

A brief introduction to AI & the SELFBACK case study

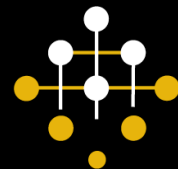
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January 24, 2024 @ REHAB-24

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Ethics and governance of artificial intelligence for health: Guidance on large multi-modal models

18 January 2024 | Publication



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Overview

Artificial Intelligence (AI) refers to the capability of algorithms integrated into systems and tools to learn from data so that they can perform automated tasks without explicit programming of every step by a human. Generative AI is a category of AI techniques in which algorithms are trained on data sets that can be used to generate new content, such as text, images or video. This guidance addresses one type of generative AI, large multi-modal models (LMMs), which can accept one or more type of data input and generate diverse outputs that are not limited to the type of data fed into the algorithm. It has been predicted that LMMs will have wide use and application in health care, scientific research, public health and drug development. LMMs are also known as “general-purpose foundation models”, although it is not yet proven whether LMMs can accomplish a wide range of tasks and purposes.

WHO TEAM

Chief Scientist and Science Division (SCI),
Health Ethics & Governance (HEG)

EDITORS

World Health Organization

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An Introduction to AI

Russell and Norvig define Artificial Intelligence as

“the study of [intelligent] agents that receive precepts from the environment and take action.

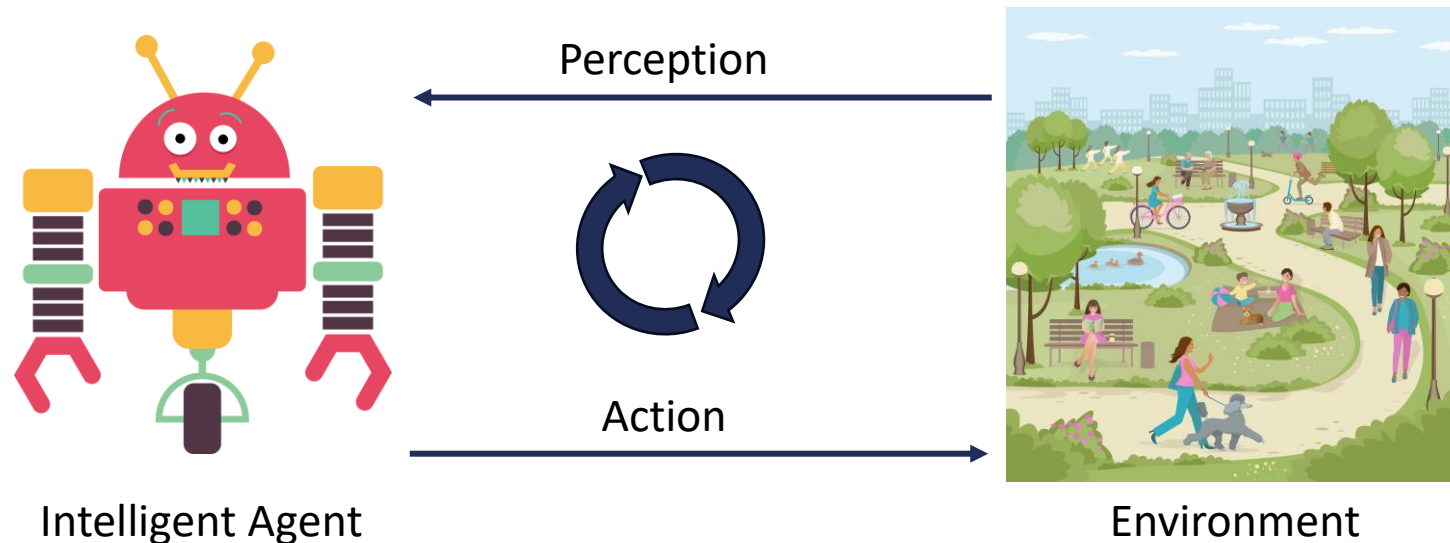
Each such agent is implemented by a function that maps percepts to actions, and we cover different ways to represent these functions, such as production systems, reactive agents, logical planners, neural networks, and decision-theoretic systems”

[Russell and Norvig 2010, p. viii].

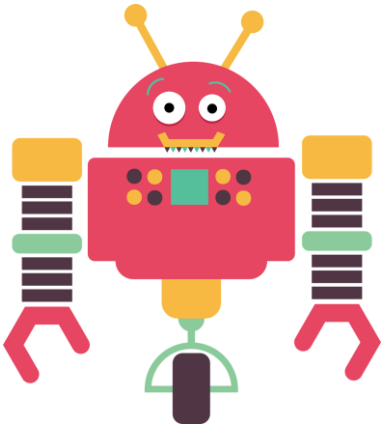


An Introduction to AI

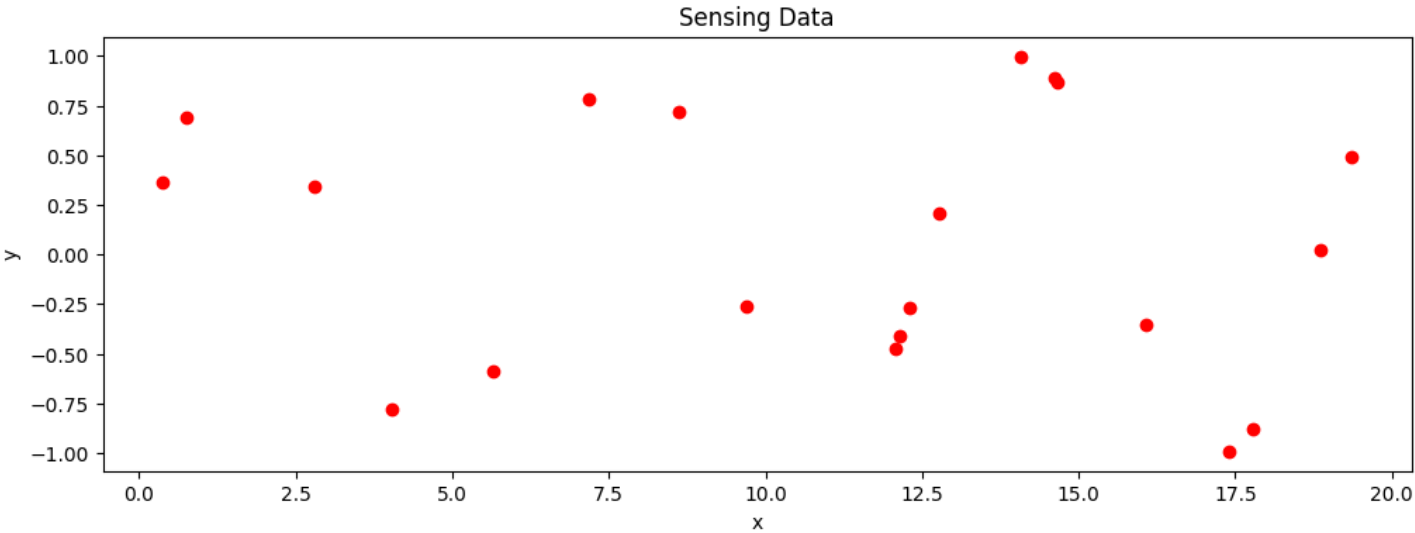
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Sensing



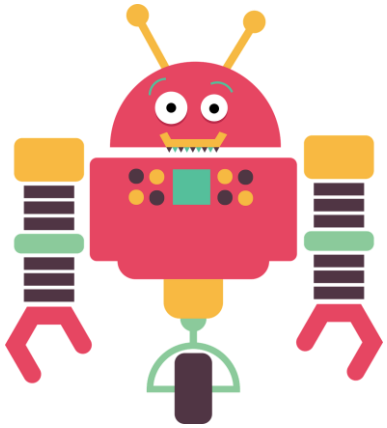
Intelligent Agent



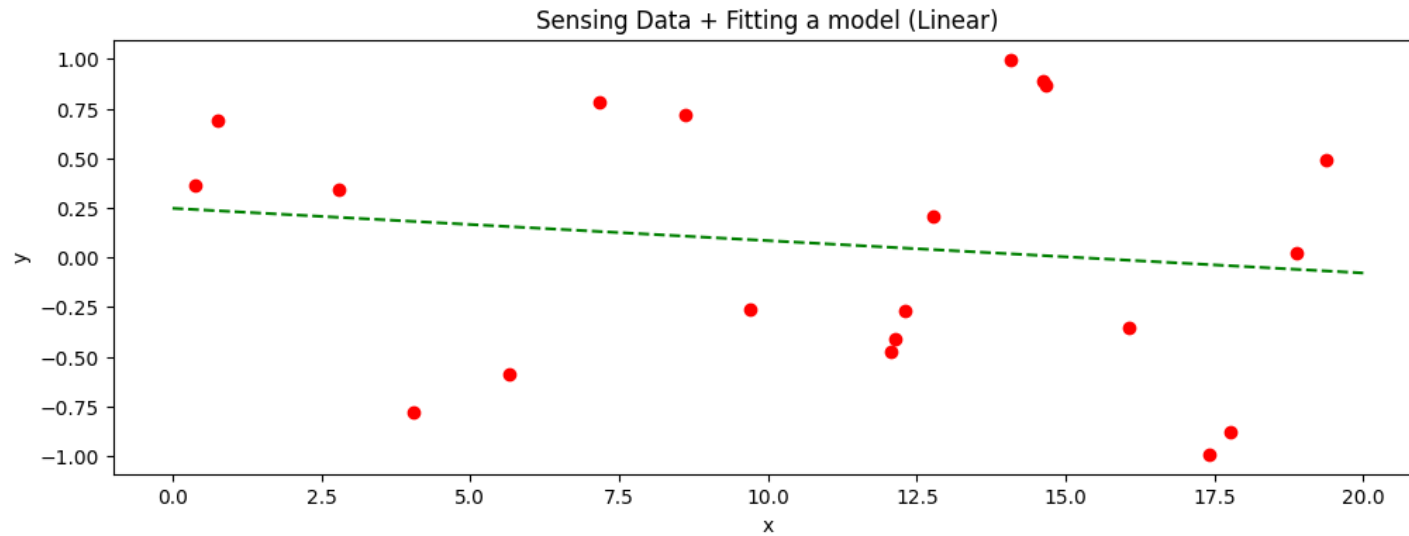
Environment



Sensing \rightarrow Fitting a linear model



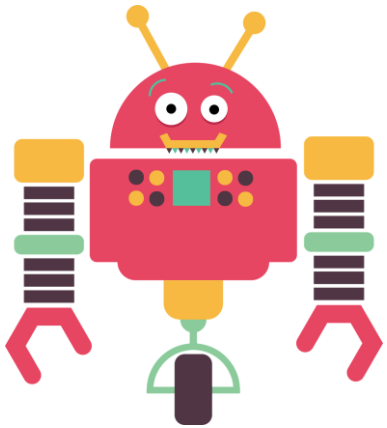
Intelligent Agent



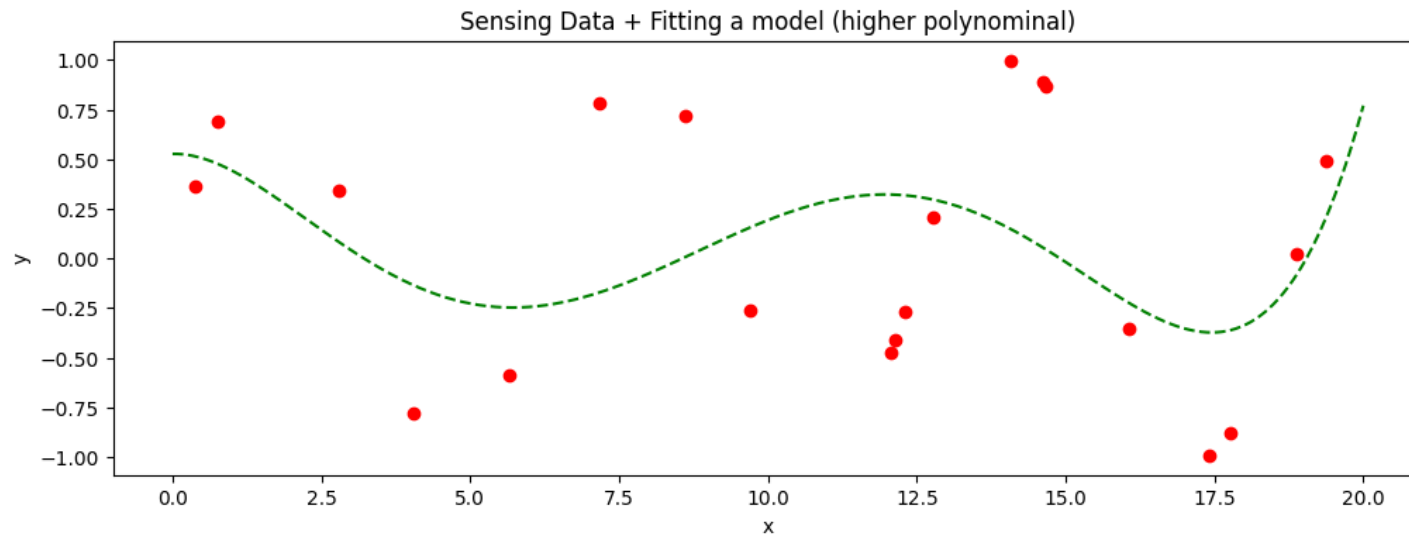
Environment



Sensing \rightarrow Fitting a higher polynomial model

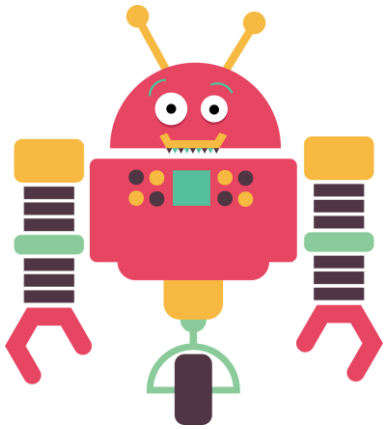


Intelligent Agent

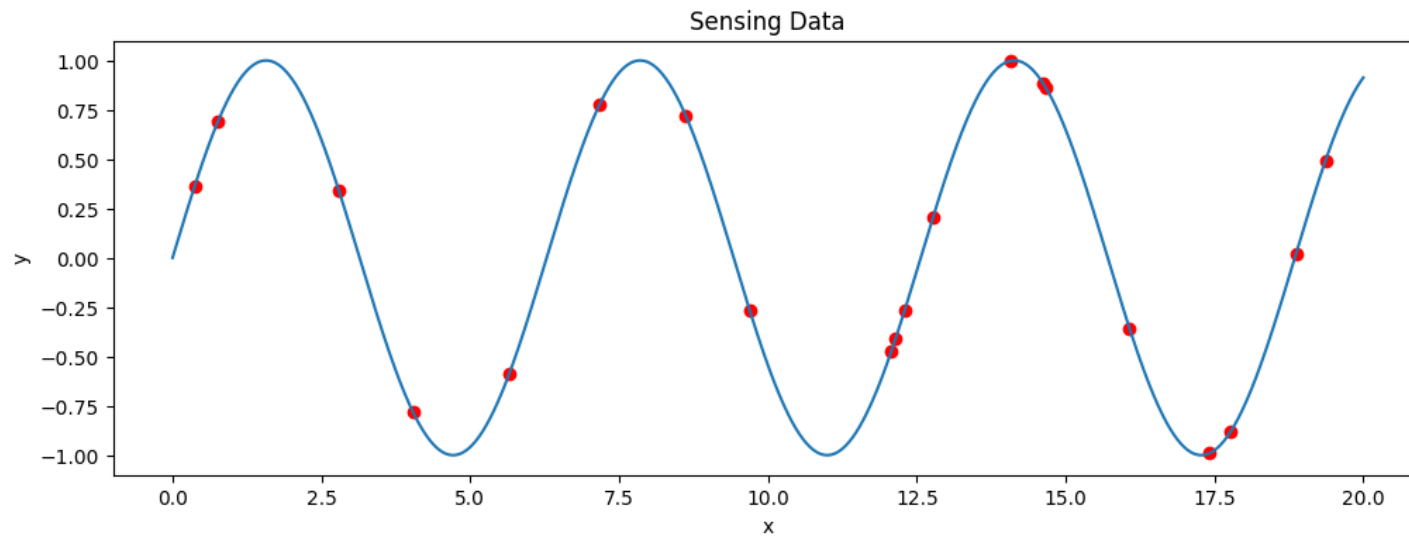


Environment

Sensing → Finding the perfect model

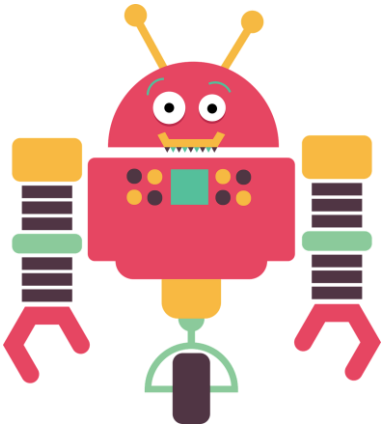


Intelligent Agent

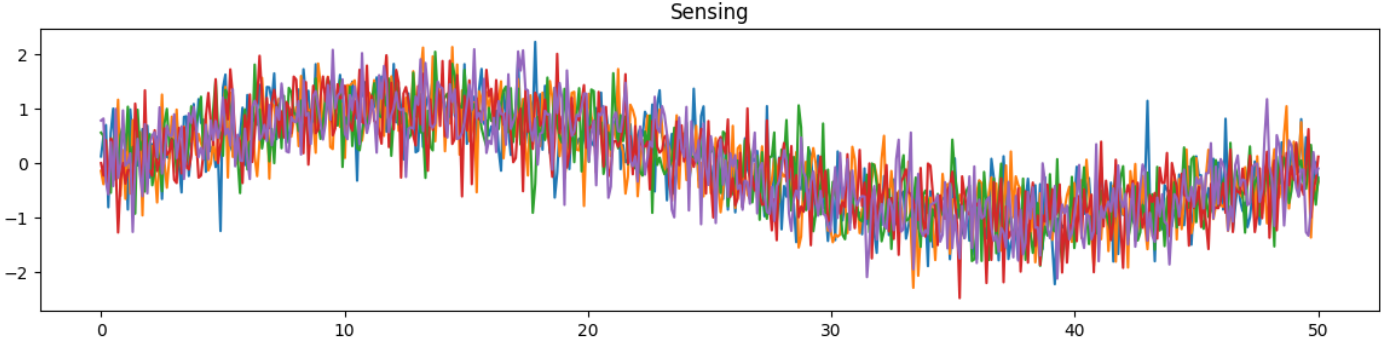


Environment

Sensing → Multiple Signals



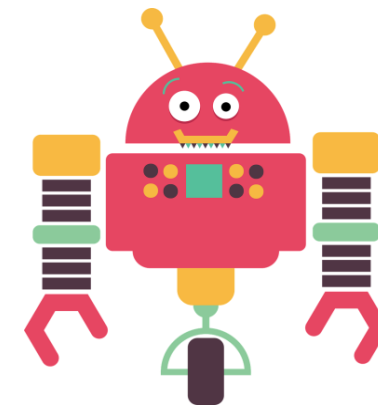
Intelligent Agent



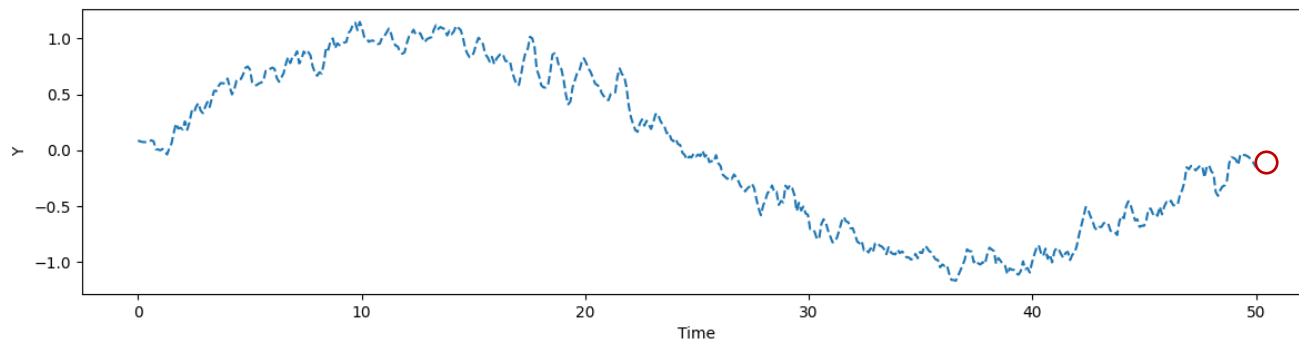
Environment



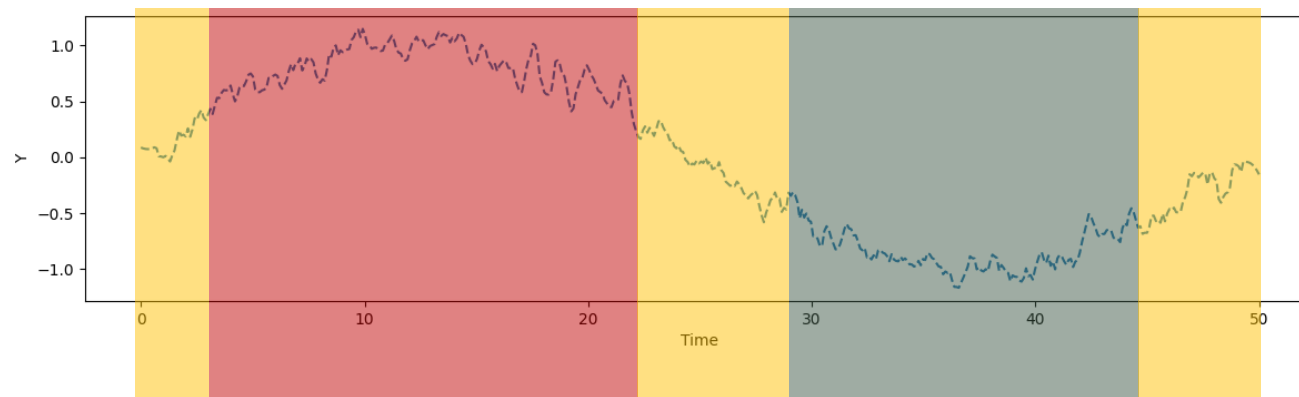
AI Tasks



Intelligent Agent



What's next → prediction

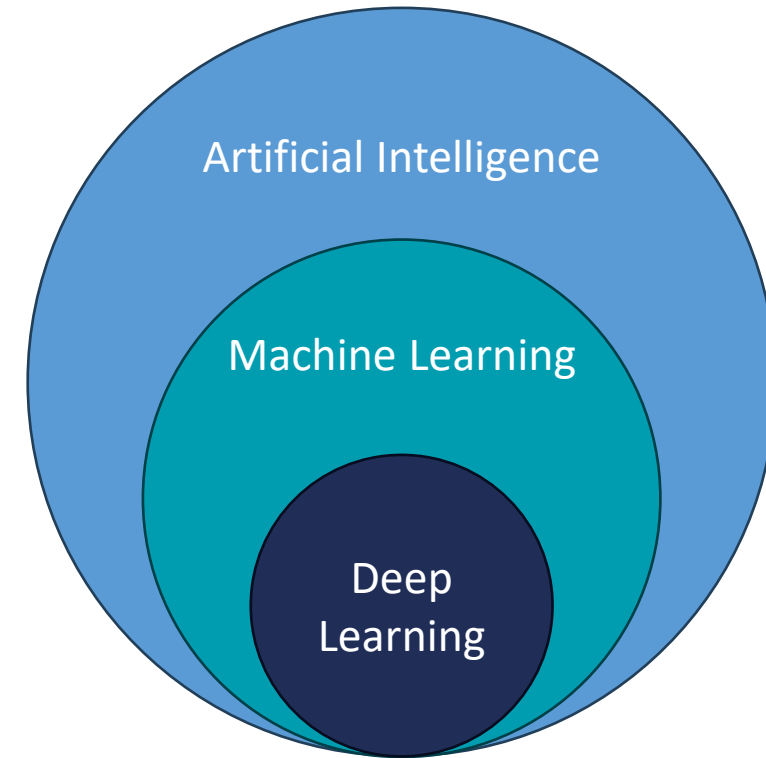


Characterize data → classification

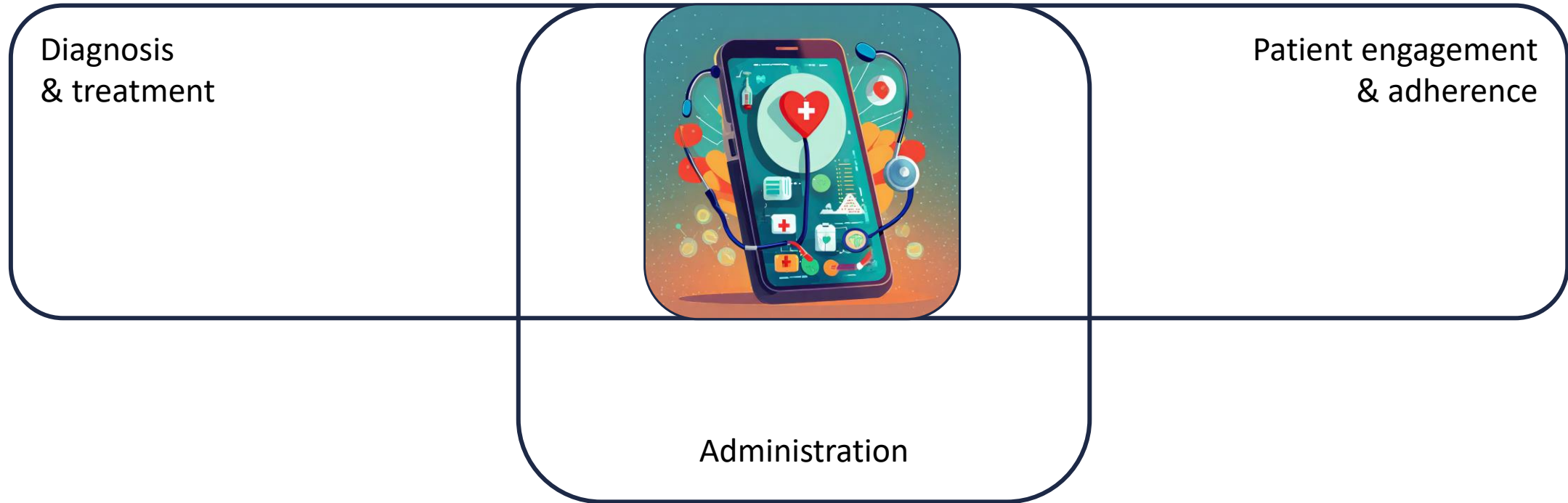


Summary: Brief AI Intro

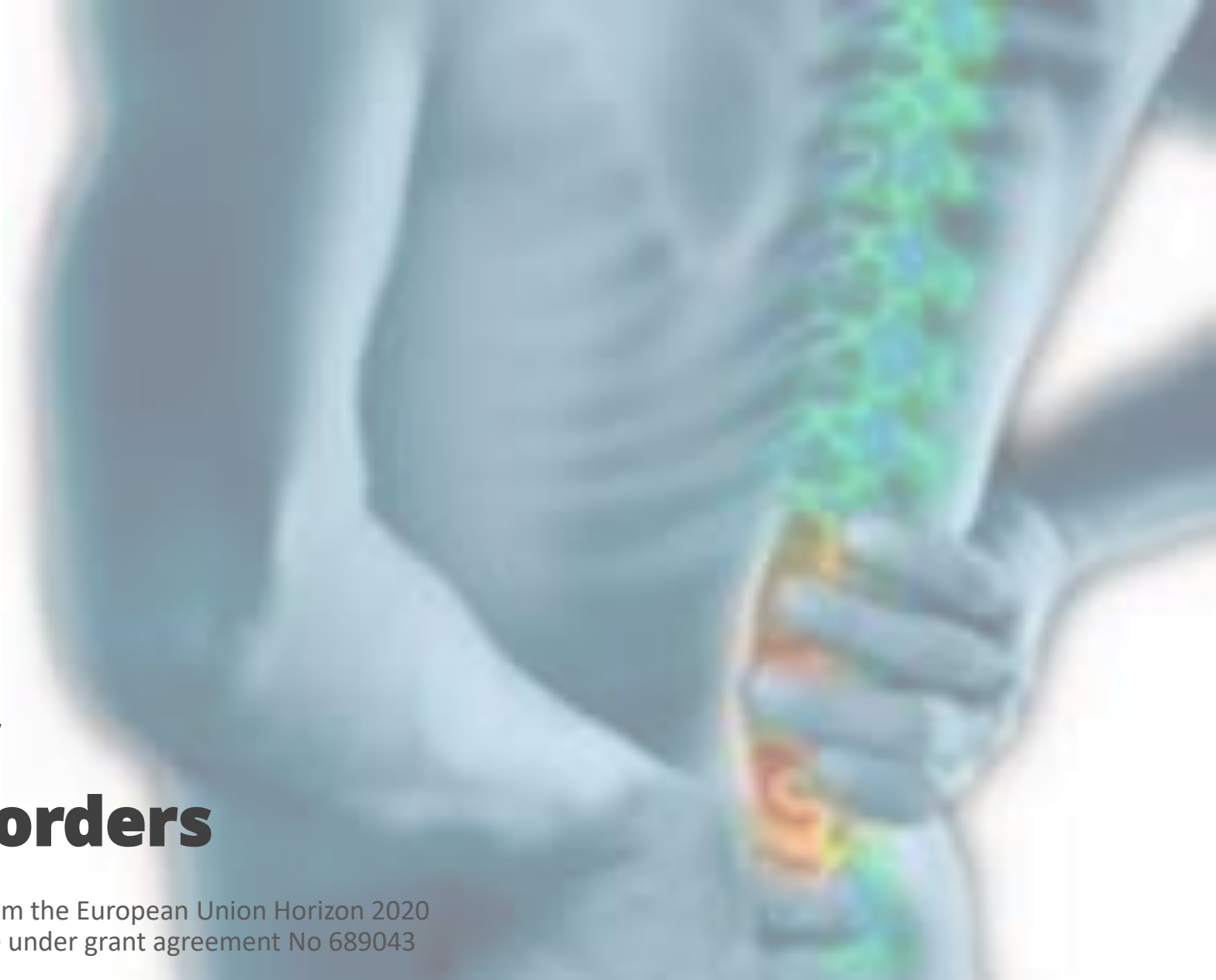
- An AI agent observes the environment
 - Tasks define actions for an AI agent
 - Prediction on what happens next
 - Classifying existing data
 - Finding **patterns** in data
- Machine Learning or Deep Learning methods



AI-driven Healthcare Interventions



<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6616181/>, Image: Generated by Adobe Firefly



Use Case: Self-Management of Musculoskeletal Disorders



This project has received funding from the European Union Horizon 2020 research and innovation programme under grant agreement No 689043





selfBACK Consortium

- Interdisciplinary and international team
- 5+ years runtime (2016-2021)
- 40+ individuals
- 4,92 Mio EUR budget

 NTNU

 SDU

 ROBERT GORDON
UNIVERSITY ABERDEEN

 University
of Glasgow



National Research Centre
for the Working Environment

Trade expansion

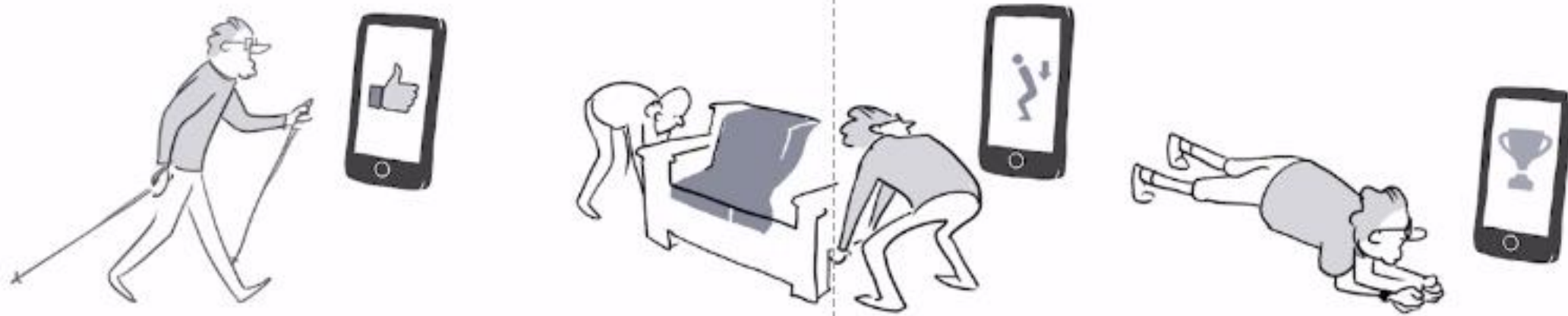

HEALTH LEADS

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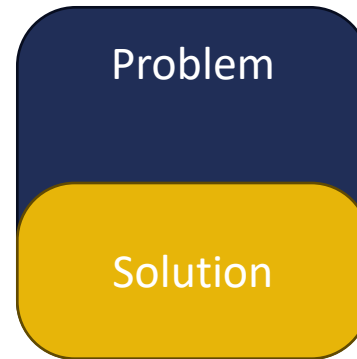
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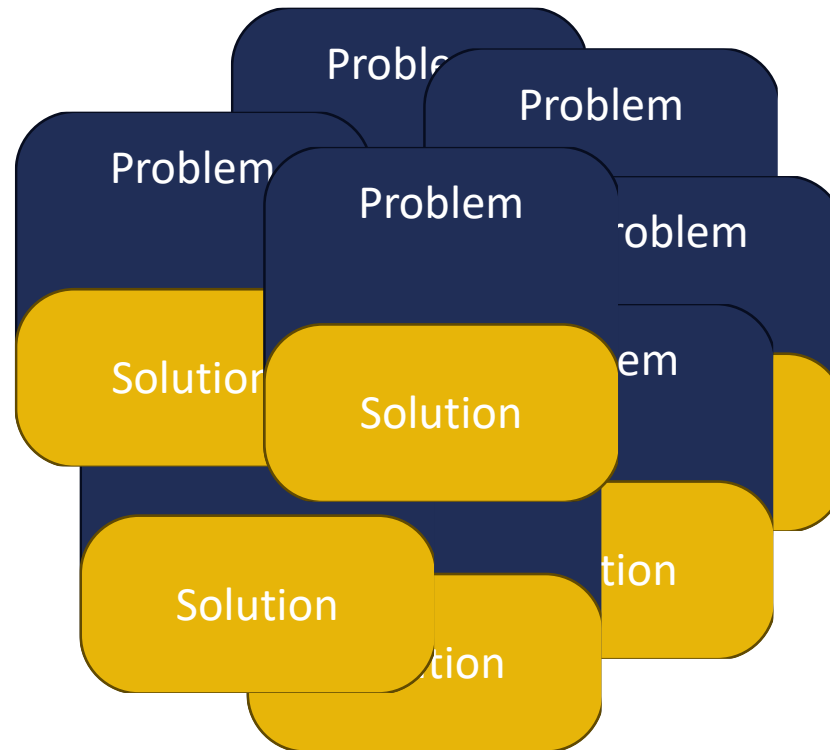




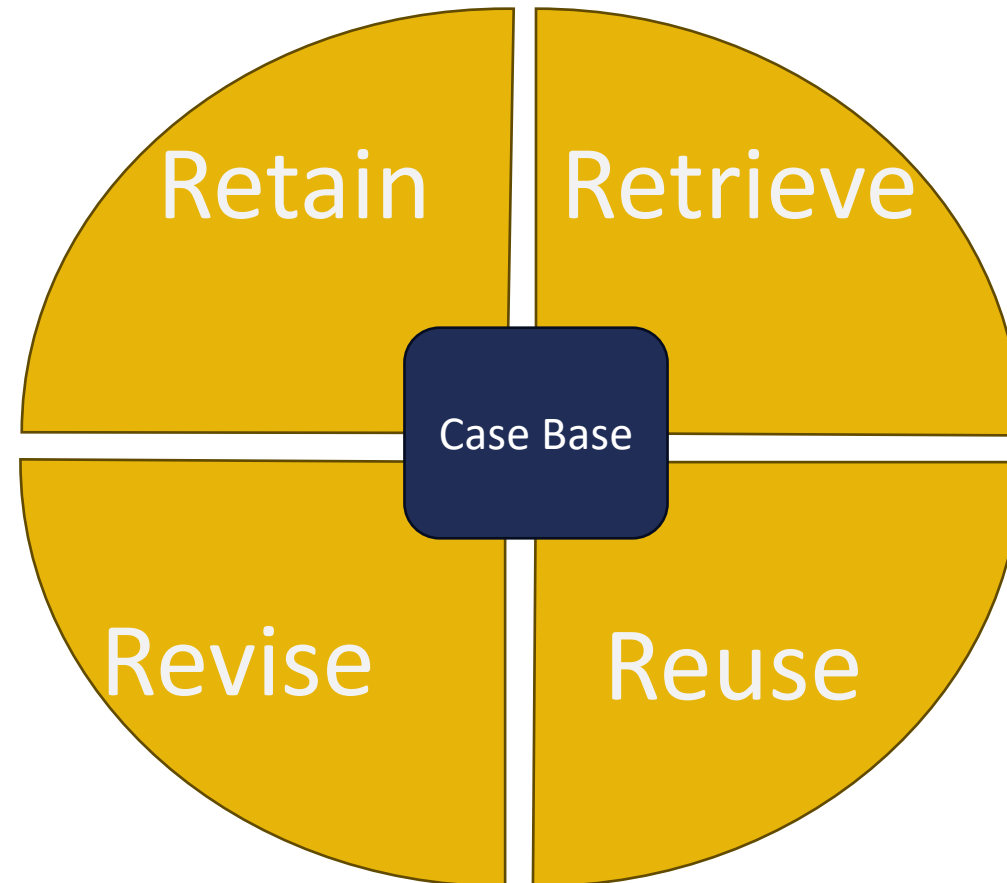
Methodology: Case-Based Reasoning



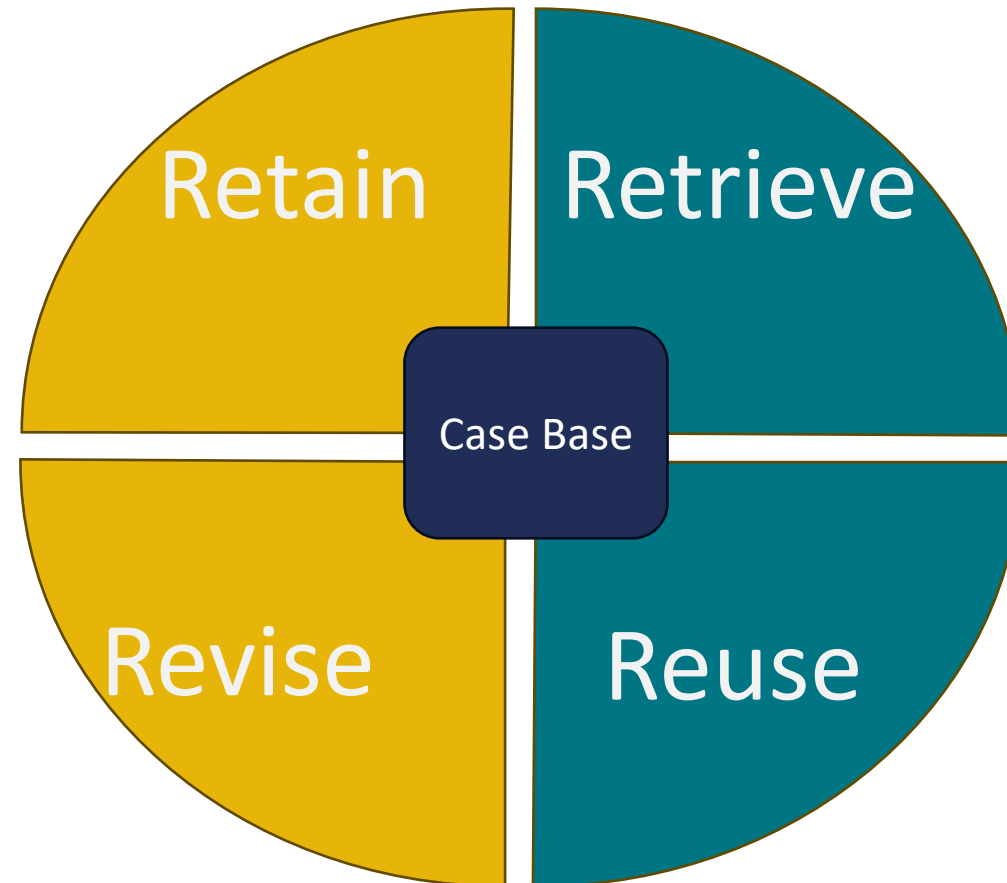
Methodology: Case-Based Reasoning



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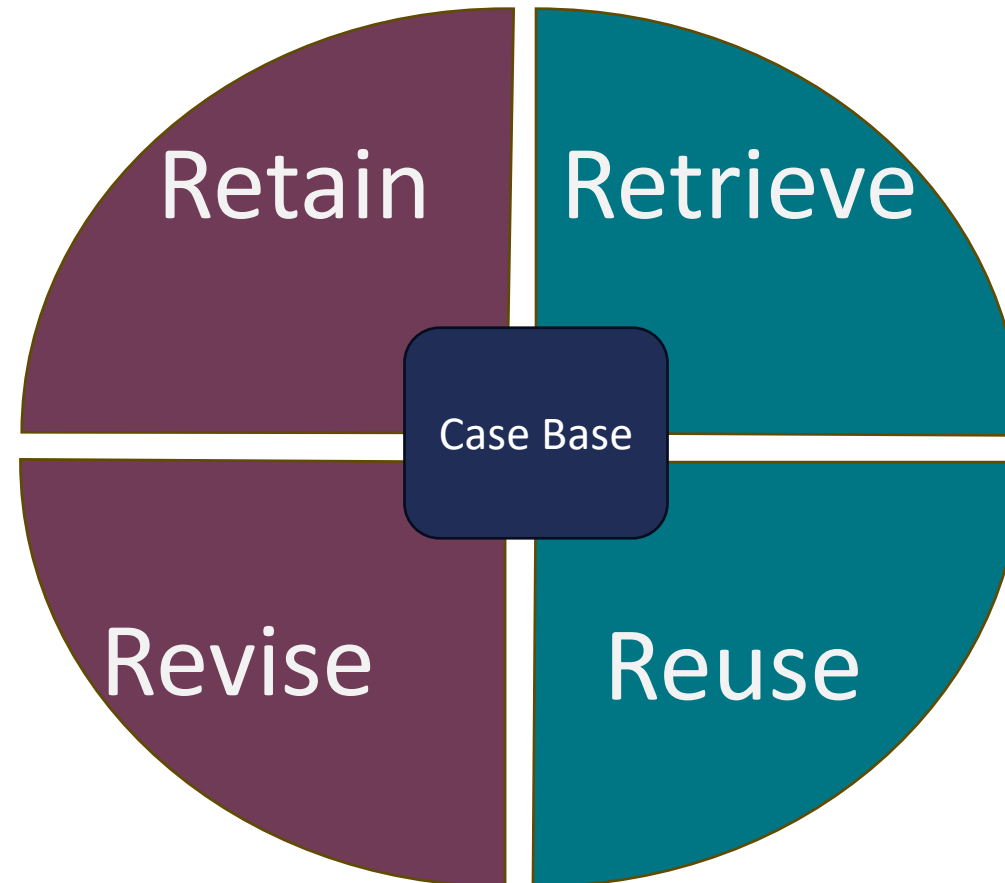
Methodology: Case-Based Reasoning



Reasoning:
The CBR system finds similar, relevant cases that can be used to solve a problem.

Methodology: Case-Based Reasoning

Learning:
The CBR captures cases created during reasoning and keeps them for future use.



Reasoning:
The CBR system finds similar, relevant cases that can be used to solve a problem.

Key takeaways

- Embrace AI as a collaborative tool, not a competitor
- Start with a problem you want to solve – and understand
- Data is important – needs to be relevant and efficiently managed



Questions?



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