

Remembering Why to Remember: Performance-Guided Case-Base Maintenance

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For an ideal CBR system

- ... retains a small case-base that is capable of handling most of the target domain with the least adaptation
- In reality, there are always **tradeoffs**



Compactness vs. Competence

Overall Performance

- Not just affected by case-base compactness.
- Other factors: e.g. performance environment, patterns in problem distribution, etc.
- Hence,
“... effective maintenance requires remembering why cases are being remembered (or forgotten).”

Outlines

- Main idea: making case-base maintenance more performance-based.
- The journal is divided as follows:
 - The competence-performance dichotomy
 - Performance goals for case-base maintenance
 - The value of performance-based criteria
 - A performance-base metric for case selection
 - Experiments about the tradeoffs and the comparison between competence-base & performance-base strategies

The Competence-Performance Dichotomy

- Main idea is to distinguish competence from performance
- The original paragraphs are a bit confusing
- From my understanding:
 - **Competence of CBR:** A range of possible solution that the system is able to provide to a problem domain, under no constraint and ideal situations.
 - **Performance of CBR:** Ability to provide a possible solution, within a limited time-frame, under actual constraints in actual situations surrounding the target problem.

Performance Goals for Case-base Maintenance (1)

- A maintenance system should identify instrumental goals (beneath top-level goals) for more flexible approach
- Smyth and McKemma (1999) defined 3 types of top-level goals for CBR:
 - Problem-solving efficiency goals
 - Competence goals
 - Solution quality goals for problem solved

Performance Goals for Case-base Maintenance (2)

- Besides, strategies on case addition/deletion should also be guided by constraints:
 - case size
 - the performance trade-off over time
 - availability of any 2nd case sources
 - any expected distribution of future problems.

The Value of Performance-Base Criteria

A Performance-Base Metric for Case Selection

Experiments