

# Democratizing Artificial Intelligence

UNDERSTANDING ARTIFICIAL INTELLIGENCE



Jason Prassides

Content Developer, DataCamp

# AI democratization

AI is deeply impacting our lives

*How to bring AI benefits to everyone and eliminate its potentially harmful side?*

Access to:

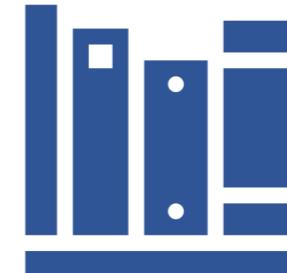
- Use of AI-based systems and solutions
- Design of AI tools anyone can effortlessly use to supplement their tasks



# AI literacy

**AI literacy:** individuals and organizations' understanding of AI concepts, technologies, and their implications in:

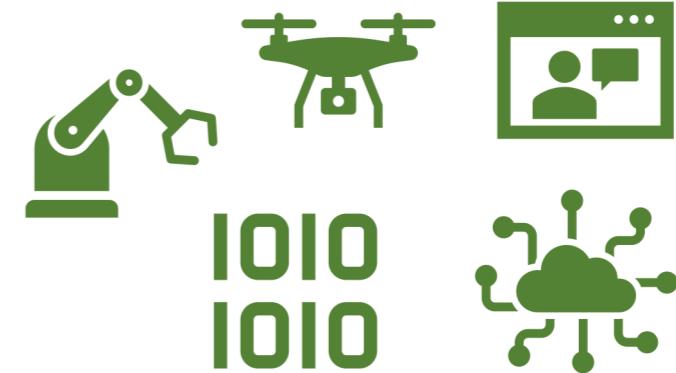
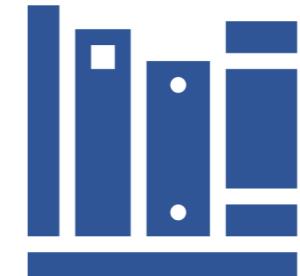
- Organizations
- Society, economy and the environment



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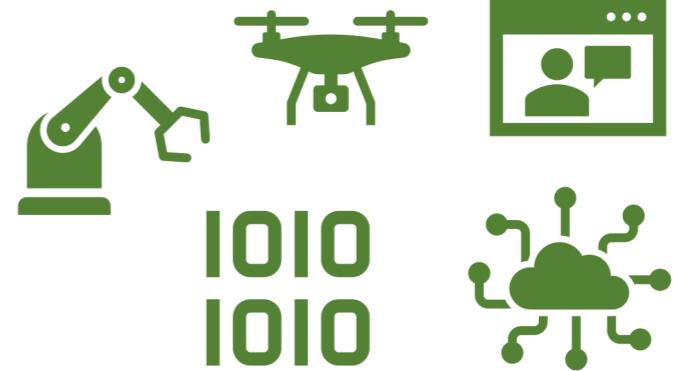
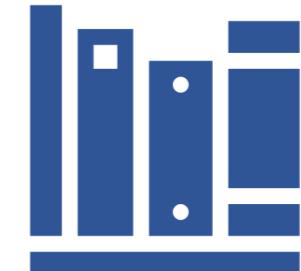
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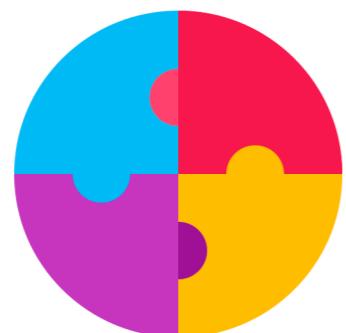


# How AI literacy contributes to AI democratization?

**Empowered individuals:** equipped with knowledge and skills to engage with AI



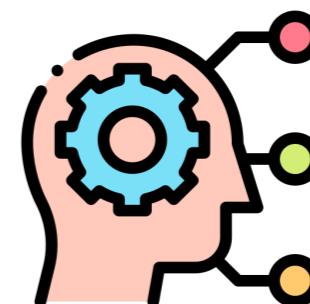
**Inclusive participation:** engage in AI-related activities and participatory decisions



**Ethics awareness:** fairness, privacy, transparency, responsible AI



**Critical thinking:** ability to evaluate AI systems and make informed judgments



# Data democratization

## In organizations

- **Make information underlying data accessible to all roles**
  - Competitive market advantage
  - Optimizing activities
  - Proactive strategic mindset
- **Data upskilling is crucial**



# Data democratization

## In society

- Make information accessible to individuals
- Enable access, use and contribution to data-driven insights, through:
  - Open data policies and data-sharing
  - Data visualization and literacy
- Empower communities with data



# **Let's practice!**

**UNDERSTANDING ARTIFICIAL INTELLIGENCE**

# Explainability and interpretability

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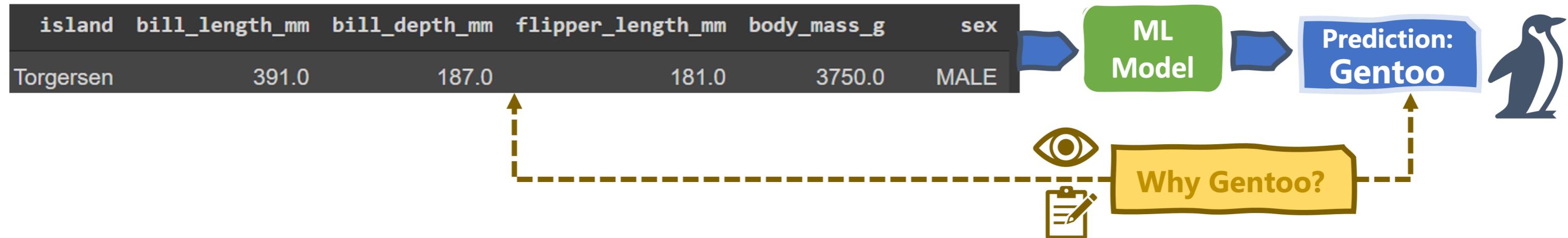


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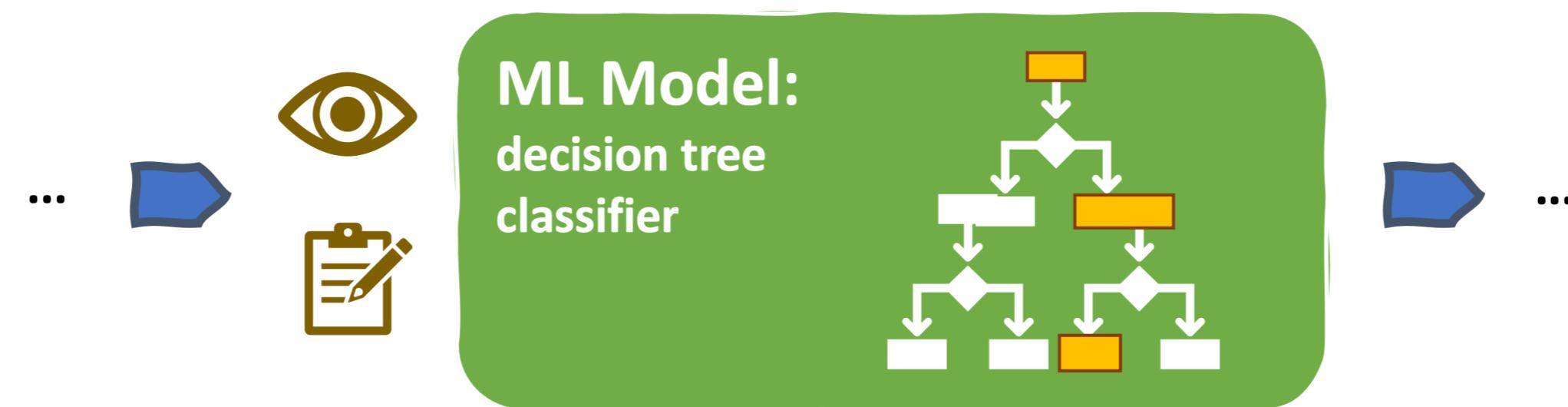
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# Explainability and interpretability

**Explainability:** humans' ability to access and understand AI outputs, e.g. predictions, decisions

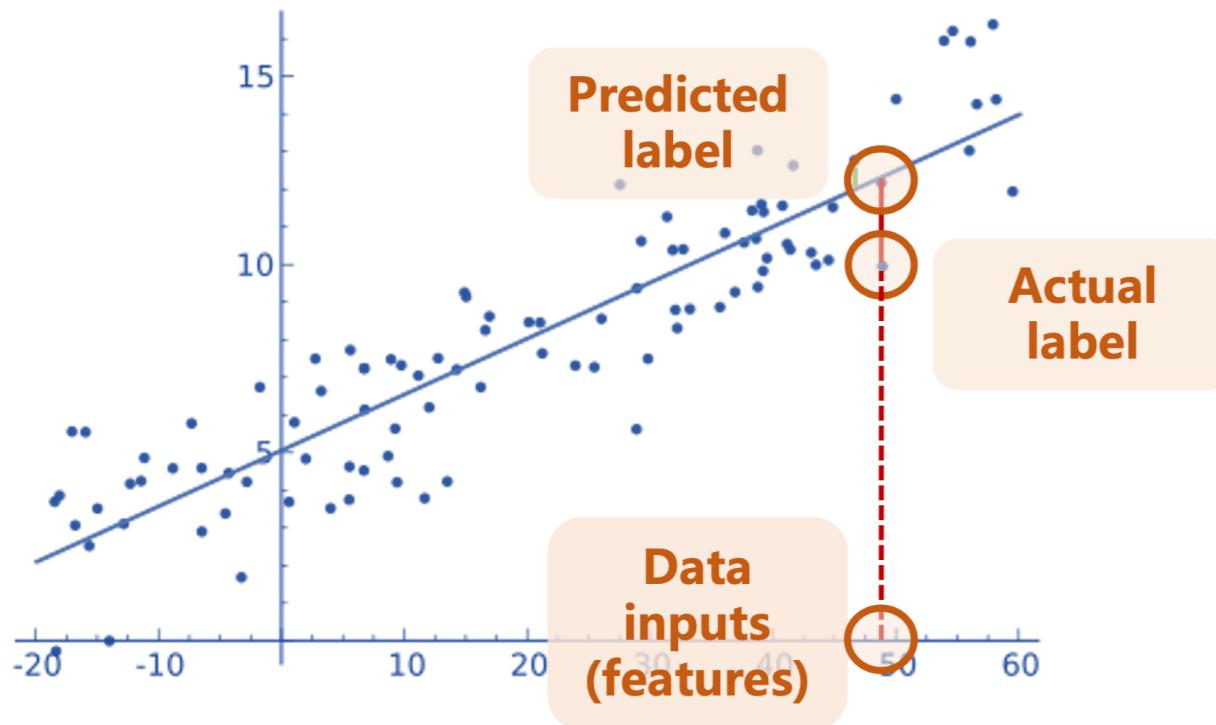


**Interpretability:** understand AI systems' internal processes: algorithm, model, data workflow



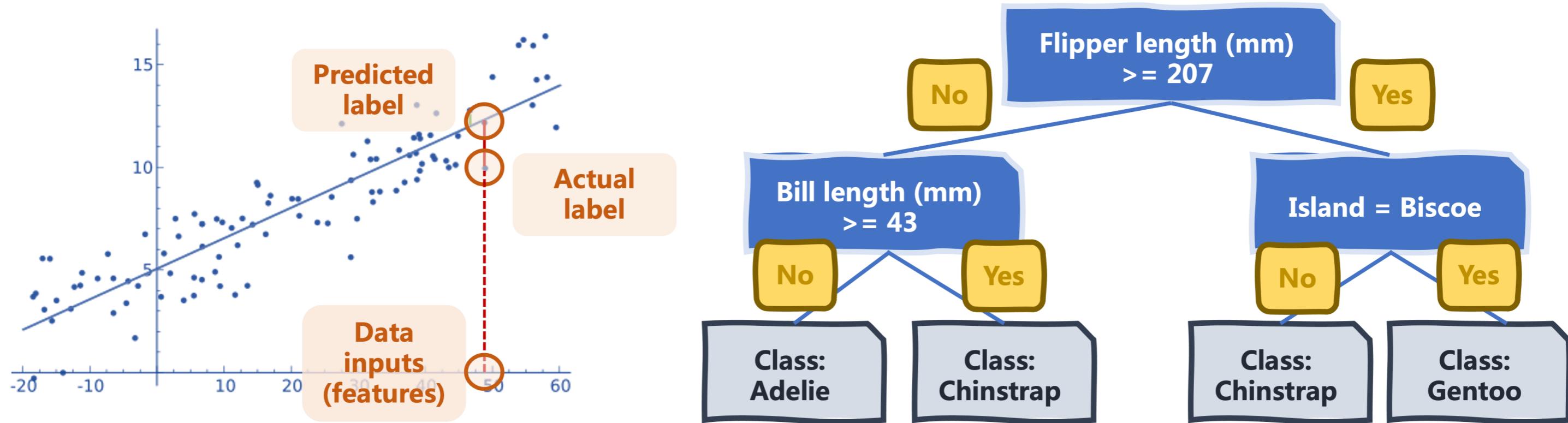
# White-box vs black-box AI systems

White-box: transparent and easily interpretable models/systems



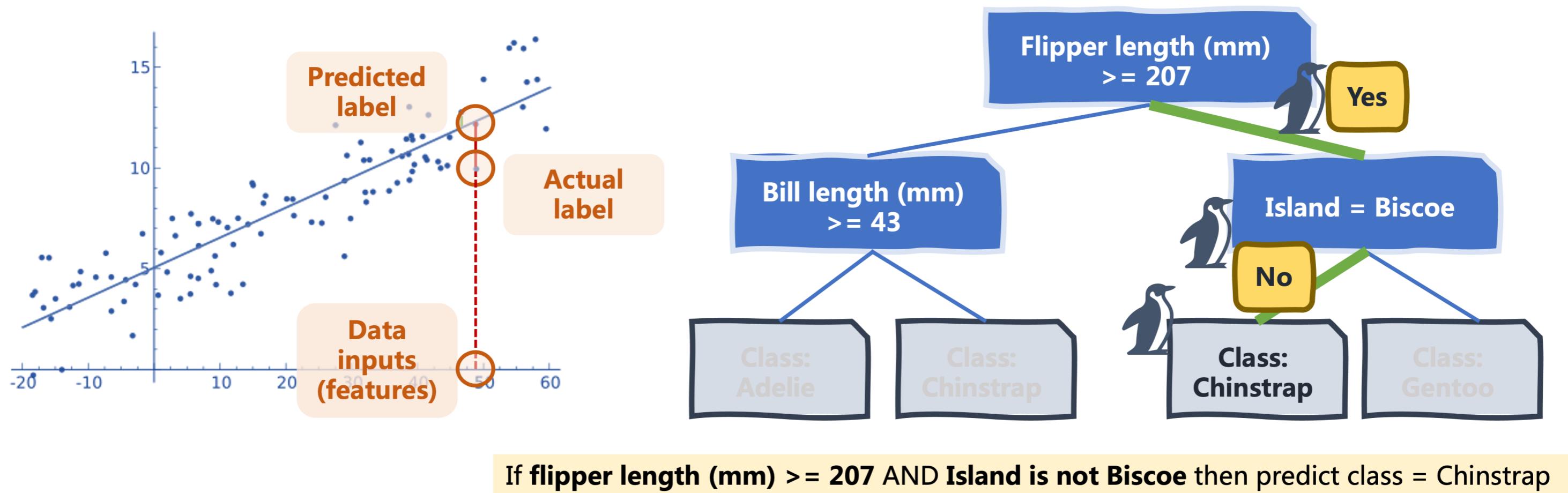
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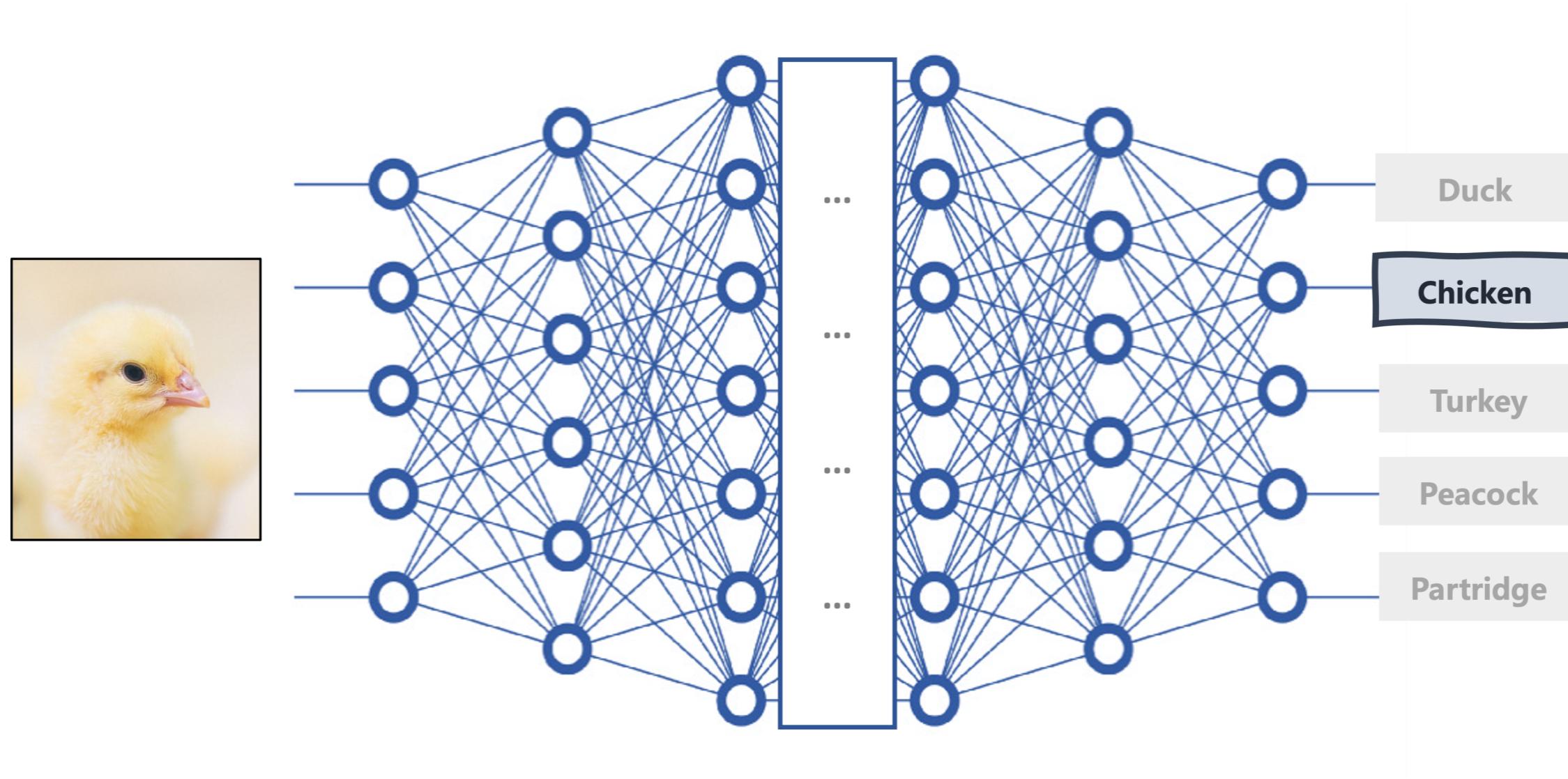
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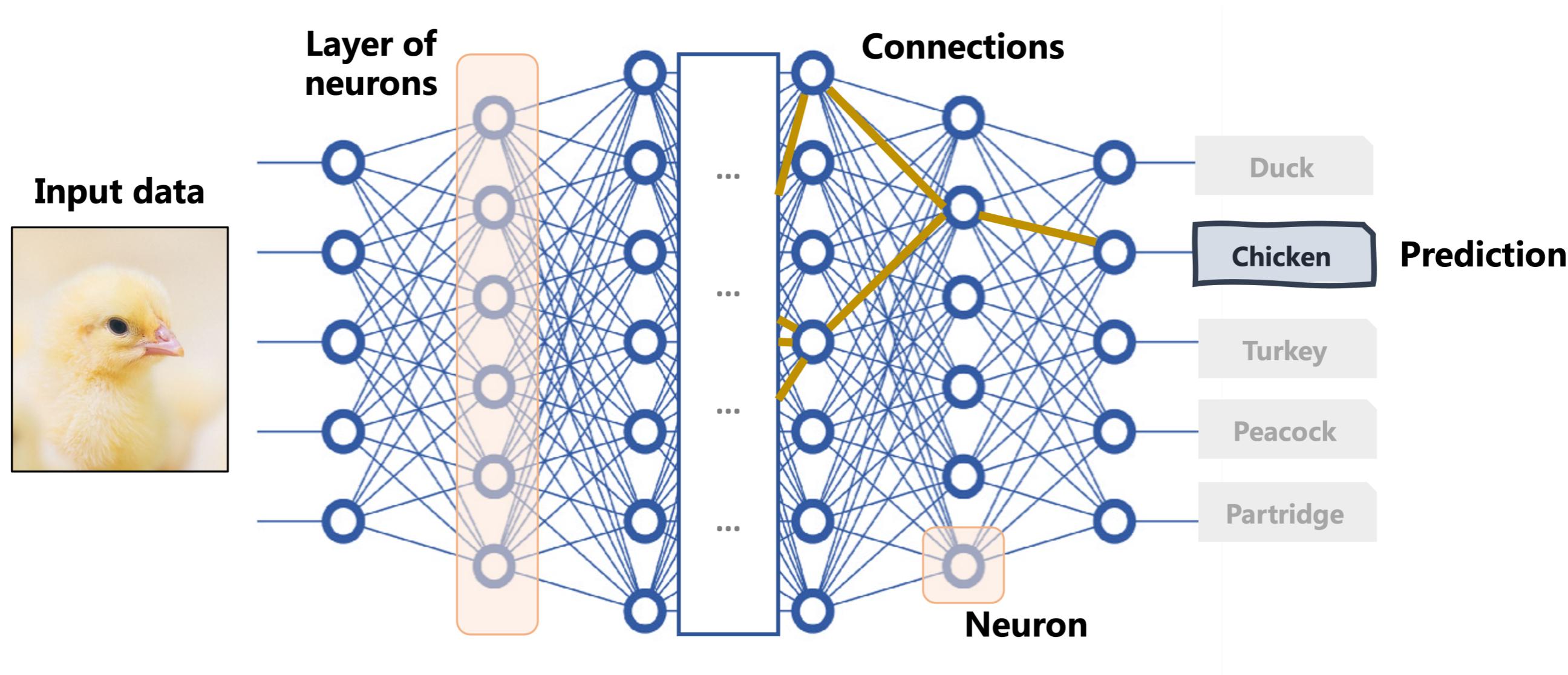
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**Black-box:** higher complexity, little or no degree of understandability



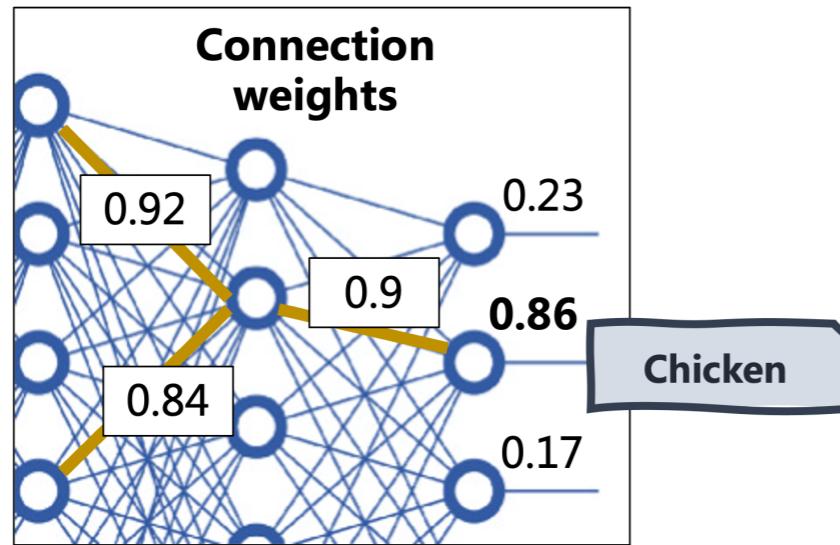
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# Basic Explainable AI (XAI) tools

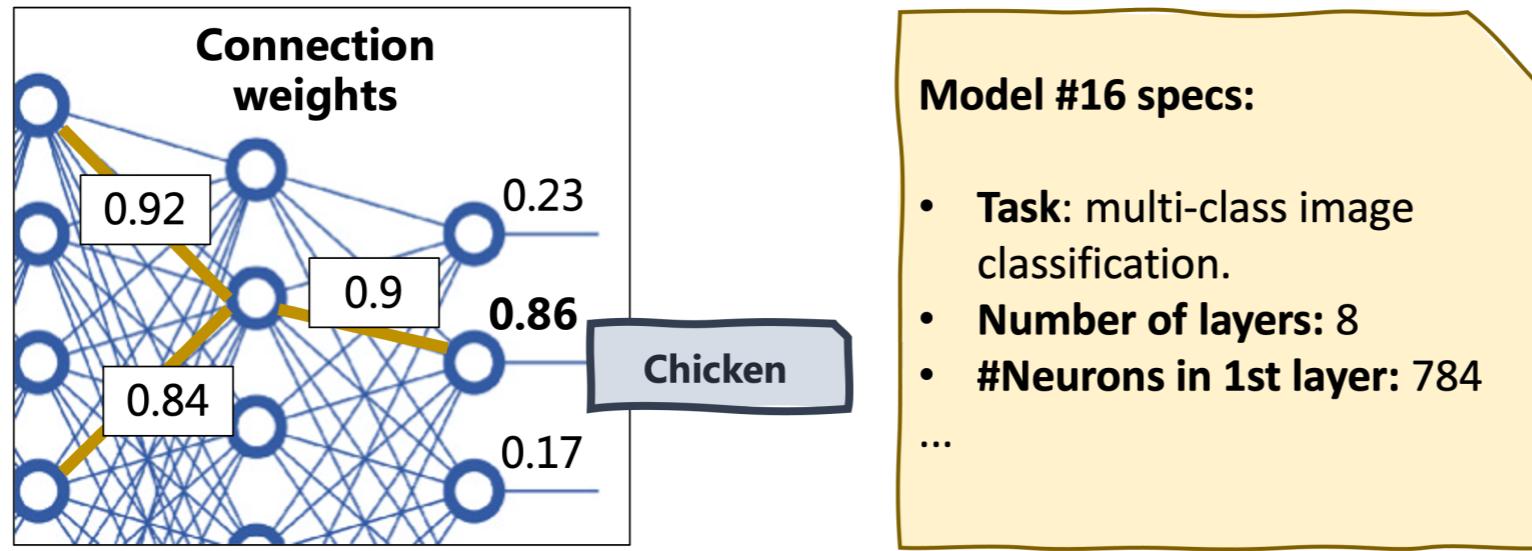
XAI: methods and tools to increase AI systems and models' transparency and explainability



- **Model introspection:** examining internal model parameters to understand decisions

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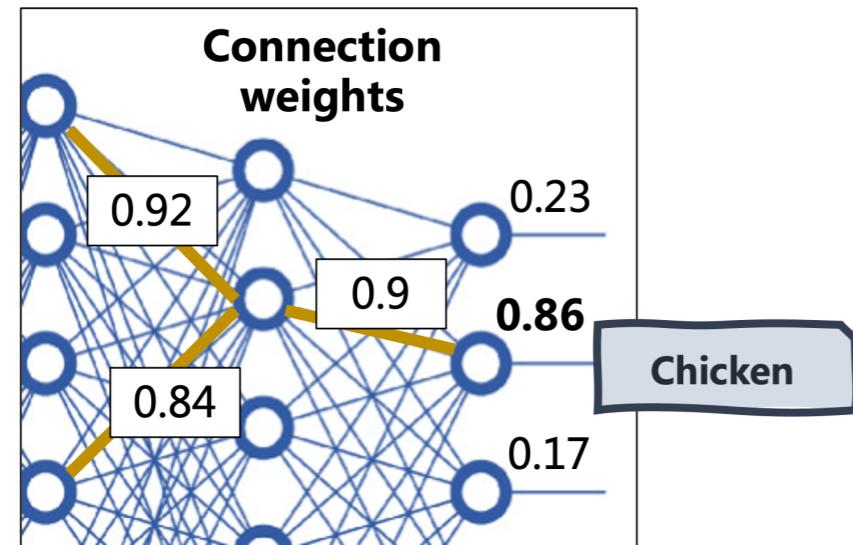
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- **Model documentation:** shareable architecture and design considerations

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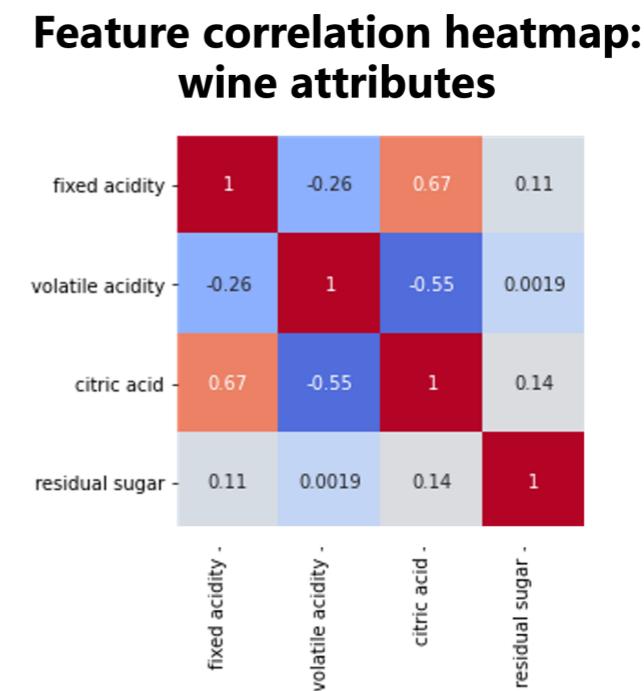
# XAI: methods and tools to increase AI systems and models' transparency and explainability



## **Model #16 specs:**

- **Task:** multi-class image classification.
  - **Number of layers:** 8
  - **#Neurons in 1st layer:** 784

...

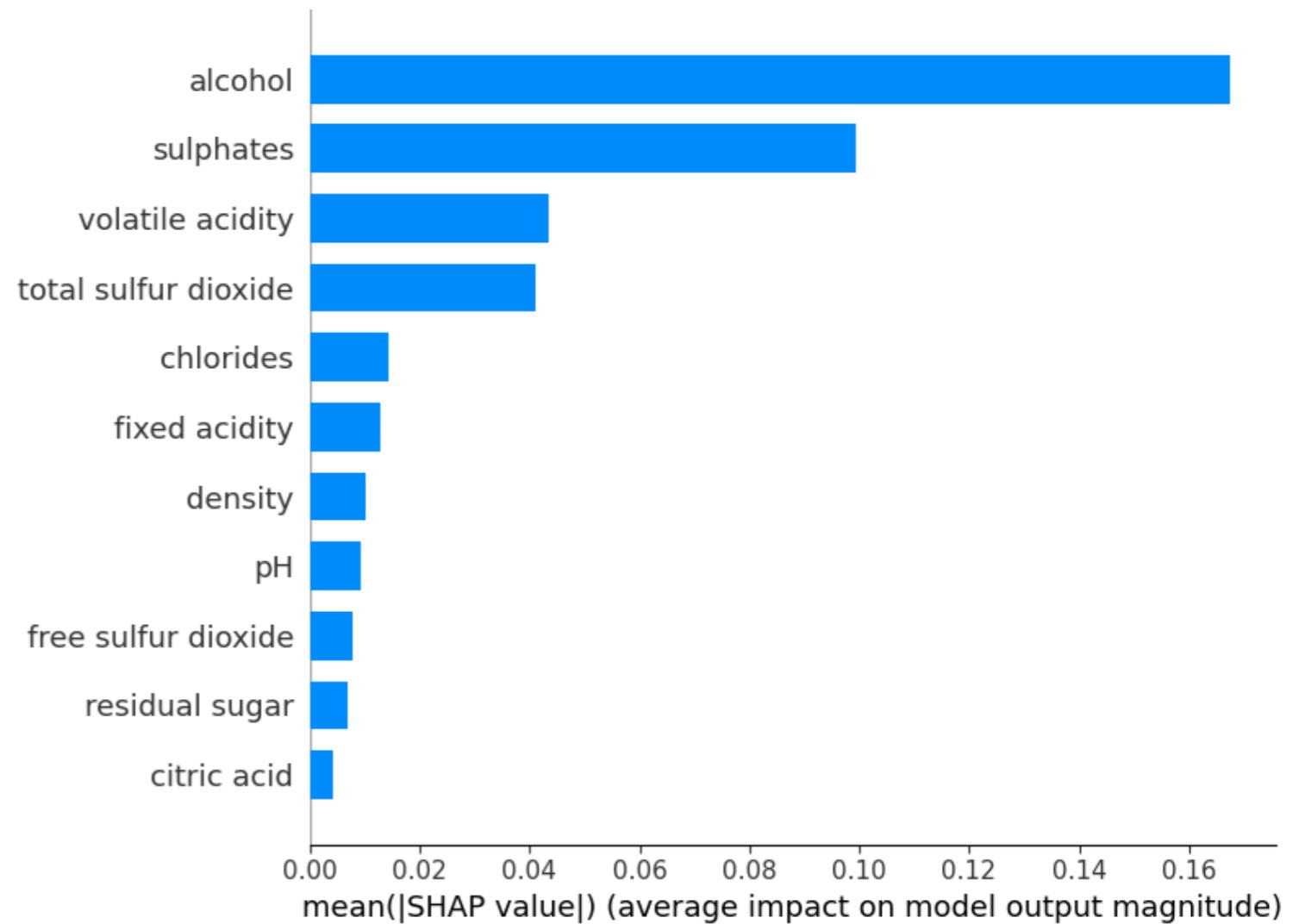


- **Model introspection:** examining internal model parameters to understand decisions
  - **Model documentation:** shareable architecture and design considerations
  - **Model visualization:** human-friendly representation of data features and model outputs

# XAI tools: feature importance

**Feature importance:** impact or contribution of features (predictors) in model outputs

- Understand how data-driven models (ML/DL) make decisions
- Detect and mitigate issues, e.g. biases
- Impact on model performance if a feature were removed

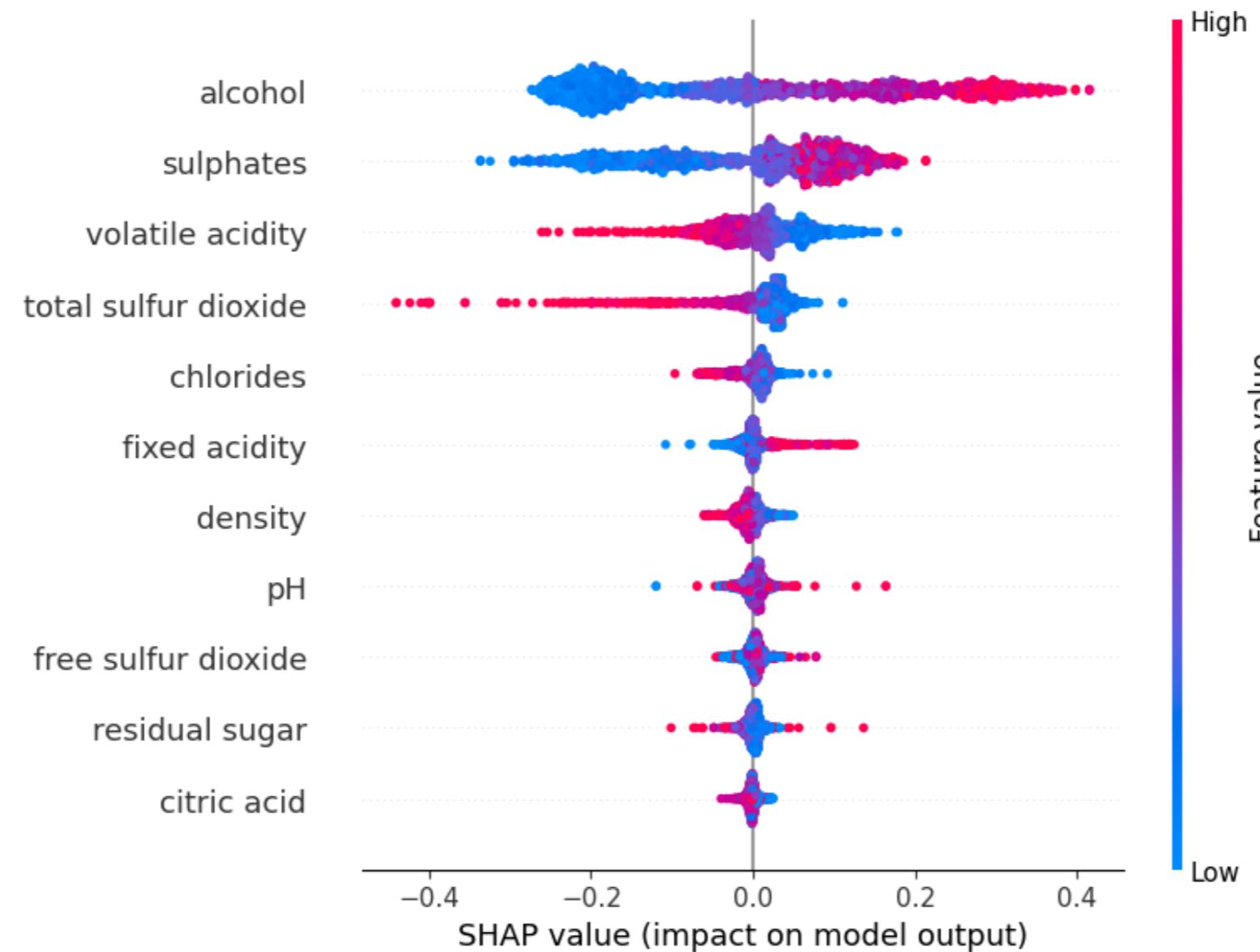


## SHAP (SHapley Additive exPlanations)

- Feature importance visualizations toolbox

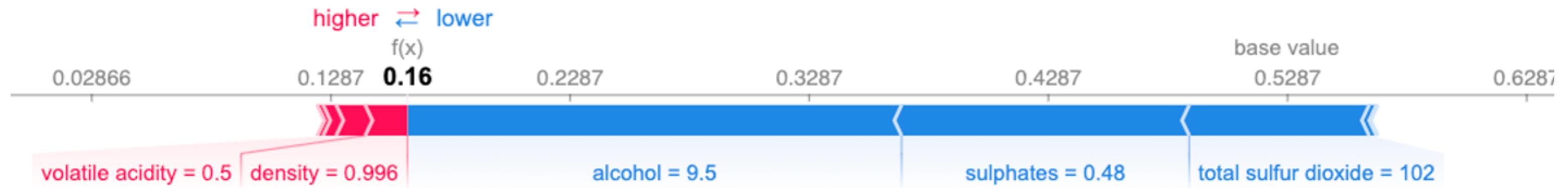
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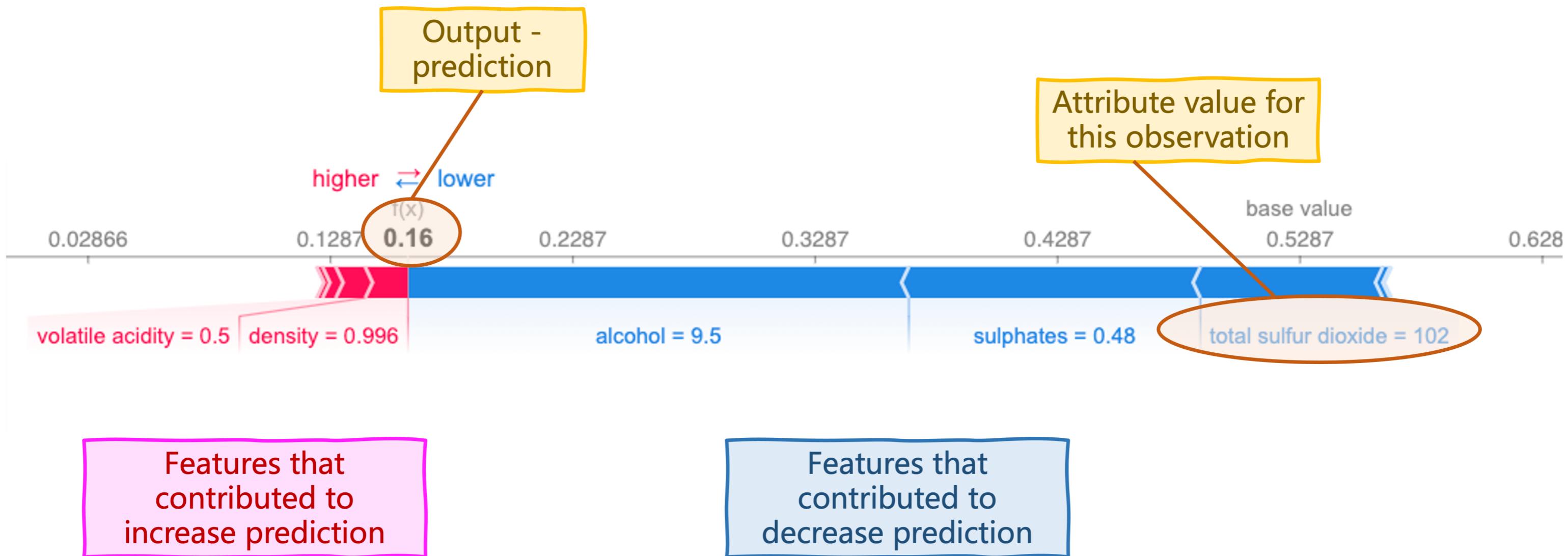
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# Practical implications of XAI

- **Algorithmic transparency:**
  - How algorithms process data and make decisions
- **Local and global interpretability:**
  - Understand system behavior for a specific prediction, **vs**
  - Understand system overall behavior on a dataset or problem
- **Ethical considerations:**
  - XAI to address ethical AI concerns: *biases, discrimination, compliance, etc.*
- **Human-AI collaboration:**
  - Reliable collaboration based on trust and feedback

# **Let's practice!**

**UNDERSTANDING ARTIFICIAL INTELLIGENCE**

# Social challenges: ethics, fairness and privacy

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# Responsible AI

**Responsible AI:** Ethical and accountable development and use of AI systems, with regard to societal impact

**Responsible AI**

# Responsible AI

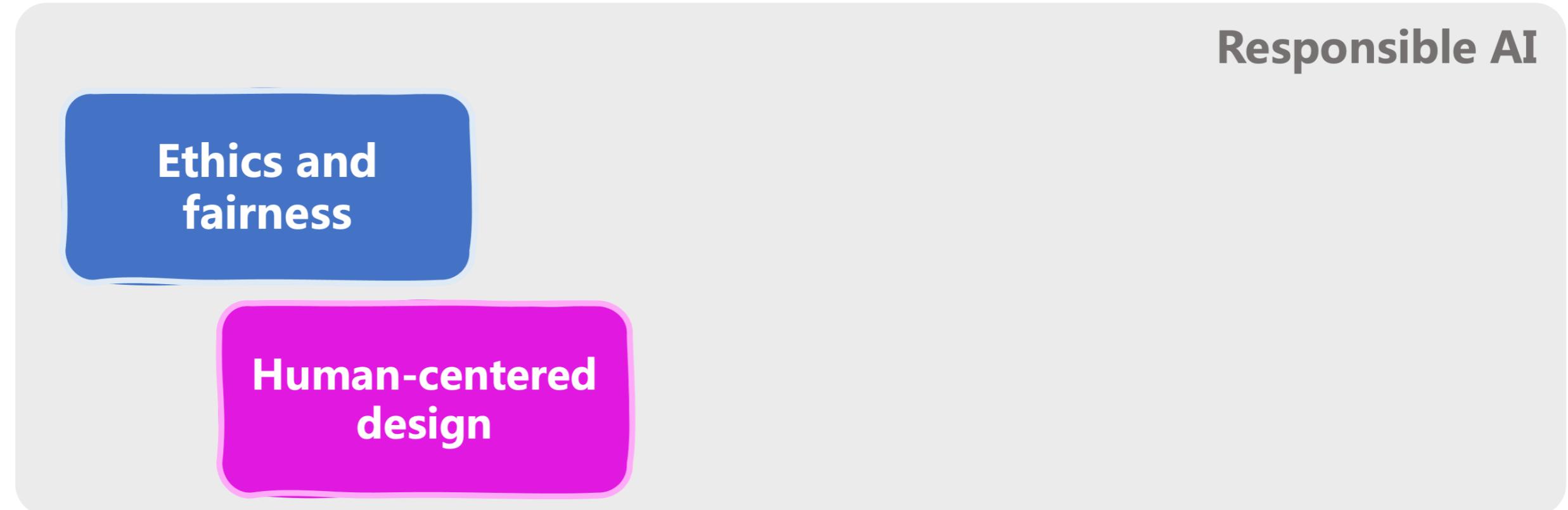
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Ethics and  
fairness

**Responsible AI**

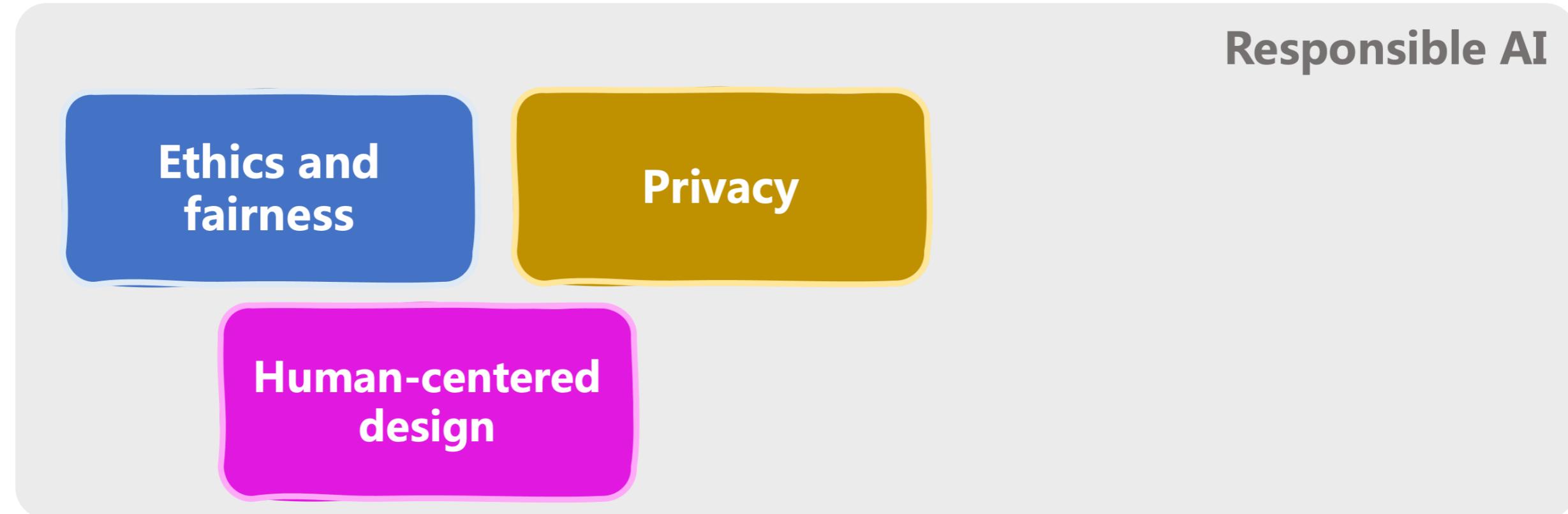
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# Ethics and fairness

AI ethics: adhere to ethical guidelines and principles:

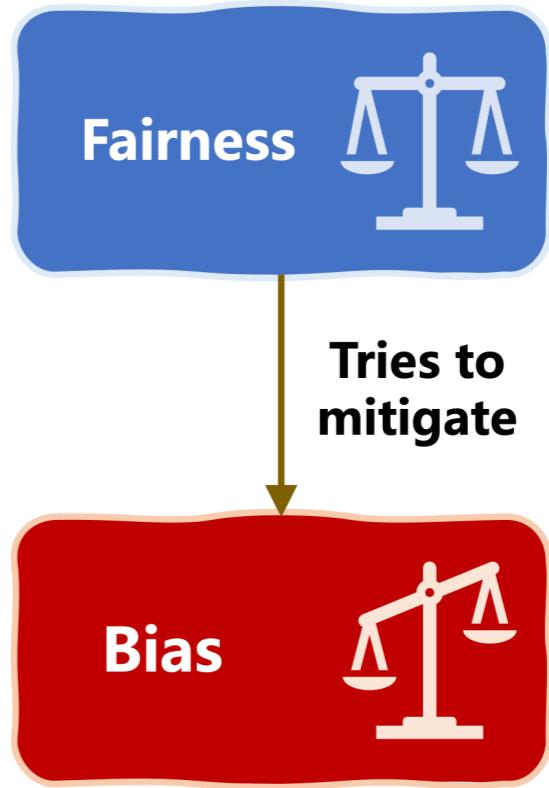
- Fairness
- Transparency
- Privacy
- Accountability
- Liability for AI decisions



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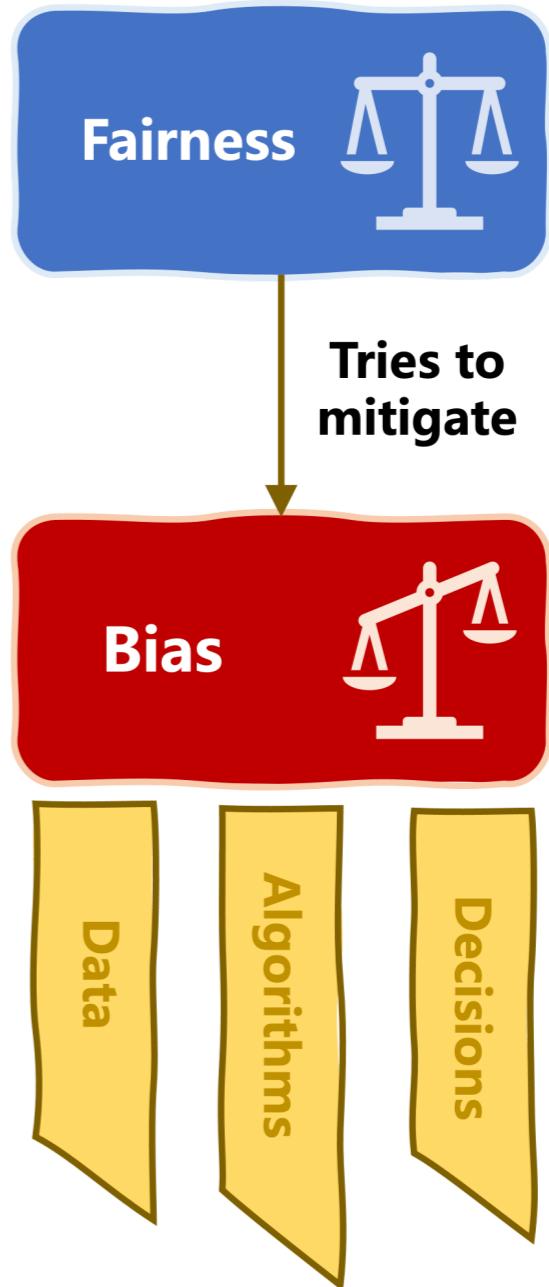
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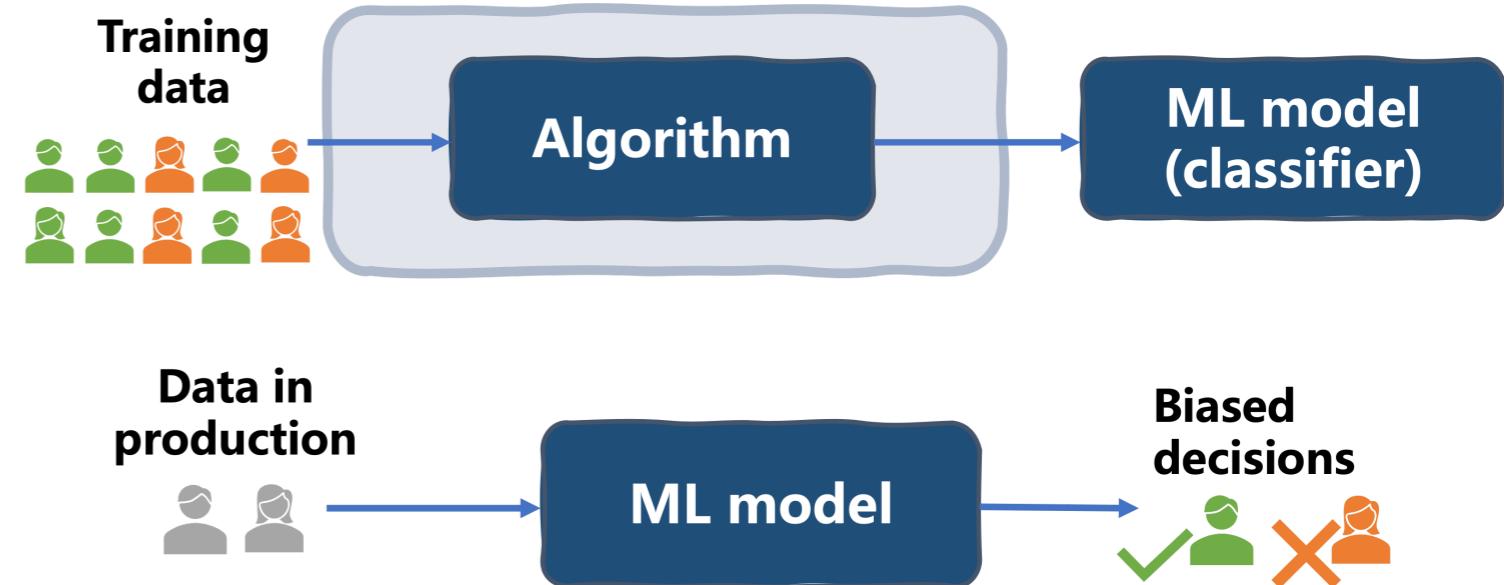
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# Bias in AI systems: examples

## Screening job resumes

- Biased training data: mostly male hirings
- Unfair treatment of female candidates
- **Solutions:** active data collection, bias-correction algorithms



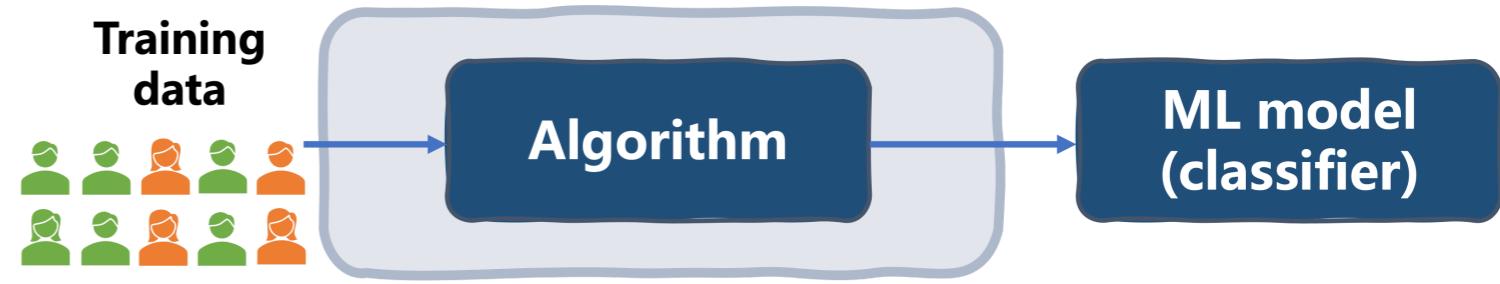
## E-commerce recommendations



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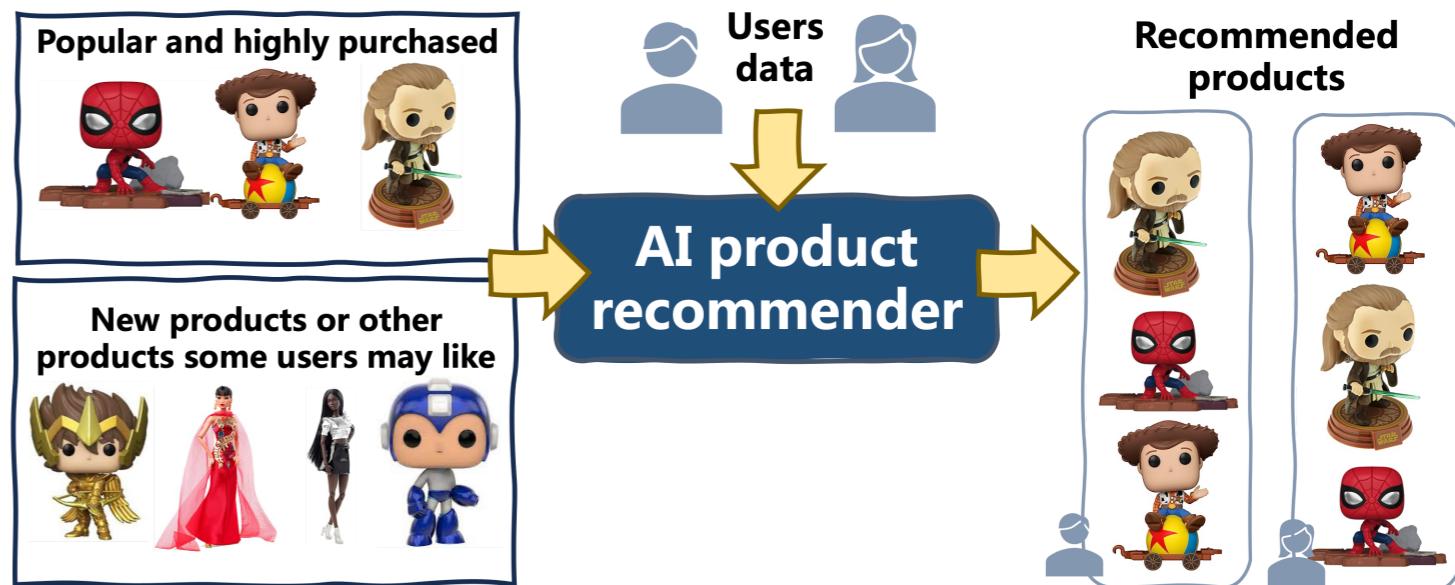
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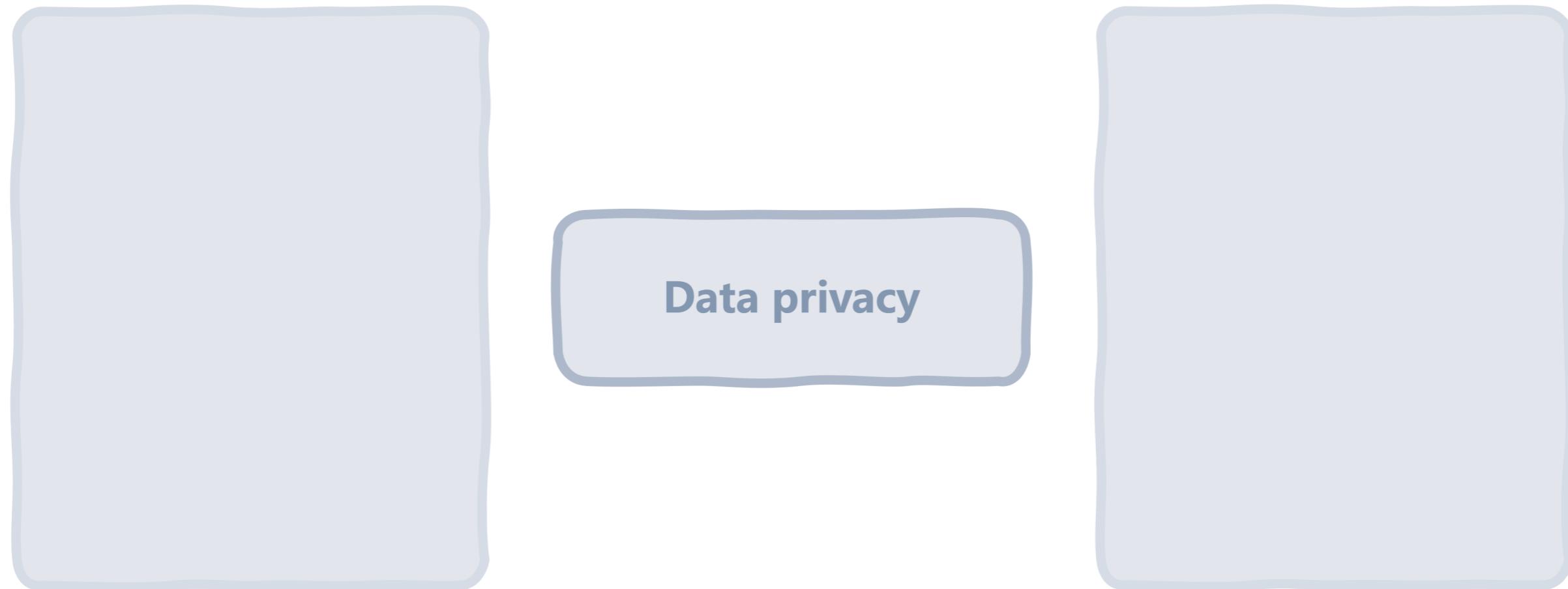
## E-commerce recommendations

- Popular products are overly promoted
- New or different products are disregarded
- **Solutions:** techniques and metrics for diverse and fair recommendations



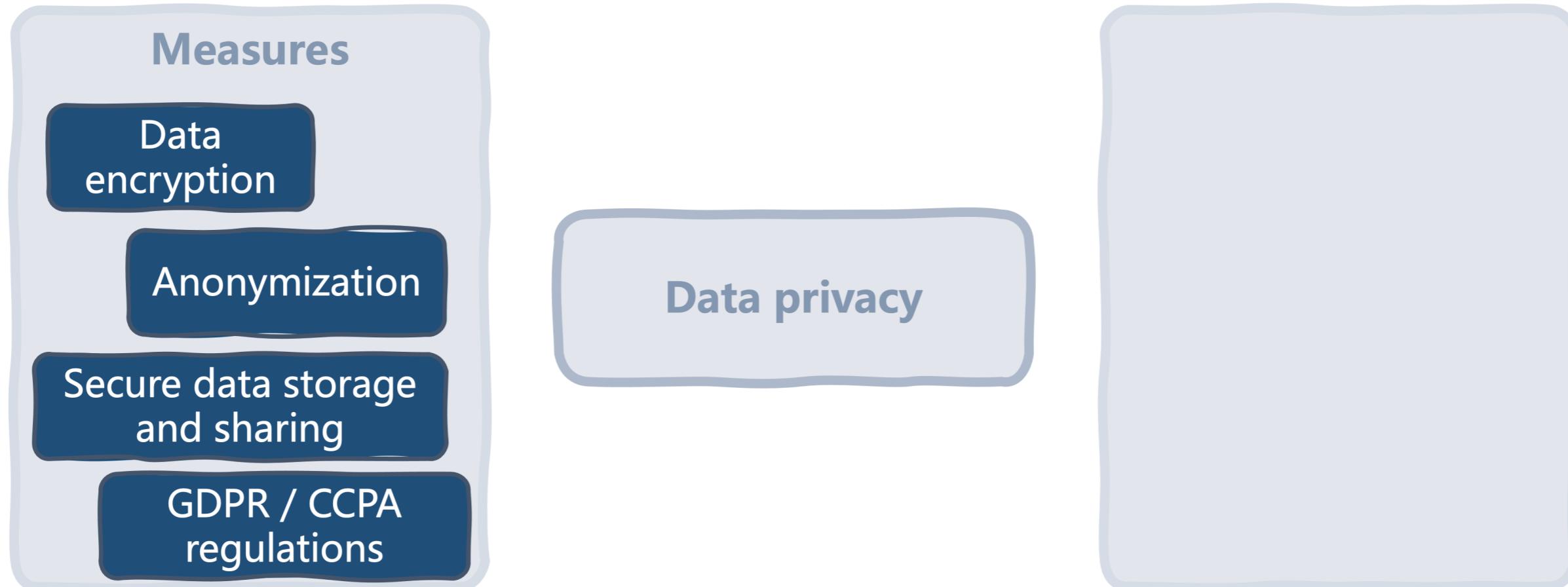
# Data privacy in AI systems

**Data privacy:** safeguarding sensitive or personal information from unauthorized access and misuse



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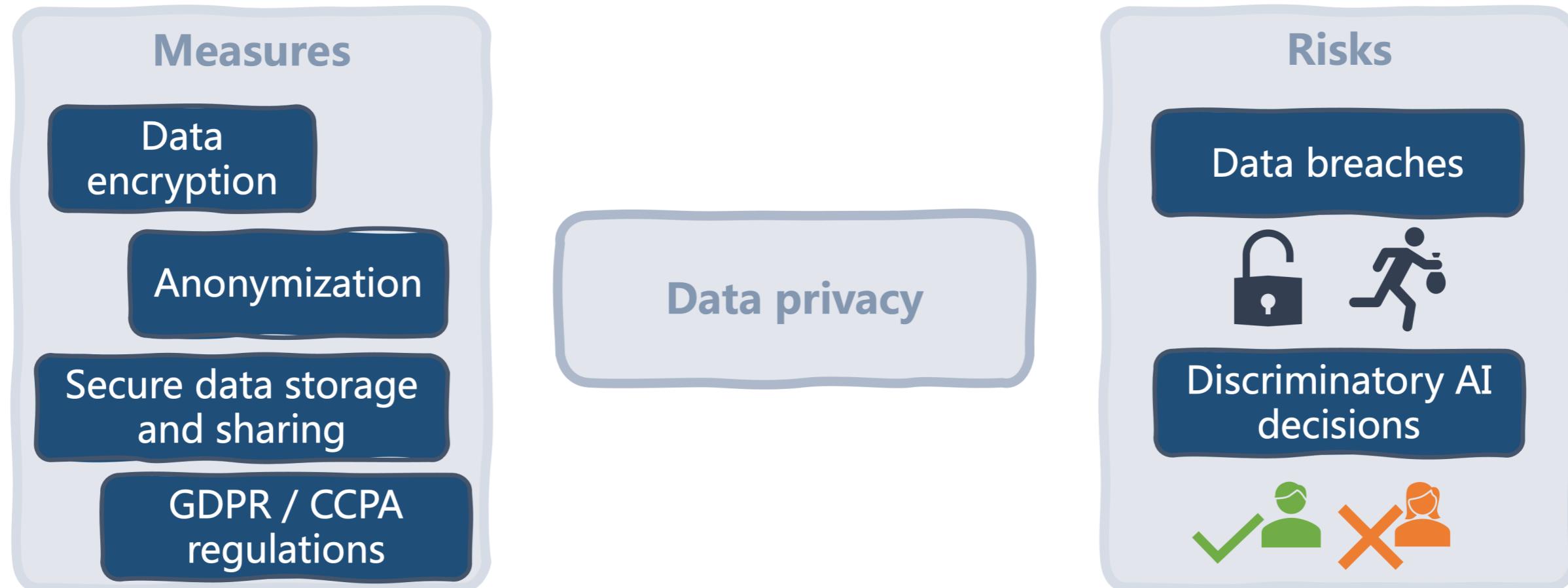
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# Social challenges: the future of AI

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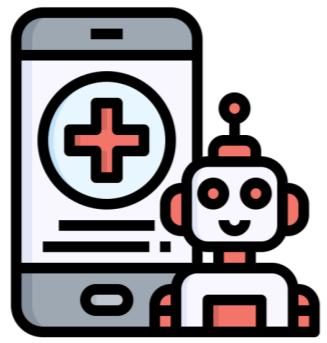


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# How AI may shape our present (and future) society?

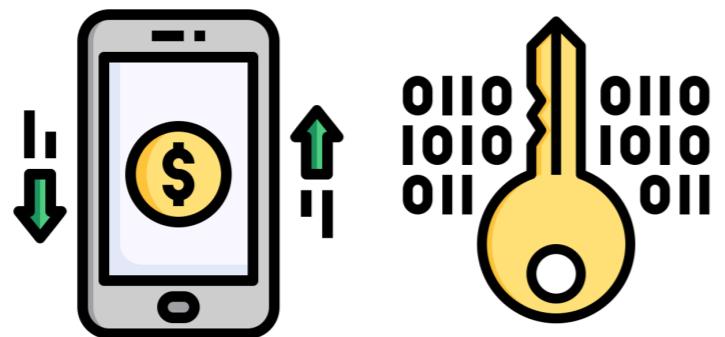
**Healthcare:** advanced diagnosis, personalized treatments, surgical robots, etc.



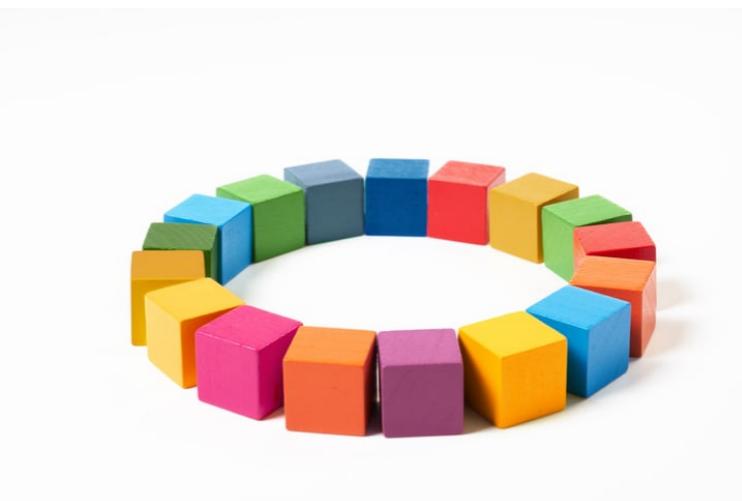
**Governments and Law:** Generative AI; new regulations about responsible use



**Finance and cybersecurity:** risk management, fraud detection



**Sustainable Development Goals (SDGs)**



# AI and sustainability<sup>1</sup>



<sup>1</sup> Source: United Nations (<https://sdgs.un.org/goals>)

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# AI and the future of workforce

## Challenges:

Job displacement, rapidly evolving skillsets

- **Example:** Large Language Models (e.g. *ChatGPT*), prompt engineering skills

## Opportunities:

New jobs, e.g. AI ethicist, AI educator

Industry transformation

The screenshot shows a mobile-style interface for a large language model. At the top, there's a dark header bar with three horizontal lines on the left, the text "Prompt Engineering Simplified" in the center, and a plus sign on the right. Below this is a white message list area. The first message is from a user with a profile picture of a man: "Hi ChatGPT, can you explain me what is \"Prompt Engineering\" in simple terms?". To the right of this message is a small edit icon. The second message is from the AI, represented by a green square icon with a white AI symbol: "Certainly! \"Prompt engineering\" refers to the process of crafting or designing effective prompts or instructions when working with language models like me, ChatGPT. It involves carefully formulating a specific question, statement, or description to guide the model's output in a desired direction.". There is also an edit icon next to this AI response.

# AI and the future of education

## Challenges:

- **Skills gap:** educational institutions need to keep up to date with relevant AI training
- **Digital divide:** ensure universal access to AI-powered education



## Opportunities:

- **Personalized learning**

# AI and the future of the environment

## Challenges:

- Ecological degradation: energy consumption, electronic waste, carbon footprint

## Opportunities:

- Understand climate change
- Optimize use of natural resources
- Optimize renewable energy use



# **Let's practice!**

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# One journey ends, another begins

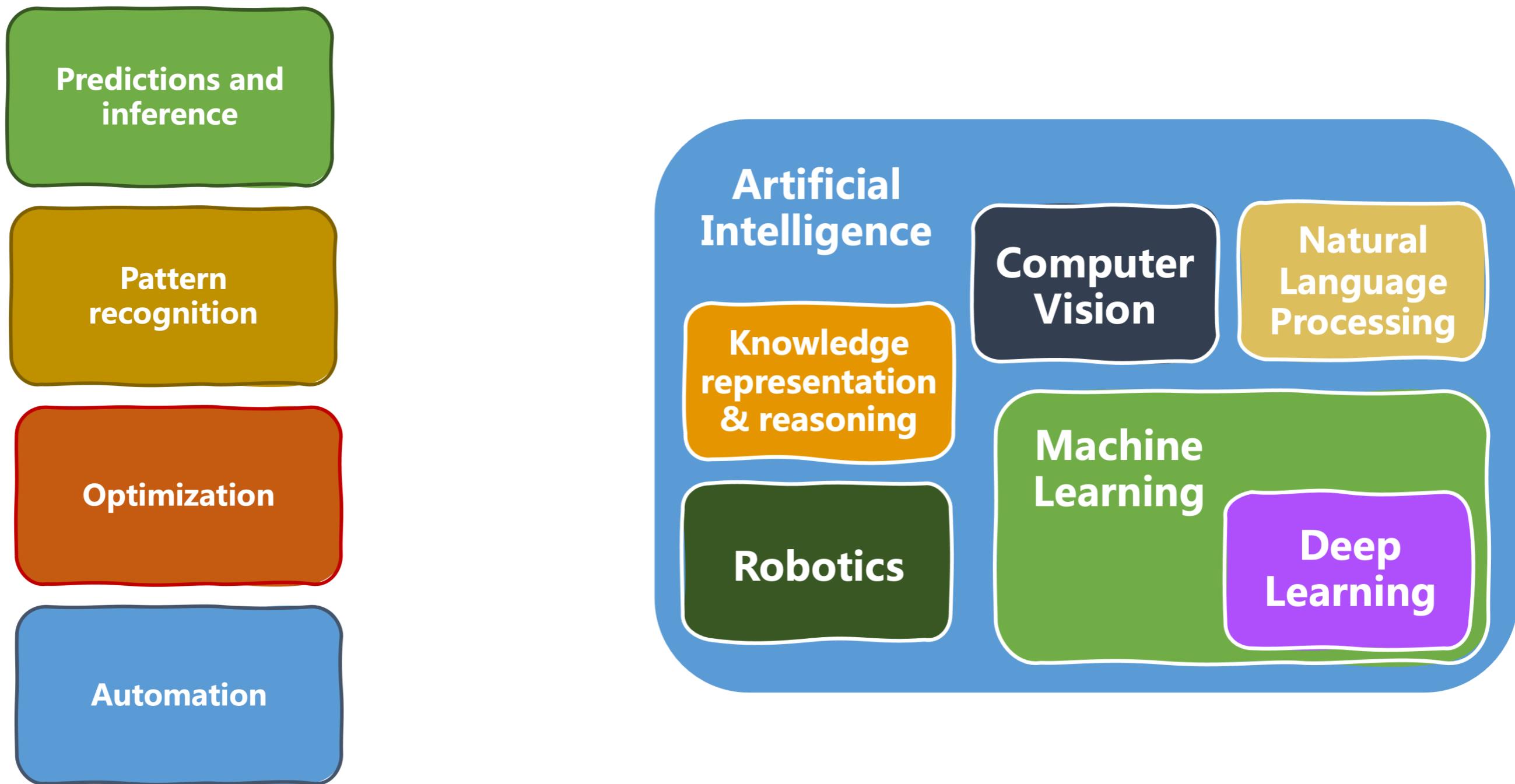
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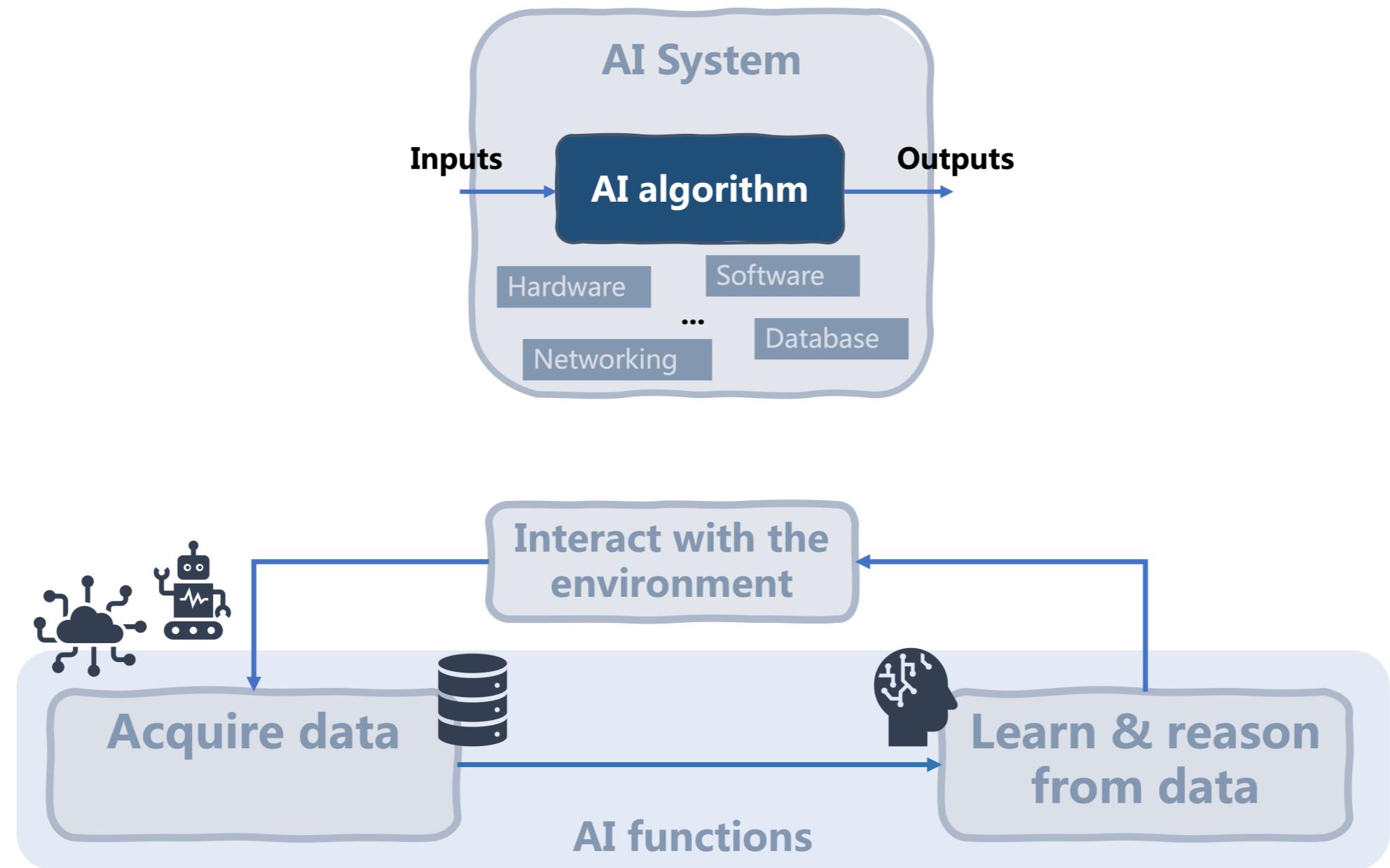
Iván Palomares Carrascosa

Senior Data Science & AI Manager

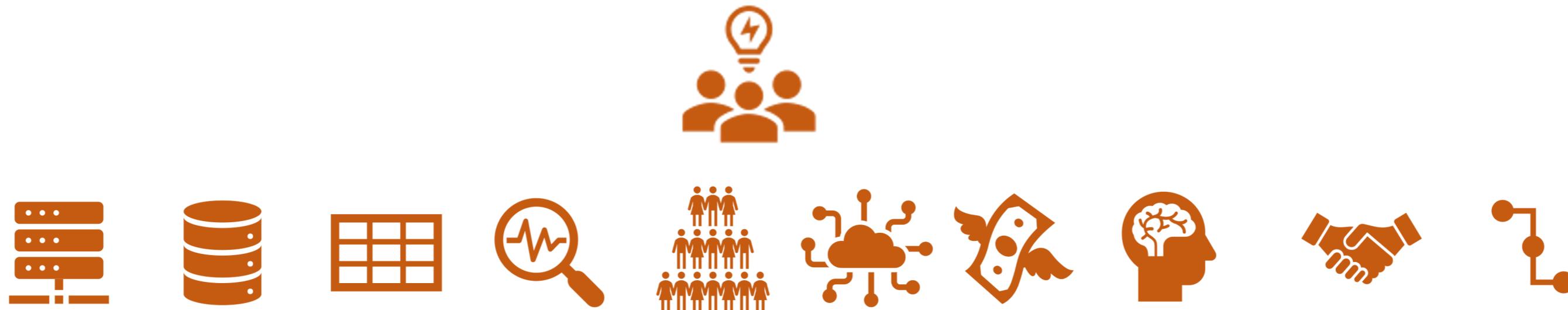
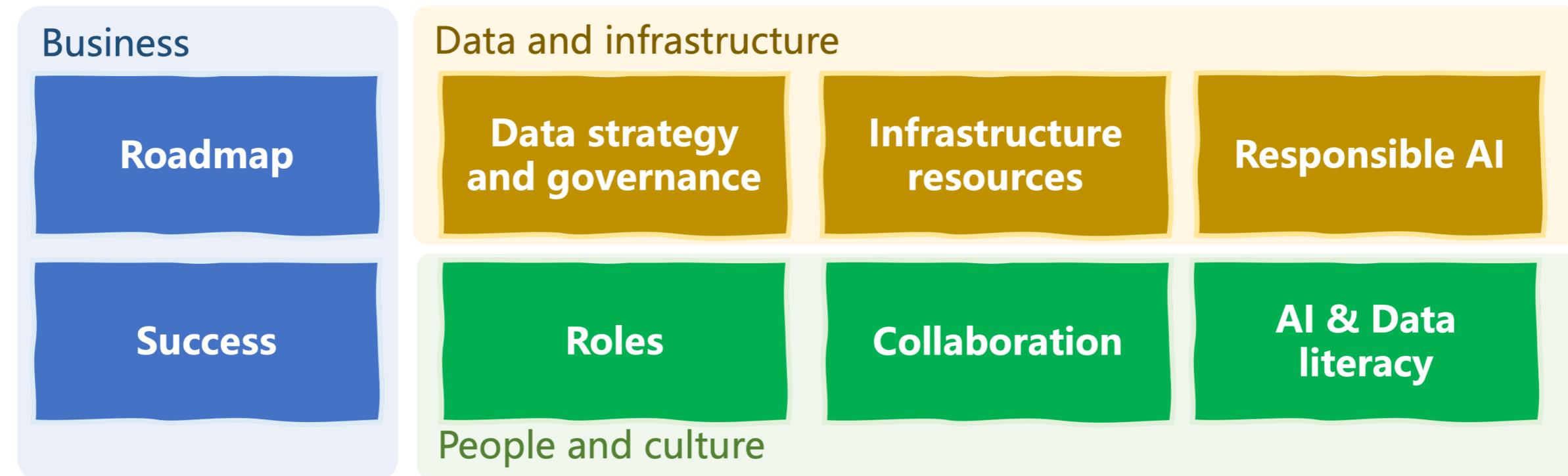
# Chapter 1: What is Artificial Intelligence



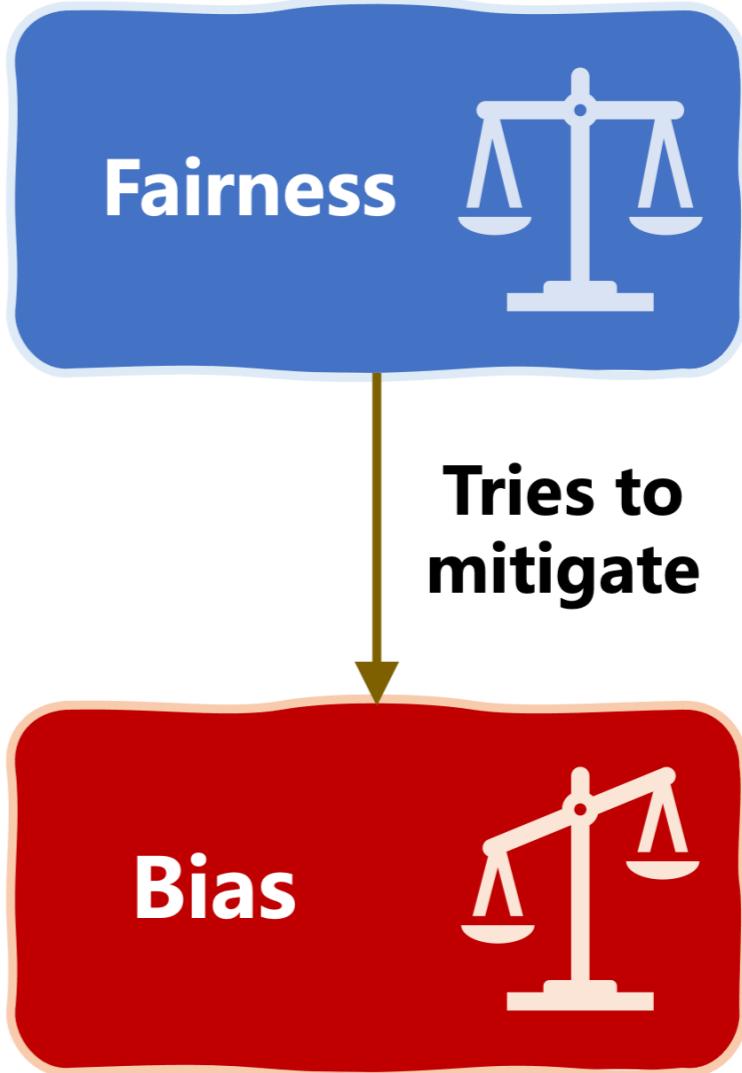
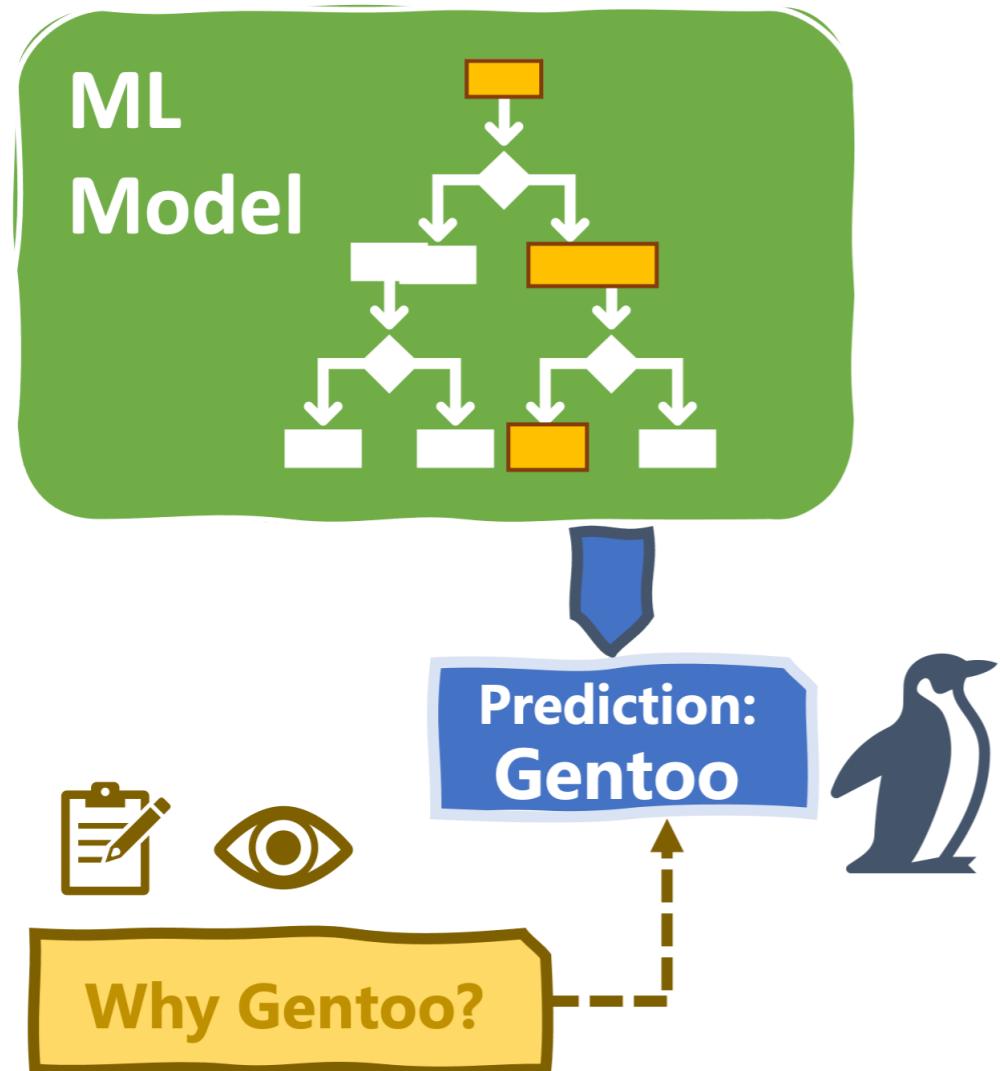
# Chapter 2: Tasks AI can solve



# Chapter 3: Harnessing AI in organizations



# Chapter 4: The human side of AI



# What to learn next?

- [\*\*AI Essentials Skill Track\*\*](#)
  - An exciting 6-course pathway to consolidate your AI literacy
- [\*\*Implementing AI Solutions in Business\*\*](#)
  - From use cases to proofs-of-concept, explore AI system deployment in business
- [\*\*Introduction to Deep Learning in Python\*\*](#)
  - A hands-on course to introduce Deep Learning in Python



# Congratulations!

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