

AI2V

Apply Artificial Intelligence to get Value

AI2V 101

By Alexandre Dietrich

What is AI ?

What is AI ?

Google search: "Artificial Intelligence definition"

Dictionary:

the theory and development of **computer systems** able to perform **tasks** that normally require human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages.

Encyclopaedia Britannica:

Artificial intelligence (AI), the ability of a **digital computer** or computer-controlled robot to perform **tasks** commonly associated with intelligent beings. The term is frequently applied to the project of developing **systems** endowed with the intellectual processes characteristic of humans, such as the ability to reason, discover meaning, generalize, or learn from past experience.

Stanford University – Computer Science Department:

Q. What is artificial intelligence?

A. It is the science and engineering of making intelligent machines, especially intelligent **computer programs**. It is related to the similar **task** of using computers to understand human intelligence, but AI does not have to confine itself to methods that are biologically observable.

Mckinsey & Company:

Artificial intelligence: A definition

AI is typically defined as the ability of a machine to perform **cognitive functions** we associate with human minds, such as perceiving, reasoning, learning, and problem solving. Examples of technologies that enable AI to solve business problems are robotics and autonomous vehicles, computer vision, language, virtual agents, and machine learning.

AI2V Function

AI2V Function

AI(S, D) → V

AI - Artificial Intelligence


S - Situation

D - Data

V - Value

→ - Enablers / Inhibitors

Why not use Humans ?

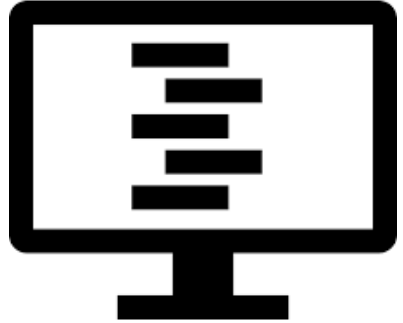
 **AI(S, D) → V**

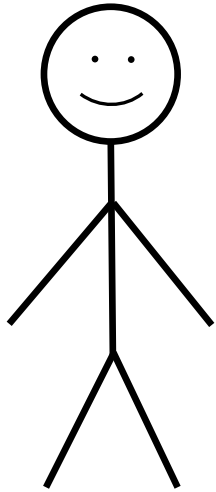
Why not use Humans ?







Why not use a Traditional Computer Program ?



 + D¹²³ = OK



+ D   ¹²³ = OK
 

A? + D   ¹²³ = OK
 

$AI(S^1, D^1) \Rightarrow V^1$

$AI(S^2, D^2) \Rightarrow V^2$

$AI(S^1, D^1) \Rightarrow V^1$

$AI(S^2, D^2) \Rightarrow V^2$

$AI(S^3, D^3) \Rightarrow V^3$

$AI(S^2, D^2) \Rightarrow V^2$

$AI(S^3, D^3) \Rightarrow V^3$

...

$AI(S^N, D^N) \Rightarrow V^N$

Present

Narrow

AI(S, D) → V

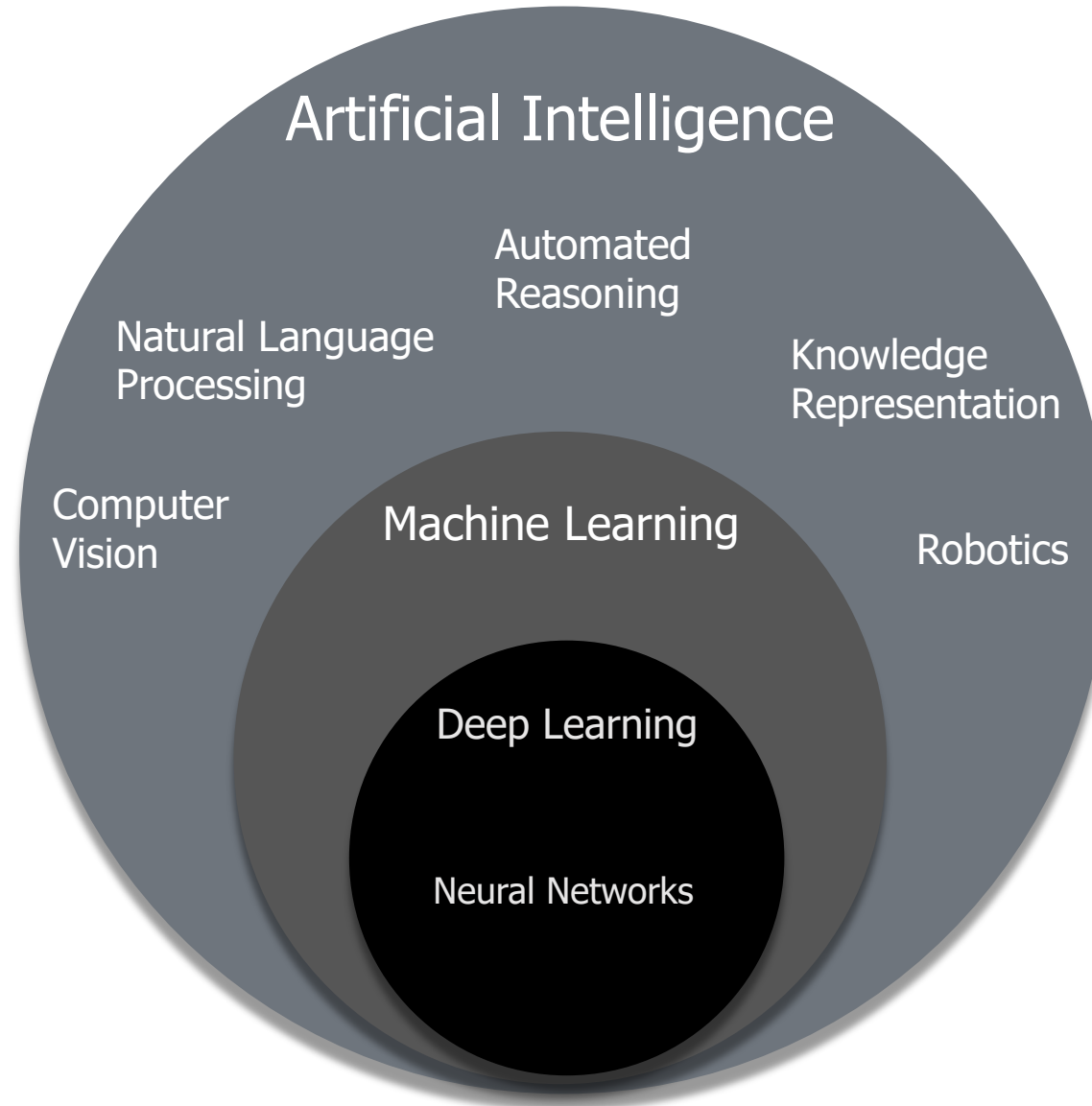
Future ?

General

$$\text{AI}(S_1^N, D_1^N) \Rightarrow V_1^N$$

AI Capabilities

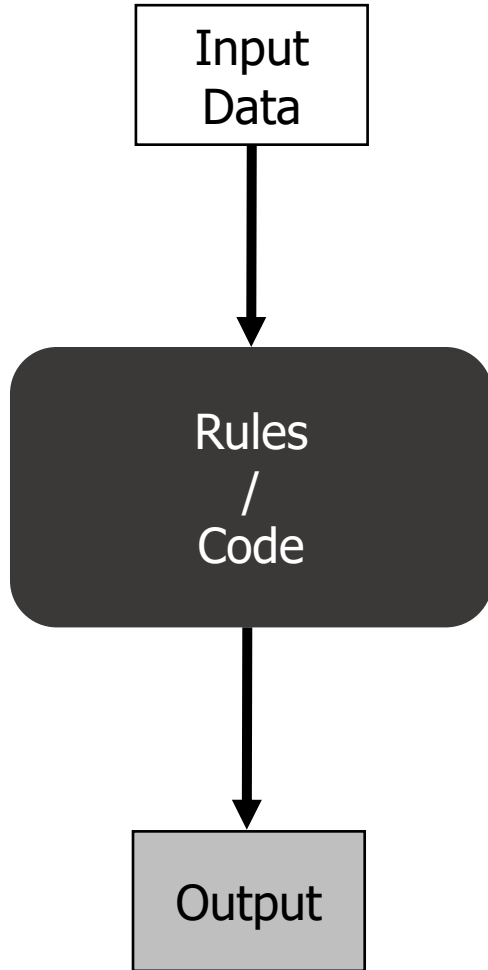
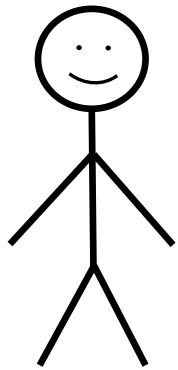
AI(S, D) → V



Machine Learning

Traditional Programming X Machine Learning

Software Developer



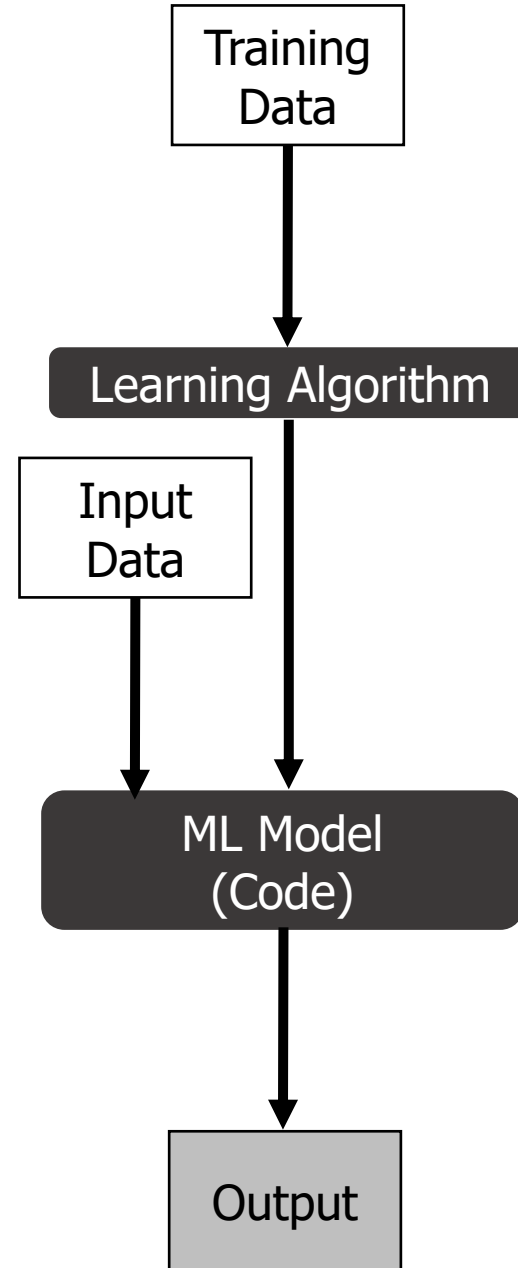
Training Data

Learning Algorithm

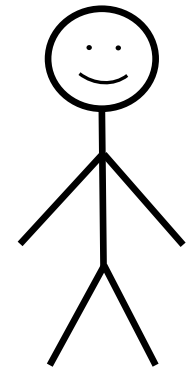
Input Data

ML Model (Code)

Output



Machine Learning Engineer



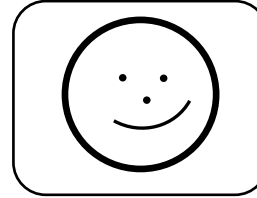
Traditional Programming X Machine Learning

Web Page Field
A = 123456

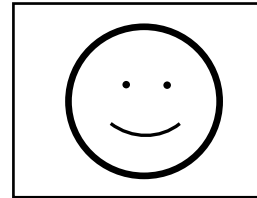
Accounts Database
B = 123456

```
if A == B:  
    print('Account Number is correct')  
else:  
    print('Account Number is wrong')
```

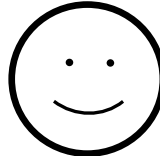
Smartphone Camera



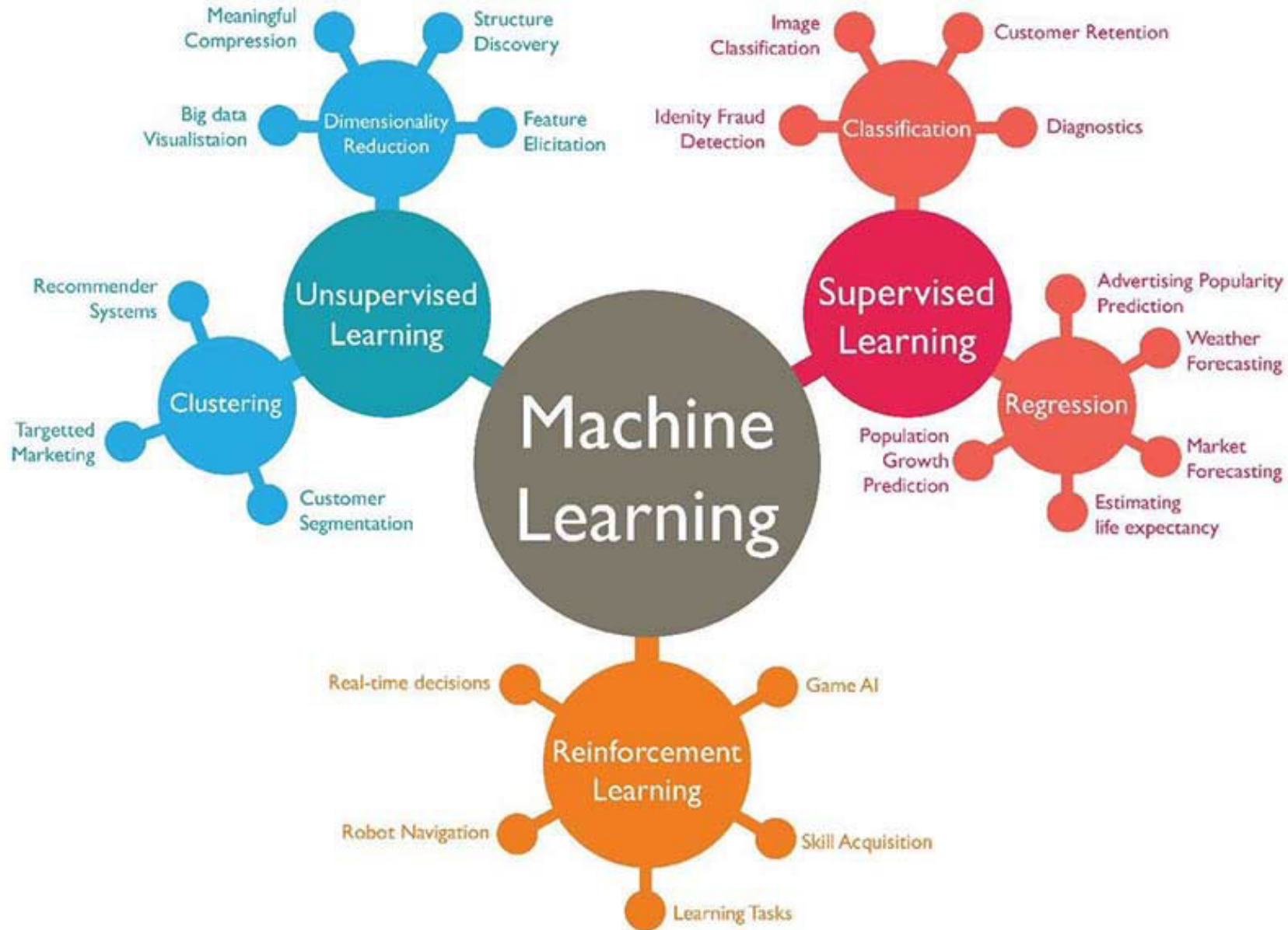
Pictures Database



Machine Learning output:

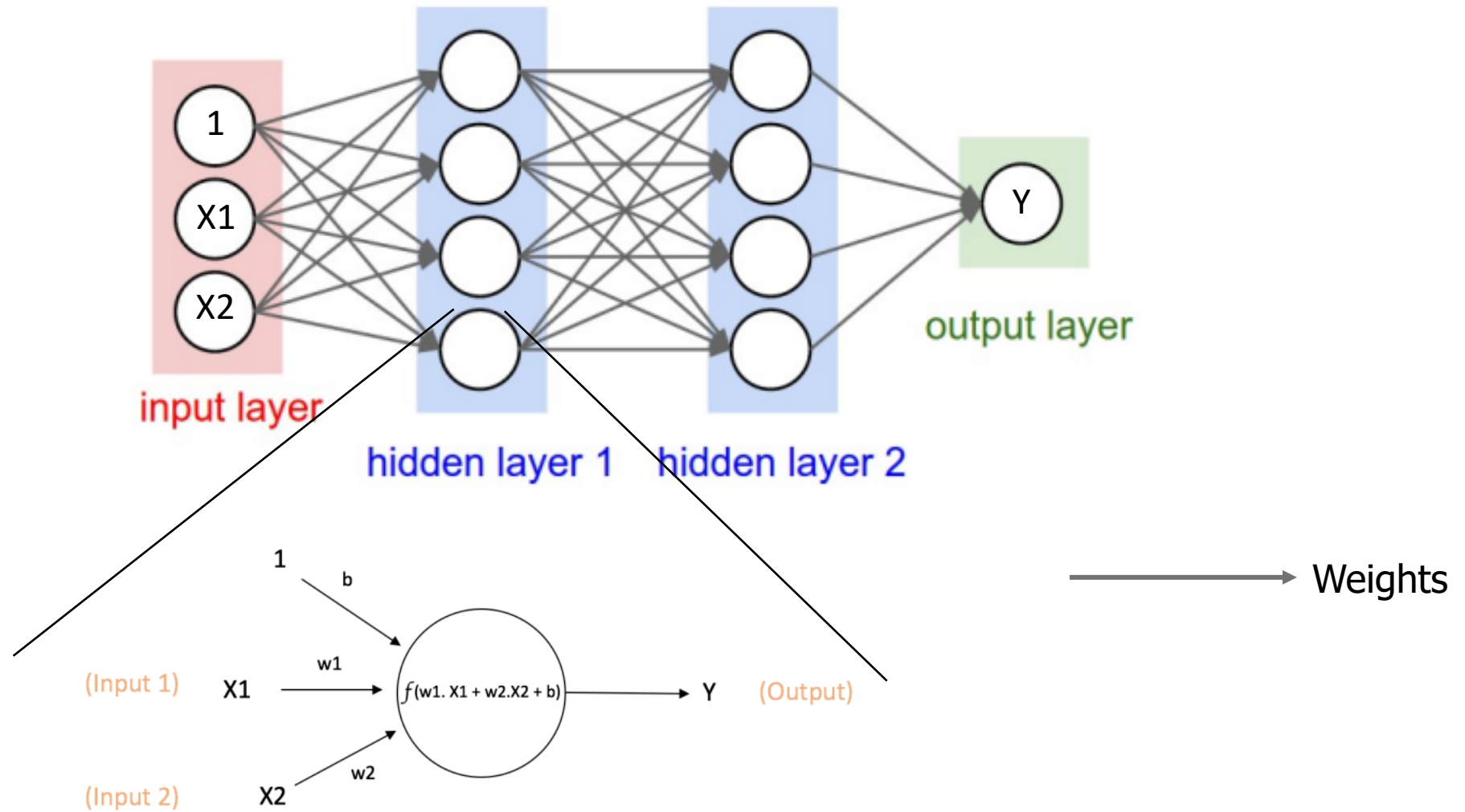
The probability that  is equal  is **87%** .

```
if probability >= 85%:  
    print('Welcome back')  
else:  
    print('Unknown Customer')
```

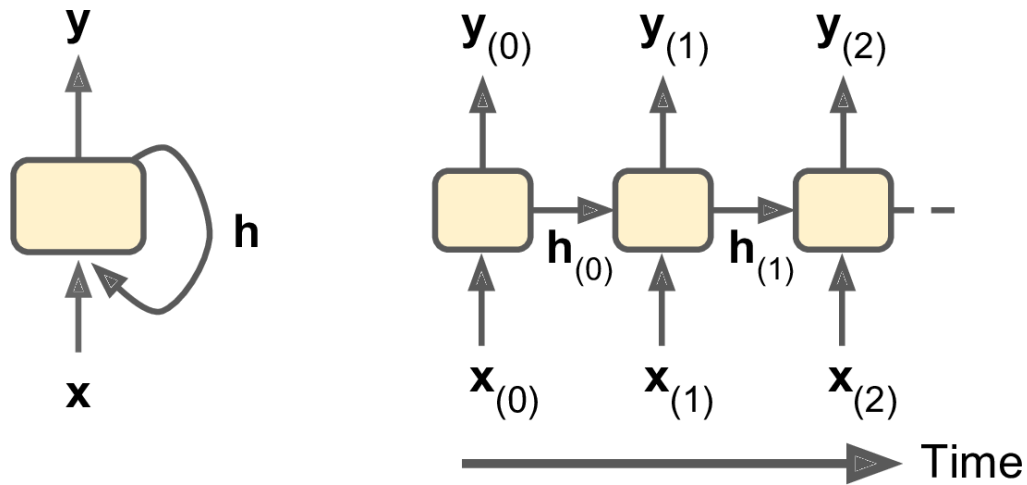



Deep Learning

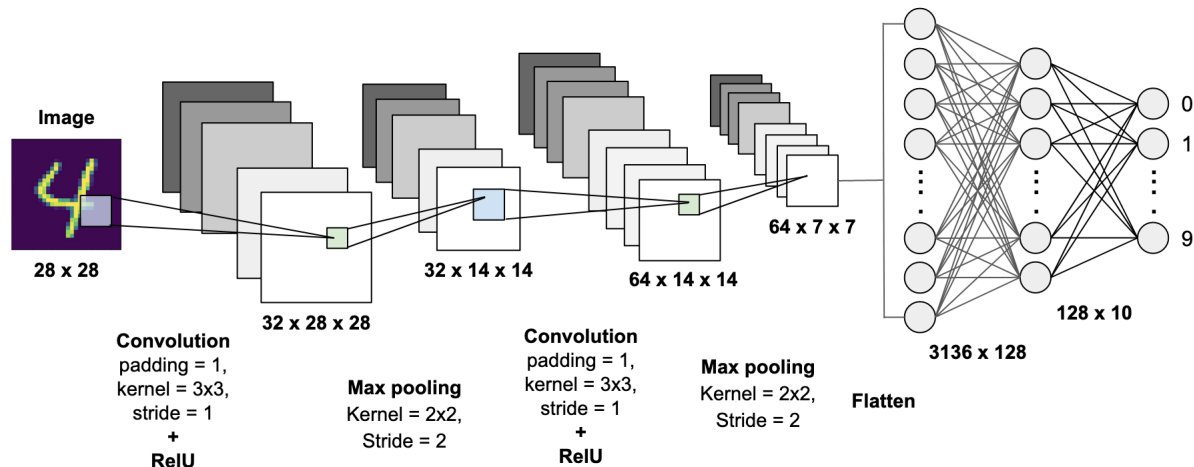
Multilayer Perceptron (Fully Connected Neural Network - FCNN)



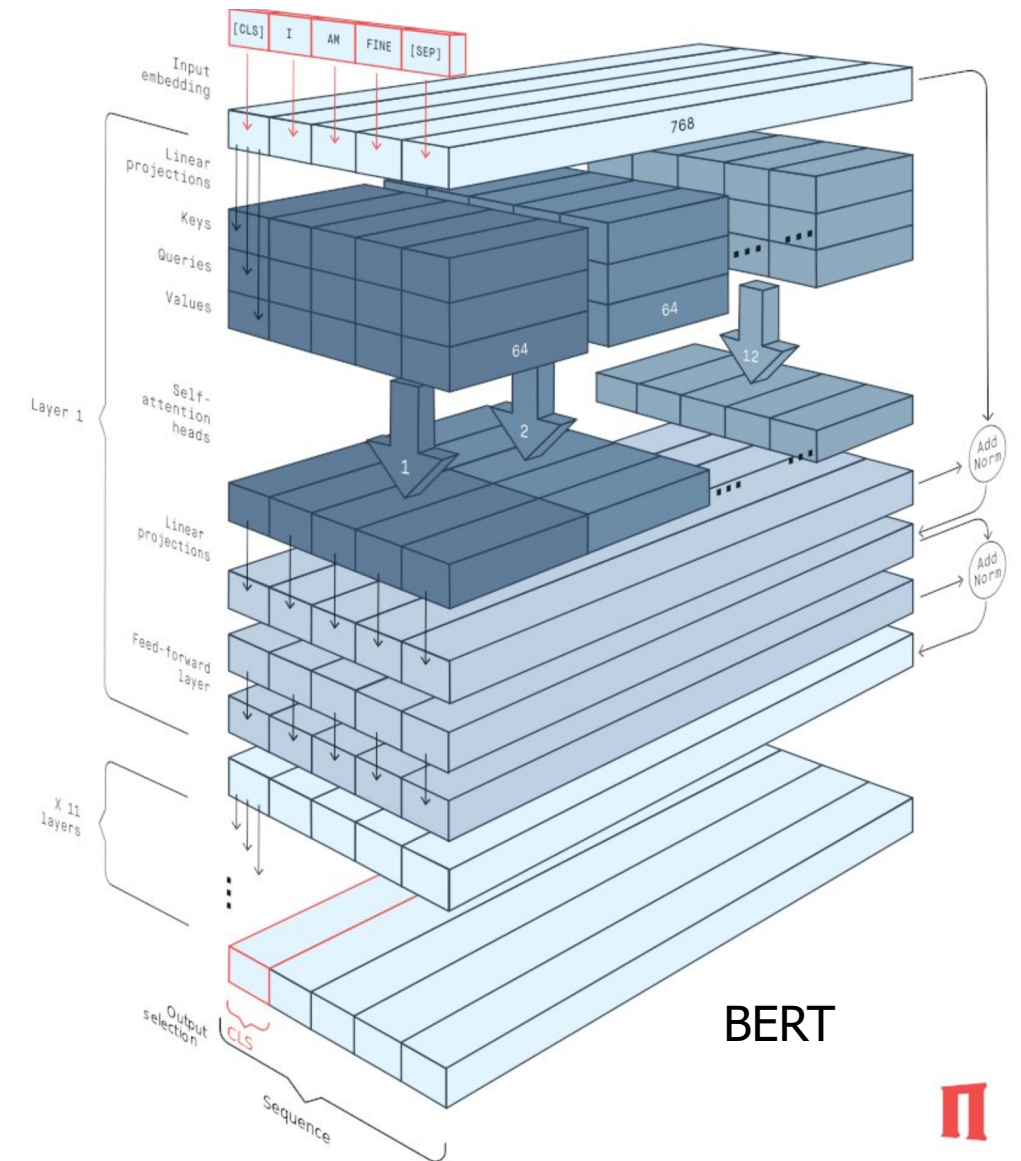
Recurrent Neural Network (RNN)



Convolutional Neural Networks (CNN)

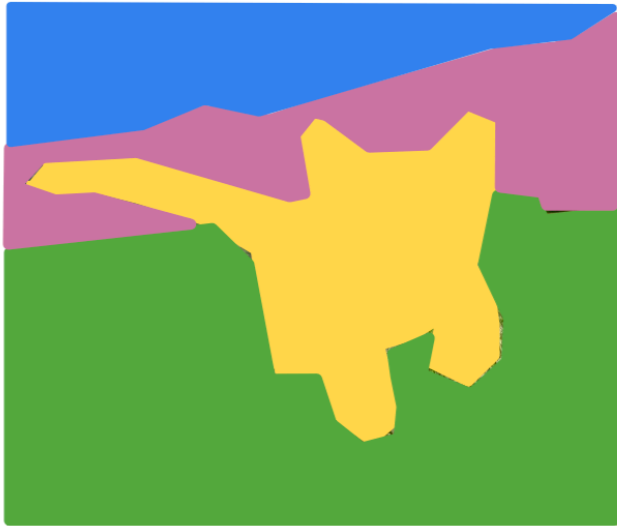


Transformers (pre-trained models)



Computer Vision

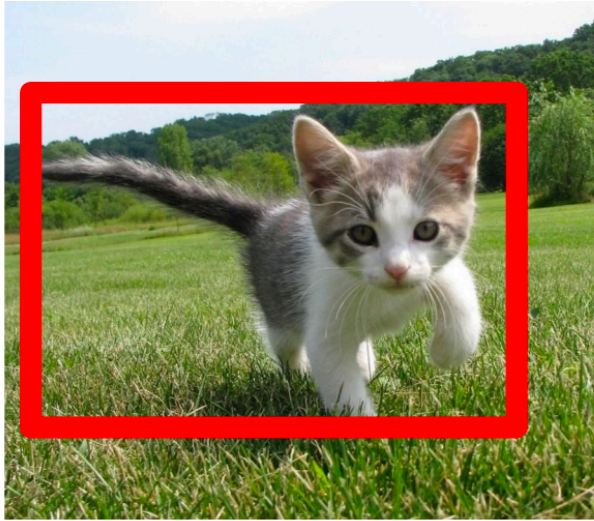
Semantic Segmentation



GRASS, CAT,
TREE, SKY

No objects, just pixels

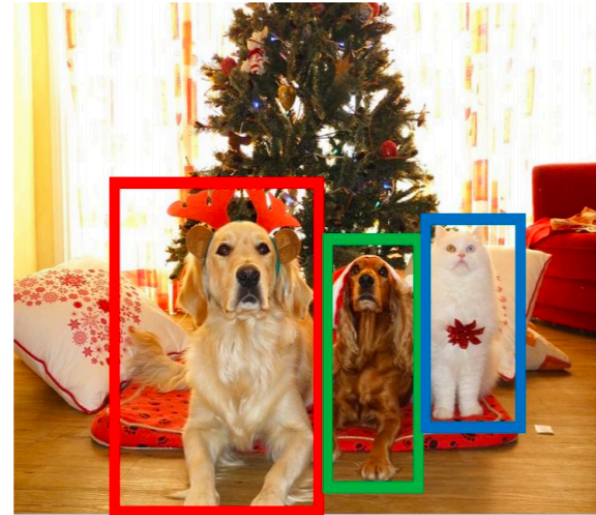
Classification + Localization



CAT

Single Object

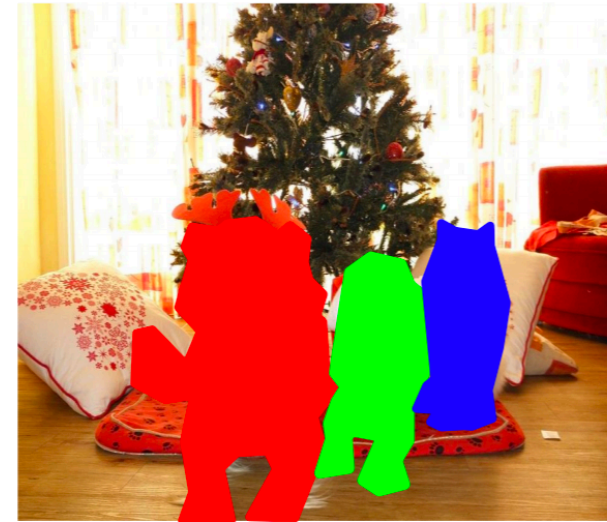
Object Detection



DOG, DOG, CAT

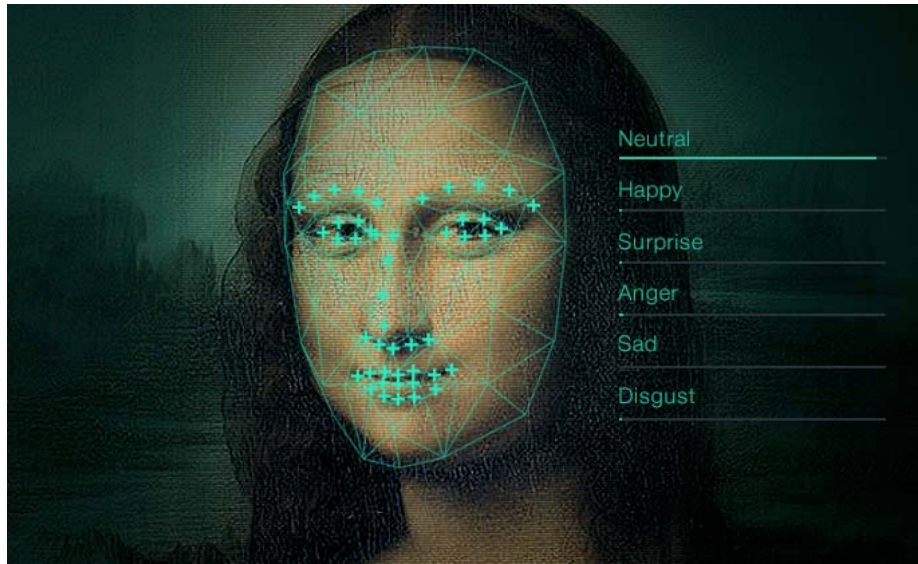
Multiple Object

Instance Segmentation



DOG, DOG, CAT

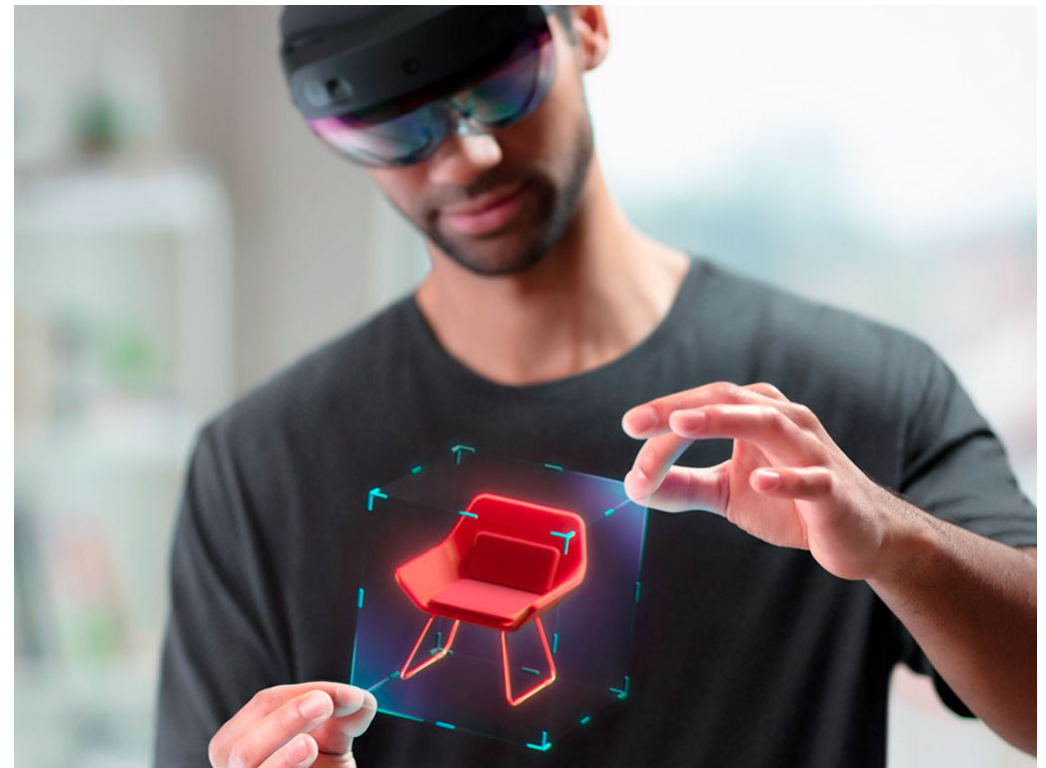
Facial Recognition



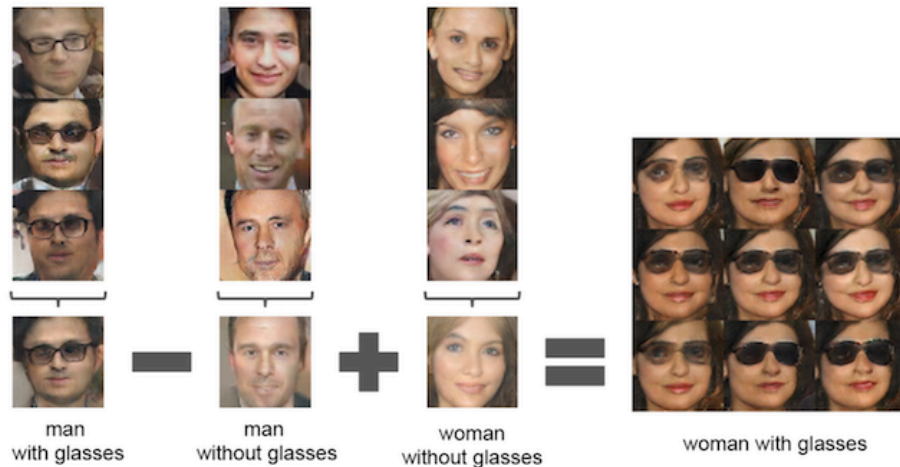
Style Transfer



Augmented Reality



Generative Adversarial Network (GAN)



Natural Language Processing

Passage: “Toronto residents have been staying home and practicing social distancing for more than a month now, and the chilly spring weather has made doing so just a little bit easier.” BlogTO

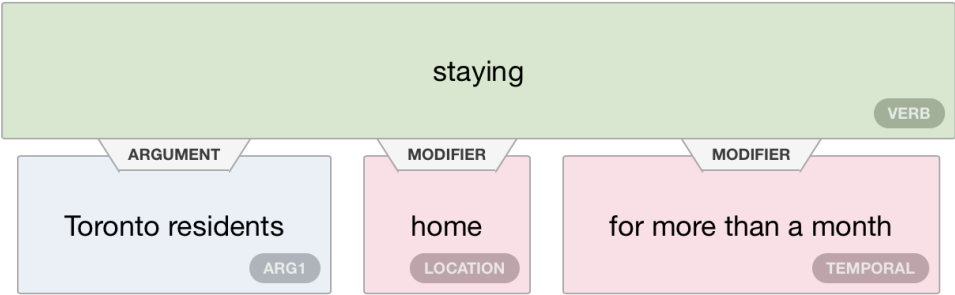
Reading Comprehension:

Model: NAQANet
Question: Where are the Toronto residents?

Answer: home

Semantic Role Labeling:

Model: BERT



Sentiment Analysis:

Model: RoBERTa
Answer: Positive

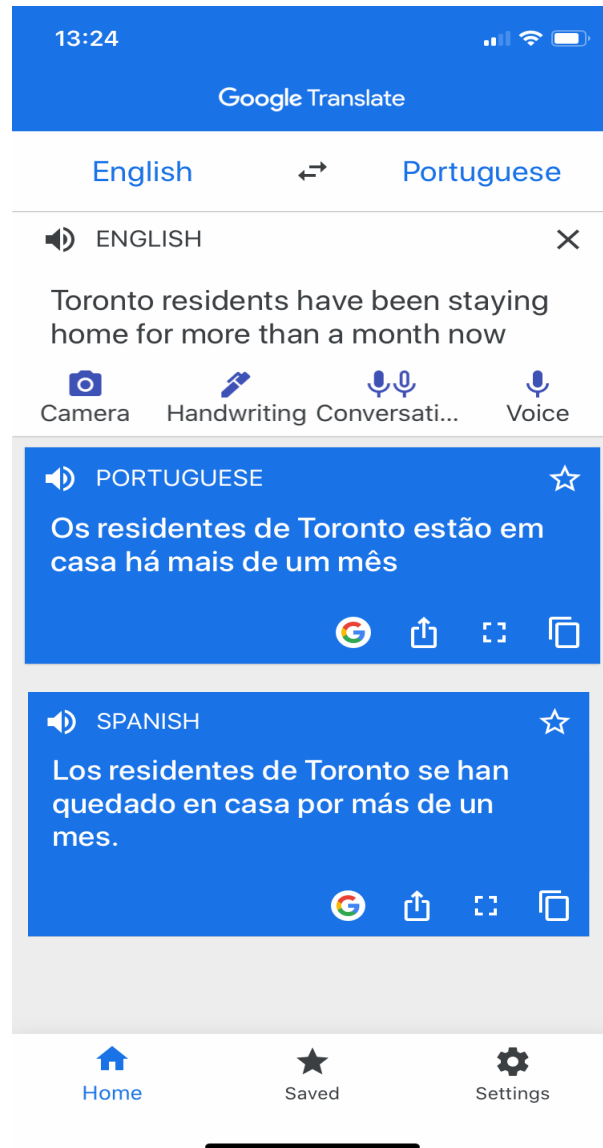
Language Modeling:

Model: GPT-2
Sentence: Toronto residents have been staying ...

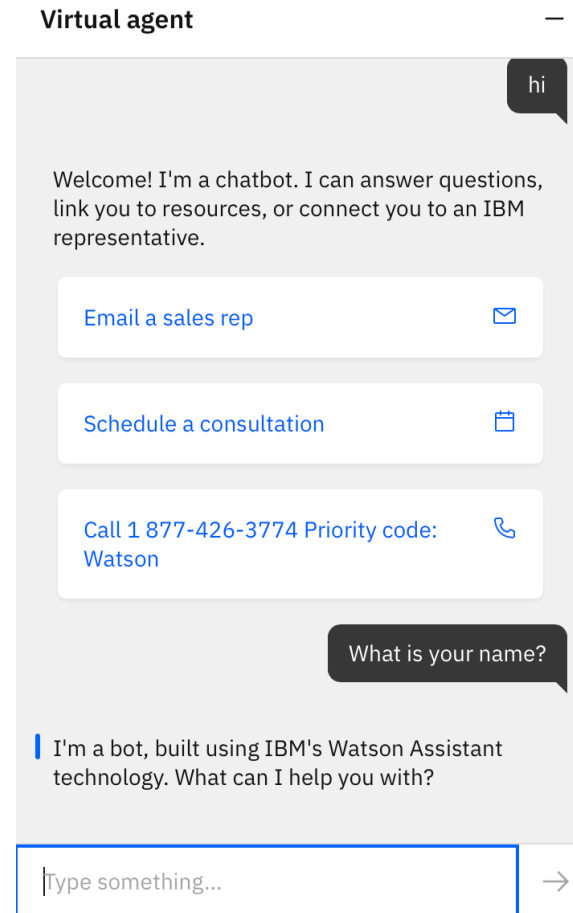
Predictions:

- 24.2% in
- 15.2% at
- 5.3% away
- 4.0% home
- 3.6% up

Language Translation



Text Classification and Named-Entity Recognition

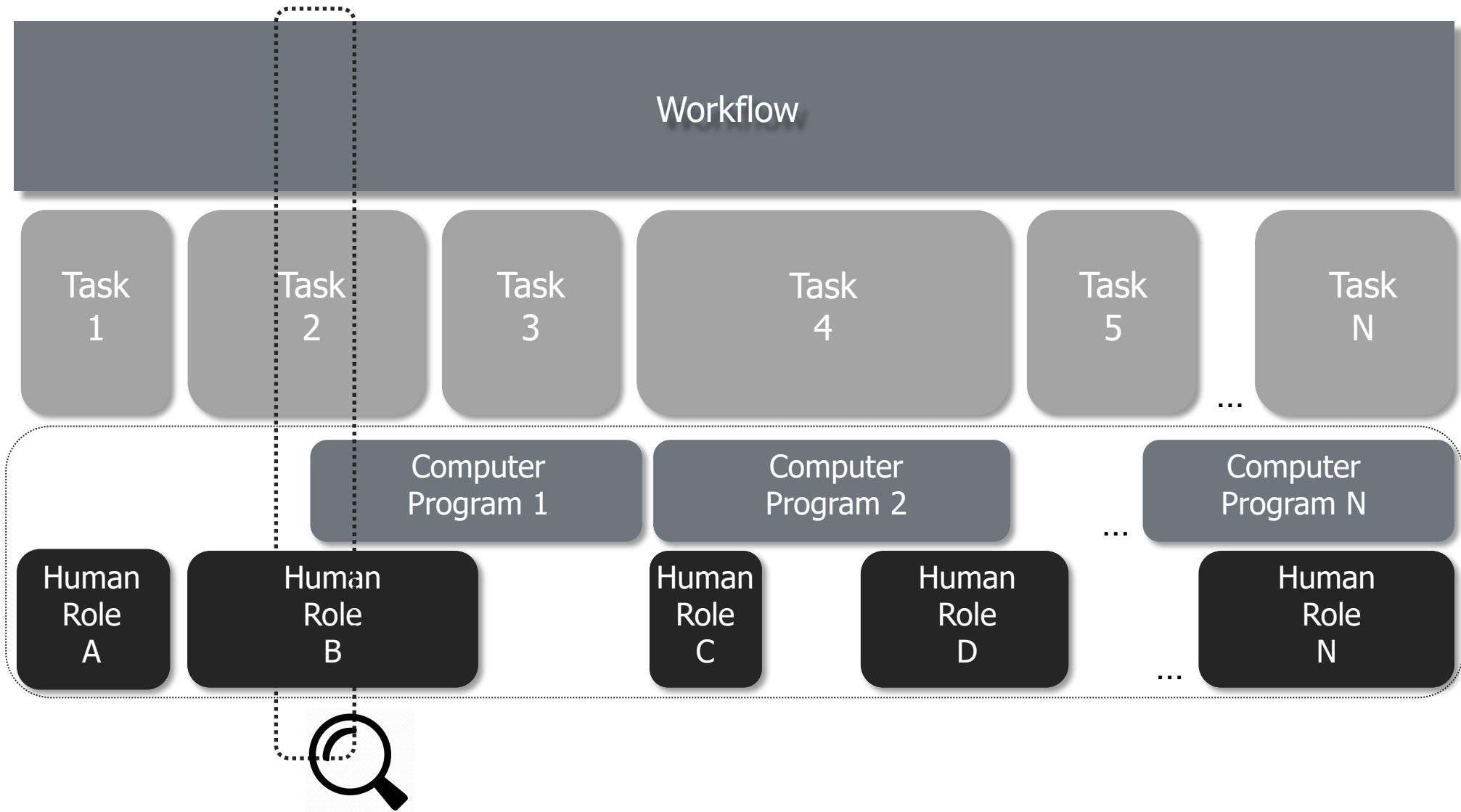


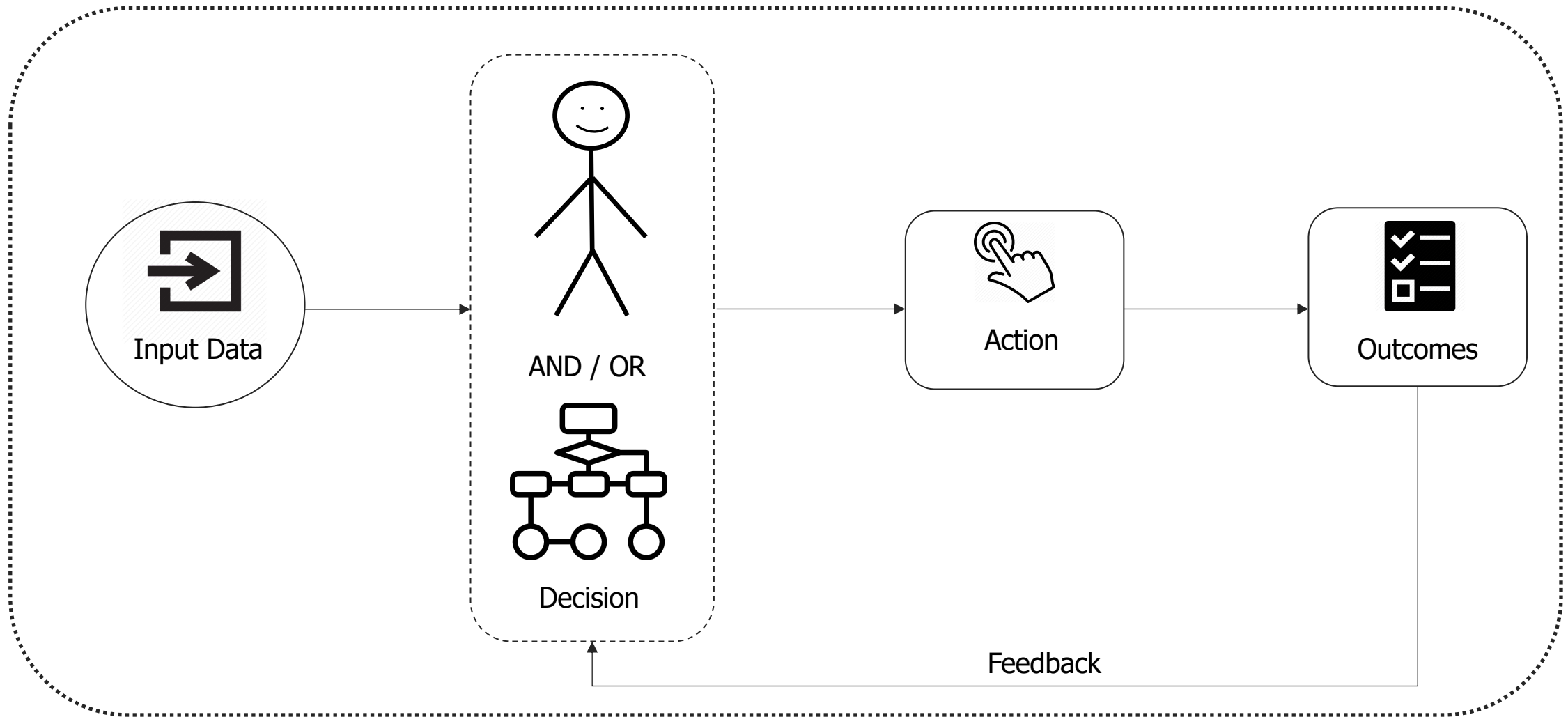
Speech Recognition and Synthesis



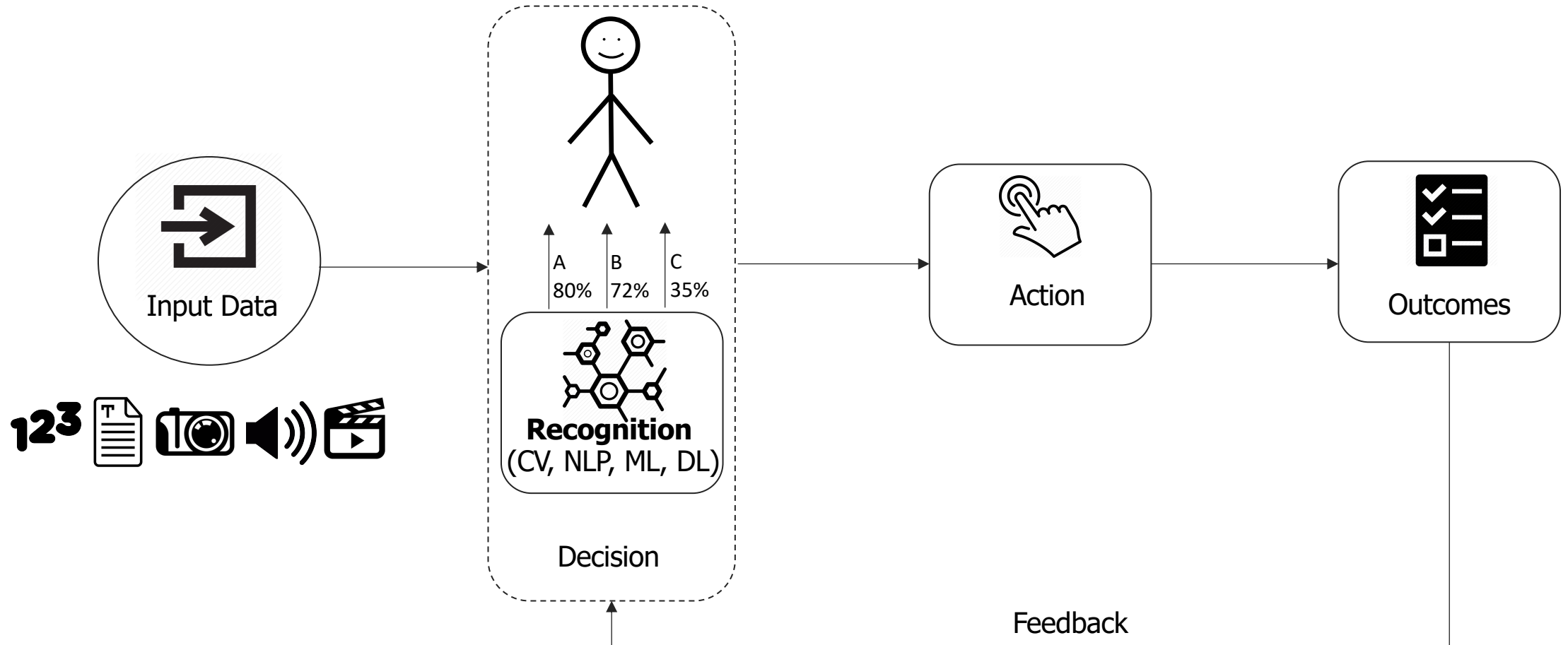
Situation

AI(S, D) → V



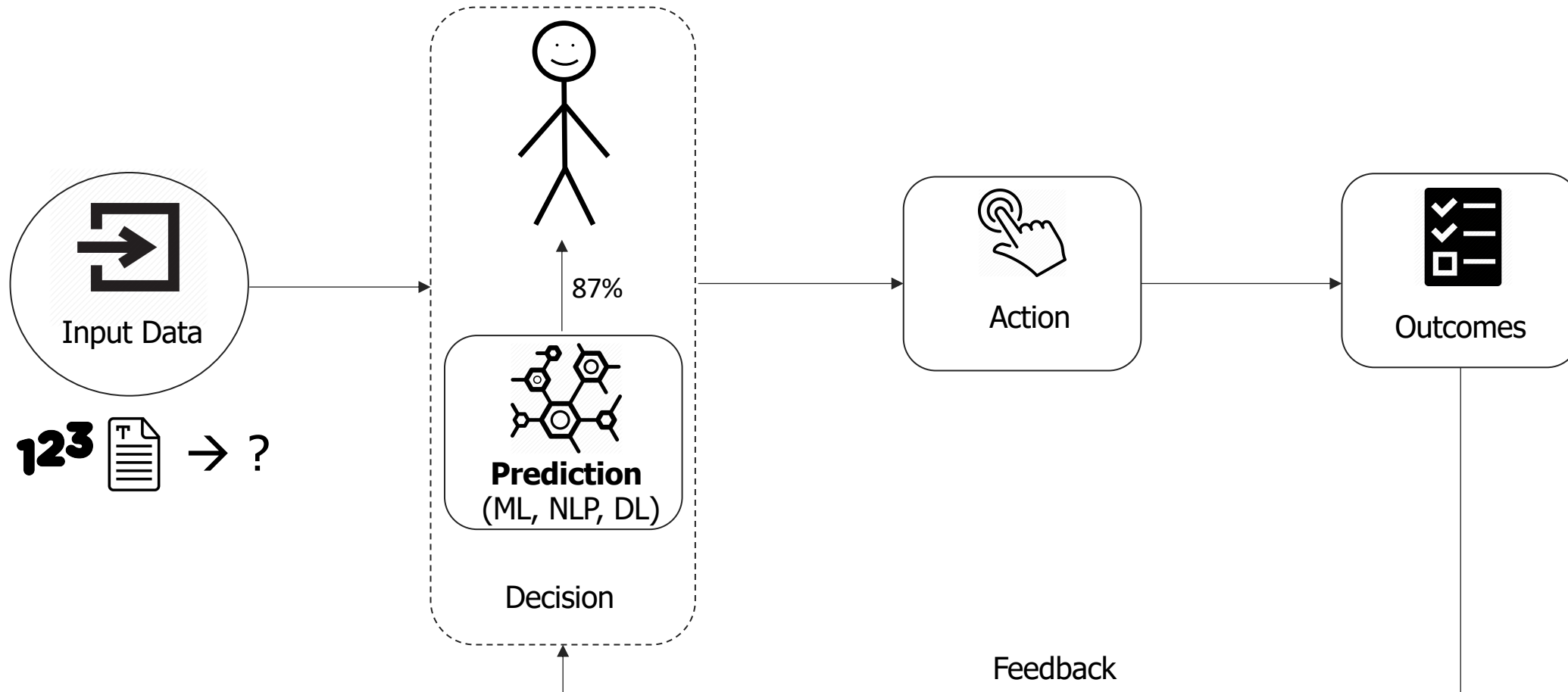


Recognition

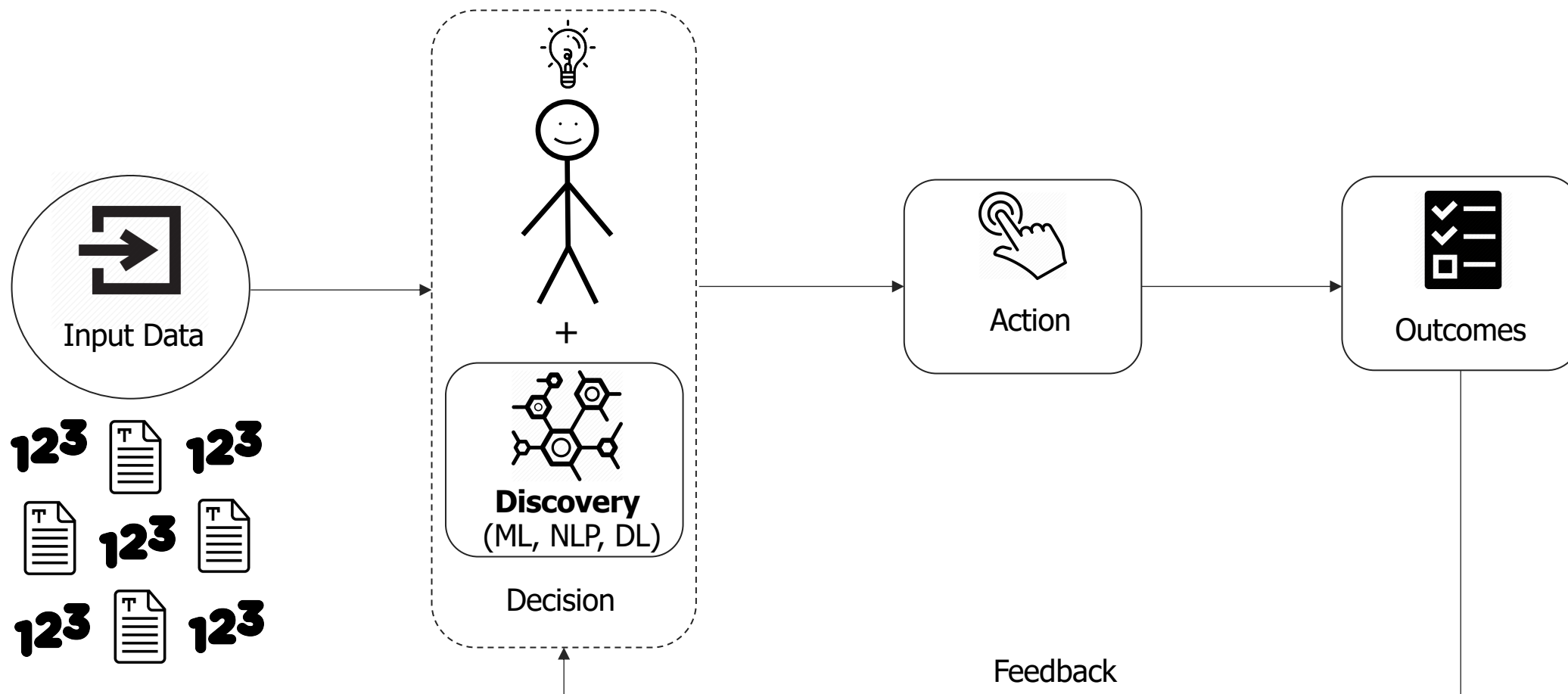


CV – Computer Vision NLP – Natural Language Processing ML – Machine Learning DL – Deep Learning

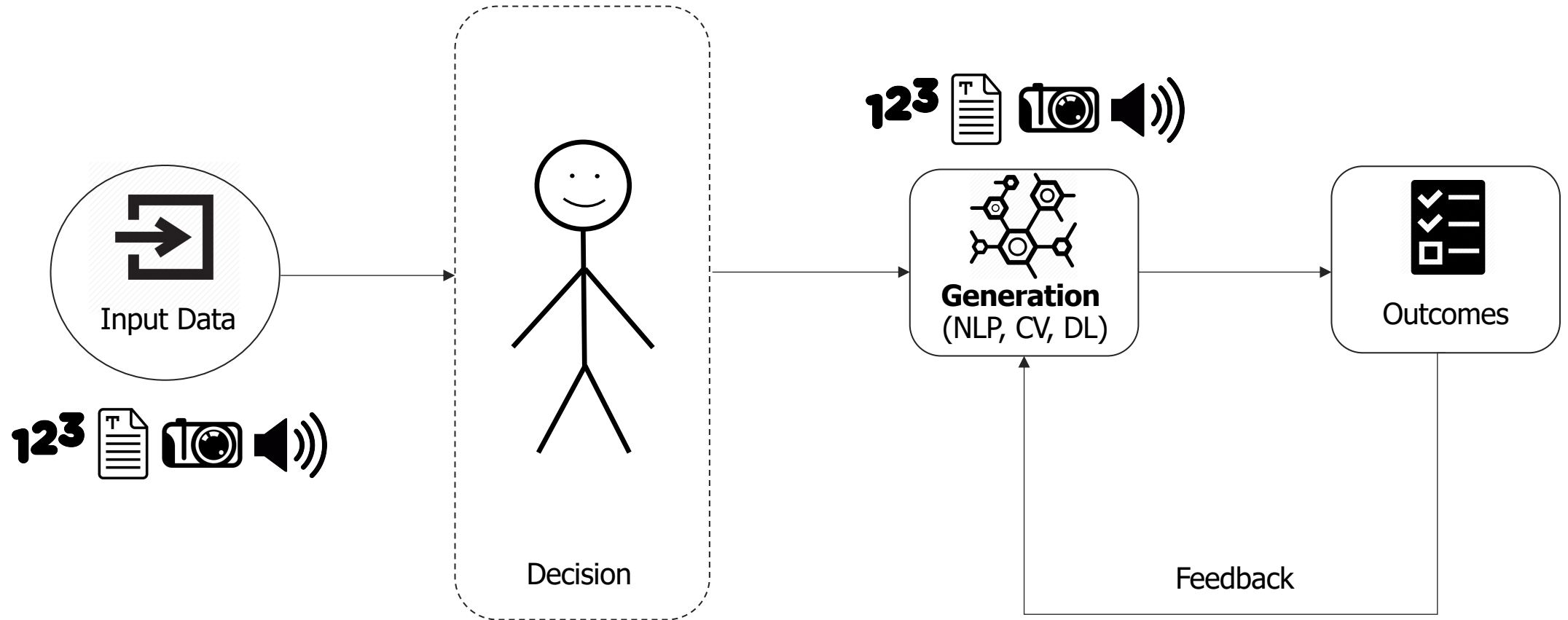
Prediction



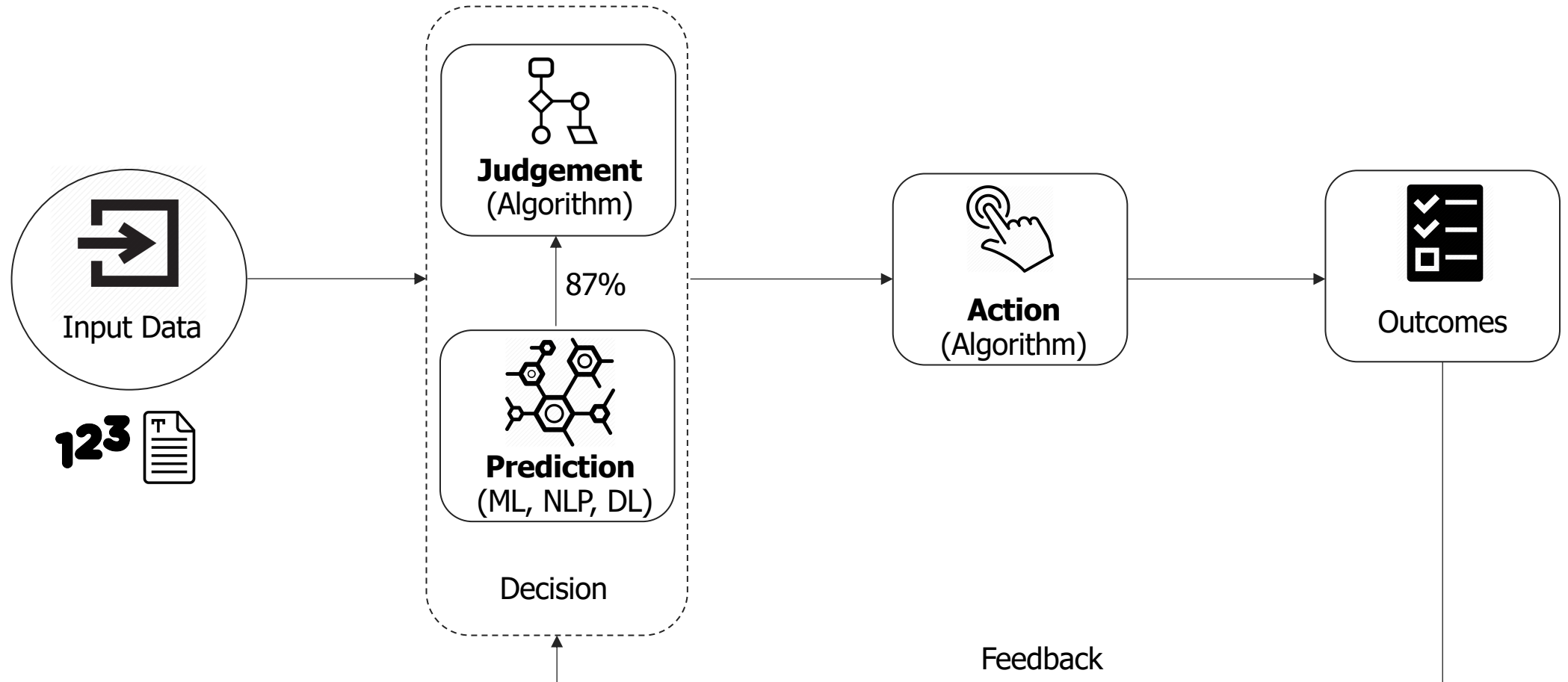
Discovery



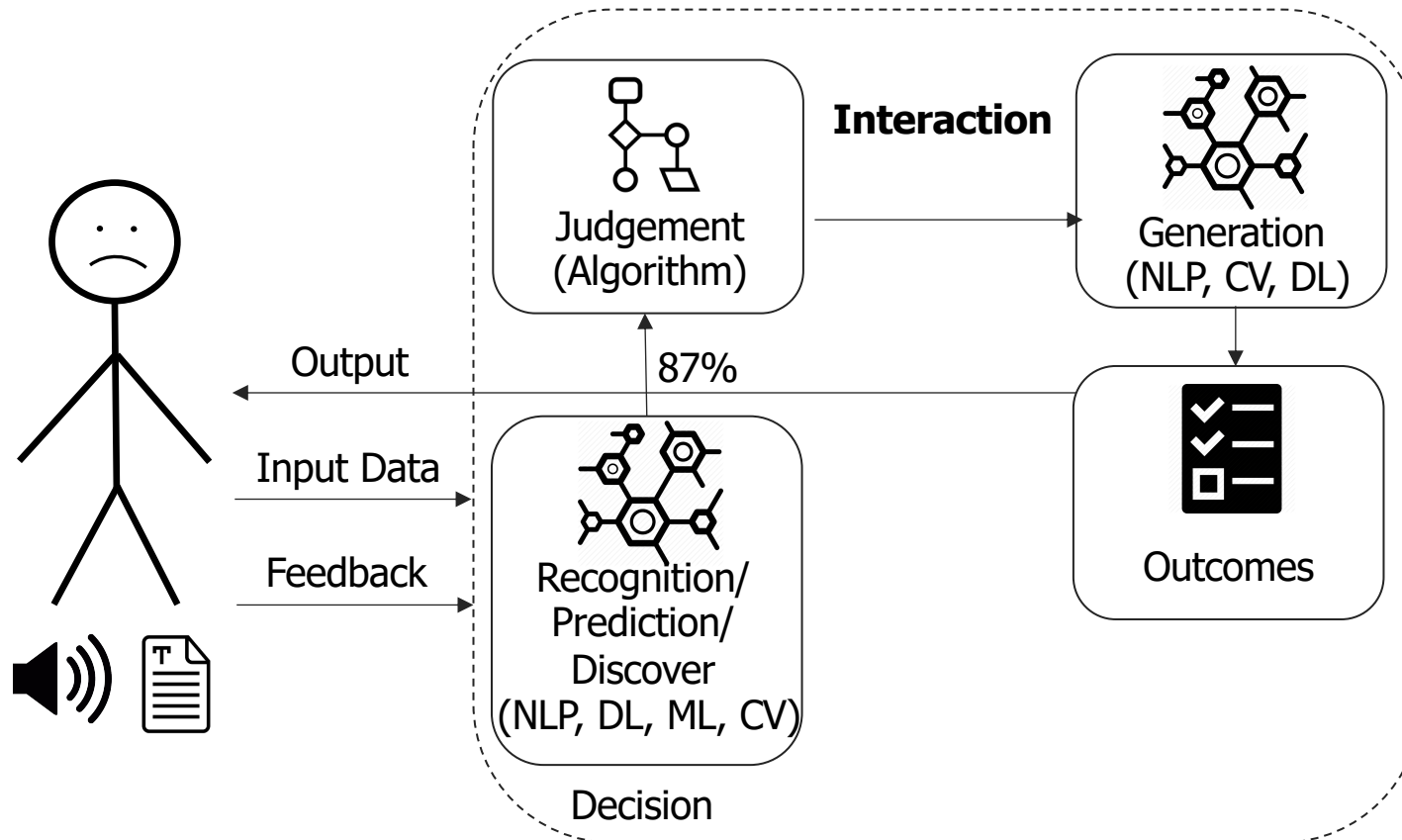
Generation

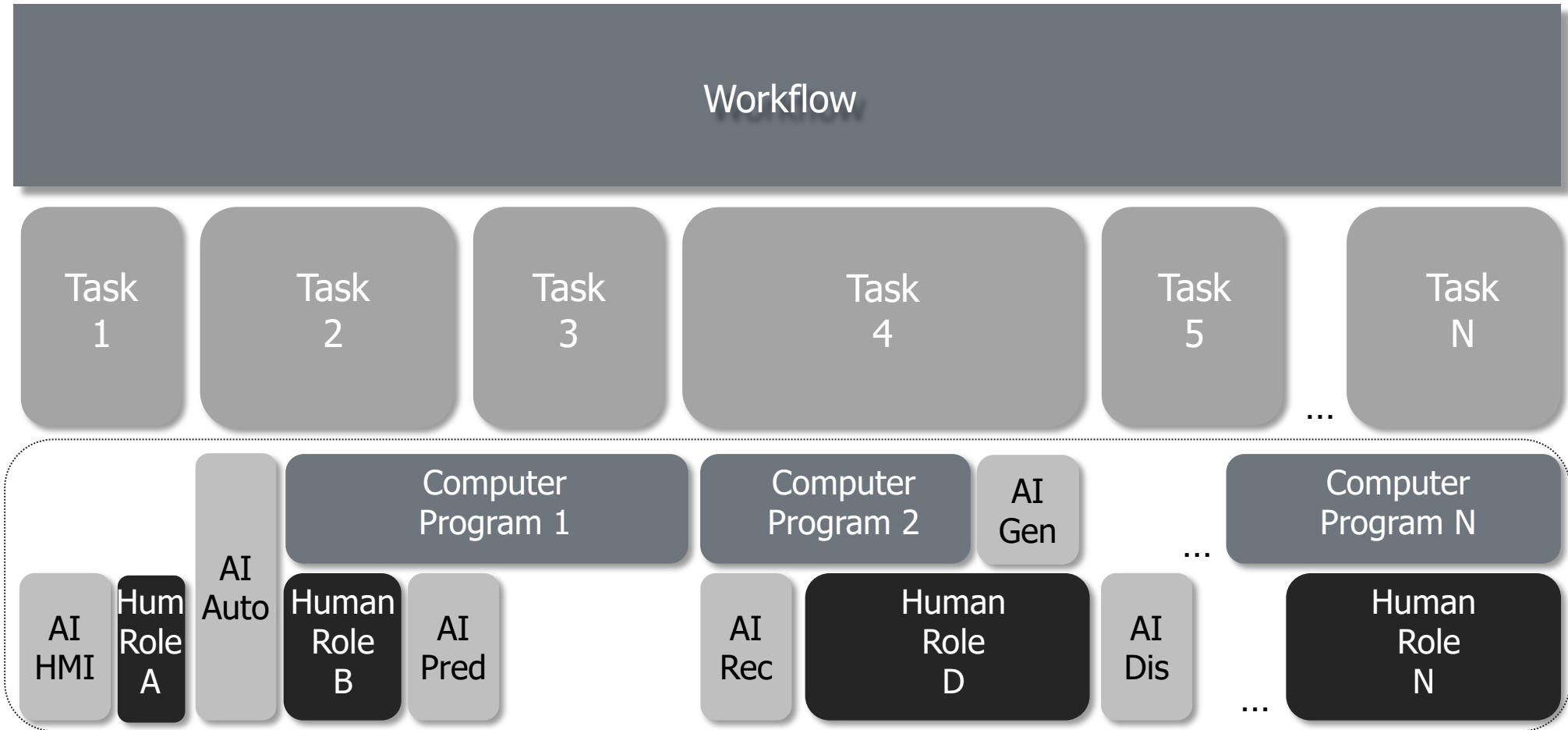


Automation

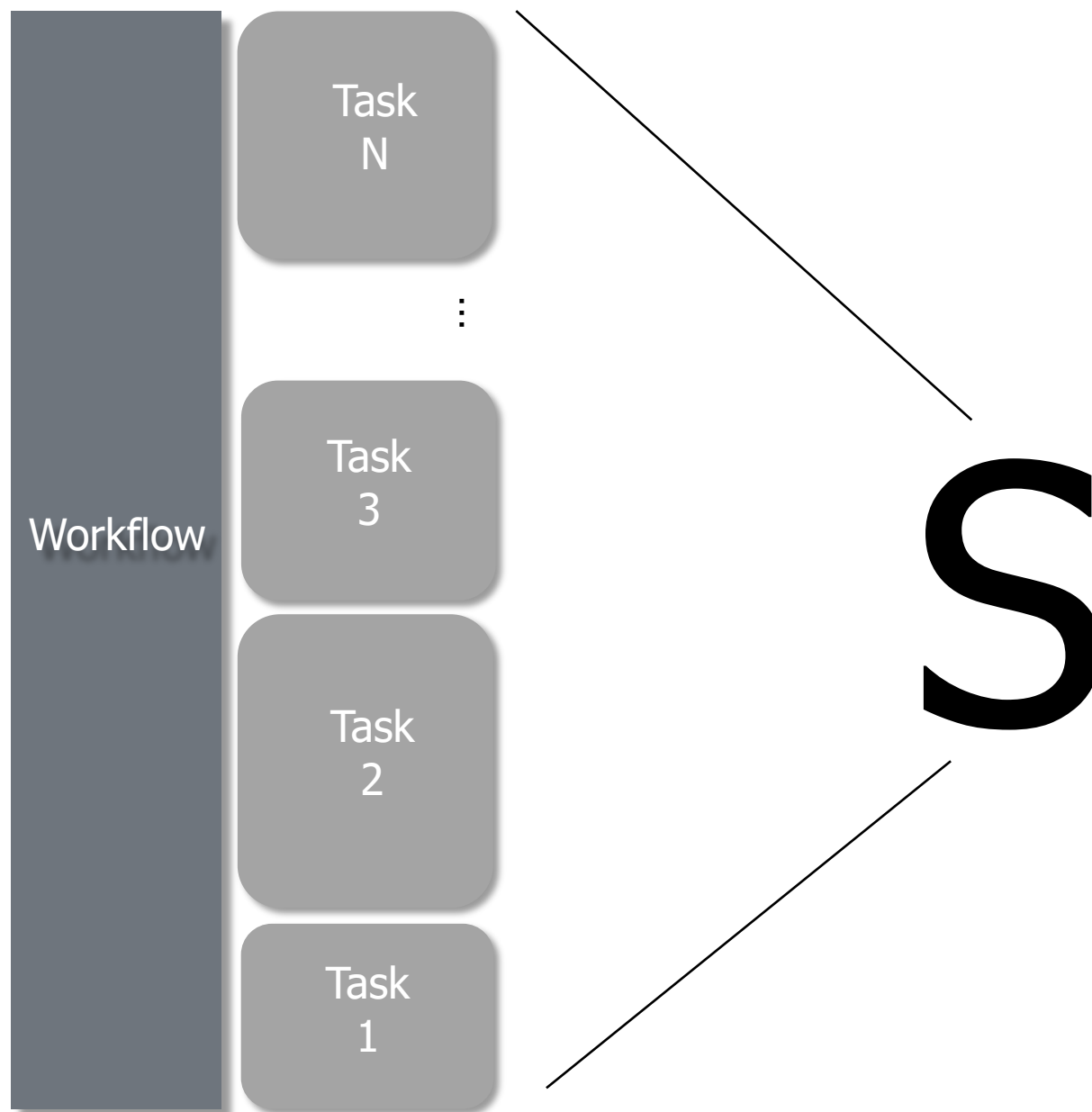
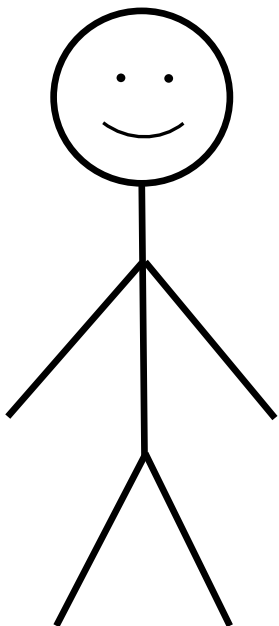


Human-Machine Interaction





Auto – Automation Dis – Discovery Gen – Generation HMI – Human-Machine Interaction Pred – Prediction Rec – Recognition



Data

AI(S, D) → V

AI(S,) → V

Structured Data
Unstructured Data
Small Data
Big Data

AI(S, D) → V

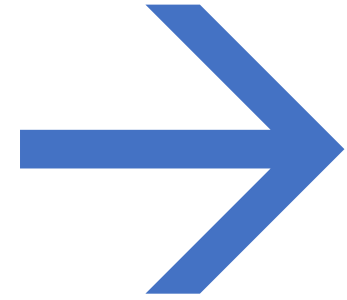
Messy Data
Training Data
Input Data
Feedback Data

Data Management

Enablers and Inhibitors

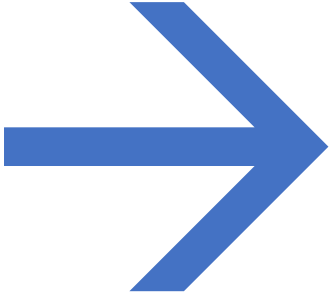
AI(S, D) → V

AI(S, D)



V

People
Tools
Infrastructure
Process

AI(S, D)  v

Transparency
Explainability
Ethics

People

Data Scientist

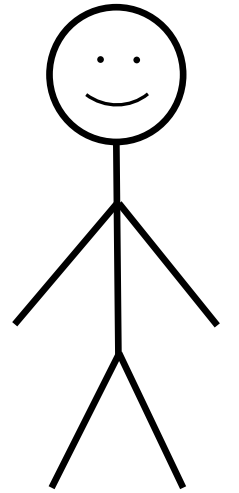
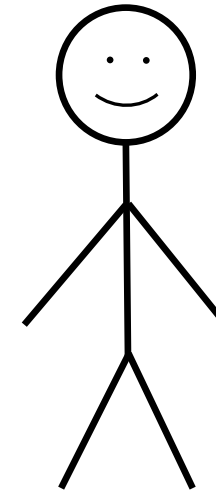
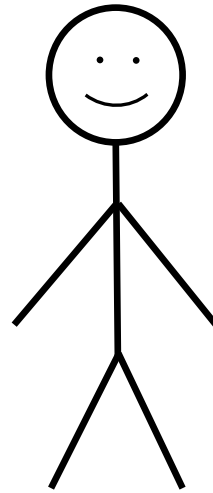
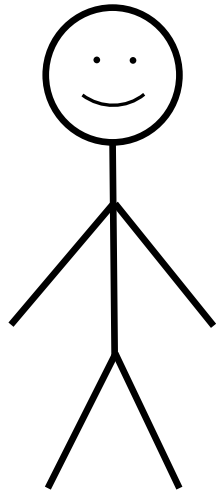
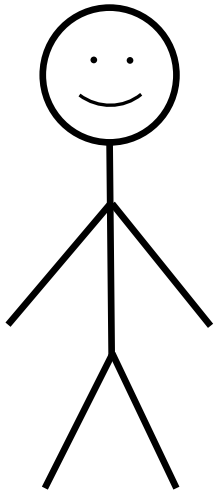
Machine Learning
Engineer

Business Professional
Business Analyst
Data Analyst

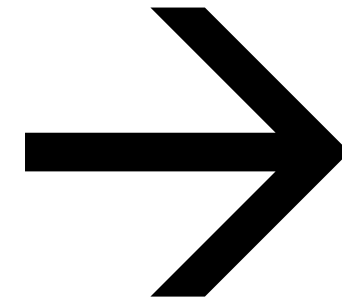
Data Engineer
Data Analyst

Software Developers
Software Engineers
Machine Learning
Engineer

Business Professional
Business Analyst



AI(S, D)



V

Value

AI(S, D) → V

Get value from:

Human augmentation

Task automation

Products and services innovation

Lifelong learning

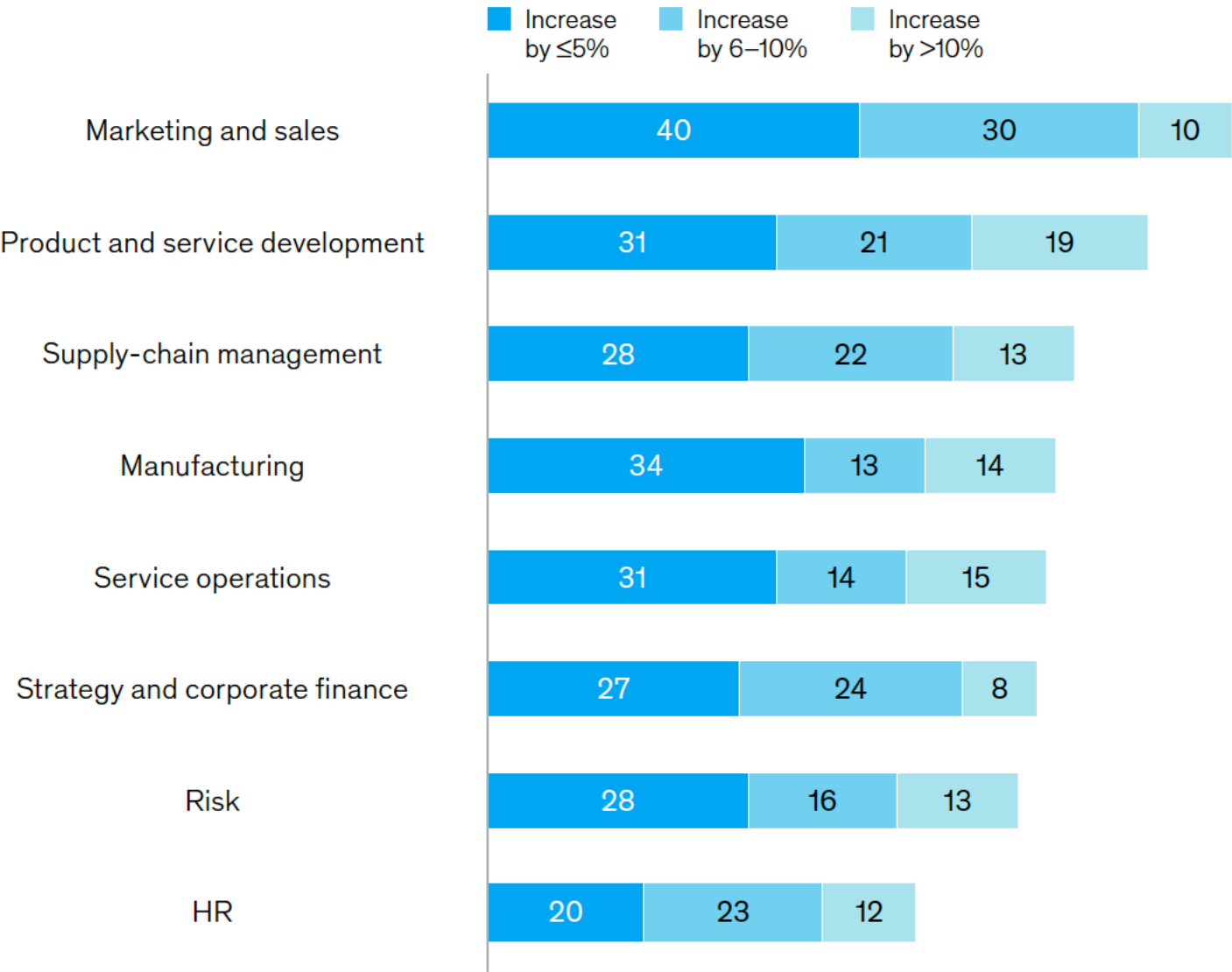
Just for fun

Cost decrease and revenue increase from AI adoption, by function,¹ % of respondents²

Average cost decrease

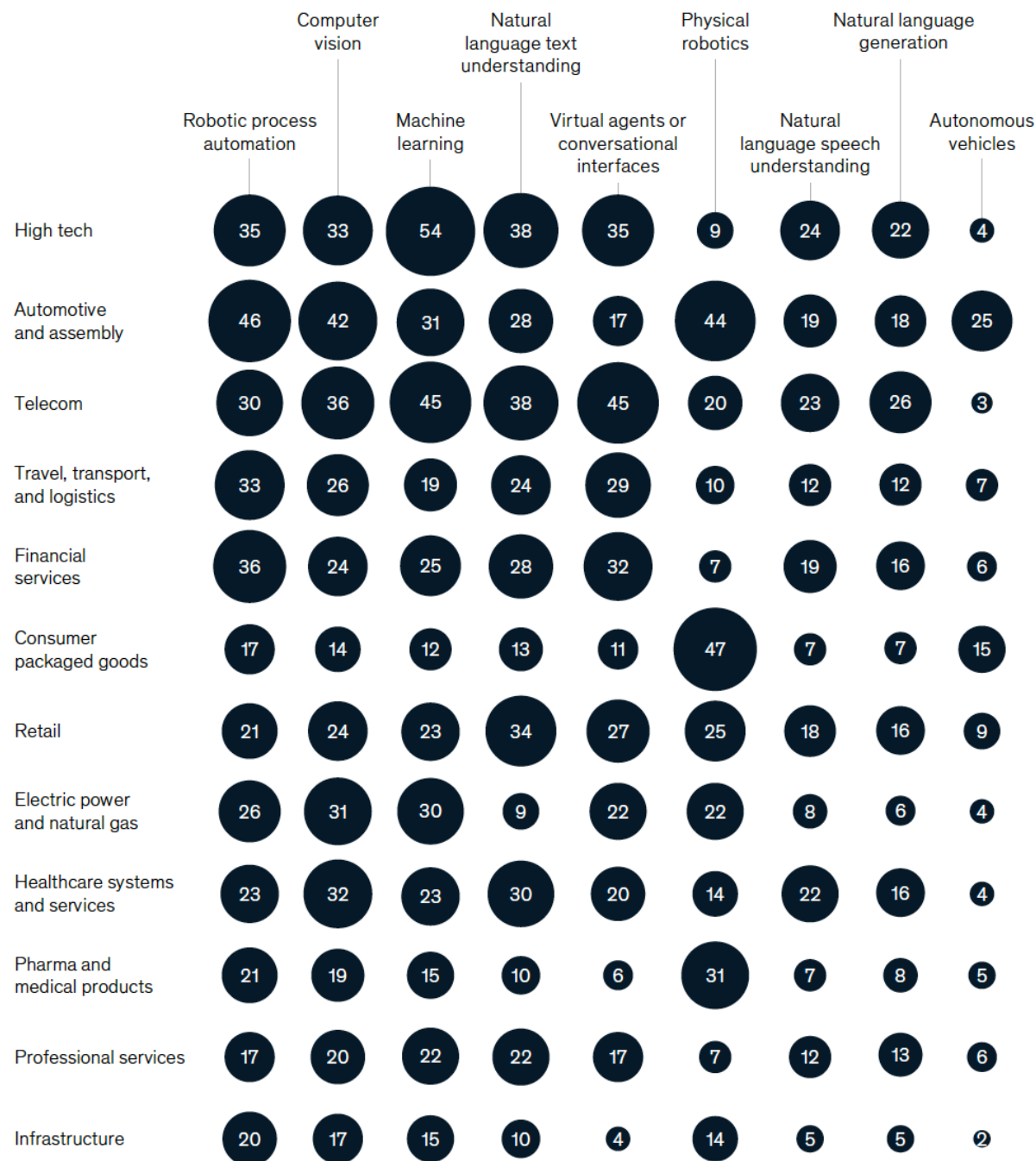


Average revenue increase



Source: McKinsey & Company, 2019

Organizations' AI capabilities,¹ % of respondents,² by industry

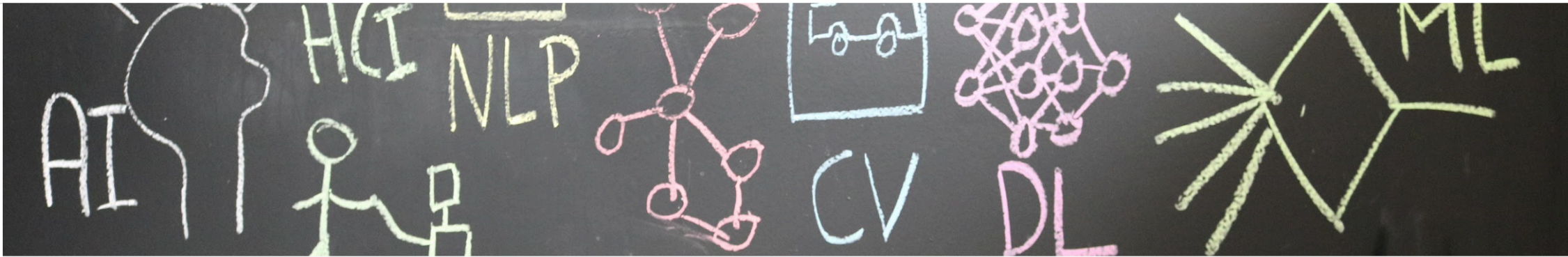


Source: McKinsey & Company, 2019

AlexD.ai

Conclusion

AI(S, D) → V



Alexandre Dietrich

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0:01 / 2:18

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This is a video to welcome the course "AI2V 101 - Apply Artificial Intelligence to get Value".

Next video: AI2V 101 - Course Structure

AI2V 101 Apply Artificial Intelligence to get Value Course

Welcome 48

Welcome 3

What is AI? 6

AI Capabilities 10

Situation 6

Data 7

AI2V 101 - Full Course

AI2V 101 - Introduction

AI2V 101 - 1 Concepts

AI2V 101 - 2 AI Capabilities

AI2V 101 - 3 Situation

AI2V 101 - 4 Data

Thank You

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Artificial Intelligence Enthusiast

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