



# ARTIFICIAL INTELLIGENCE

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# DEFINITION OF ARTIFICIAL INTELLIGENCE

Artificial intelligence (AI) is defined as the ability of machines and systems to acquire and apply knowledge and to carry out intelligent behavior.

This means performing a broad variety of cognitive tasks, e.g. sensing, processing oral language, reasoning, learning, making decisions and demonstrating an ability to move and manipulate objects accordingly.

Intelligent systems use a combination of big data analytics, cloud computing, machine-to-machine communication and the Internet of Things (IoT) to operate and learn.

AI is empowering new kinds of software and robots that increasingly act as self-governing agents, operating much more independently from the decisions of their human creators and operators than machines have previously done.

# ORIGINS OF AI

- 1950's
  - Paper by Alan Turing – the father of computer science and AI
    - Can you tell if you are talking to a human or a machine?
  - Chess and checkers game playing – machine learning
  - Artificial neural networks – inspired by natural neural network in the brain
  - Dartmouth Summer Research School on *Artificial Intelligence*
- 1960's
  - Major funds allocated to AI research in US and UK
  - ELIZA at MIT – natural language processing
  - HAL 9000 in popular culture

ELIZA: Is something troubling you ?  
YOU: Men are all alike.  
ELIZA: What is the connection, do you suppose ?  
YOU: They're always bugging us about something or other.  
ELIZA: Can you think of a specific example ?  
YOU: Well, my boyfriend made me come here.  
ELIZA: Is it important to you that your boyfriend made you come here ?  
YOU: He says I'm depressed much of the time.  
ELIZA: I am sorry to hear that you are depressed.  
YOU: It's true. I am unhappy.  
ELIZA: Can you explain what made you unhappy ?  
YOU: █

ELIZA (1965 – MIT)

[https://en.wikipedia.org/wiki/ELIZA#/media/File:ELIZA\\_conversation.jpg](https://en.wikipedia.org/wiki/ELIZA#/media/File:ELIZA_conversation.jpg)

# ORIGINS OF AI

- 1970's
  - High hopes: “in from three to eight years we will have a machine with the general intelligence of an average human”
  - Lighthill Report – start of “AI Winter”
  - Computers not capable to store enough information or process it fast
- 1980's
  - Expert Systems – mimic decision making process of a human expert
  - Deep Learning – large neural networks recognize shapes, digits, and can predict words
  - Japan's Fifth Generation Computer Project – disappointment leads to “Second AI Winter”




# LIFE

## CO-ED DORMS

An intimate revolution on campus

THE  
GRANDEUR  
OF  
DE GAULLE

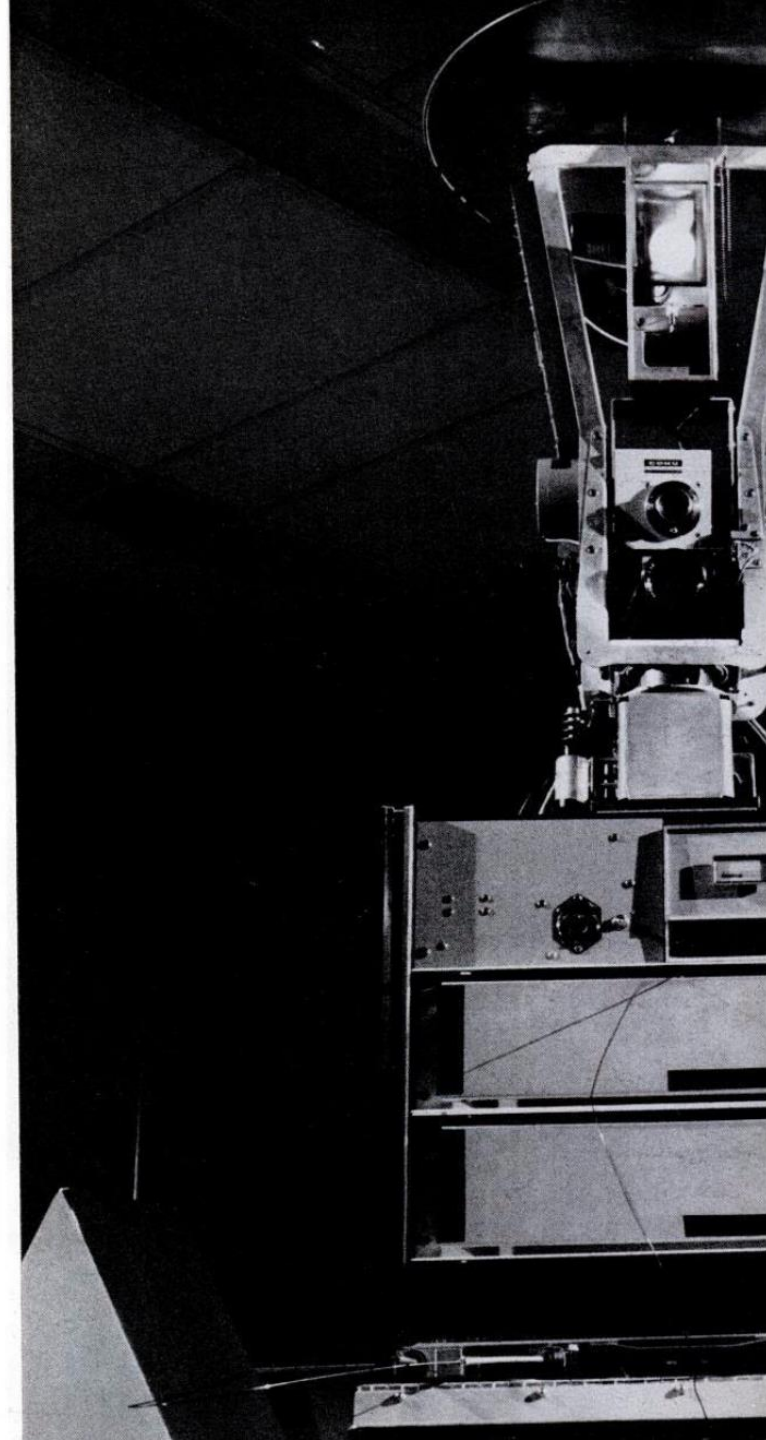


Rod Singler and  
Cindy Stewart  
in their dorm  
at Oberlin

# Meet Shaky, the first electronic person

Marvin Minsky of MIT's Project Mac, a 42-year-old polymath who has made major contributions to Artificial Intelligence, recently told me with quiet certitude: "In from three to eight years we will have a machine with the general intelligence of an average human being. I mean a machine that will be able to read Shakespeare, grease a car, play office politics, tell a joke, have a fight. At that point the machine will begin to educate itself with fantastic speed. In a few months it will be at genius level and a few months after that its powers will be incalculable."

NOVEMBER 20 • 1970 • 506



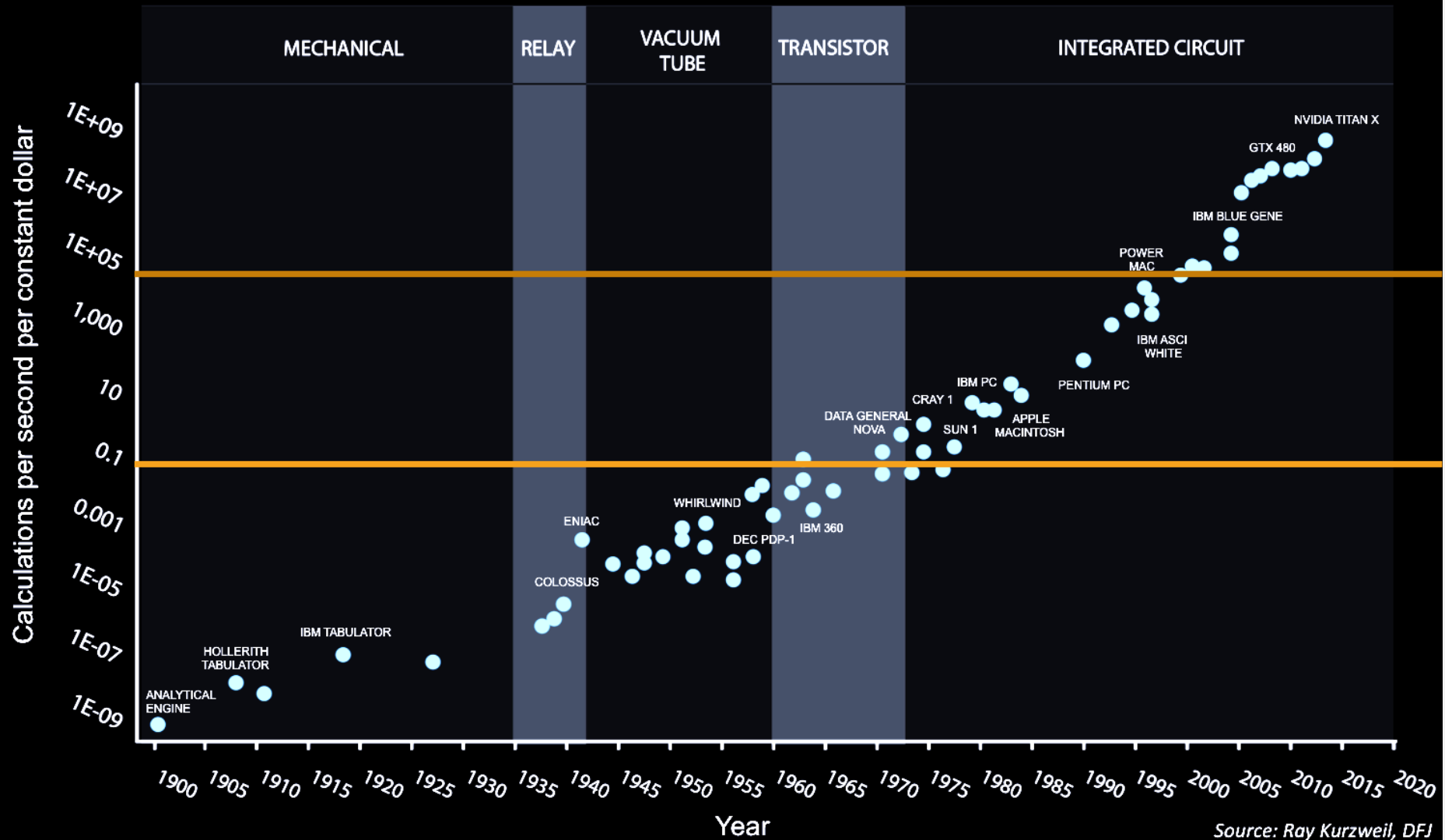
# ORIGINS OF AI

- 1990's
  - Algorithmic advances and rigor in machine learning
    - Support Vector Machines, Long Short Term Memory, Gradient-Based Learning, Probability, Bayesian Networks, Hidden Markov Models, Information Theory, Stochastic Modeling
  - IBM's Deep Blue beats Garry Kasparov
  - Intelligent agents
- 2000's
  - Big data
  - Cloud computing
  - Storage and compute power
  - Autonomous vehicles



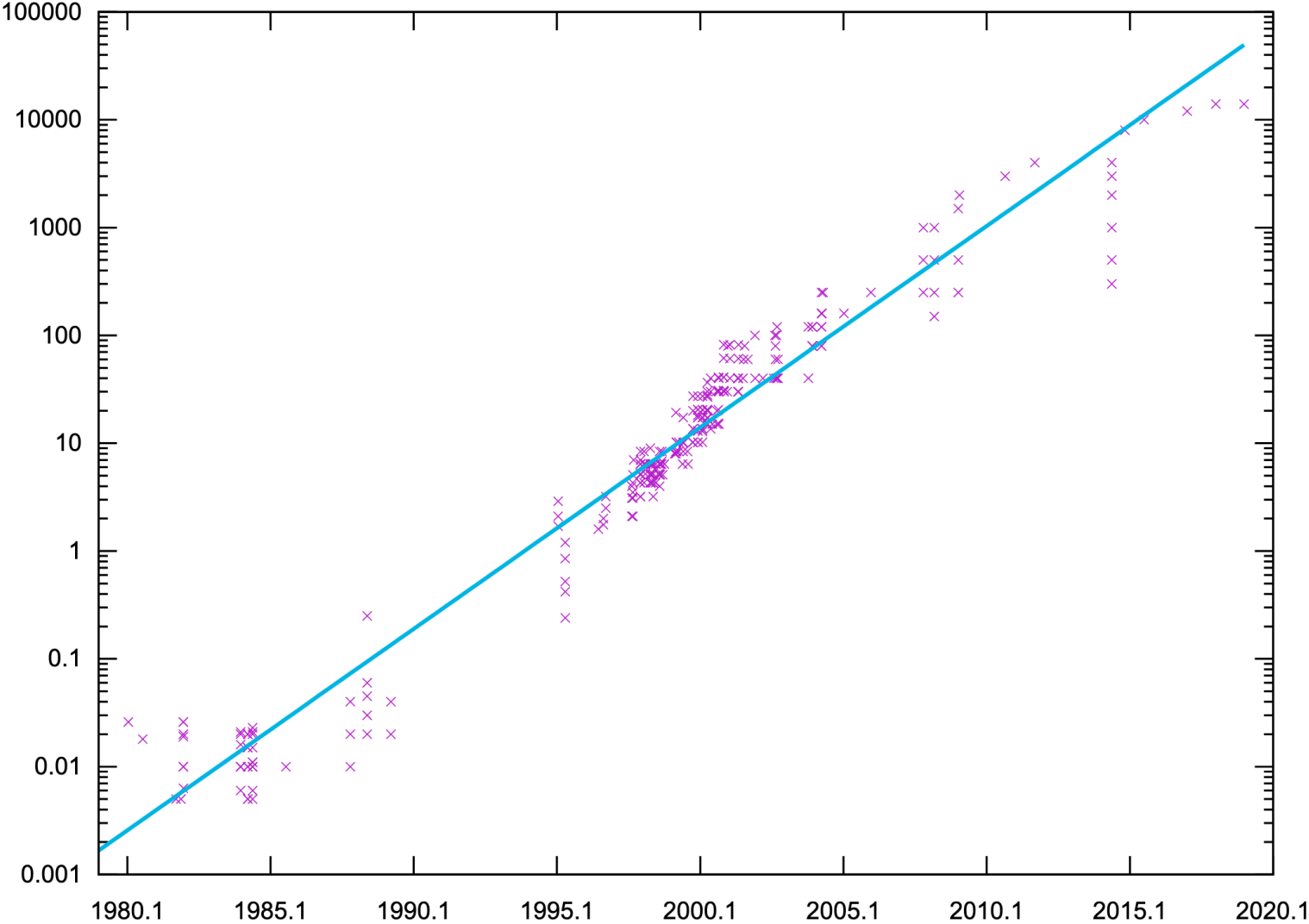


# 120 Years of Moore's Law



STORAGE

HD STORAGE (GIGABYTES) VERSUS YEAR



# APPLICATIONS OF AI

**Agriculture**

**Business**

**Finance**

**Medicine**

**Education**

**Government**

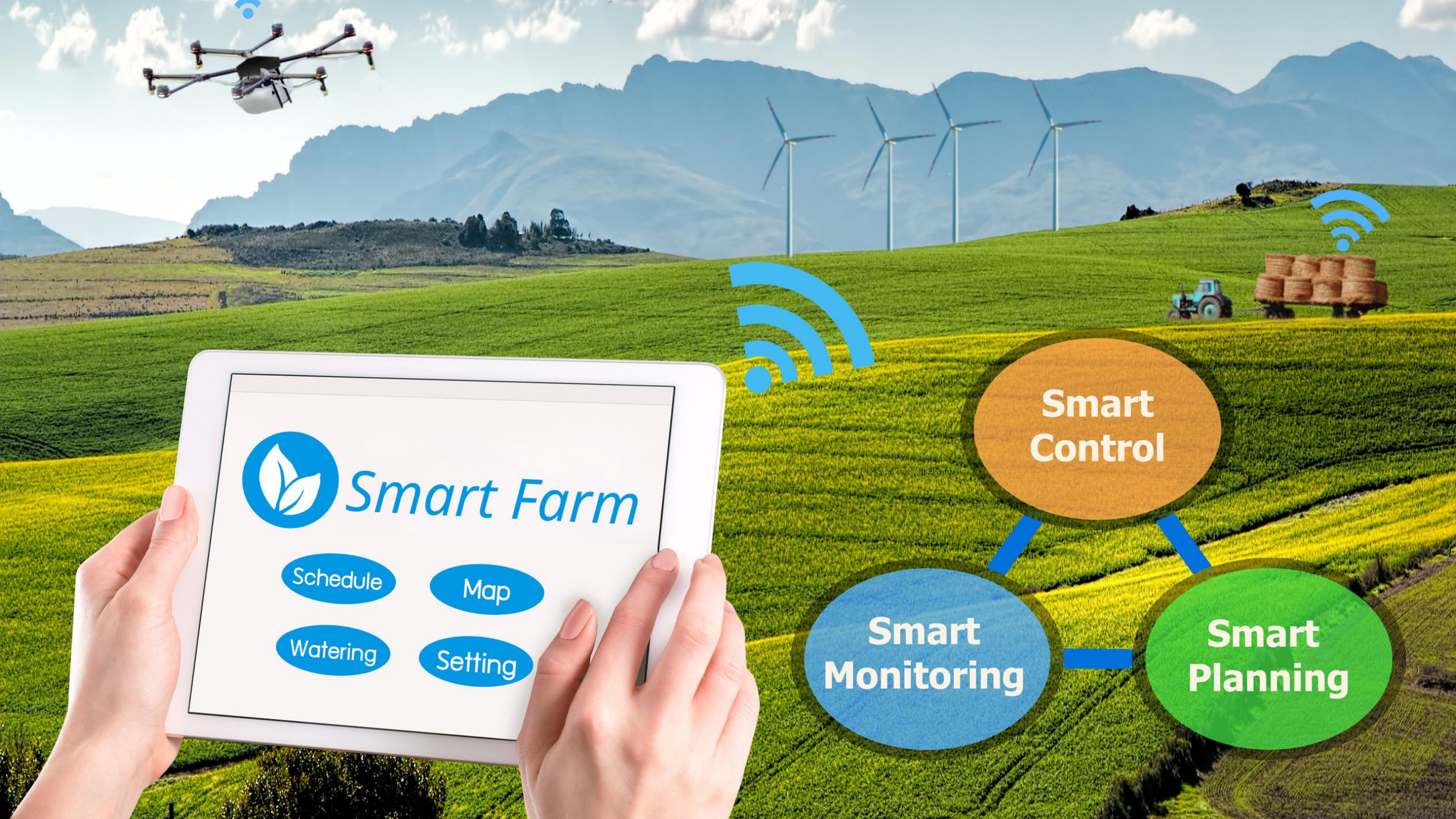
**Industry**

**Media**

**Transportation**

**Games**





# Smart Farm

Schedule

Map

Watering

Setting

Smart Control

Smart Monitoring

Smart Planning

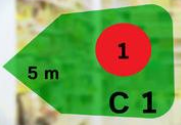
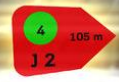




What are you looking for?

Your current lists.

1. Cup Noodle
2. Orange
3. Meat
4. Shirt



CODE  
ROAD21

Daily Deals









# Lesson 1

Lesson 1





# GOVERNMENT COULD USE AI FOR...



Identifying spreading diseases early



"Listening" to social media for public feedback on government-relevant topics

Logging/checking into various systems in order to quickly find the source of a server problem



Enabling self-driving shuttles that could bring passengers to or from transit stations



Generating dynamic data dashboards to help answer citizen questions



Preventing cyberattacks by learning what malicious behavior looks like



"Listening" to social media for quick notifications of emergency situations



Delivering dynamic activity reports to IT departments



Identifying fraudulent benefits claims



Helping to schedule meetings

Creating "synthetic data" to quickly train machine learning algorithms

Guiding a citizen to the service they're looking for by answering questions regardless of phrasing (e.g., "How do I file my taxes" or "Where do I go to file my taxes")



Predicting traffic congestion and car accidents



Predicting crime/suggesting optimal police patrol presence



Measuring whether new child welfare policies helped reduce the harm done to children

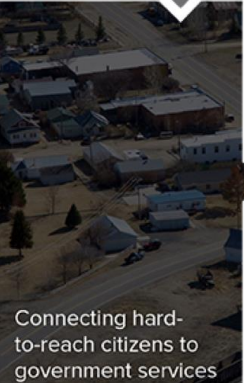


Helping to speed up HR paperwork

Finding possible health code violations



Counting pedestrians in a given area at a given time



Connecting hard-to-reach citizens to government services



Suggesting additional services and resources to citizens who are applying for something



Quickly compiling and analyzing police body cam evidence



Handling the most common types of service requests



Anticipating road infrastructure maintenance/replacement needs



Understanding traffic patterns for planning purposes



Anticipating water infrastructure failures













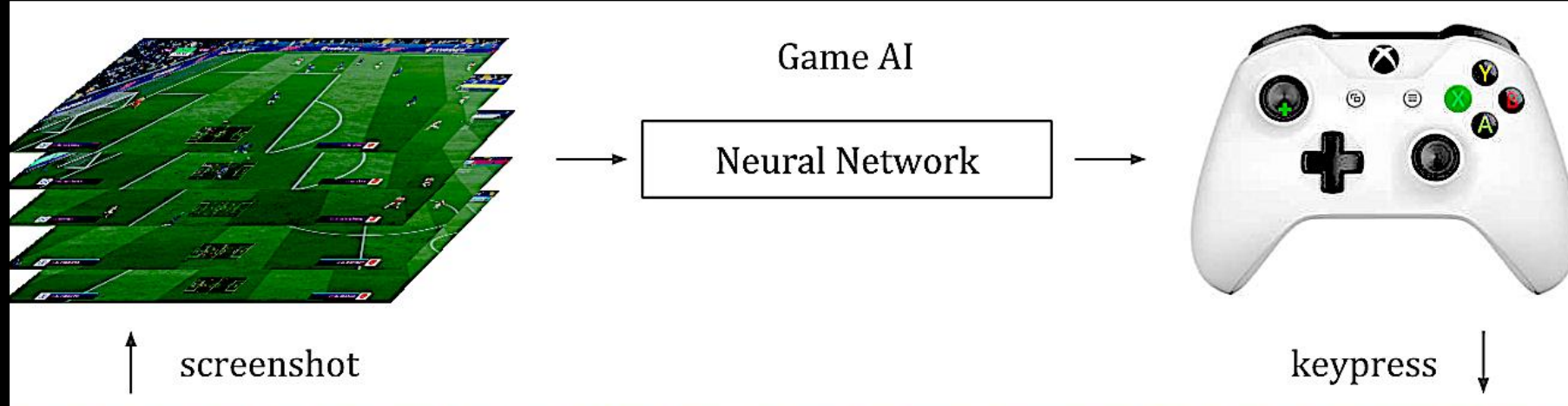
98.7%



43.2 m







# AI RESEARCHERS

In top 1000 according to Google Scholar

- Ali S. Hadi (Egypt / Egypt)
- Adnan Darwiche (Lebanon / USA)
- Hussein Abbass (Egypt / Australia)
- Raja Chatila (Syria / France)
- Nizar Habash (Palestine / UAE)
- Iyad Rahwan (Syria / USA)