Competence guided incremental footprint-based retrieval

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Introduction

• CBR success depends largely on the RETRIEVAL process

• Retrieval method contains 2 set of procedures: similarity assessment and case searching

• Example: exhaustive searching, decision tree

• Simplest approach to reduce retrieval cost: search reduced/edited case base
Footprint-based retrieval / FBR

- Retrieval technique introduced by Smyth and McKenna
- Uses case competence model to guide retrieval
- Highly efficient and achieves NEAR-optimal competence and quality
- Later, FBR is improved to guarantee optimal retrieval competence and quality: iFBR
Model of case competence

- Local competence contribution of a case: coverage and reachability set
- Related set
- Shared coverage
- Competence group
- Footprint case
- Footprint set
FBR

- Stage 1: Retrieving from footprint set
- Stage 2: Retrieving from related set
Extension to FBR

- FBR problem: best case may not be within the related set of reference case
- Solution: Incremental FBR/ iFBR
- iFBR: extending stage 2 of FBR beyond related set of one reference case
- How? Get k best footprint cases as reference set and search the union of the related set of the k cases
Experimentation - efficiency
Experimentation - optimality

![Graph showing sub-optimal targets (%) against k (reference set size). The graph compares different methods: Standard, COV-FP, and CNN-FP.](image)