

# 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.

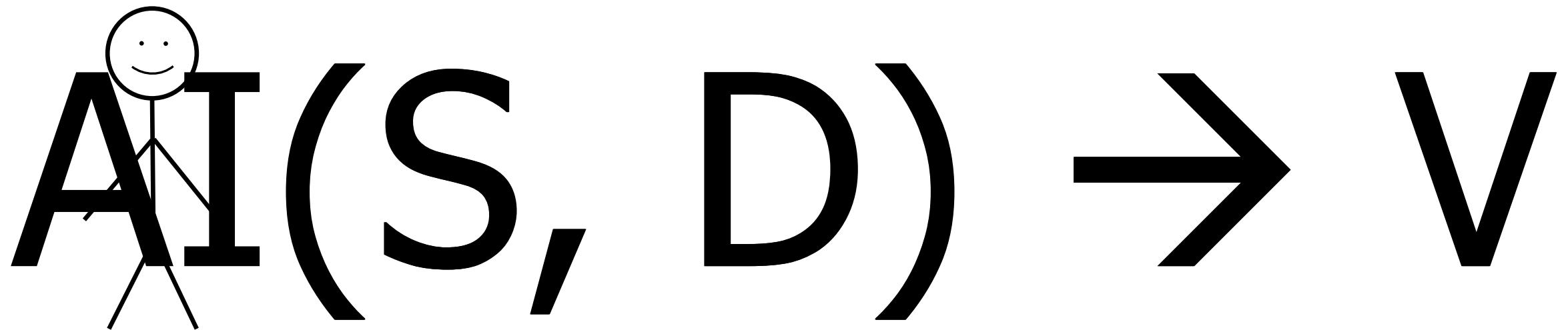
# AI2V Function

## AI2V Function

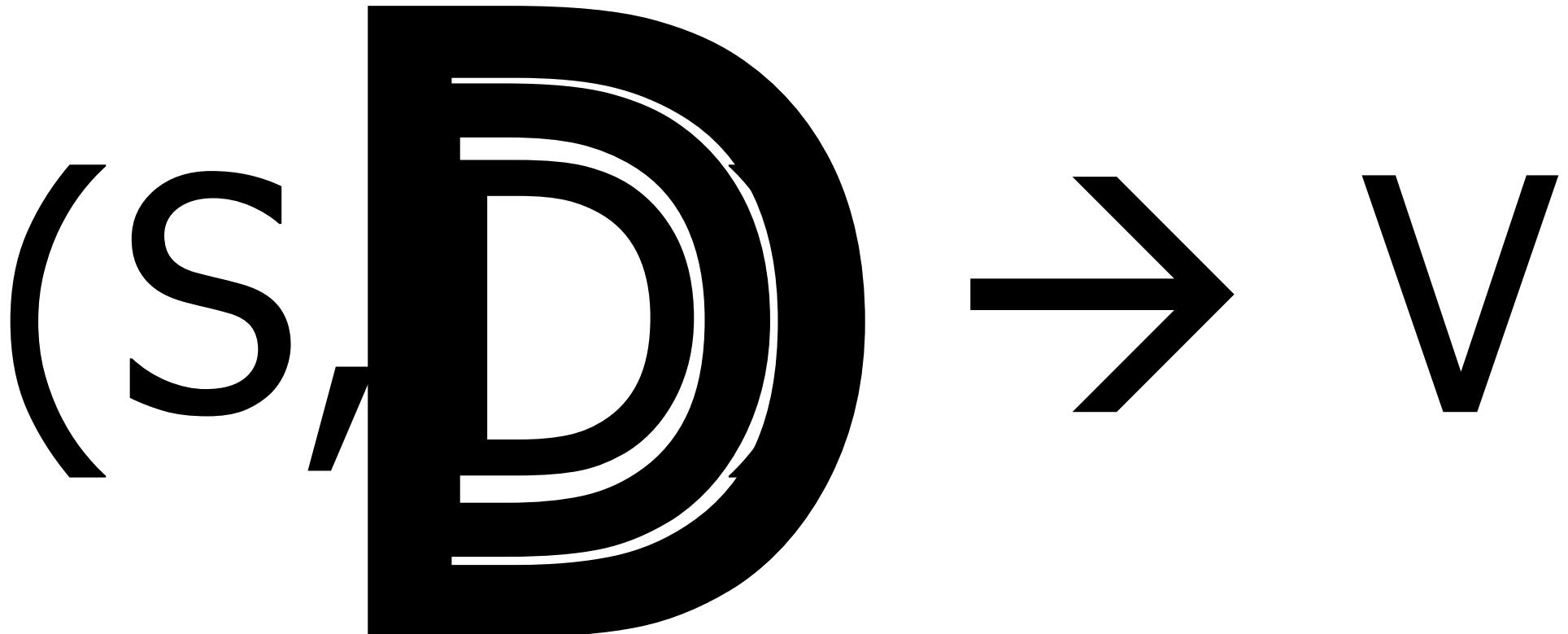
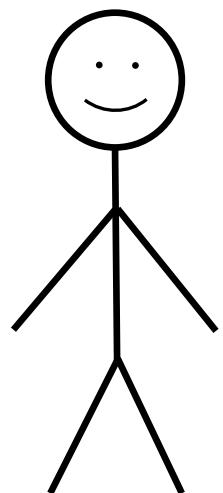


AI - Artificial Intelligence  
S - Situation  
D - Data  
V - Value  
→ - Enablers / Inhibitors

Why not use Humans ?

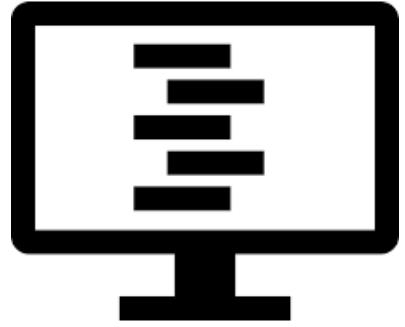


Why not use Humans ?

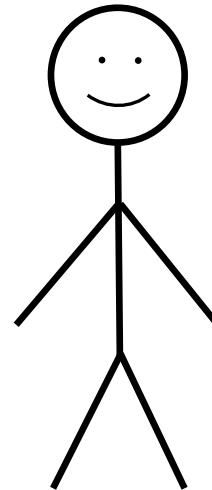


Why not use a Traditional Computer Program ?





+ D 123 = OK



+ D 123 = OK

A? +

D 123 = OK

$\text{AI}(S^1, D^1) \rightarrow V^1$

$\text{AI}(S^2, D^2) \rightarrow V^2$

$\text{AI}(S^1, D^1) \rightarrow V^1$

$\text{AI}(S^2, D^2) \rightarrow V^2$

$\text{AI}(S^3, D^3) \rightarrow V^3$

**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

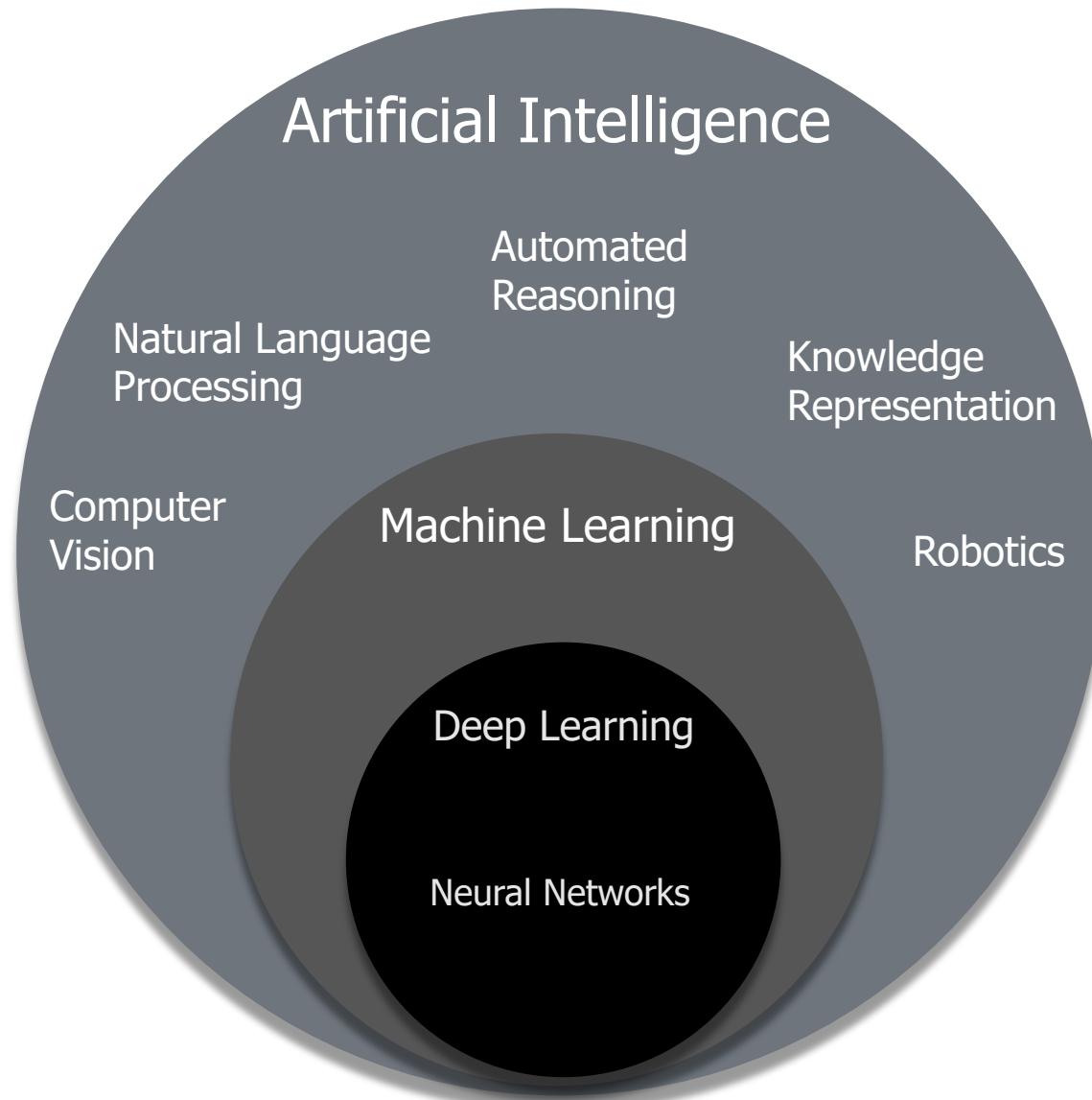
General

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

Future ?

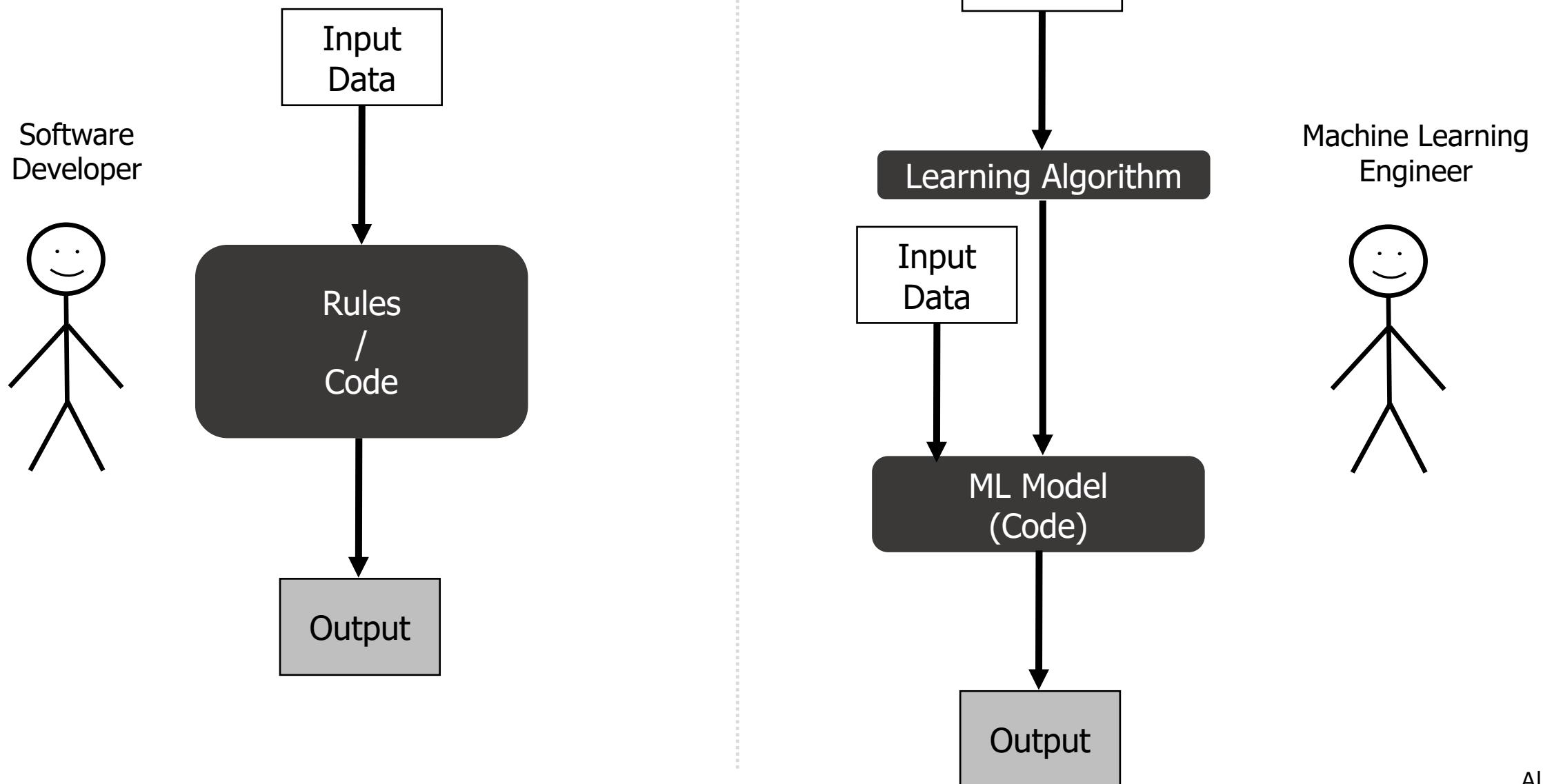
# AI Capabilities

**AI(S, D) → V**



# Machine Learning

# Traditional Programming X Machine Learning

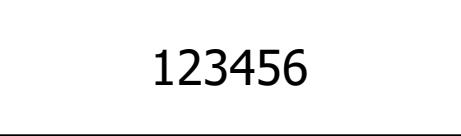


# Traditional Programming X Machine Learning

Web Page Field

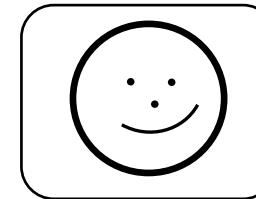
A =  123456

Accounts Database

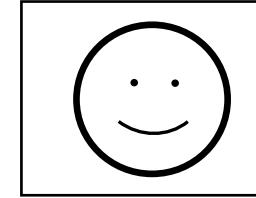
B =  123456

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

Smartphone Camera



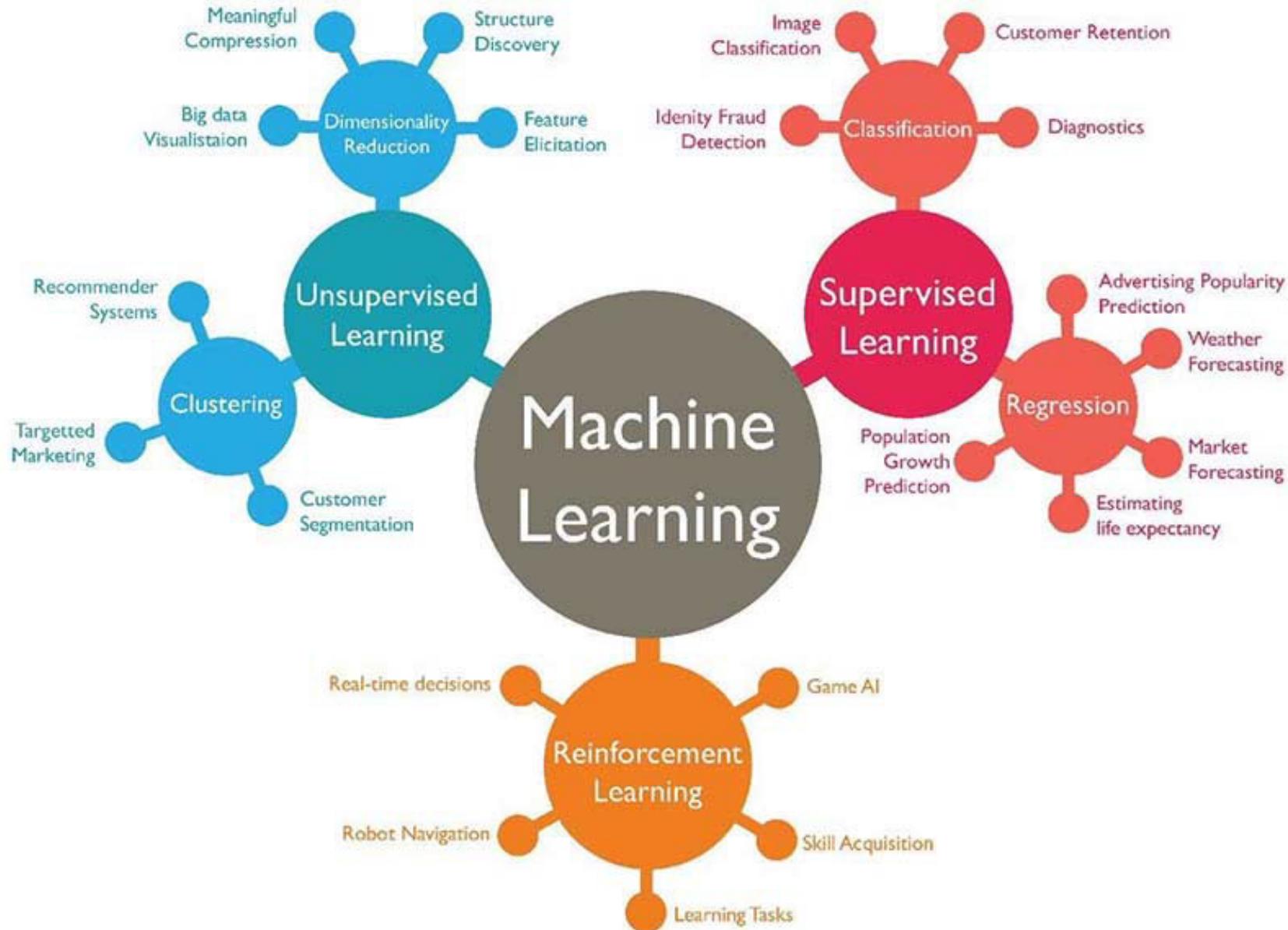
Pictures Database



Machine Learning output:

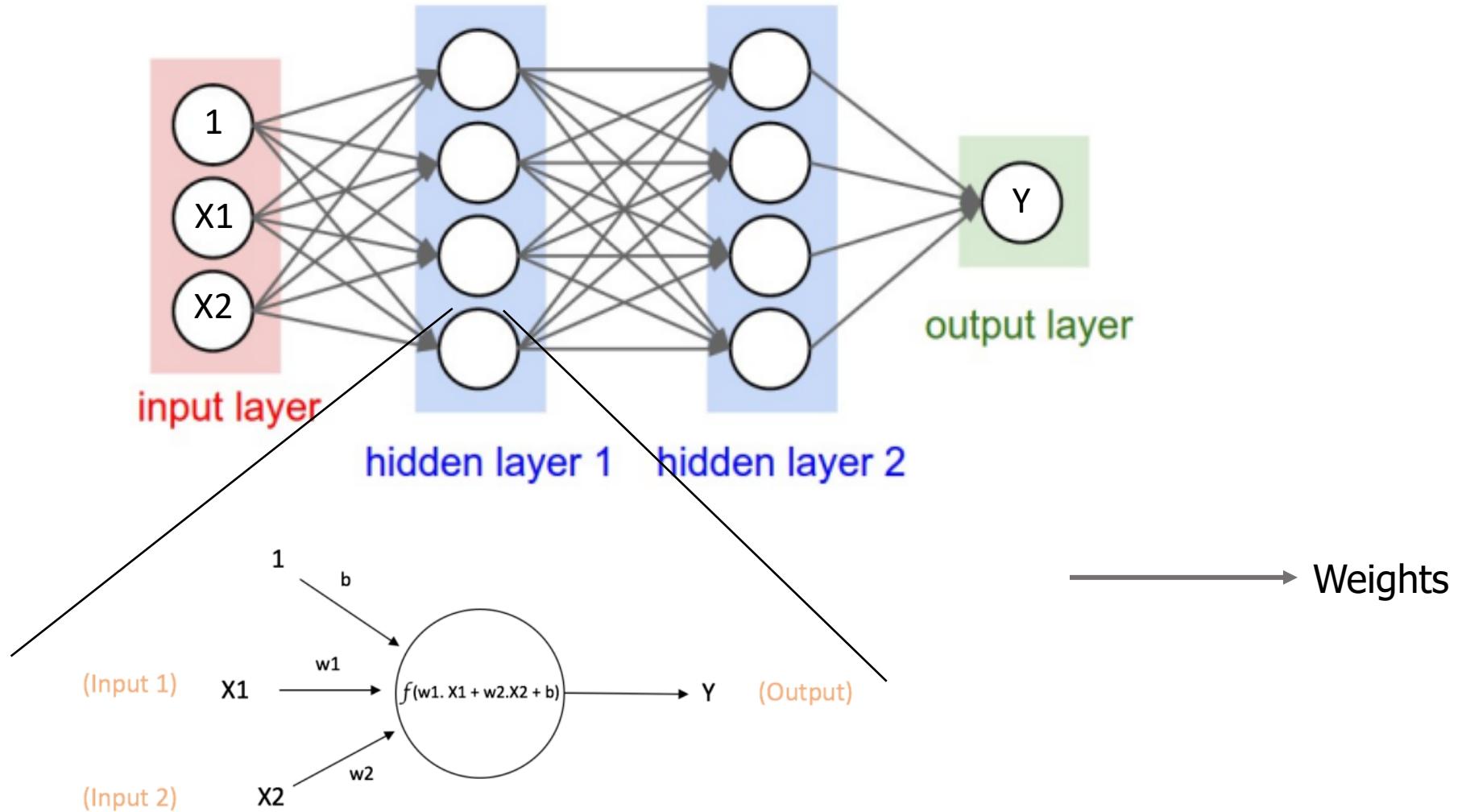
The probability that  is equal  is **87%**.

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

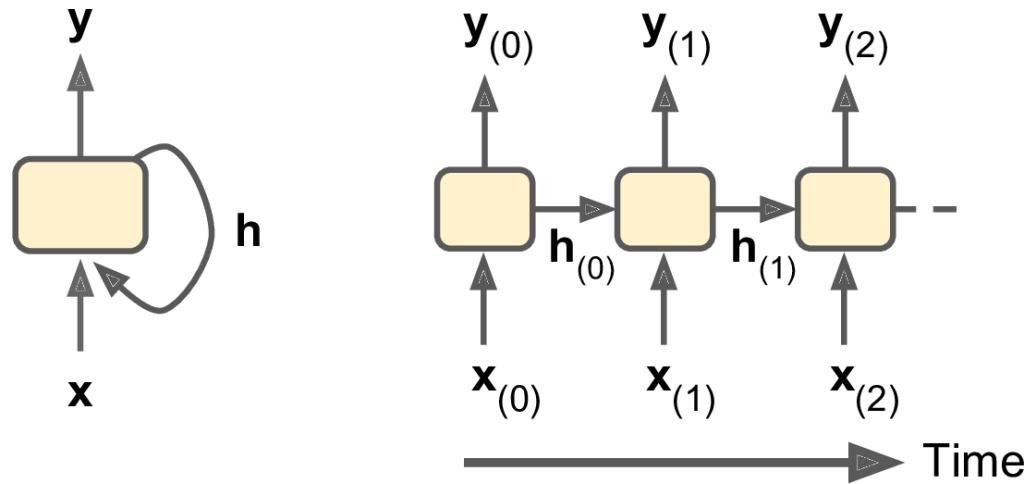


# Deep Learning

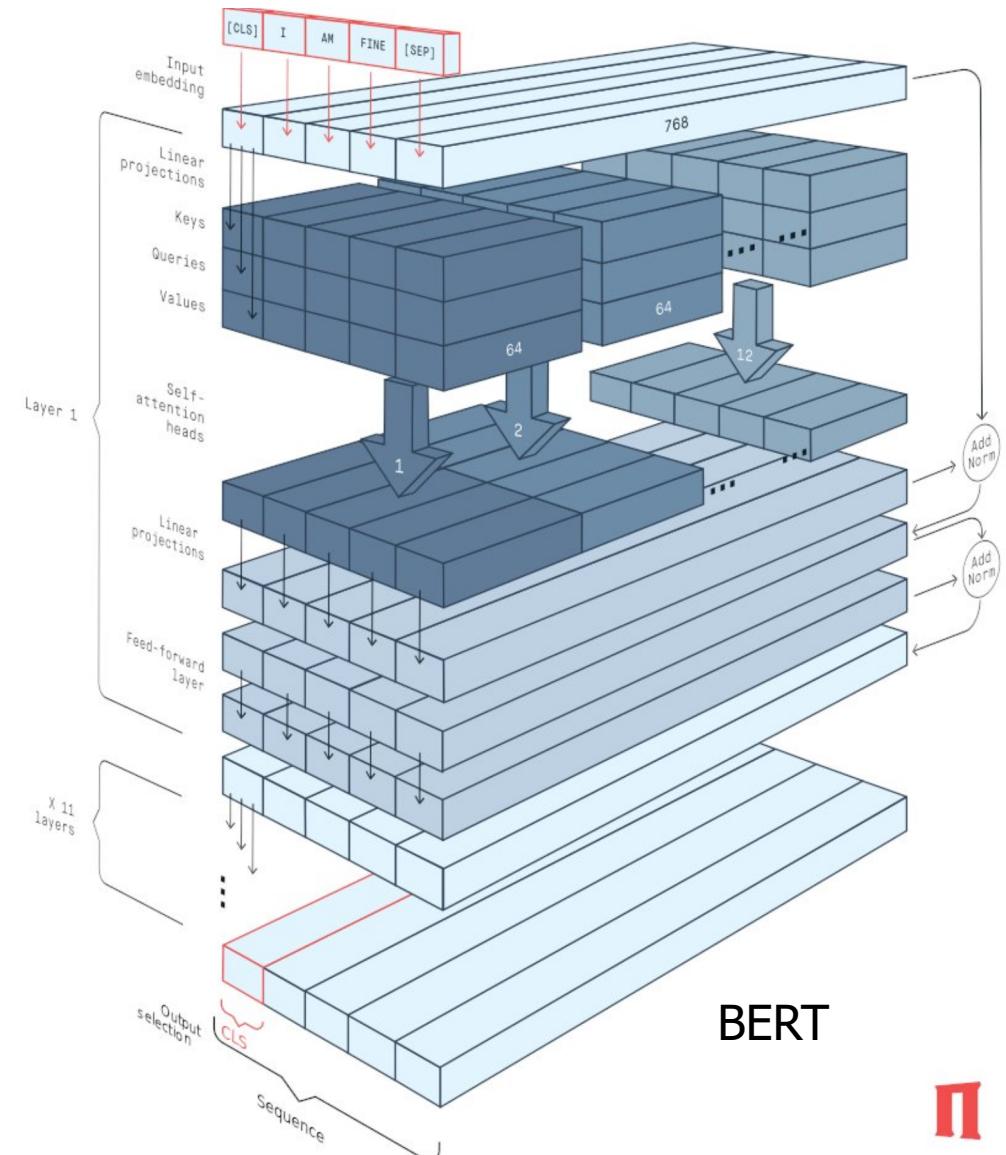
## Multilayer Perceptron (Fully Connected Neural Network - FCNN)



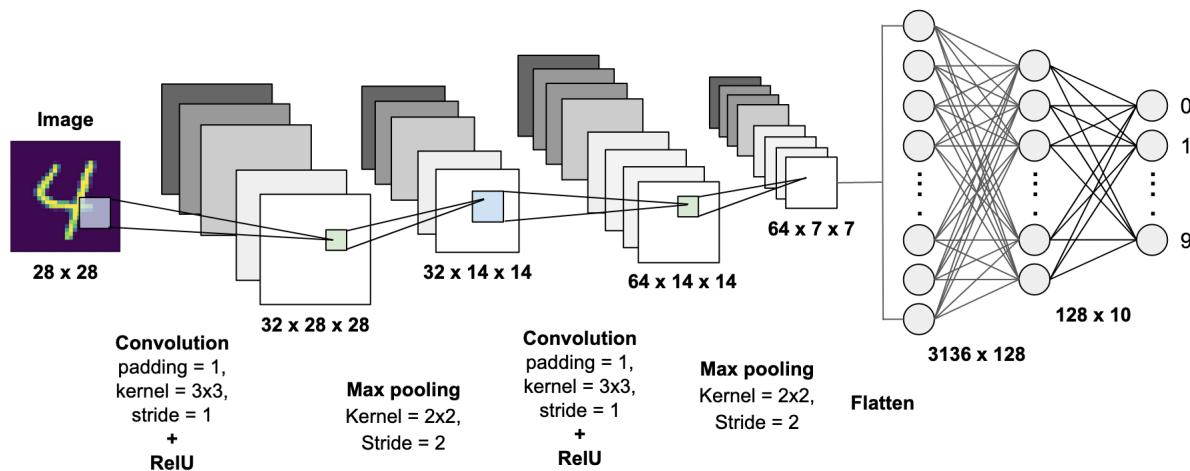
## Recurrent Neural Network (RNN)



## Transformers (pre-trained models)



## Convolutional Neural Networks (CNN)



# Computer Vision

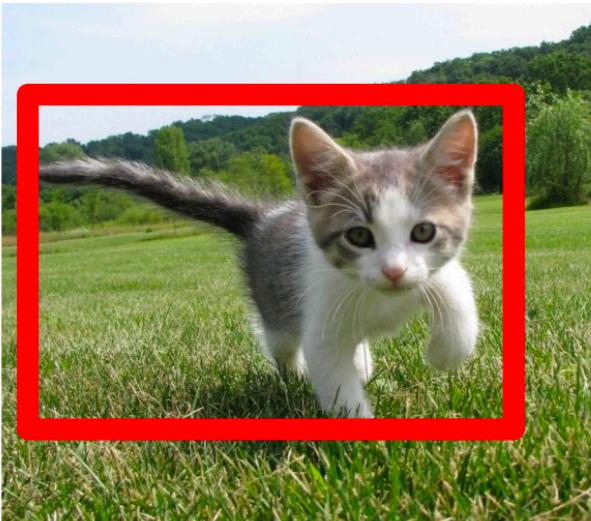
## Semantic Segmentation



GRASS, CAT,  
TREE, SKY

No objects, just pixels

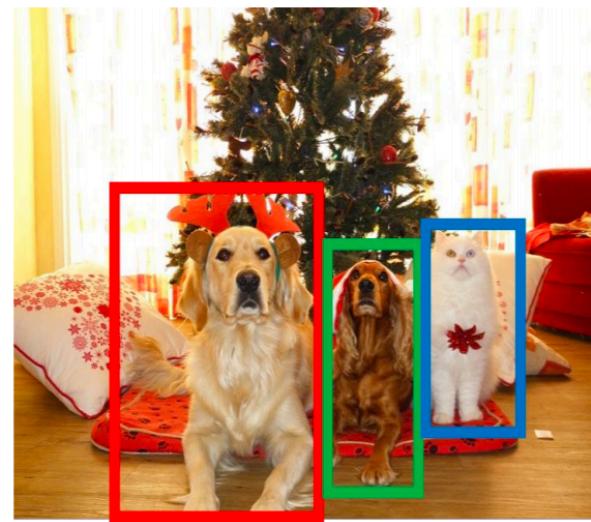
## Classification + Localization



CAT

Single Object

## Object Detection



DOG, DOG, CAT

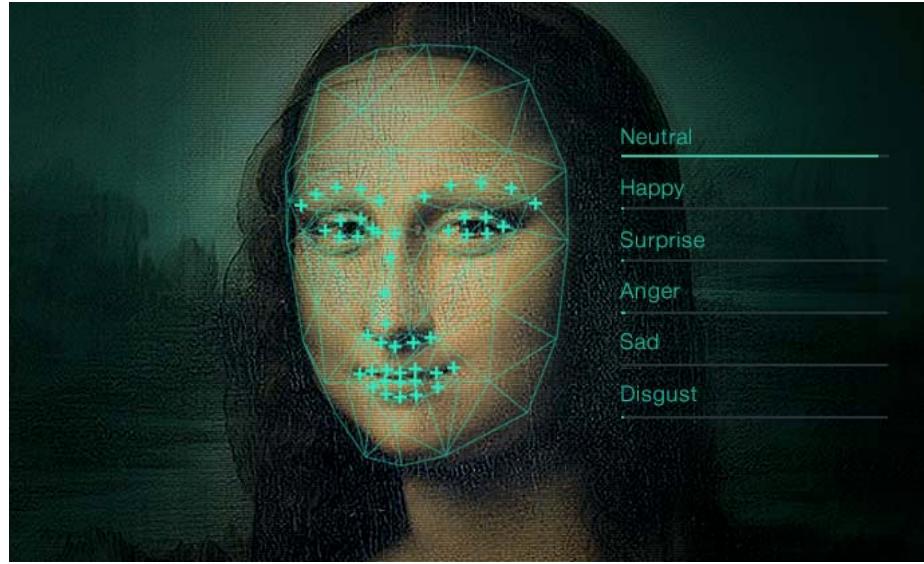
Multiple Object

## Instance Segmentation



DOG, DOG, CAT

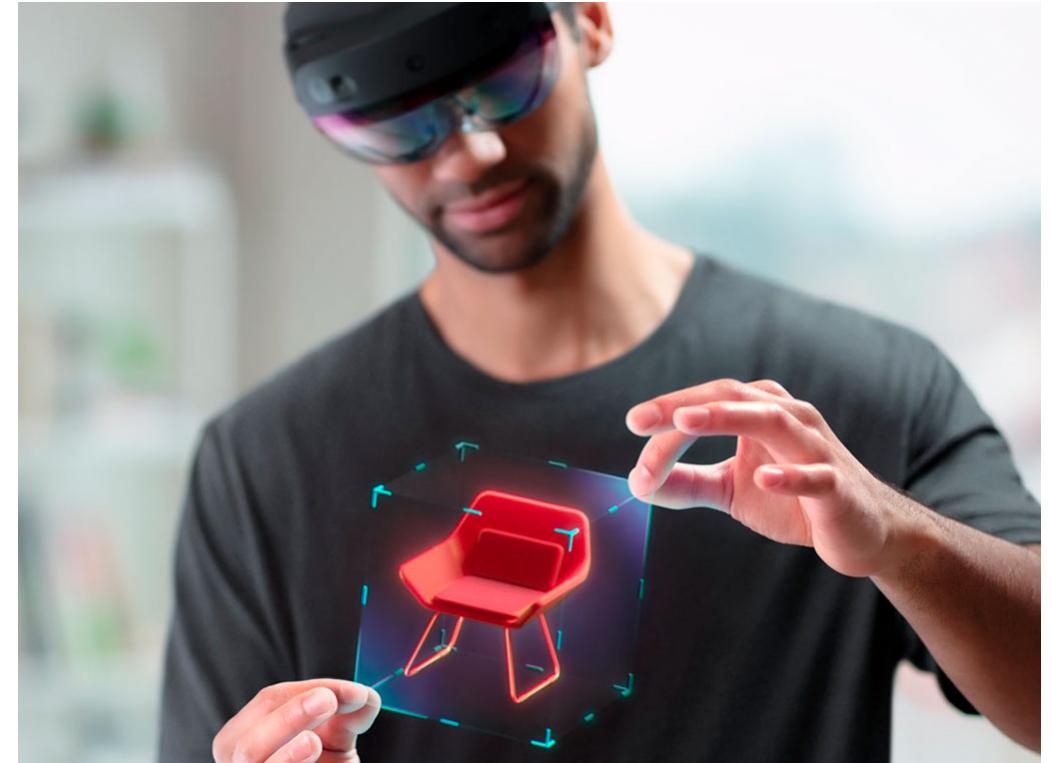
## Facial Recognition



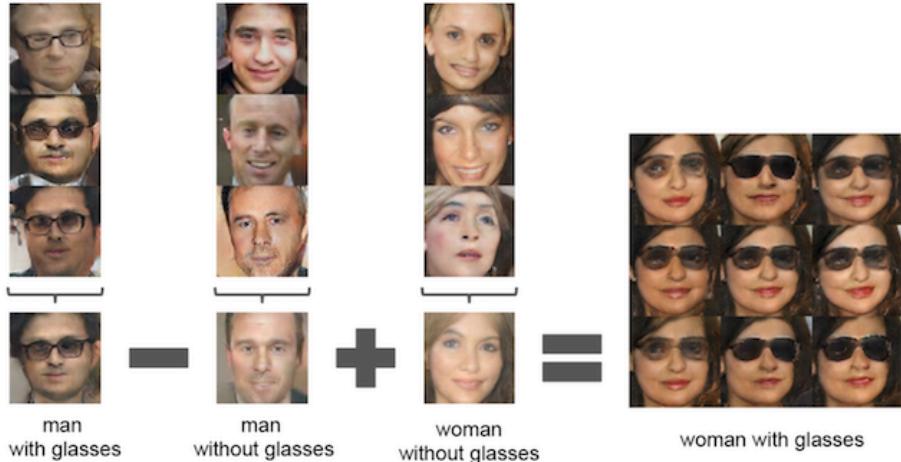
## Style Transfer



## 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:

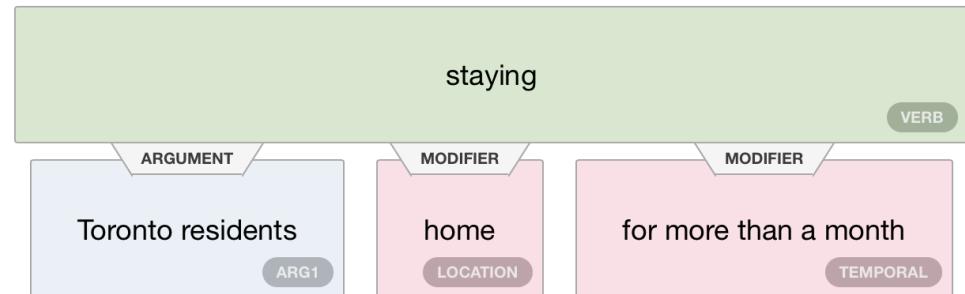
Model: NAQANet

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**

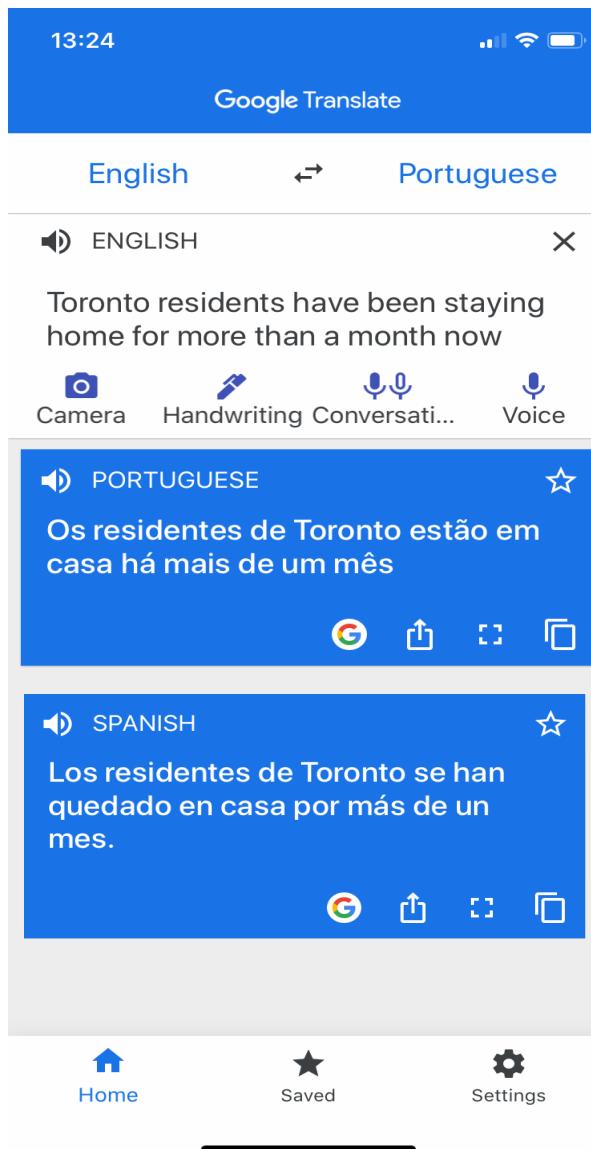
15.2% **at**

5.3% **away**

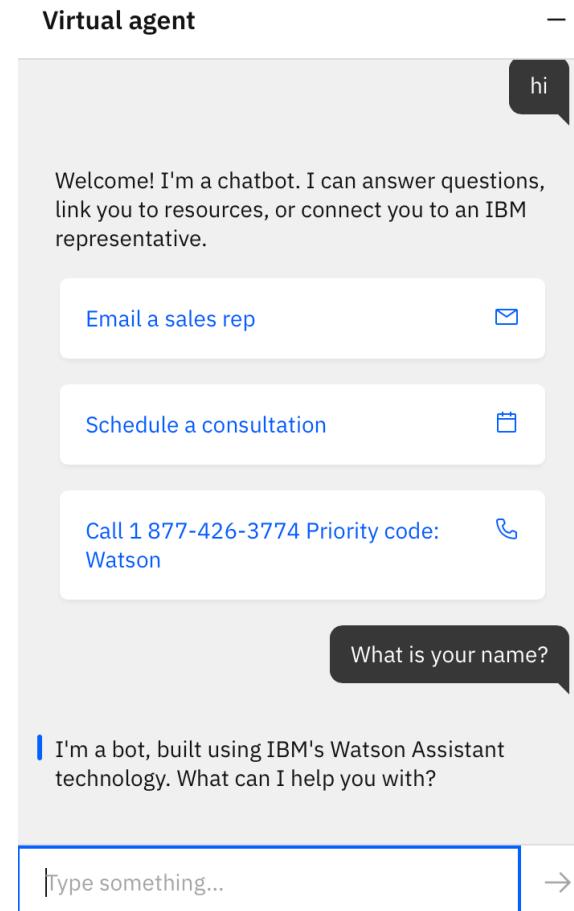
4.0% **home**

3.6% **up**

## Language Translation



## Text Classification and Named-Entity Recognition

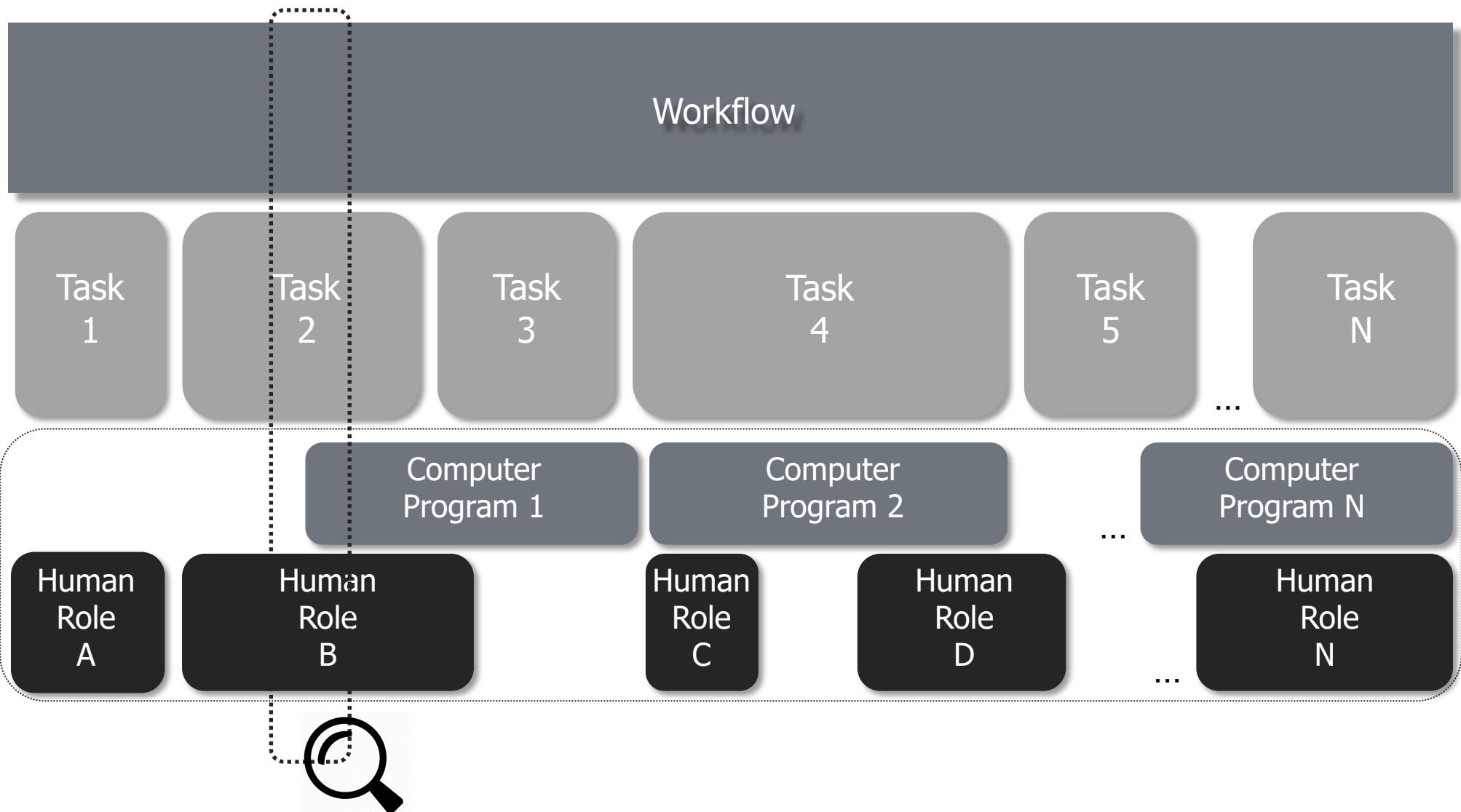


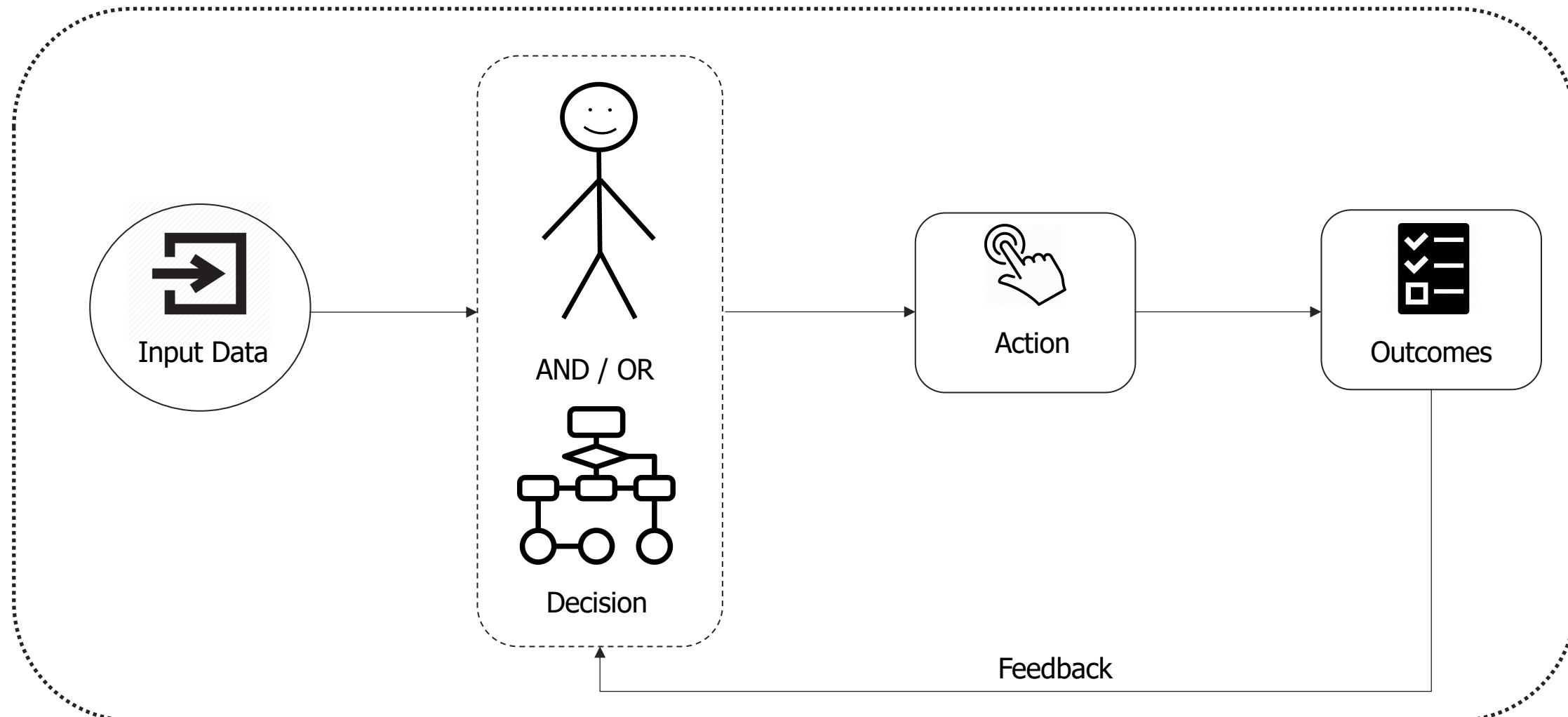
## Speech Recognition and Synthesis



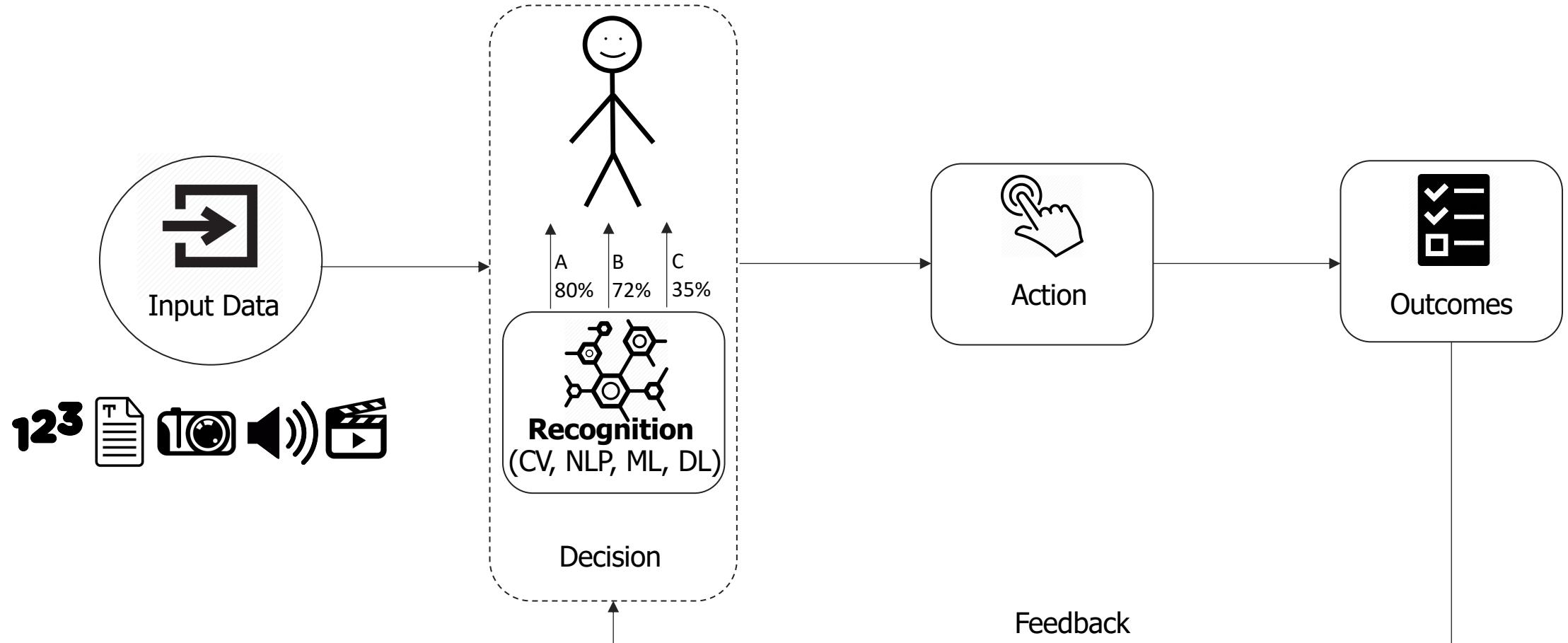
# Situation

AI(*S*, *D*) → *V*



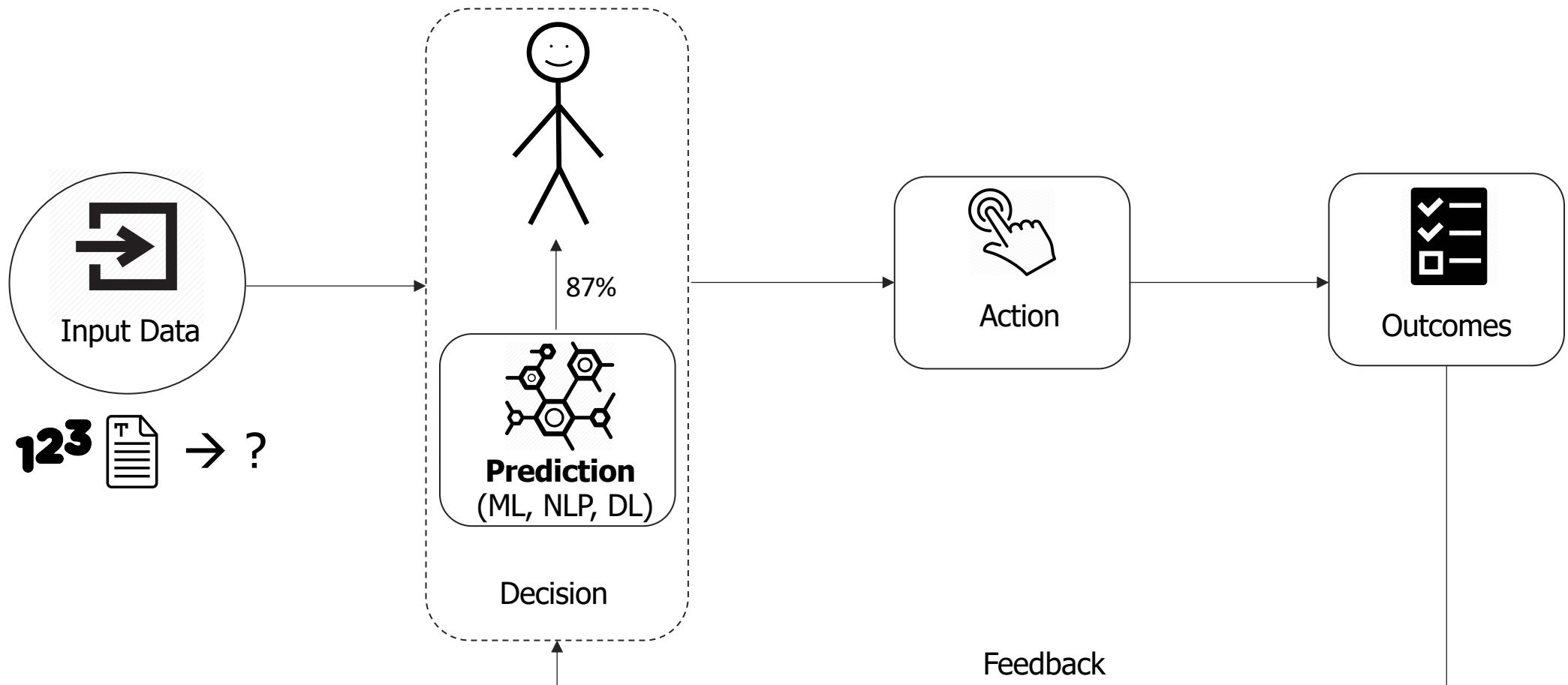


# Recognition

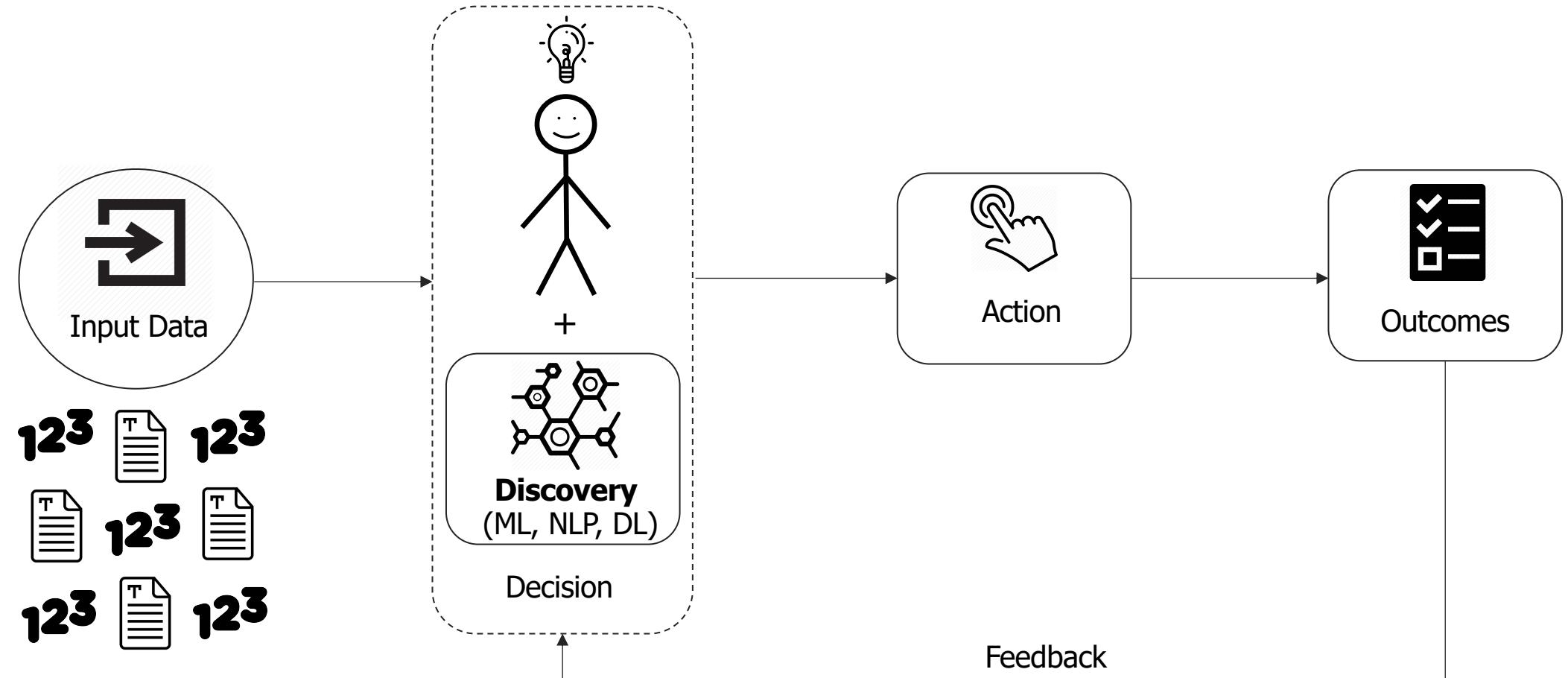


CV – Computer Vision   NLP – Natural Language Processing   ML – Machine Learning   DL – Deep Learning

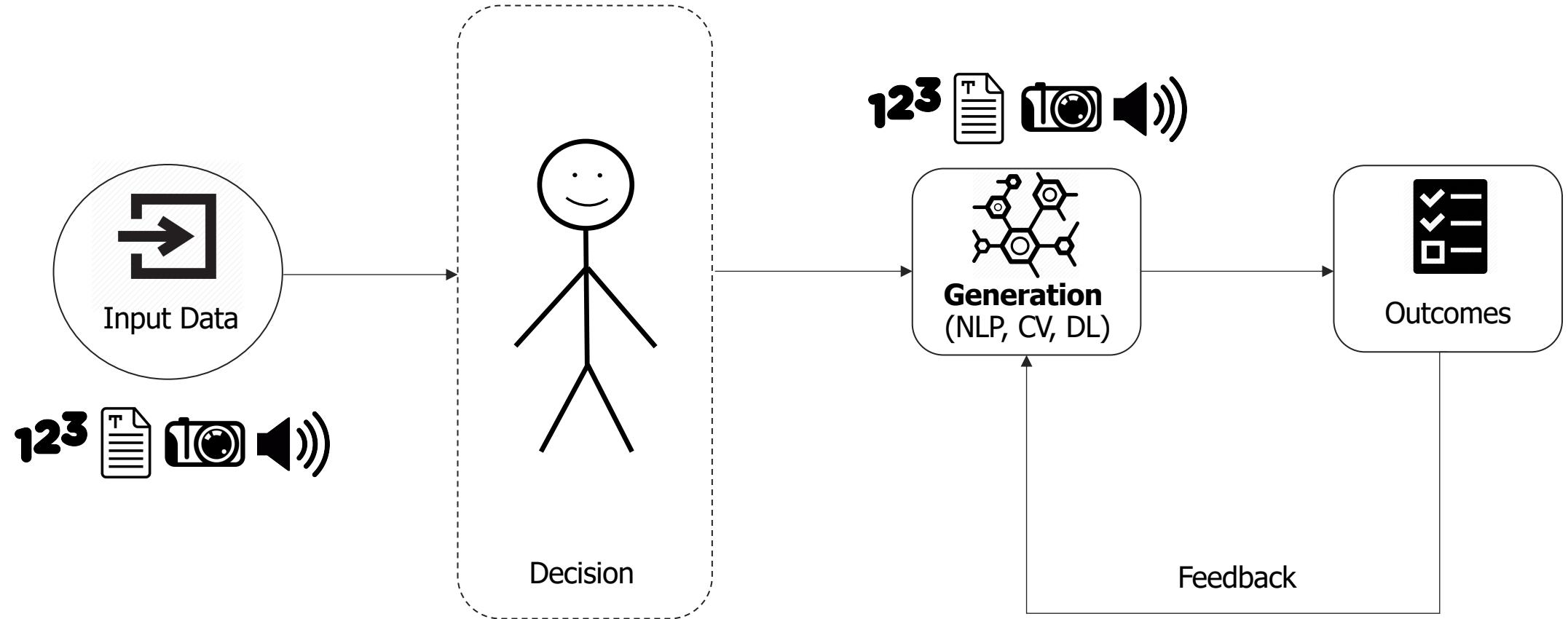
# Prediction



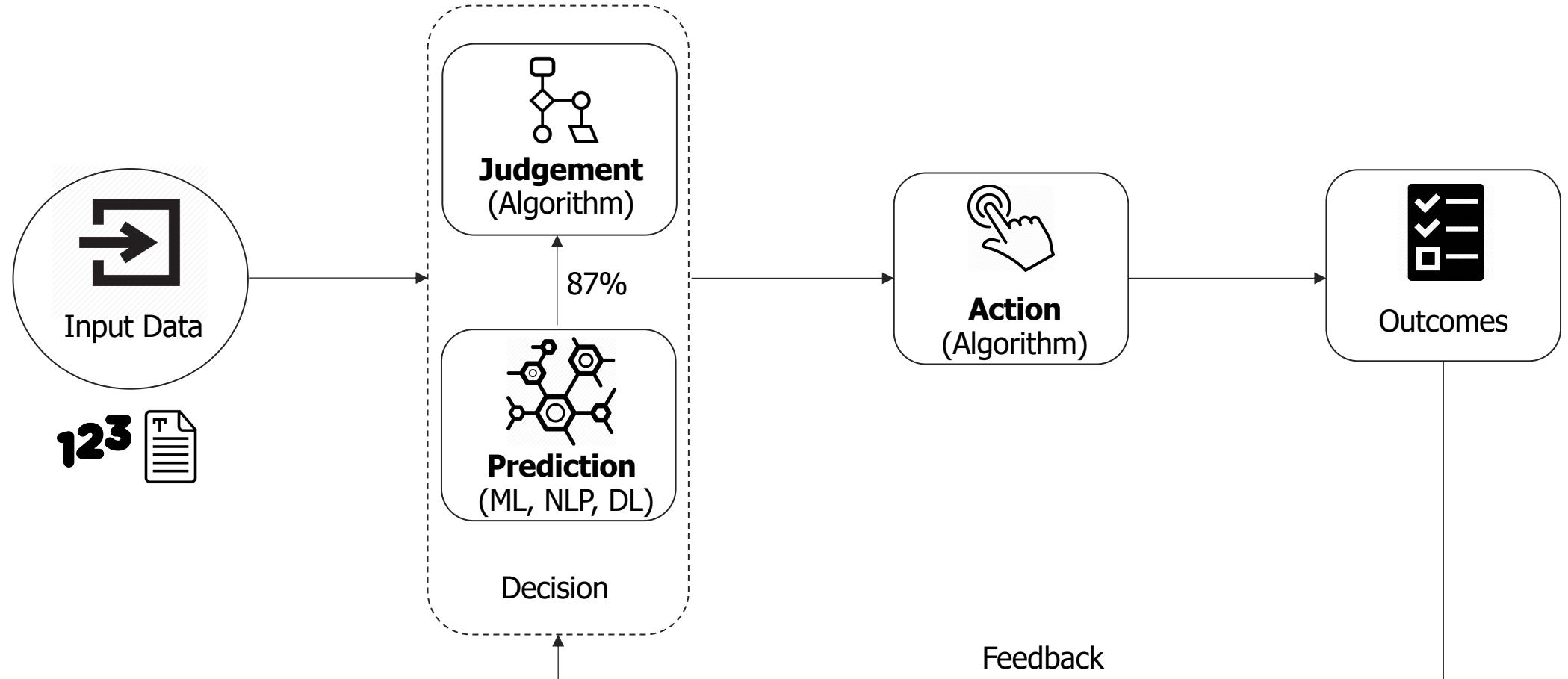
# Discovery



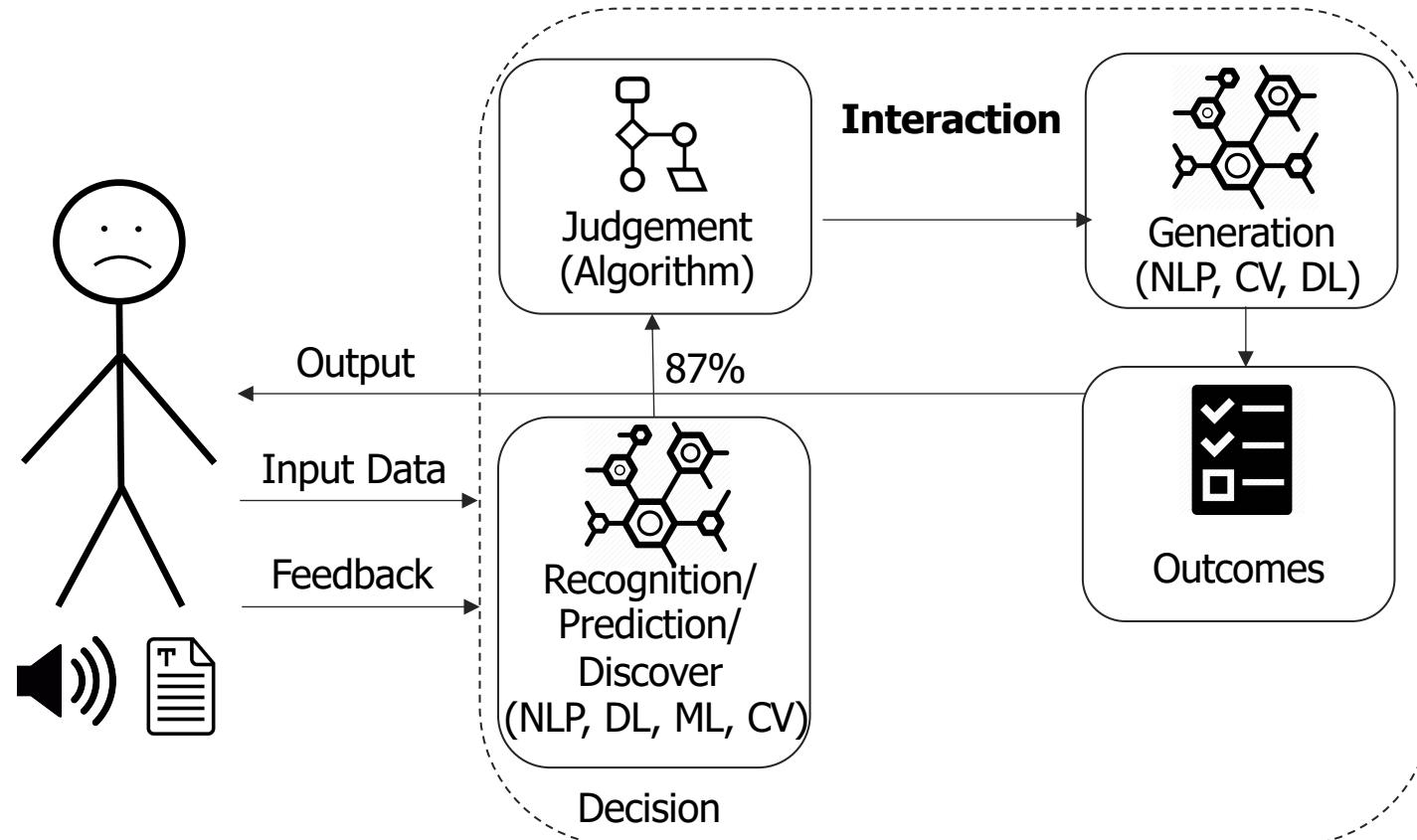
# Generation

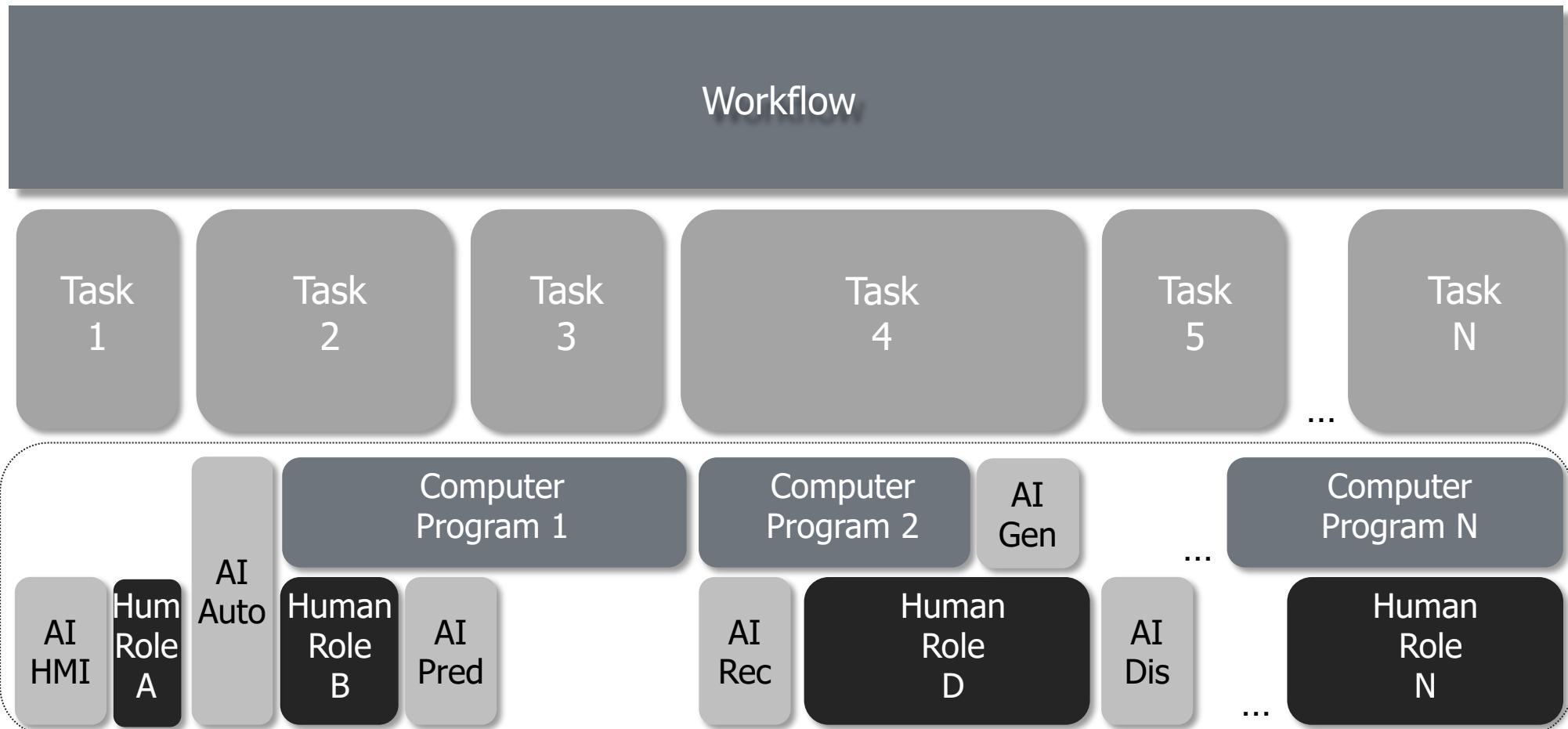


# Automation

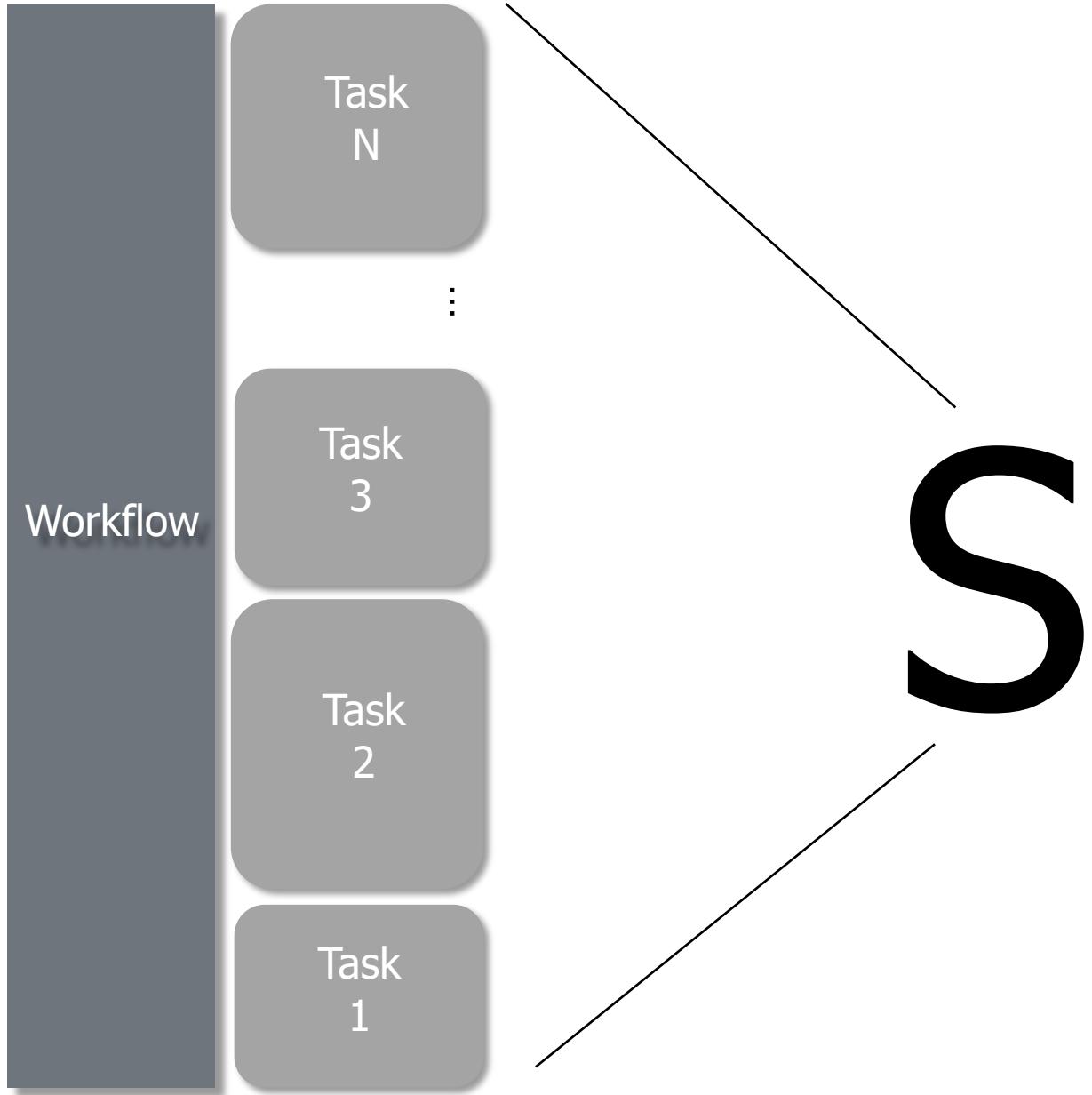
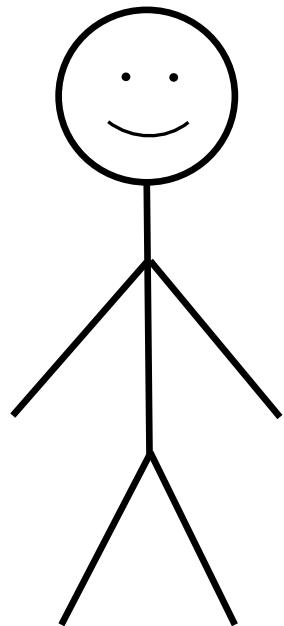


# Human-Machine Interaction





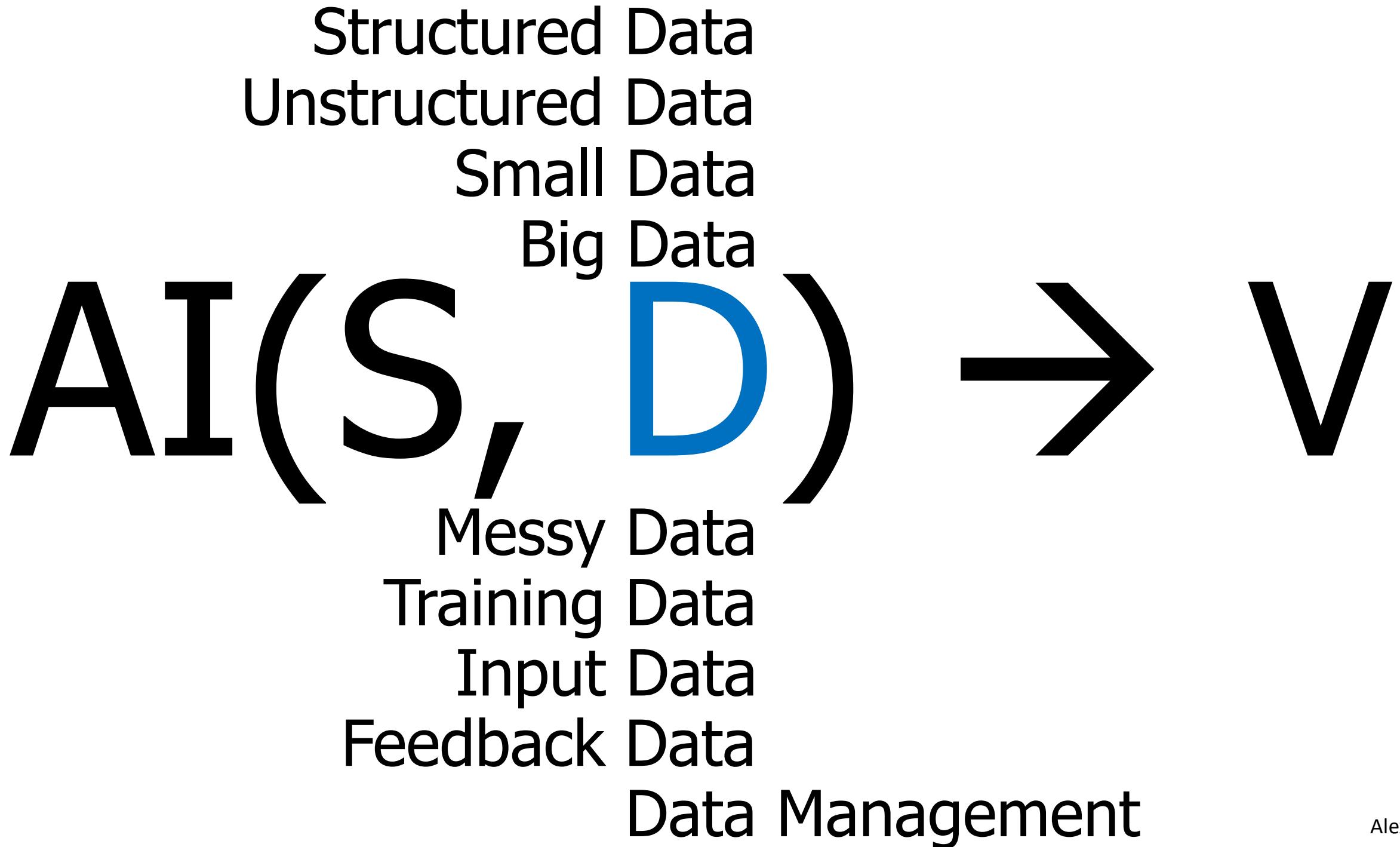
Auto – Automation Dis – Discovery Gen – Generation HMI – Human-Machine Interaction Pred – Prediction Rec – Recognition



# Data

AI(S, D) → V

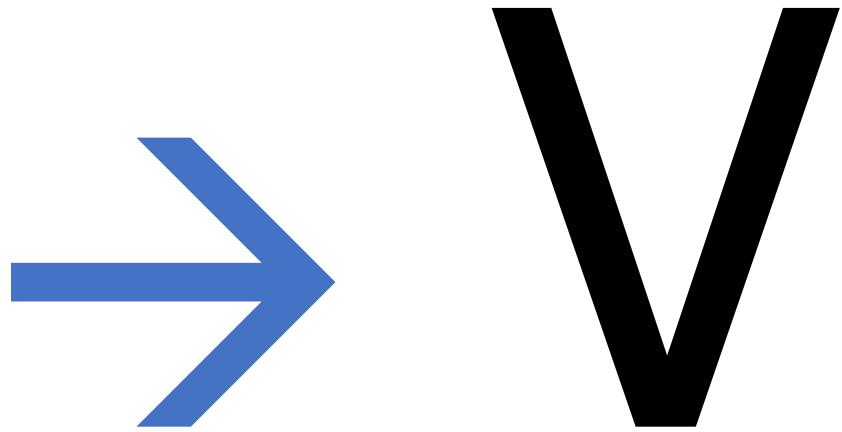
AI( $s,$ )  $\rightarrow v$



# 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

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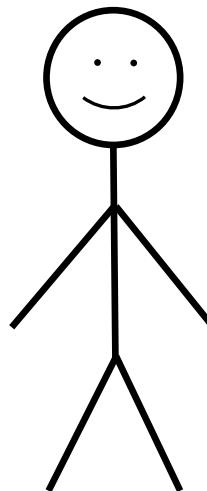
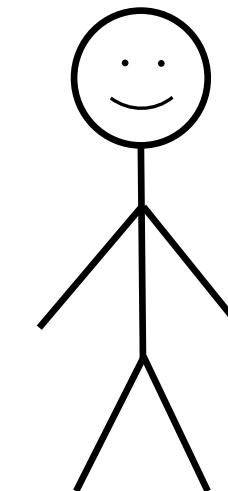
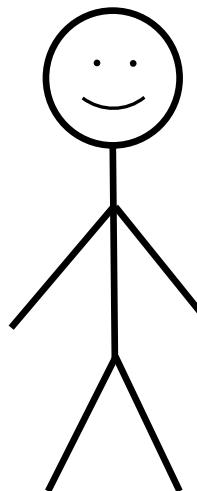
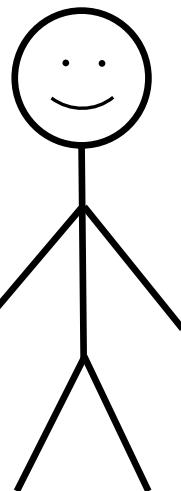
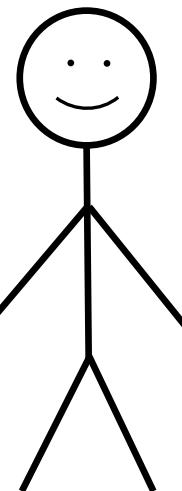
Machine Learning  
Engineer

Business Professional  
Business Analyst  
Data Analyst

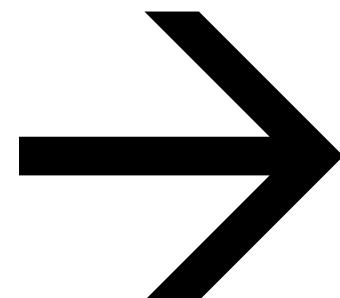
Data Engineer  
Data Analyst

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

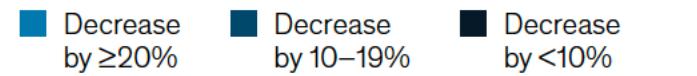
Products and services innovation

Lifelong learning

Just for fun

## Cost decrease and revenue increase from AI adoption, by function,<sup>1</sup> % of respondents<sup>2</sup>

### Average cost decrease



Marketing and sales



Product and service development



Supply-chain management



Manufacturing



Service operations



Strategy and corporate finance

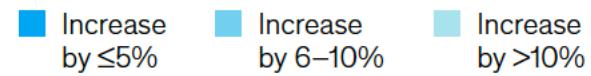


Risk



HR

### Average revenue increase



Marketing and sales



Product and service development



Supply-chain management



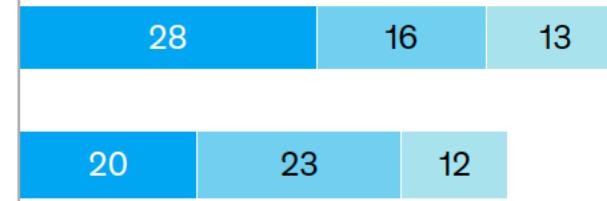
Manufacturing



Service operations



Strategy and corporate finance

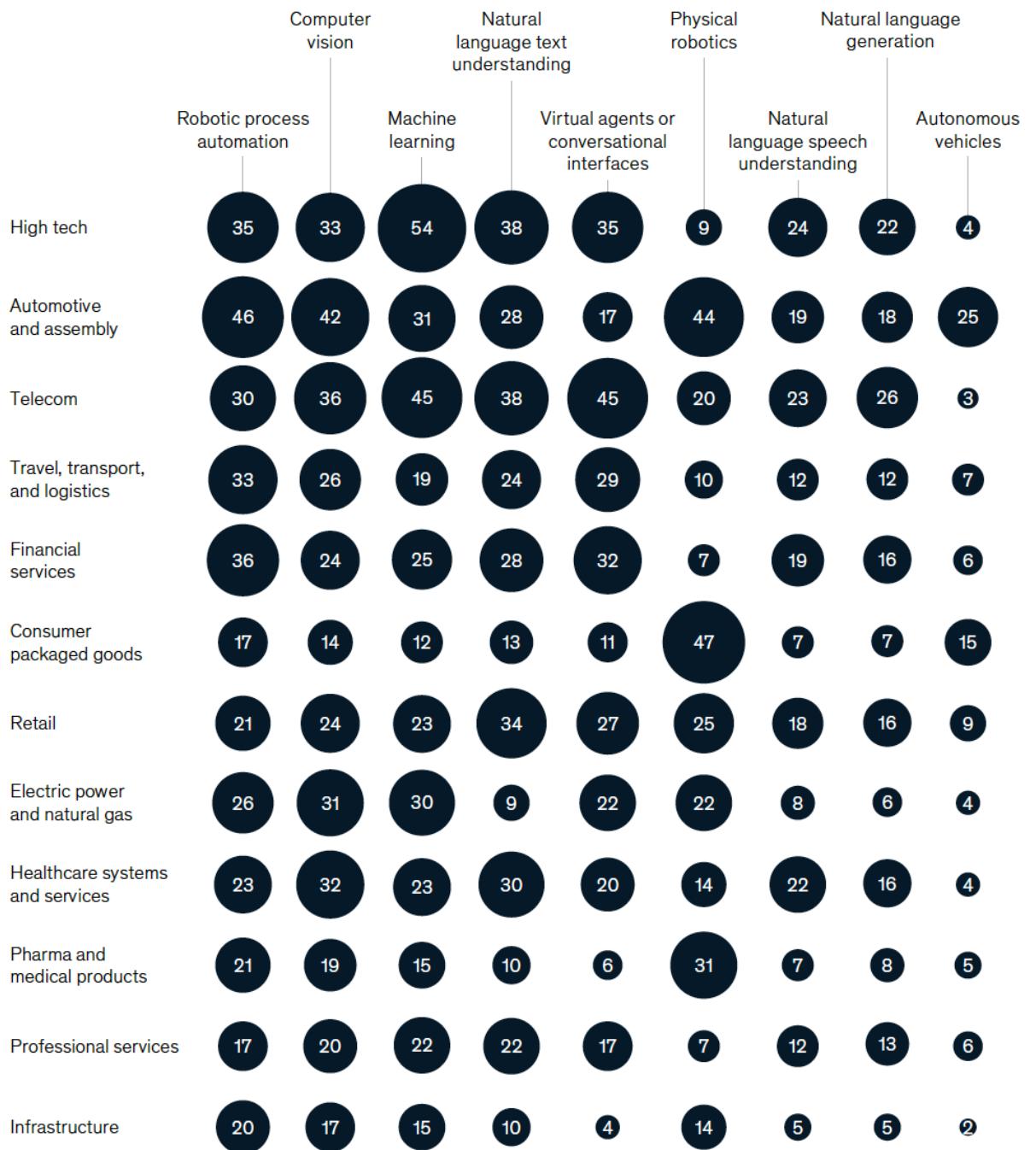


Risk



HR

### Organizations' AI capabilities,<sup>1</sup> % of respondents,<sup>2</sup> by industry



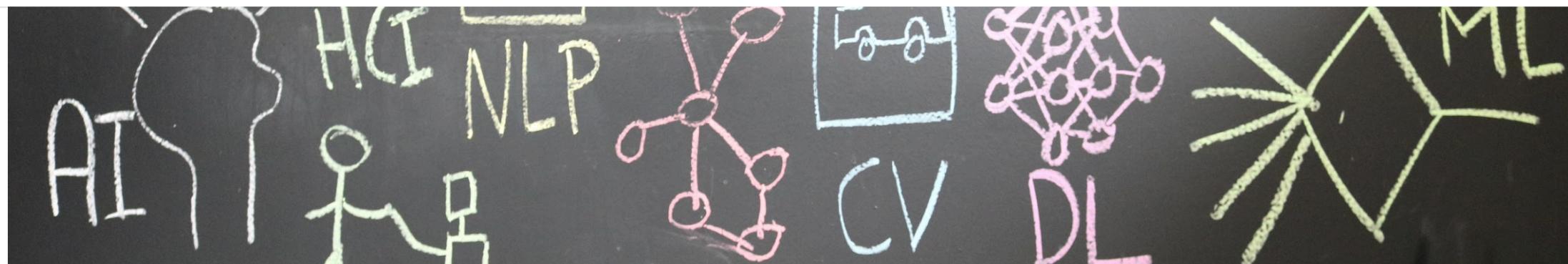
# Conclusion

AI(S, D) → V

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Next video: AI2V 101 - Course Structure

Welcome

AI2V

AI2V 101 - Full Course

Welcome

AI2V

AI2V 101 - Introduction

What is AI?

AI2V

AI2V 101 - 1 Concepts

AI Capabilities

AI2V

AI2V 101 - 2 AI Capabilities

Situation

AI2V

AI2V 101 - 3 Situation

Data

AI2V

AI2V 101 - 4 Data

>

AlexD.ai

# Thank You

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Artificial Intelligence Enthusiast

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