

# Summary

## Knowledge-intensive Case-Based Reasoning

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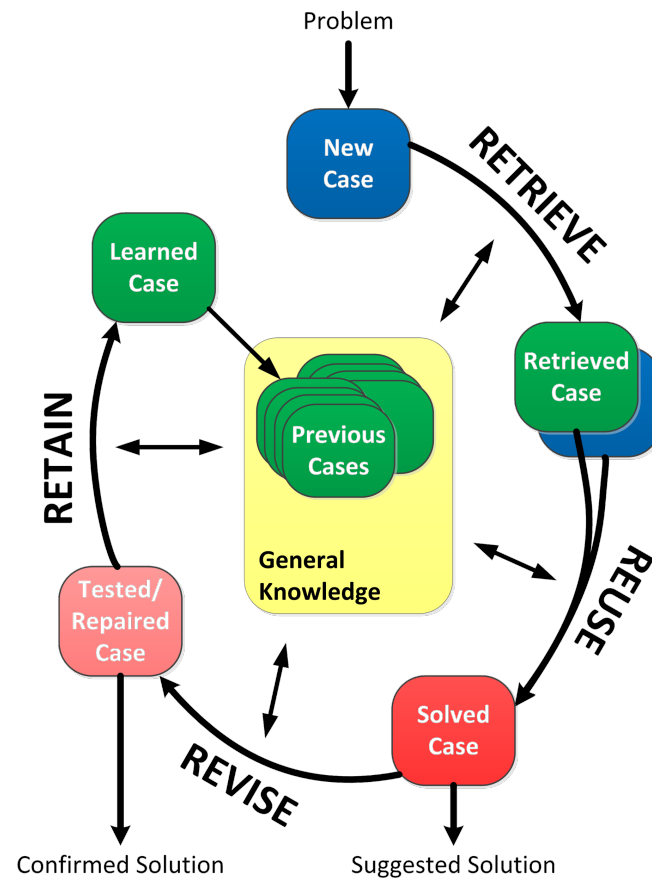


# Background

1. A. Aamodt and E. Plaza, 1994: [Case-based reasoning; Foundational issues, methodological variations, and system approaches](#). AI Communications, 7(1), pgs. 39-59.
2. Chapters 2, 3, 6, and 8 in Richter & Weber's [Case-Based Reasoning Textbook](#)
3. A. Aamodt: [Knowledge-intensive case-based reasoning in Creek](#). ECCBR 2004. LNAI 3155, Springer, 2004. pgs. 1-16.

# 4R Cycle

- Retrieve
- Reuse
- Revise
- Retain



# Knowledge Containers

## Similarity measures

The retrieval of similar cases is based upon the use of similarity functions (or measures) to compute the distance or similarity of two cases.

## Case base

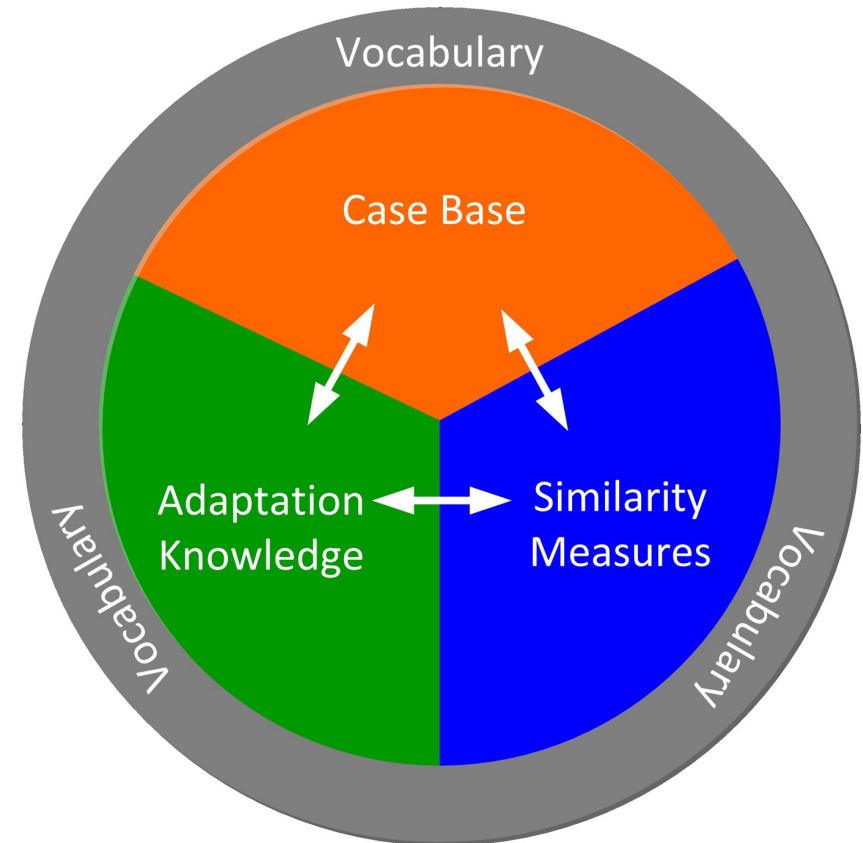
The systems experience is stored as cases within the case base which can be seen as a special form of a data base.

## Vocabulary

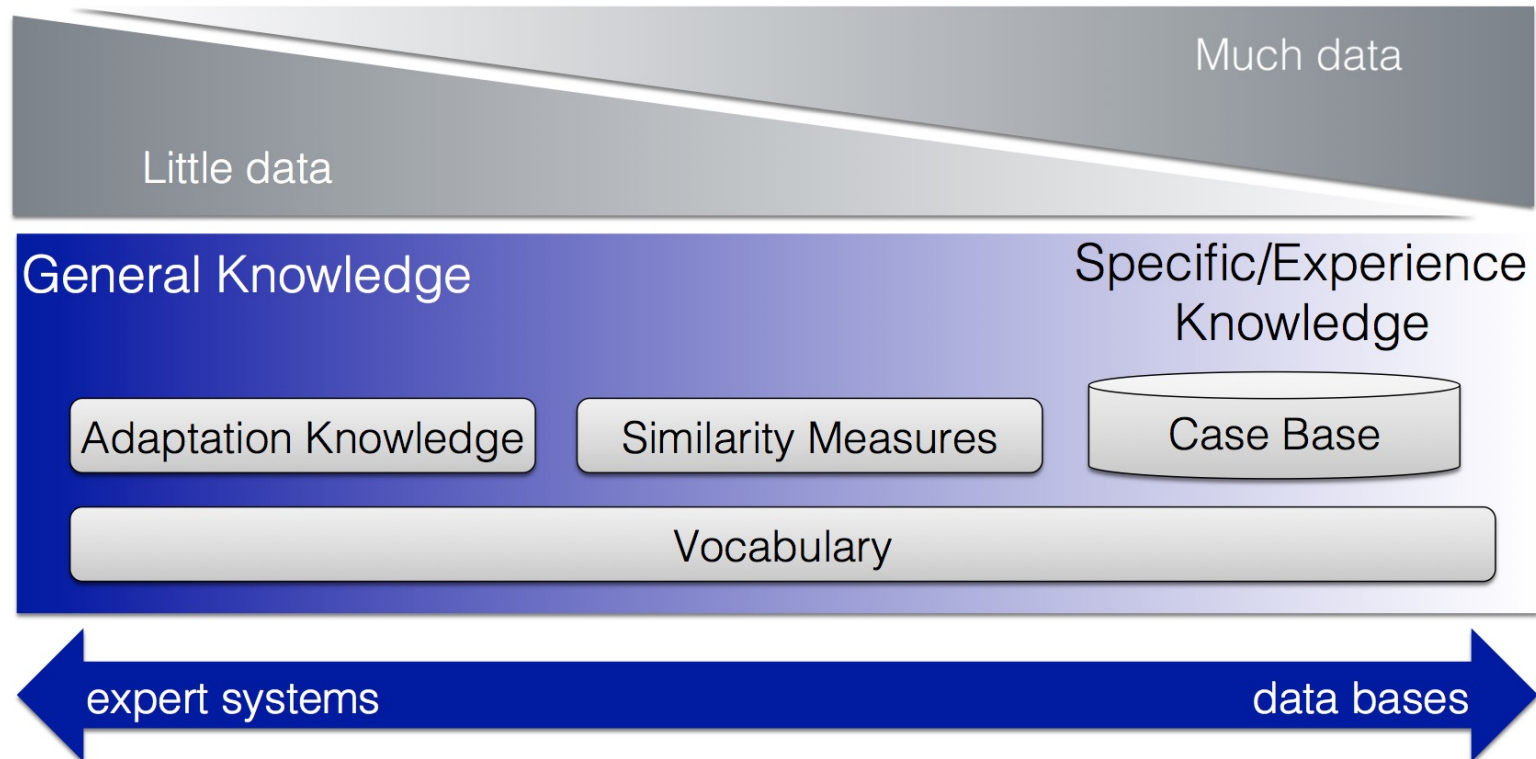
The cases themselves, the similarity measures and the adaptation knowledge are composed upon a vocabulary that contains the objects of interests (terms, attributes, concepts).

## Adaptation knowledge

Adaptation knowledge is used whenever a retrieved case's solution has to be adapted to be suitable to solve the presented problem. An example for this kind of knowledge is given by adaptation rules like "If X is not available use Y instead."



# Distribution of Knowledge



# How to read papers

- **Context of the paper:** Motivation and group or person who's presenting the work
- **Goal of the presented research:** What is the goal / motivation of work?
- **Methodology:** scientific and / or technical approach that is presented
- **Related work:** how do others address the same/similar problem
- **Method:** Design, Implementation and Experiments
- **Evaluation**

# Introduction

- David Aha: [The omnipresence of case-based reasoning in science and application](#). Proceedings of the Seventeenth SGES International Conference on Knowledge Based Systems and Applied Artificial Intelligence, 1998. pp 261-273.
- Edwina Rissland: [AI and Similarity](#). IEEE Intelligent Systems, May/June 2006. pp 39-49.

# Pensum Papers

- Smyth, B., Keane, M.T. (2022). **A Few Good Counterfactuals: Generating Interpretable, Plausible and Diverse Counterfactual Explanations.** In: Keane, M.T., Wiratunga, N. (eds) Case-Based Reasoning Research and Development. ICCBR 2022. Lecture Notes in Computer Science(), vol 13405. Springer, Cham. [https://doi.org/10.1007/978-3-031-14923-8\\_2](https://doi.org/10.1007/978-3-031-14923-8_2)
- Wijekoon, A., Wiratunga, N., Nkisi-Orji, I., Palihawadana, C., Corsar, D., Martin, K. (2022). **How Close Is Too Close? The Role of Feature Attributions in Discovering Counterfactual Explanations.** In: Keane, M.T., Wiratunga, N. (eds) Case-Based Reasoning Research and Development. ICCBR 2022. Lecture Notes in Computer Science(), vol 13405. Springer, Cham. [https://doi.org/10.1007/978-3-031-14923-8\\_3](https://doi.org/10.1007/978-3-031-14923-8_3)
- Chen, C., Li, O., Tao, D., Barnett, A., Rudin, C., & Su, J. K. (2019). **This looks like that: deep learning for interpretable image recognition.** Advances in neural information processing systems, 32.
- Eisenstadt, V., Langenhan, C., Althoff, KD., Dengel, A. (2020). **Improved and Visually Enhanced Case-Based Retrieval of Room Configurations for Assistance in Architectural Design Education.** In: Watson, I., Weber, R. (eds) Case-Based Reasoning Research and Development. ICCBR 2020. Lecture Notes in Computer Science(), vol 12311. Springer, Cham.



# Example Question

- In his paper, David Aha discusses successes and failures of CBR ventures.  
Present 1-2 successful approaches as well as reasons he identified for failure.

# Exam Schedule

Time	Name
10:00 – 10:30	Thomas
10:30– 11:00	Kristin
11:00– 11:30	Marte
11:30– 12:00	Mathias

Exams will take place in room 254 (Gamle Fysikk), aka Kerstin's office,  
on November 28, 2023