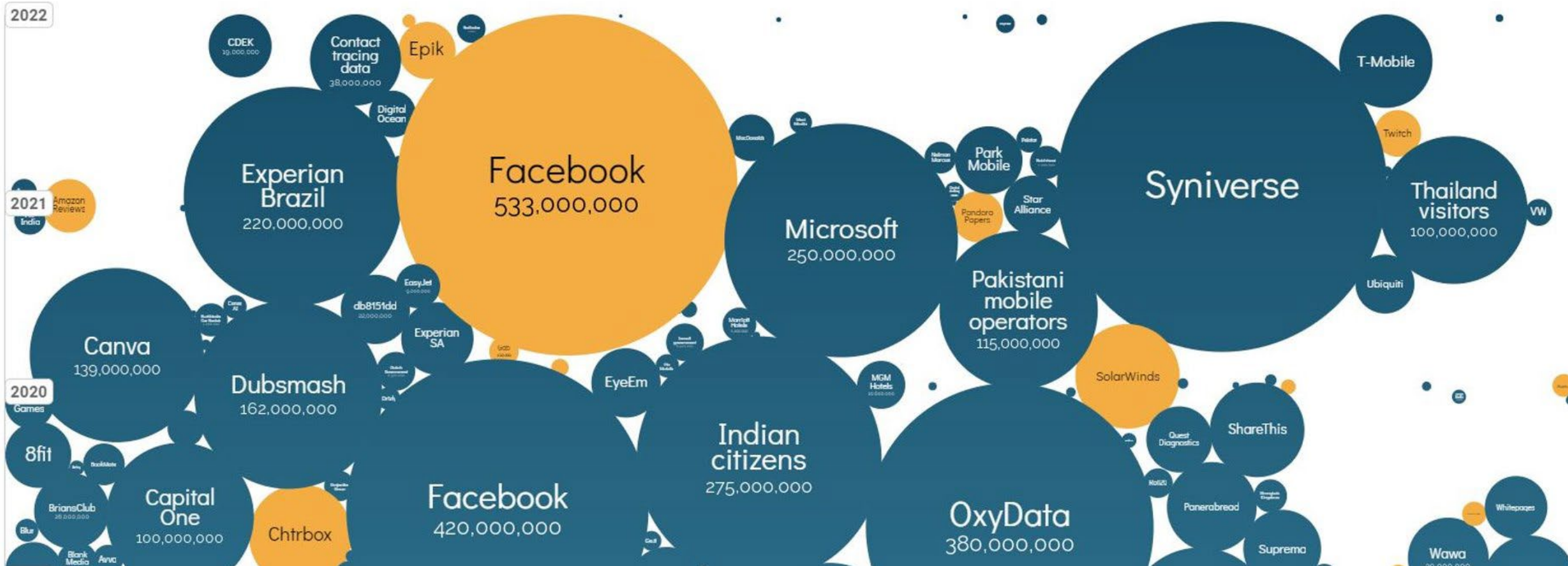
## Best Practices

- Careful of any suspicious emails
- Don't click on random links



Source: <https://www.nouveau.co.uk/content-hub/avoidphishing/>

# World's Biggest Data Breaches & Hacks

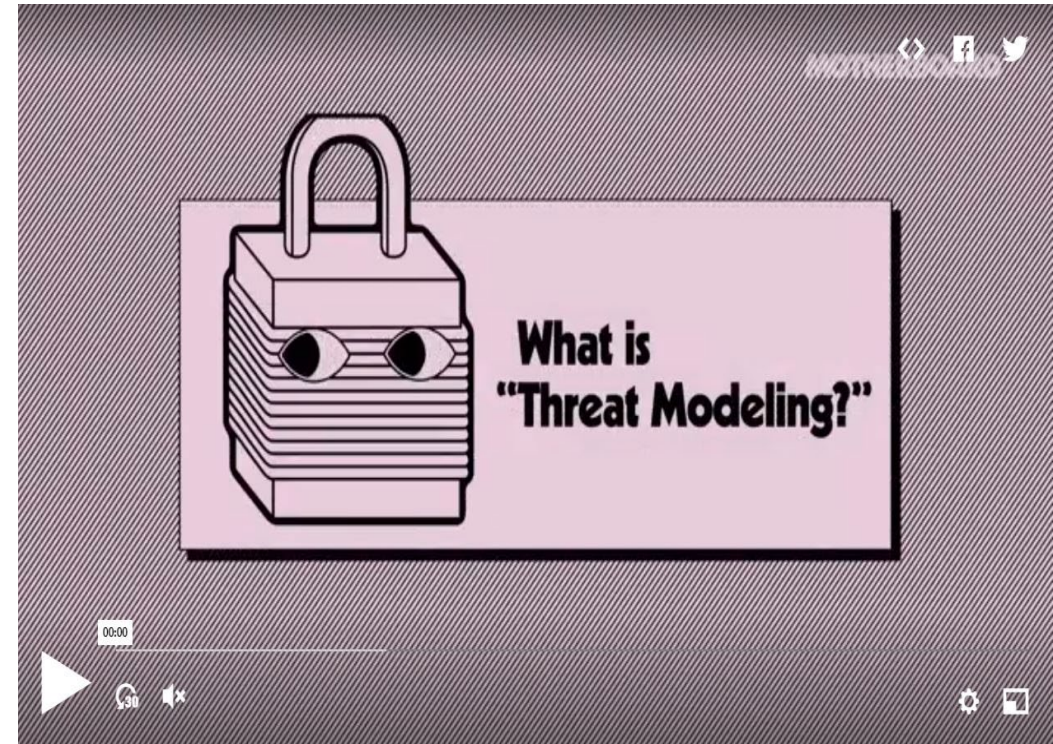


<https://informationisbeautiful.net/visualizations/worlds-biggest-data-breaches-hacks/>

# Cybersecurity - Core Fundamentals

Consider these five questions:

1. What do you want to protect?
2. Who do you want to protect it from?
3. How likely is it that you will need to protect it?
4. How bad are the consequences if you fail?
5. How much trouble are you willing to go through in order to try to prevent those consequences?



Source: [https://www.vice.com/en\\_us/article/a37p94/what-is-threat-modeling](https://www.vice.com/en_us/article/a37p94/what-is-threat-modeling)



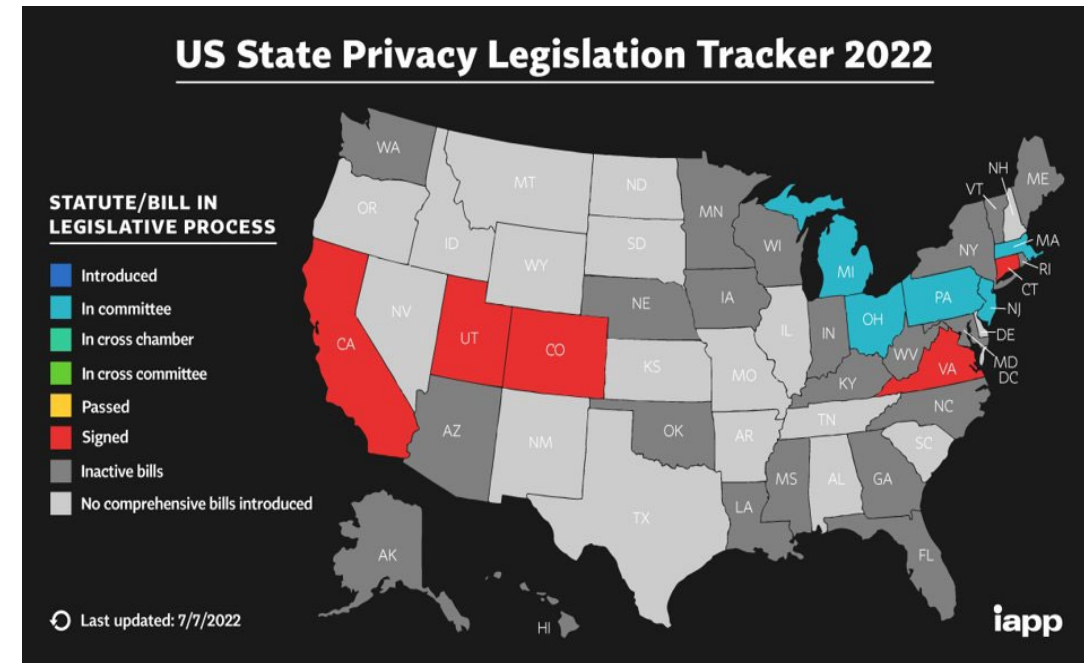
# Regulations

## Privacy and Personal Data Protection

- California Consumer Privacy Act (CCPA)

## Few Federal cybersecurity regulations

- 1996-Health Insurance Portability and Accountability Act (HIPAA)
- 1999-Gramm-Leach-Bliley Act
- 2002 Homeland Security Act, includes
  - Federal Information Security Management Act (FISMA)
- State-level momentum for comprehensive privacy bills is at an all-time high



Source: [https://www.gartner.com/resources/376000/376084/376084\\_0002.png](https://www.gartner.com/resources/376000/376084/376084_0002.png)

# Strategic Planning

What does this all mean?

- Define the eight reasons

## Eight Related Causes of Security Failure



ID: 382968

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Source: <https://www.gartner.com/document/3904673?ref=solrAll&refval=225616225&qid=0df98fbb9b466bc69199efad/>

# Password Strength

How secure are your passwords?

- Use numbers, letters, and symbols
- Make them as long as possible

Length of Password (Chars)	Only Numbers	Mixed Lower and Upper case alphabets	Mixed numbers, Lower and Upper case alphabets	Mixed numbers, Lower and Upper case alphabets , symbols
3	Instantly	Instantly	Instantly	Instantly
4	Instantly	Instantly	Instantly	Instantly
5	Instantly	Instantly	3 secs	10 secs
6	Instantly	8 secs	3 mins	13 mins
7	Instantly	5 mins	3 hours	17 hours
8	Instantly	3 hours	10 days	57 days
9	4 secs	4 days	153 days	12 years
10	40 secs	169 days	1 year	928 years
11	6 mins	16 years	106 years	71k years
12	1 hour	600 years	6k years	5m years
13	11 hours	21k years	108k years	423m years
14	4 days	778k years	25m years	5bn years
15	46 days	28m years	1bn years	2tn years
16	1 year	1bn years	97bn years	193tn years
17	12 years	36bn years	6tn years	14qd years
18	126 years	1tn years	374tn years	1ot years

Source: <https://community.isc2.org/t5/Tech-Talk/How-long-does-it-take-to-crack-passwords/td-p/32546>

# Password Strength

## Password Basics

- Keep them in your head?
- Don't change them?
- Reuse them?

## Password Management

- Consider a passphrase
  - Access a vault of your passwords
- Two-Factor Authentication



Source: <https://youtu.be/a6iW-8xPw3k>

# Cybersecurity

## Hijacking your systems!

- Who borrows flash drives?
- How else do you share data?
- Vectors for Virus & Malware



Source: <http://www.ommdvd.com/images/services/USB-Pile.jpg>

# Protection

## Considerations

- Antivirus
- Ad blocker
- Avoid dodgy plugins
- Back-up files
- Disable macros
- Don't just open attachments
- Firewall
- VPN



Source: <https://www.pcmag.com/roundup/256703/the-best-antivirus-protection>

# Artificial Intelligence (AI)

# What is Artificial Intelligence (AI)?

## Three Types of AI

### ❖ Narrow (ANI)

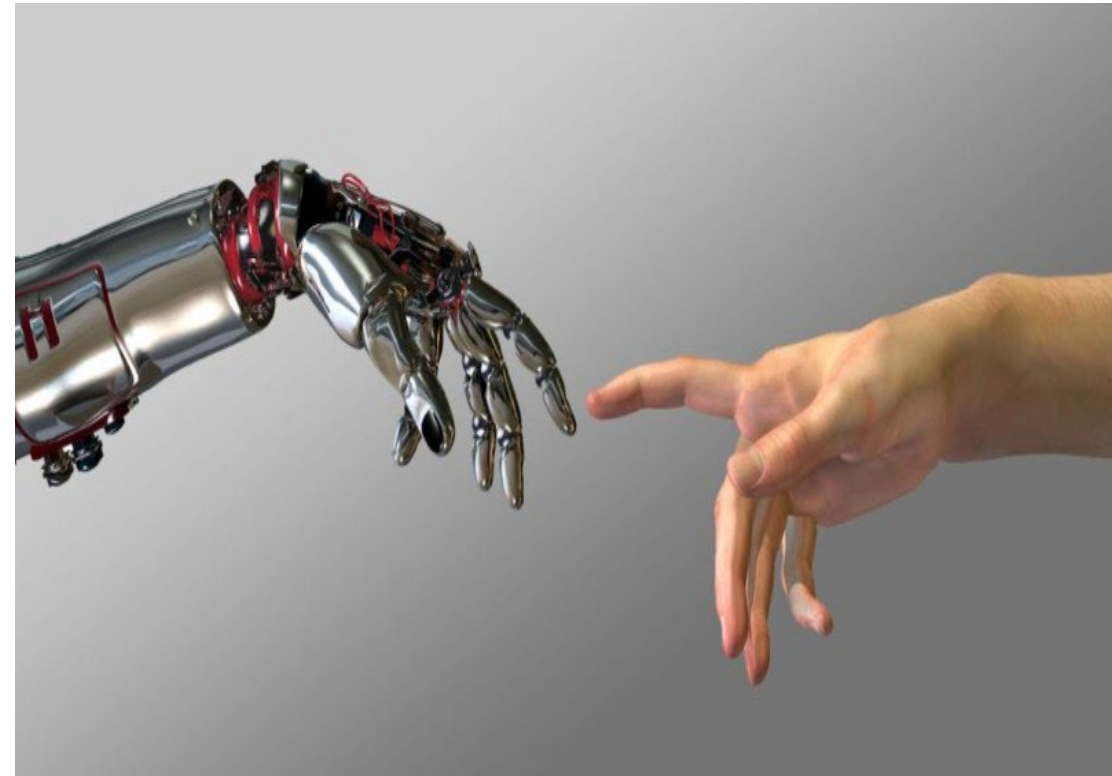
- Google maps/waze/Facebook/Autonomous cars/amazon suggestions

### ❖ General (AGI)

- Human Level Intelligence

### ❖ Superintelligence (ASI)

- Intelligence that exceeds that of a human

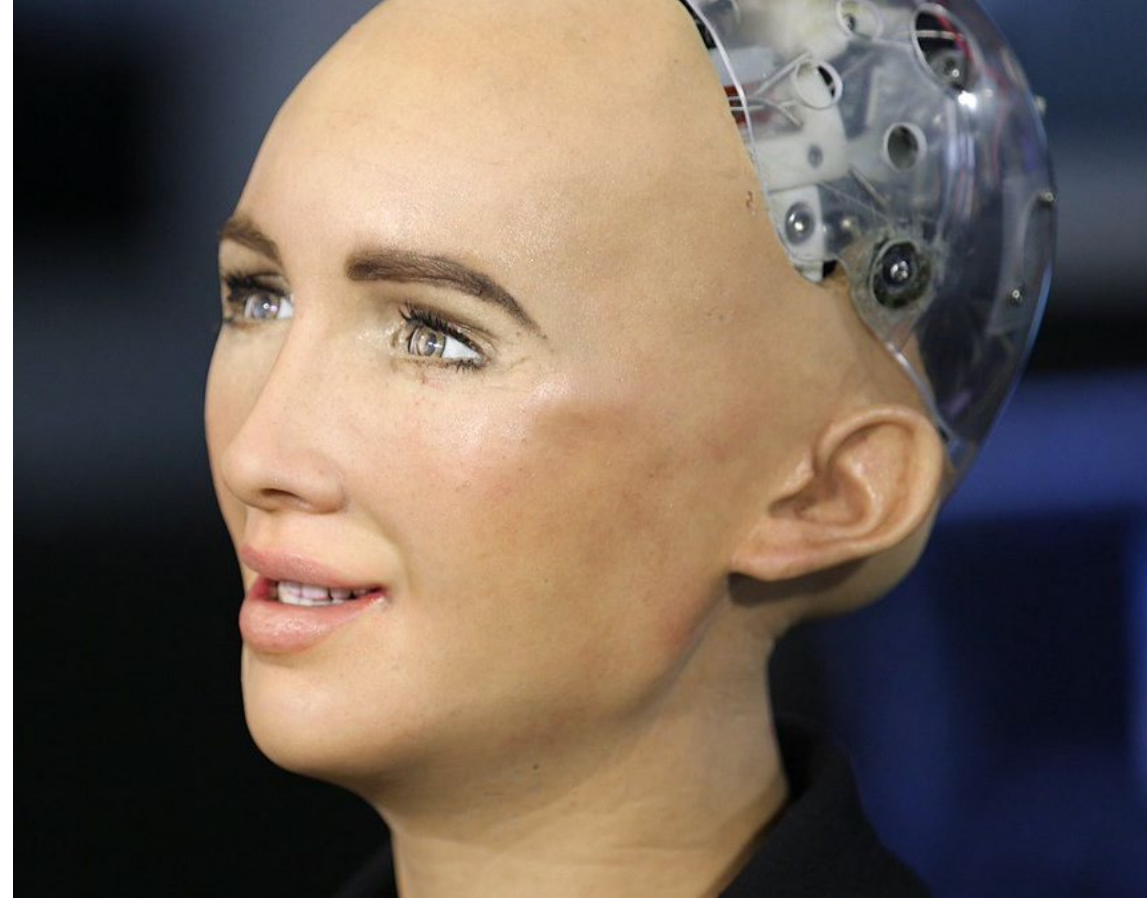


Source: <https://matrixni.org/artificial-intelligence-workshop-january-2018-register-now/>



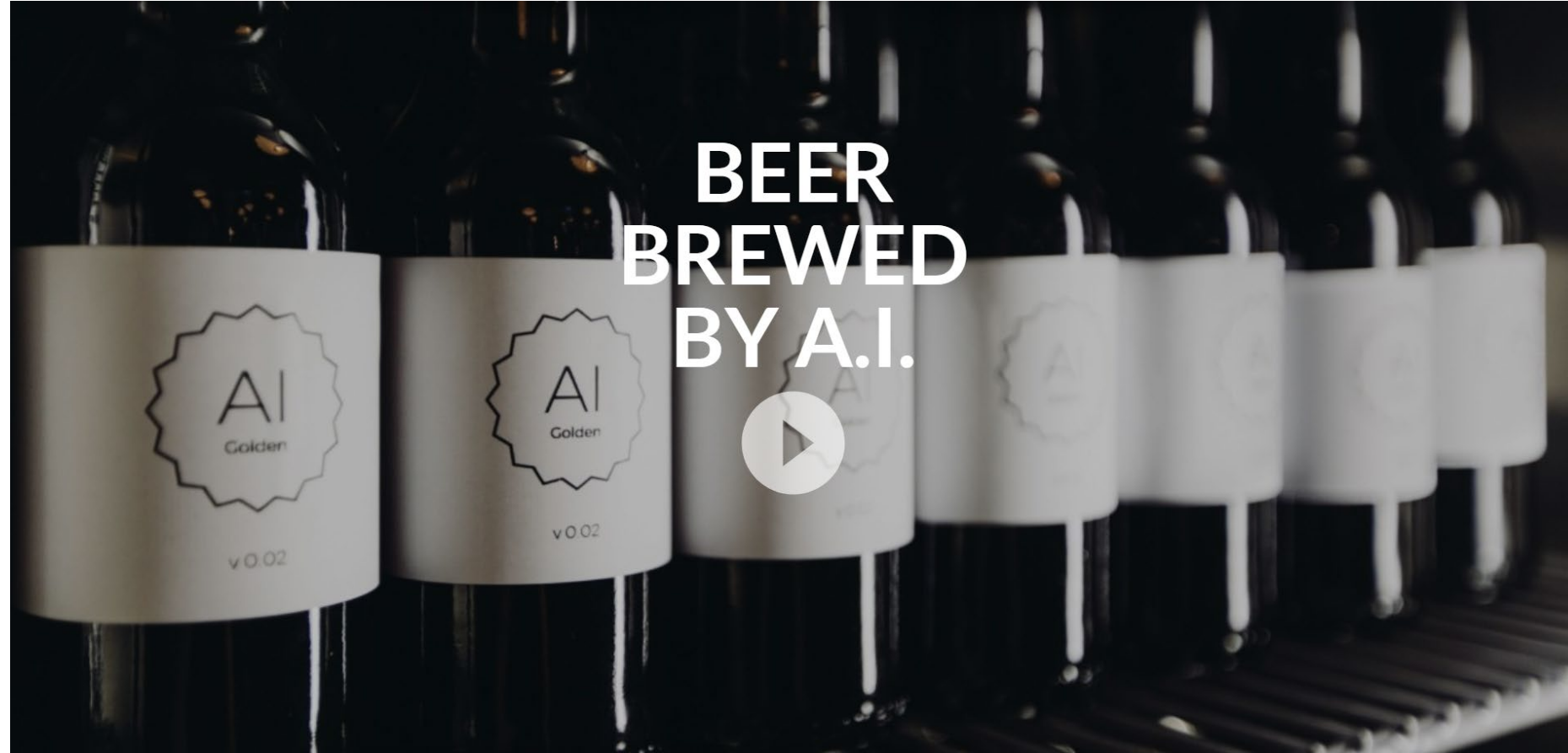
# Meet Sophia

- Granted legal Citizenship in Saudi Arabia



Source: <https://youtu.be/78-1MlkxyqI>

# Can Machines help us improve Beer?



Source: <http://intelligentx.ai/>

# What are the two most likely scenarios with AI?

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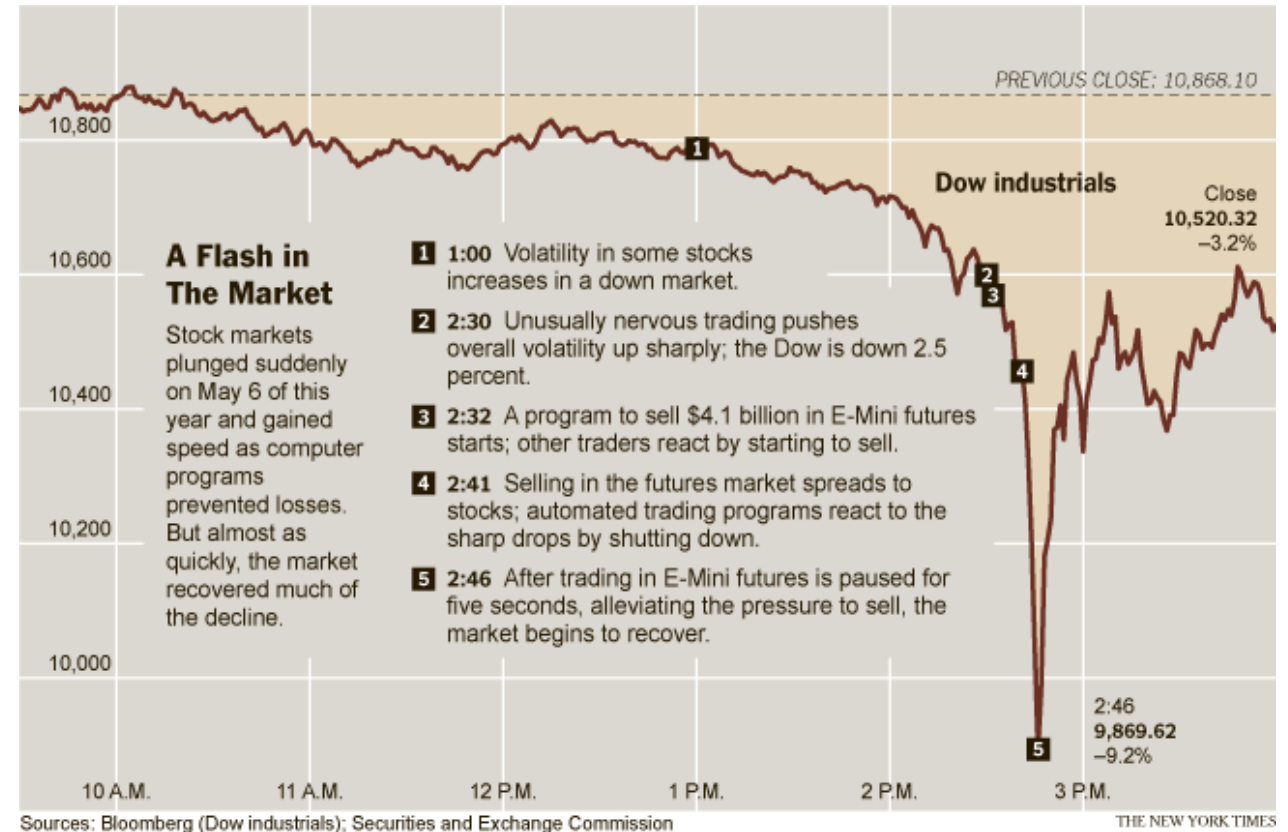
AI is programmed to do something DEVASTATING

AI is programmed to do something BENEFICIAL,  
but it develops a destructive method to achieve its goals

# The AI Revolution

## 2010 Flash Crash

- ANI caused stock market to plummet
- \$1 trillion decline in value
- Quick recovery

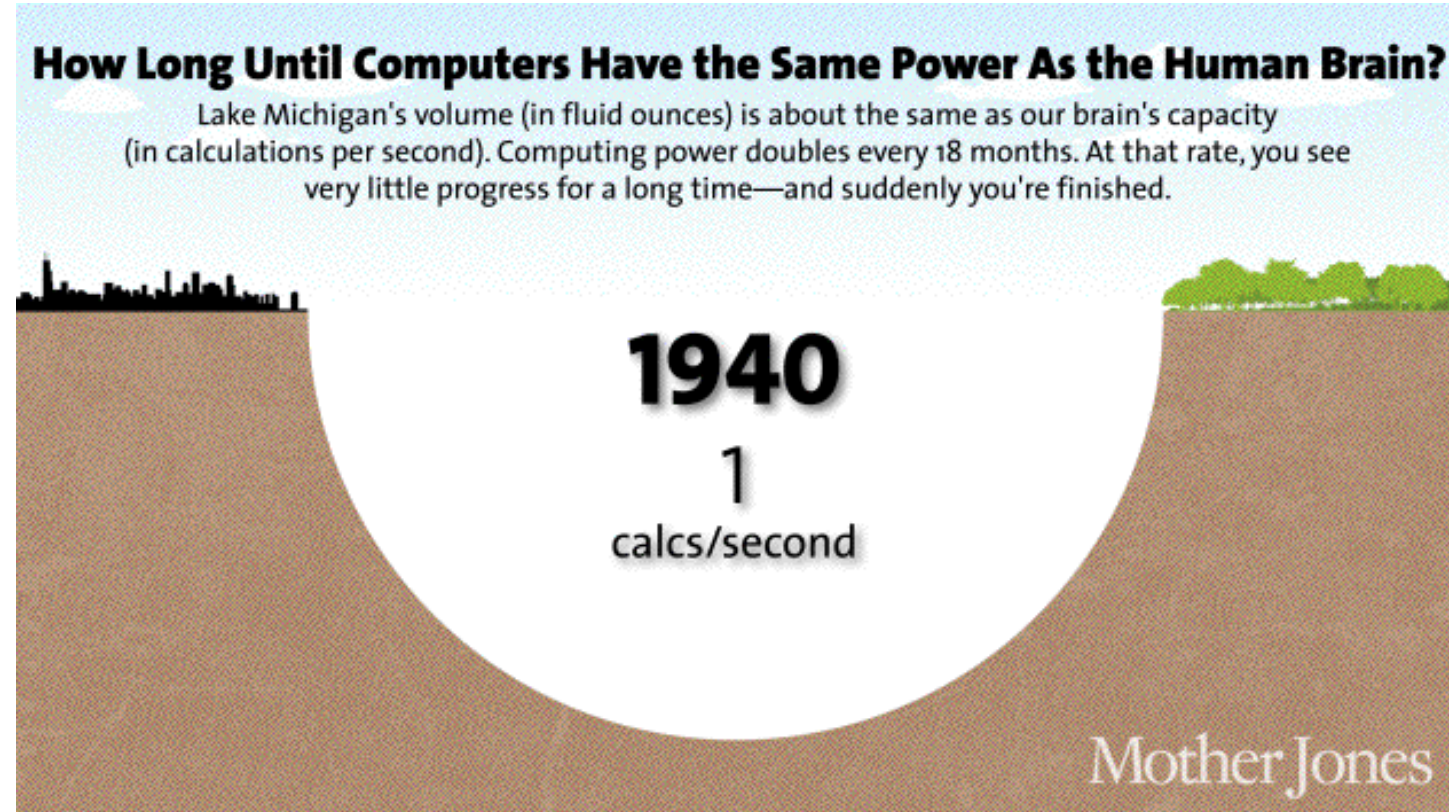


Source: <http://graphics8.nytimes.com/images/2010/10/02/business/flash-crash-dow/flash-crash-dow-popup.png>

# From AGI to ASI

This could happen soon

- Advancements in technology
- Experimentation
- Innovation



Source: <https://assets.motherjones.com/media/2013/05/LakeMichigan-Final3.gif>

# AGI Tests

- The Turing Test
- The Coffee Test
- The College Student Test
- The Employment Test



Source: <https://www.newsweek.com/black-mirror-season-4-callister-star-trek-769795>

Source: <http://robotfacebook.edwindertien.nl/product/ex-machina/>

# Alan Turing (1912-1954)

- Father of AI and computer science
- Cryptanalyst during WWII
- Cracked code that enabled Allies victory
- Contributions to physical sciences
- Prosecuted by UK and castrated for being gay
- Died of cyanide poisoning
- Receives public apology in 2009 & royal pardon in 2013



Source: <https://www.historyextra.com/period/second-world-war/bletchley-park-facts-alan-turing/>

# The Future...

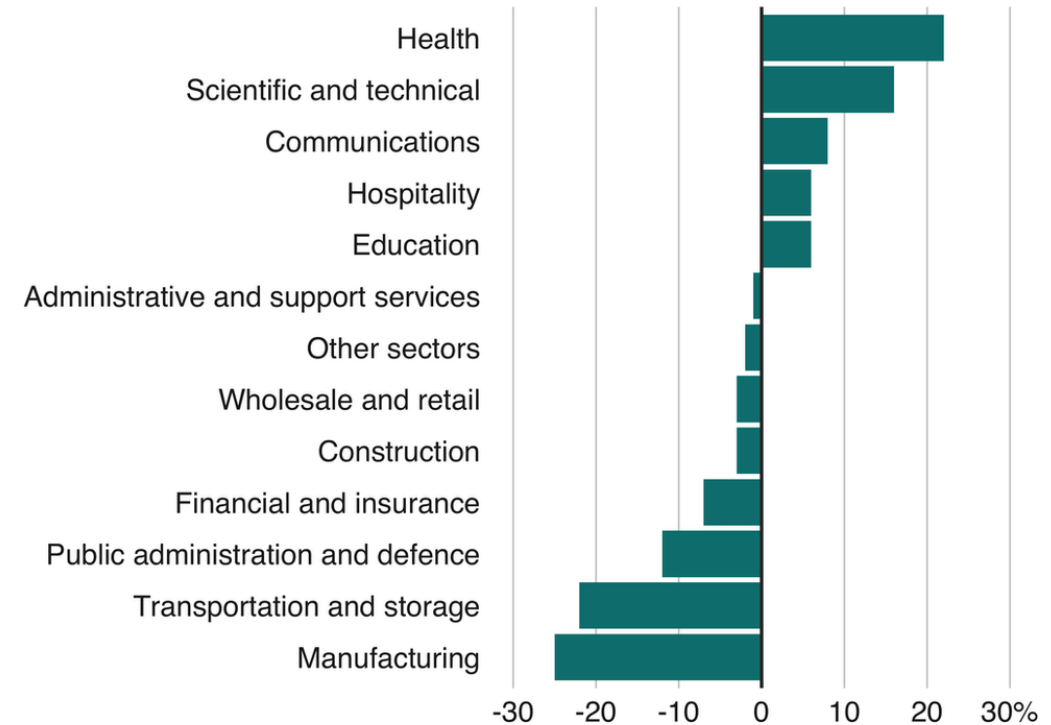
## What will the job market look like when you graduate?



Source: <https://www.weforum.org/agenda/2018/06/ai-arms-race-global-collaboration/>

## How AI could change the job market

Estimated net job creation by industry sector, 2017-2037



Source: PwC

BBC

Source: <https://www.bbc.com/news/business-44849492>



# More to Come

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Prepare with Readings & Videos before our next class!!!