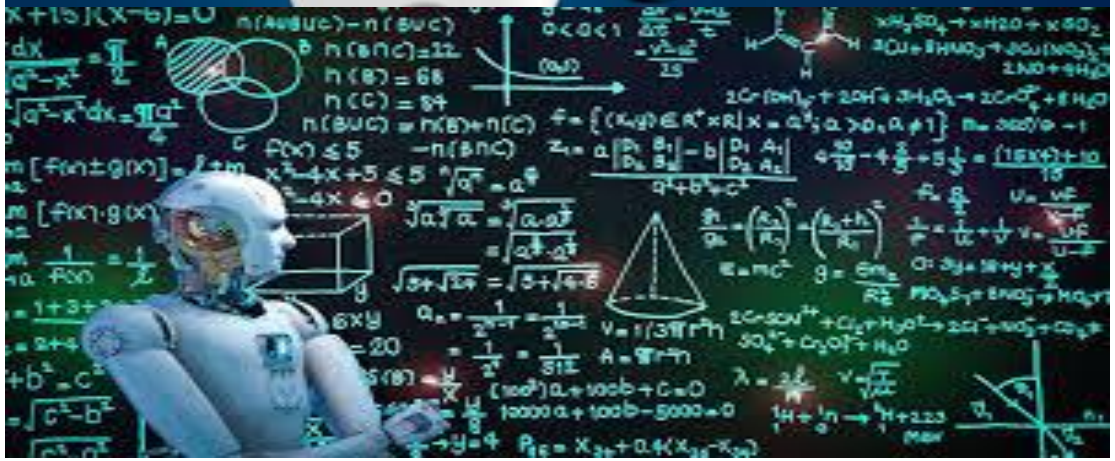
Artificial Intelligent

Dr. Shiple

Do we need assistance from machines?



Challenges and DeepMind

Go Game

Brief Development History of AI

1956: AI was proposed at the Dartmouth Conference.

1959: Arthur Samuel proposed machine learning.

1950s

1960s

1970s

1956-1976
First period of boom
The concept and development target of AI were determined at the Dartmouth conference.

1976: Due to failure of projects such as machine translation and negative impact of some academic reports, the fund for AI was decreased in general.

1980s

1976-1982
First period of low ebb
AI suffered from questioning and criticism due to insufficient computing capabilities, high computing complexity, and great difficulty of inference realization.

1985: Decision-making tree models with better visualization effect and multi-layer ANNs which broke through the limit of early perceptron.

1982-1987
Second period of boom
Expert system capable of logic rule inference and answering questions of specific fields went popular and fifth-generation computers developed.

1997: Deep Blue defeated the world chess champion Garry Kasparov.

1987: The market of LISP machines collapsed.

1990s

1987-1997
Second period of low ebb
Technical fields faced bottlenecks, people no longer focused on abstract inference, and models based on symbol processing were rejected.

2006: Hinton and his students started deep learning.

2000s

1997-2010
Period of recovery
Computing performance was improved and Internet technologies got popularized quickly.

2014: Microsoft released the first individual intelligent assistant Microsoft Cortana in the world.

2010: The era of big data came.

2010s

2010-
Period of rapid growth
New-generation information technologies triggered transformation of information environment and data basis. Multi-model data such as massive images, voices, and texts emerged continuously. Computing capabilities were improved.

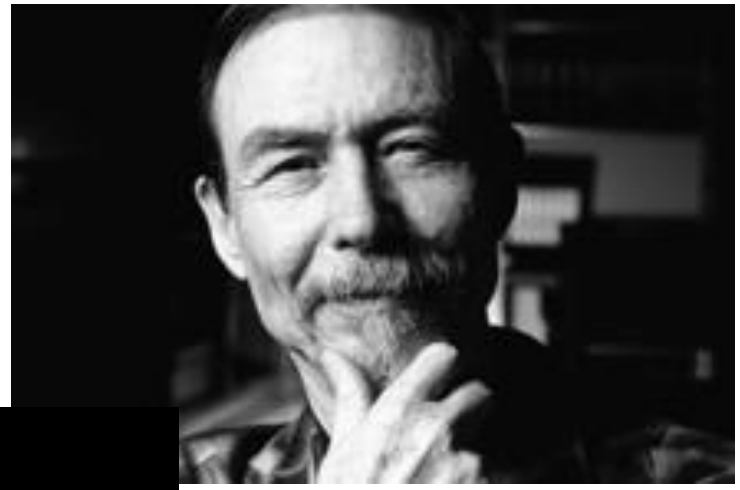
2016 March: AlphaGo defeated the world champion Go player Lee Sedol by 4-1.

2017 October: The Deep Mind team released AlphaGo Zero, the strongest version of AlphaGo.

2020s

Neuromorphic chips

- In the 1980s, he focused on electronic modelling of human neurology and biology.



Carver Mead

Types of AI

- Strong AI
  - The strong AI view holds that it is possible to create intelligent machines that can really reason and solve problems. Such machines are considered to be conscious and self-aware, can independently think about problems and work out optimal solutions to problems, have their own system of values and world views, and have all the same instincts as living things, such as survival and security needs. It can be regarded as a new civilization in a certain sense.
- Weak AI
  - The weak AI view holds that intelligent machines cannot really reason and solve problems. These machines only look intelligent, but do not have real intelligence or self-awareness.

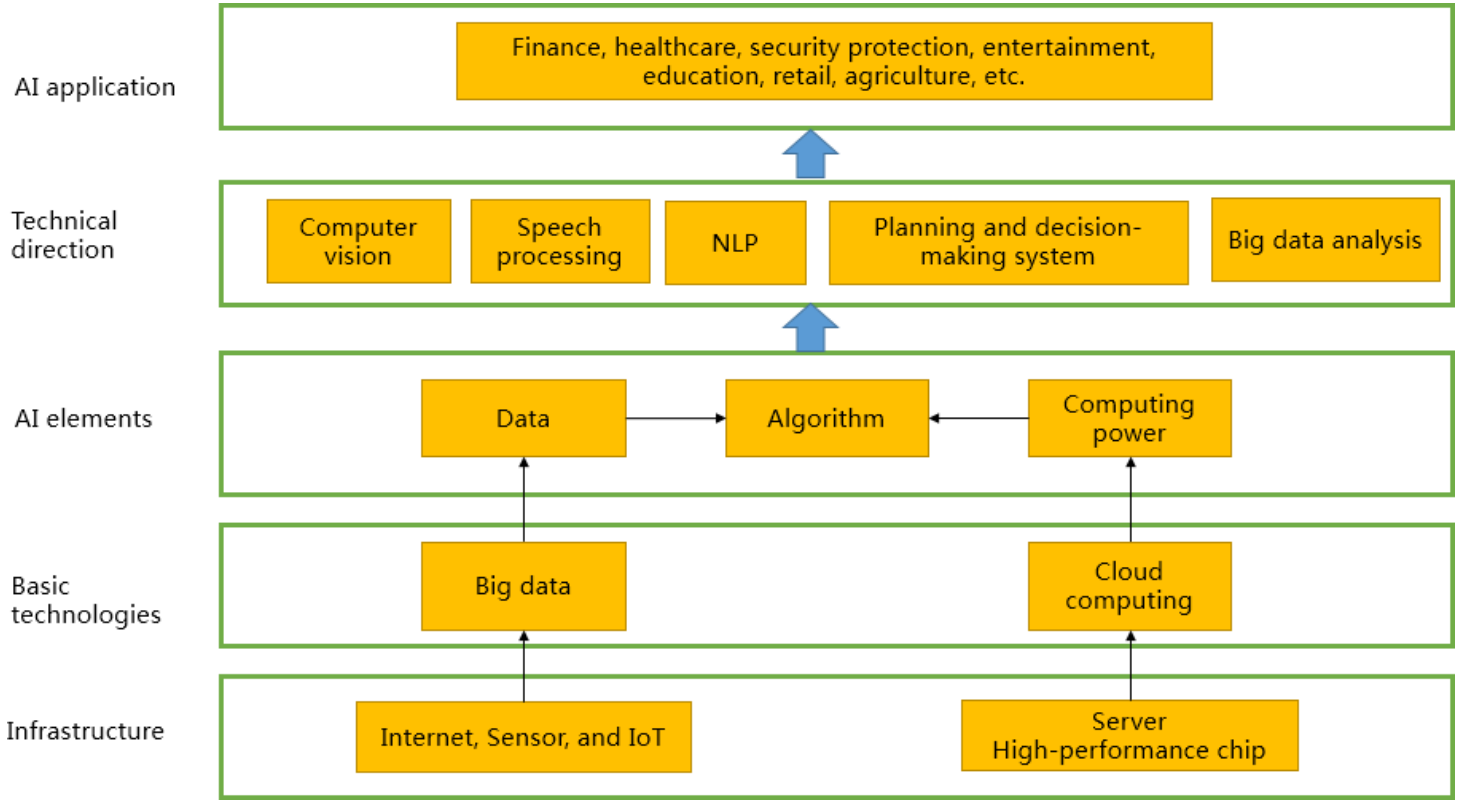
Classification of Intelligent Robots

- Currently, there is no unified definition of AI research. Intelligent robots are generally classified into the following four types:
  - "Thinking like human beings": weak AI, such as Watson and AlphaGo
  - "Acting like human beings": weak AI, such as humanoid robot, iRobot, and Atlas of Boston Dynamics
  - "Thinking rationally": strong AI (Currently, no intelligent robots of this type have been created due to the bottleneck in brain science.)
  - "Acting rationally": strong AI

Acting Like people

AI Industry Ecosystem

- The four elements of AI are data, algorithm, computing power, and scenario. To meet requirements of these four elements, we need to combine AI with cloud computing, big data, and IoT to build an intelligent society.

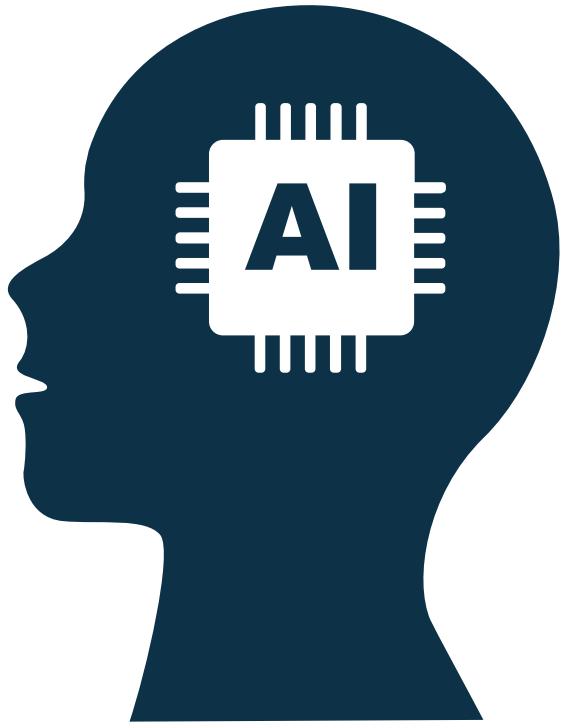


Simple Robots :-

Advanced Robots :—

How can we define AI …

- **Artificial Intelligence (AI)** is a technical science that studies and develops theories, methods, technologies, and applications for simulating and extending human intelligence.



What is Machine Learning (ML) ?

- **Machine Learning (ML)** is a branch of *artificial intelligence (AI*) and computer science which focuses on the use of data and algorithms to imitate the way that humans learn, gradually improving its accuracy.

Spam filter

what spam typically looks like?

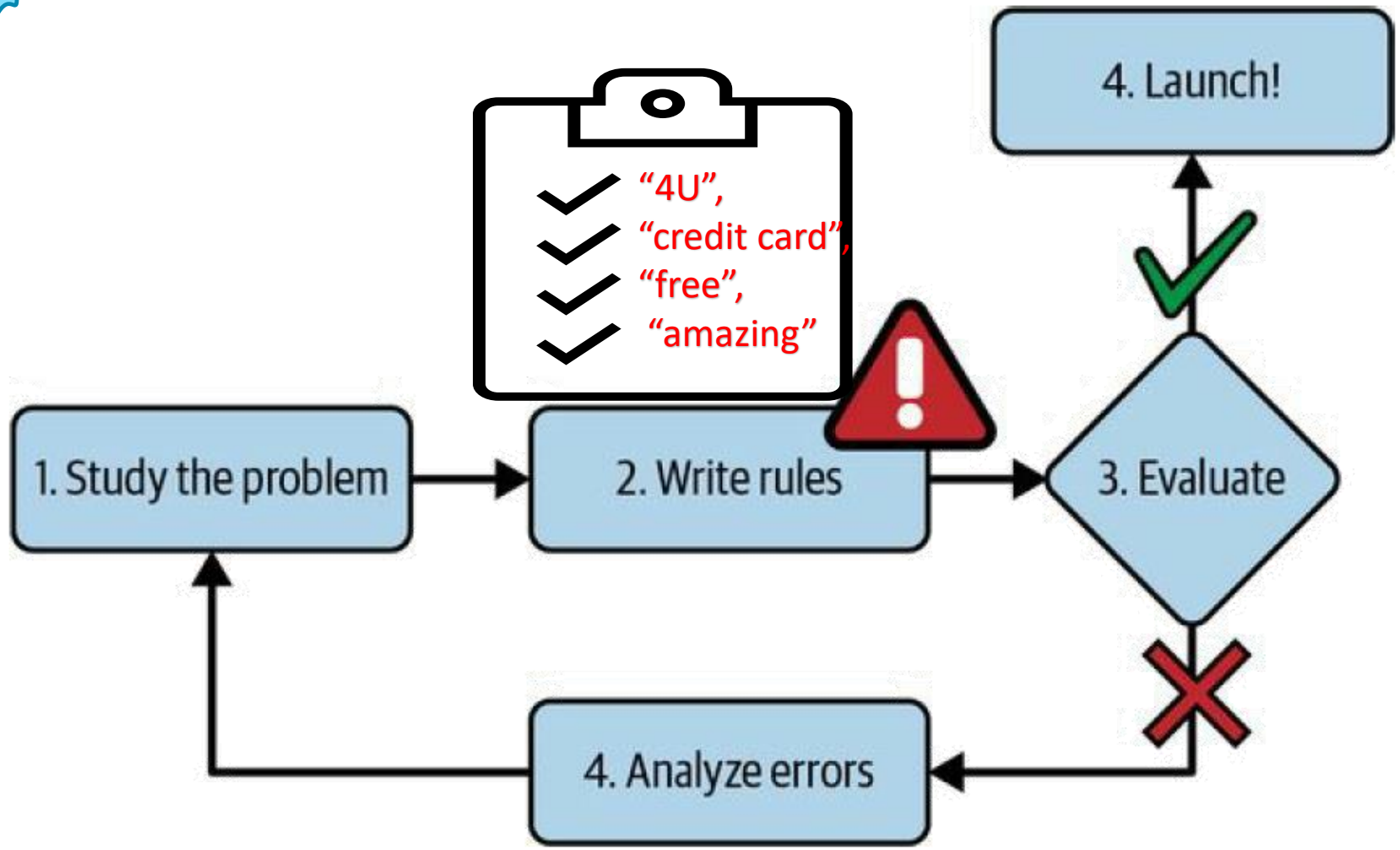


Figure 1-1. The traditional approach

Spam filter

what spam typically looks like?

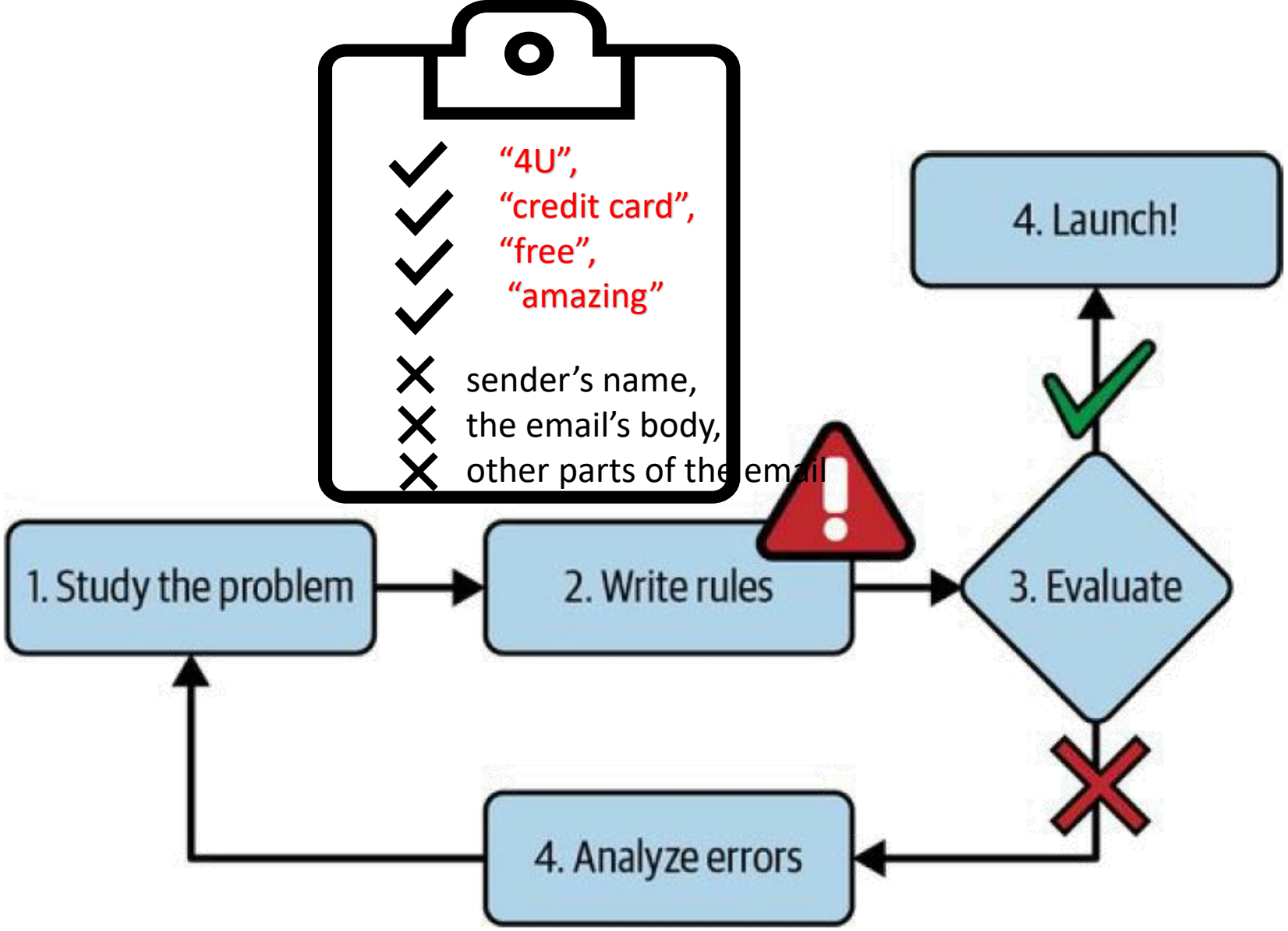


Figure 1-1. The traditional approach

Since the problem is difficult, your program will likely become a long list of complex rules—

Spam filter

machine learning techniques automatically learns which words and phrases are good predictors of spam by detecting unusually frequent patterns of words in the spam examples

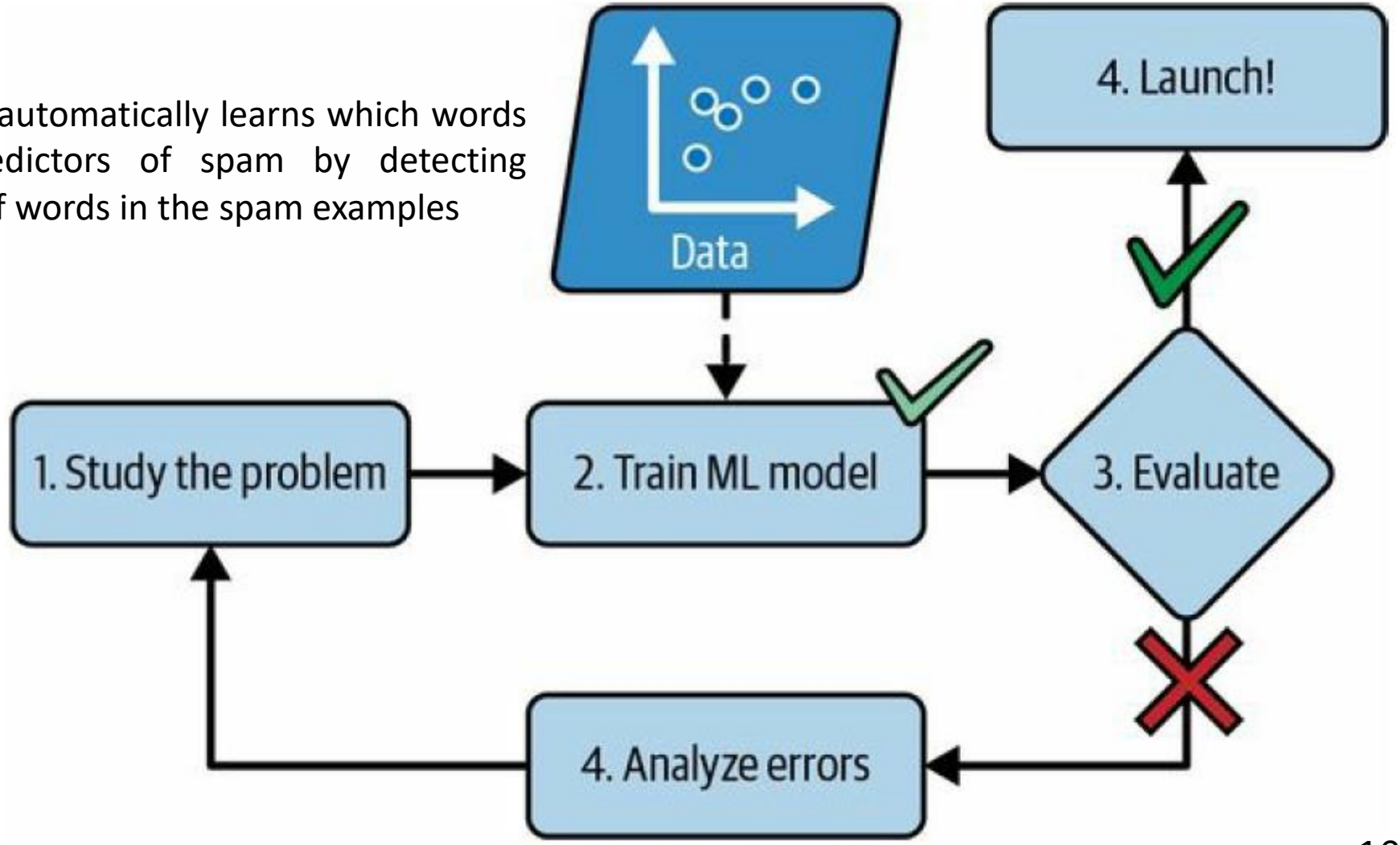


Figure 1-2. The machine learning approach

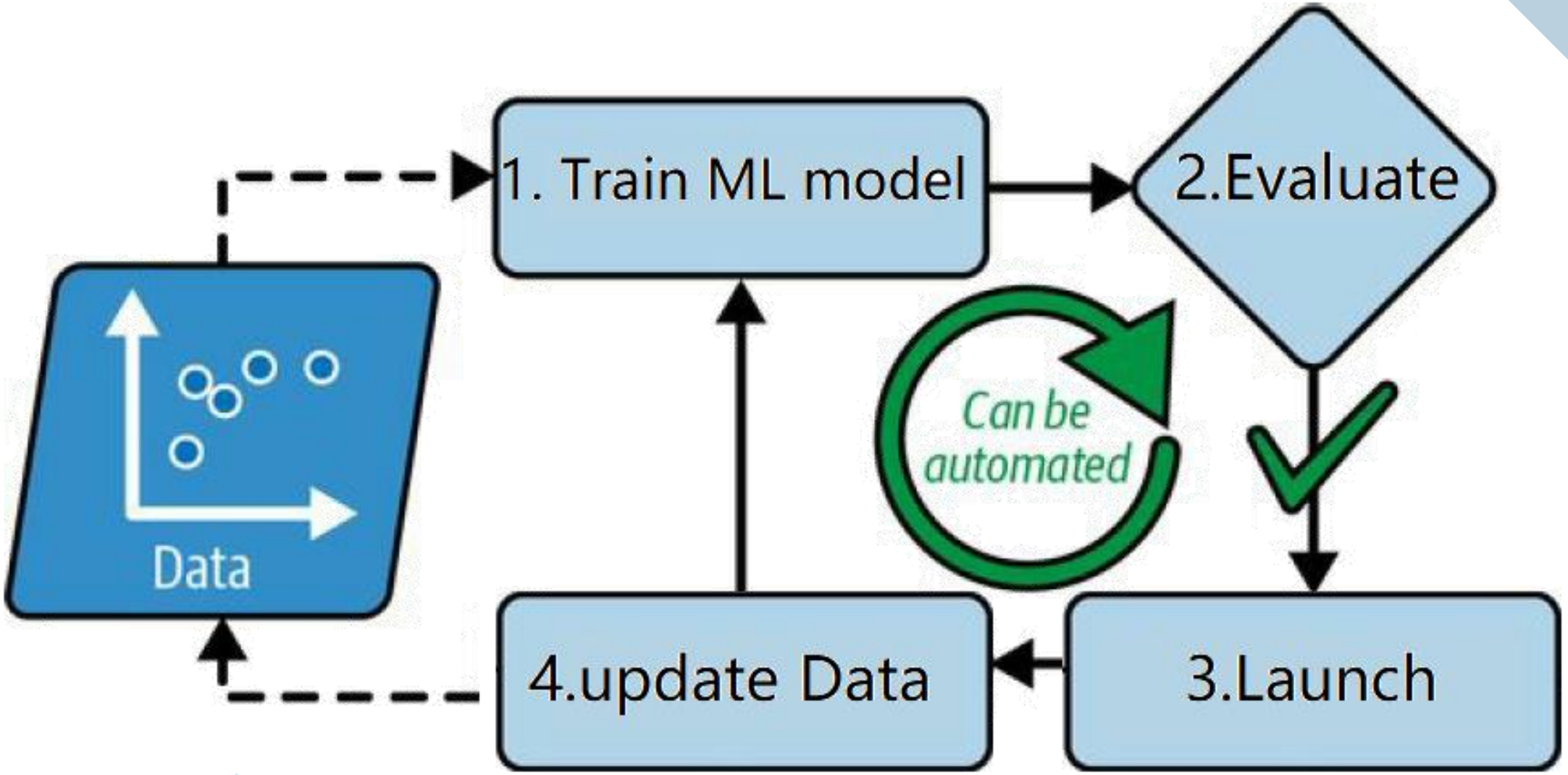
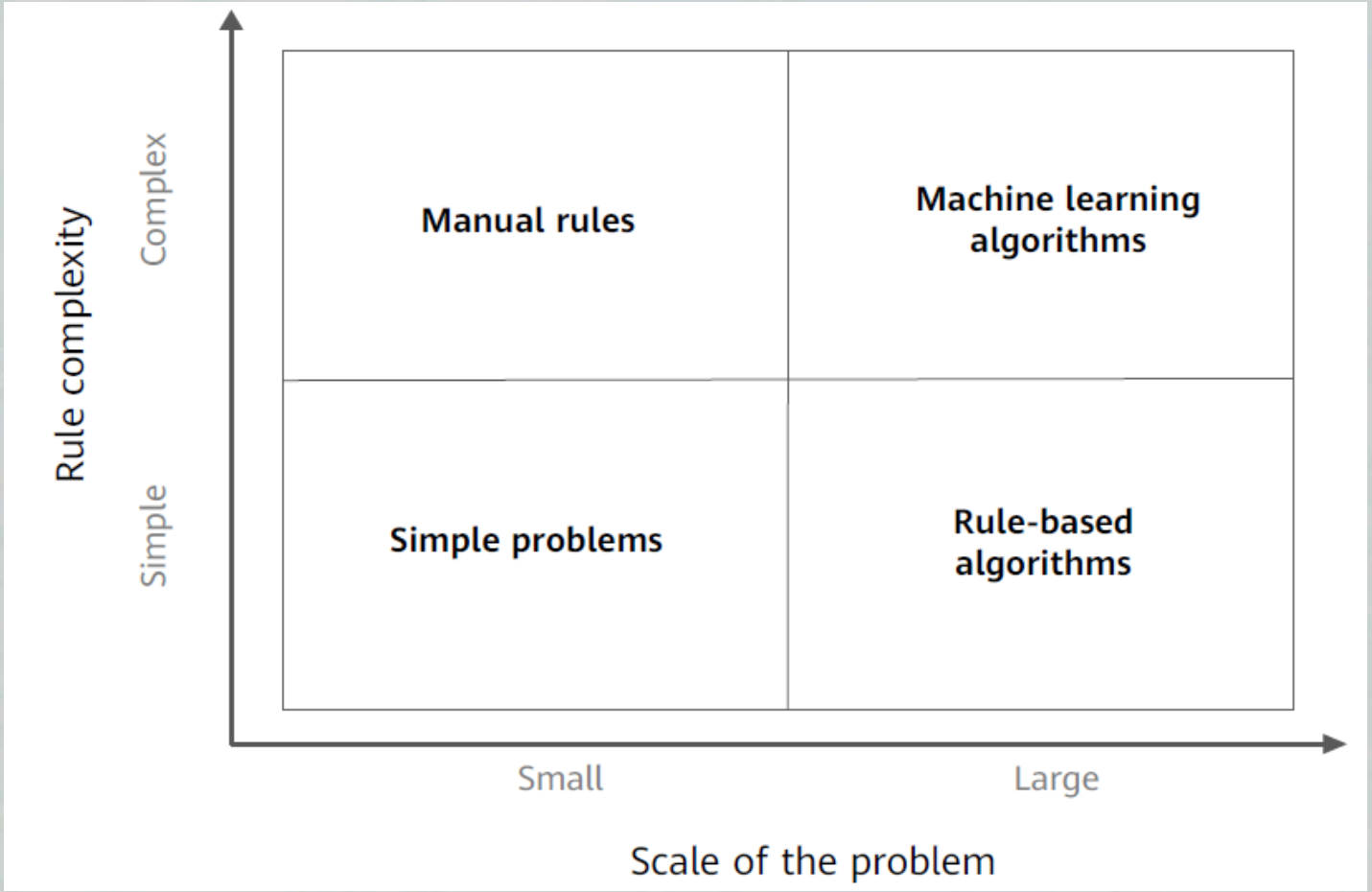


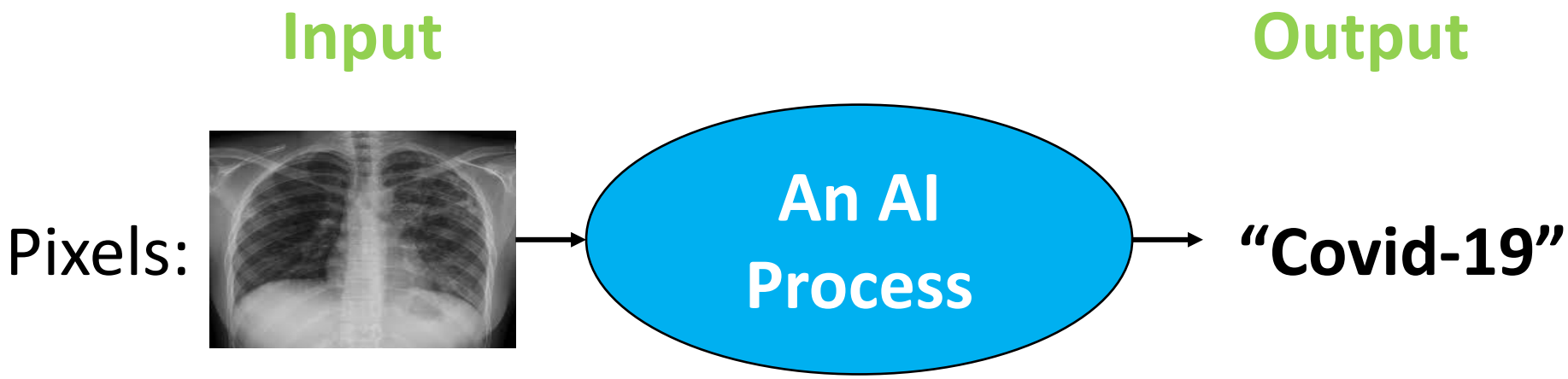
Figure 1-3. Automatically adapting to change

Traditional programming Vs Machine Language



Examples of Applications

• AI can be broadly defined as technology that can *learn* and produce intelligent behavior



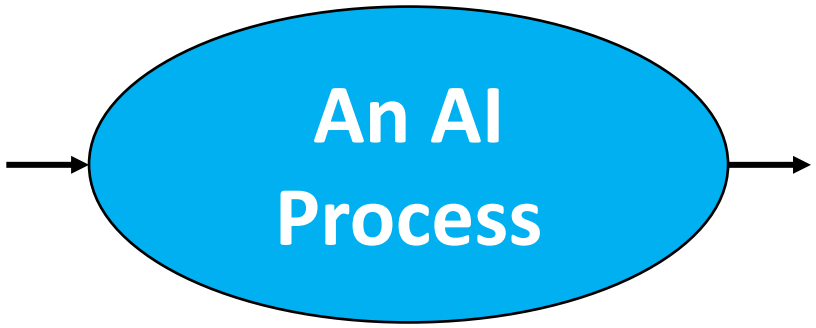
Computer Vision

Examples of Applications

• AI can be broadly defined as technology that can *learn* and produce intelligent behavior

Input

Pixels:



Output

“Four kids are playing with a ball”

Computer Vision

Examples of Applications

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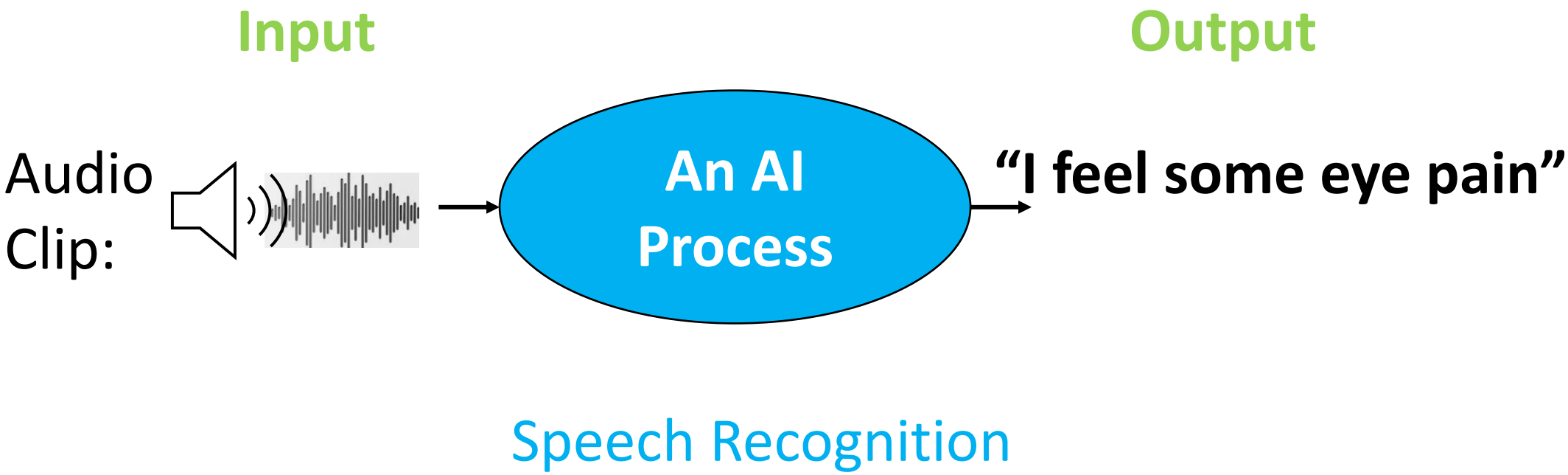


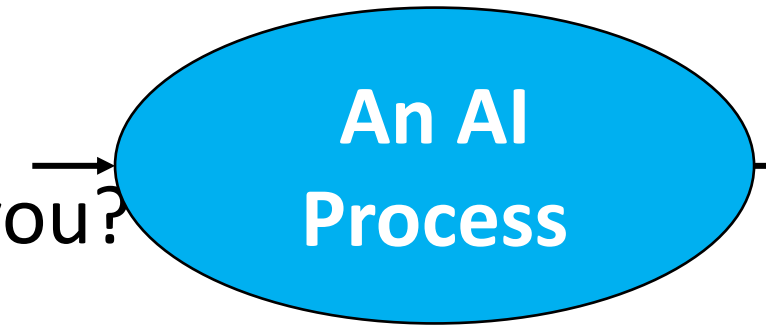
Examples of Applications

• AI can be broadly defined as technology that can *learn* and produce intelligent behavior

Input

Text:

“Hello, how are you?



Output

“Bonjour, comment allez-vous”

こんにちは,元気ですか

Machine Translation