MyCar

Project „Flexible Assembly Processes for the Car of the Third Millennium (MyCar)"

Methodology Description (High Level)
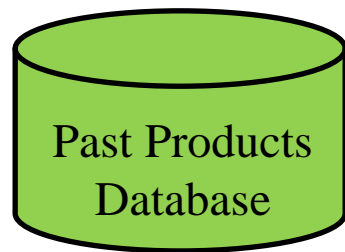Knowledge Based Key Performance Indicators Estimation

CASP

CRF CENTRO RICERCHE FIAT

LMS

MyCar SP5Knowledge Based Performance Indicator Estimation Concept

KNOWLEDGE

DATA ANALYSIS

ESTIMATION

Past Products Database
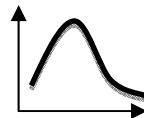
Past Product A
Past Product B
Past Product C
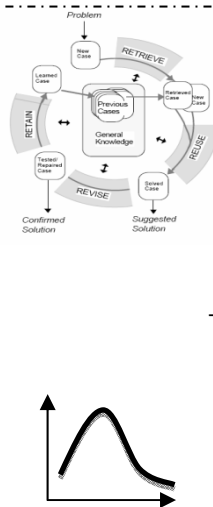
Case Based Reasoning Methods

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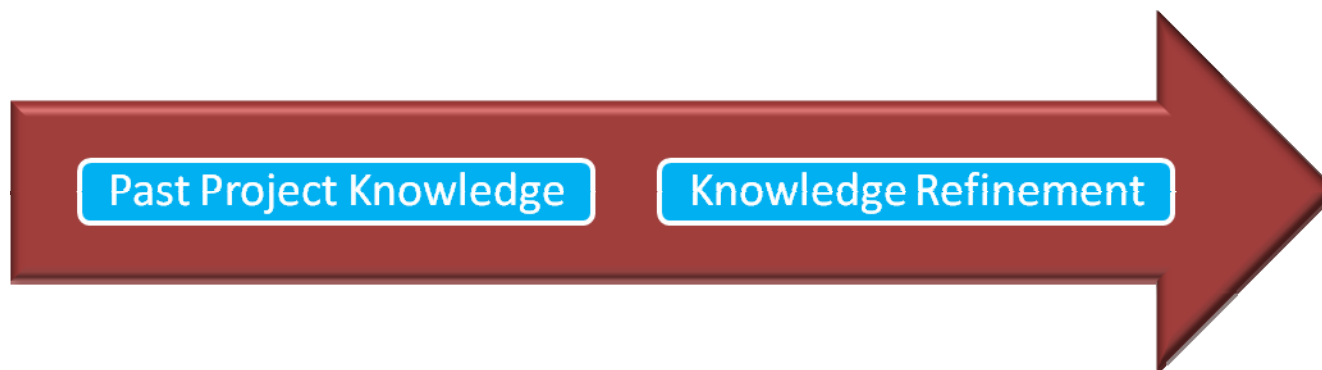
Statistical Analysis
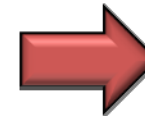
New Product

Cost (Investment, Running)
Cycle Time

Cost and Cycle time Estimation

Past Project Knowledge

Knowledge Refinement
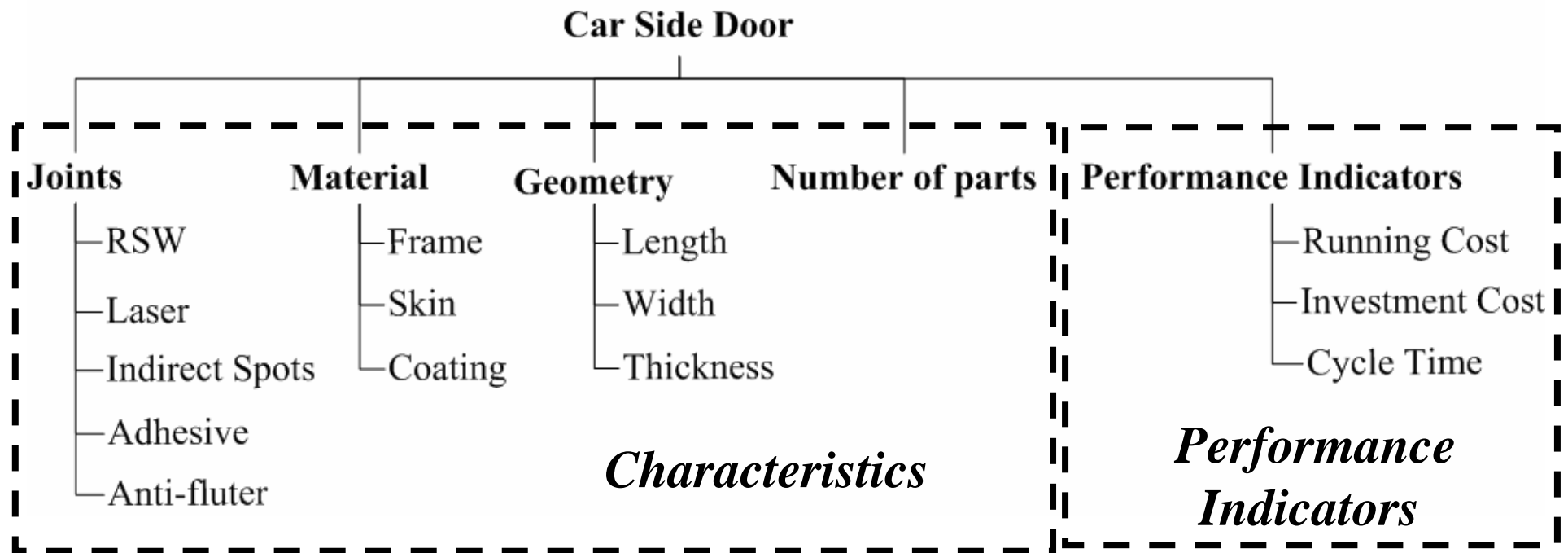
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MyCar SP5 Knowledge Based Performance Indicator Estimation Concept
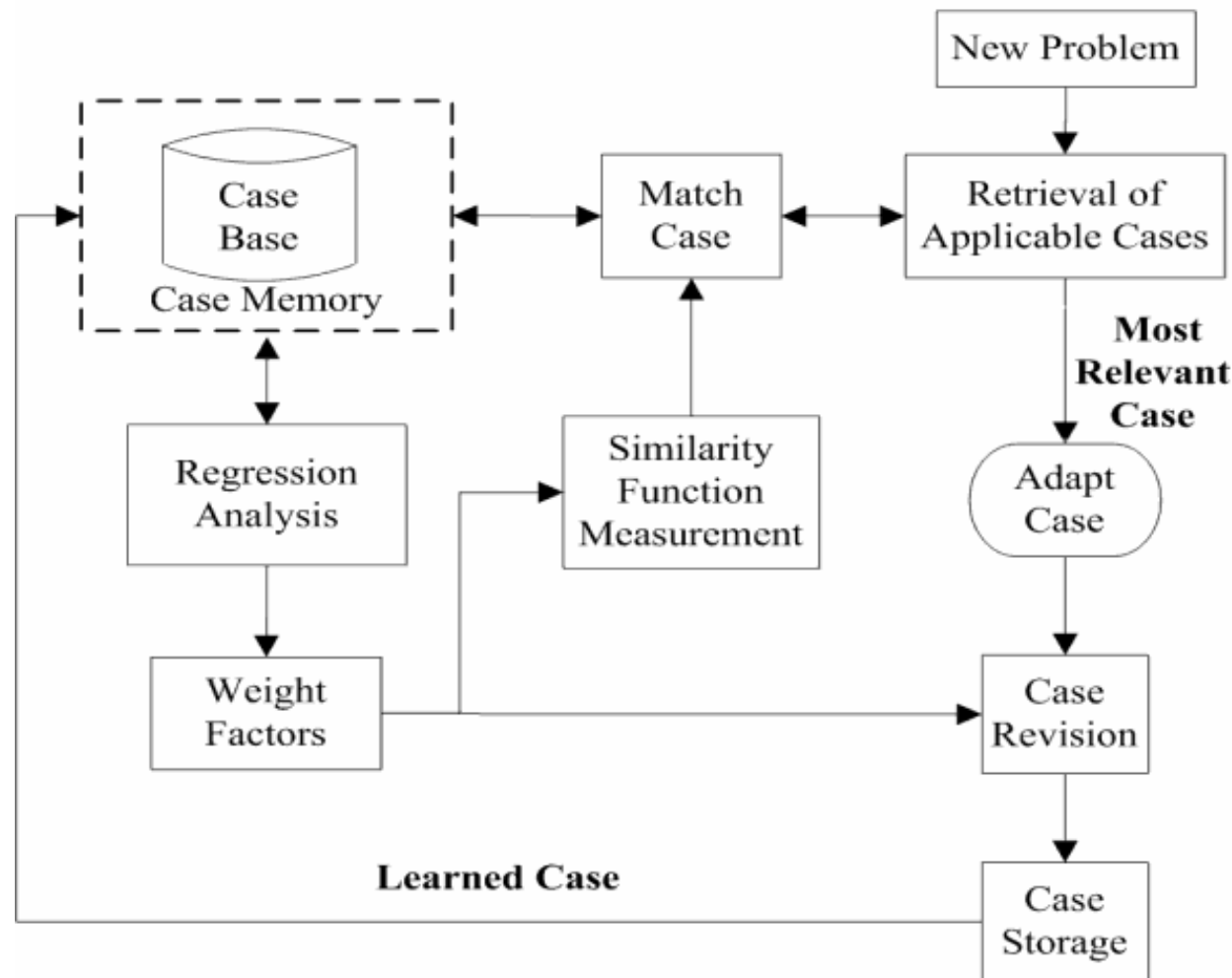
MyCar SP5 KBPIE Example: Car Side Door

MyCar SP5 KBPIE
Similarity Measurement

$$Sim_{Global}(T, S_j) = \sum_{i=1}^{n} w_i \times f(x_i^t, x_i^s)$$
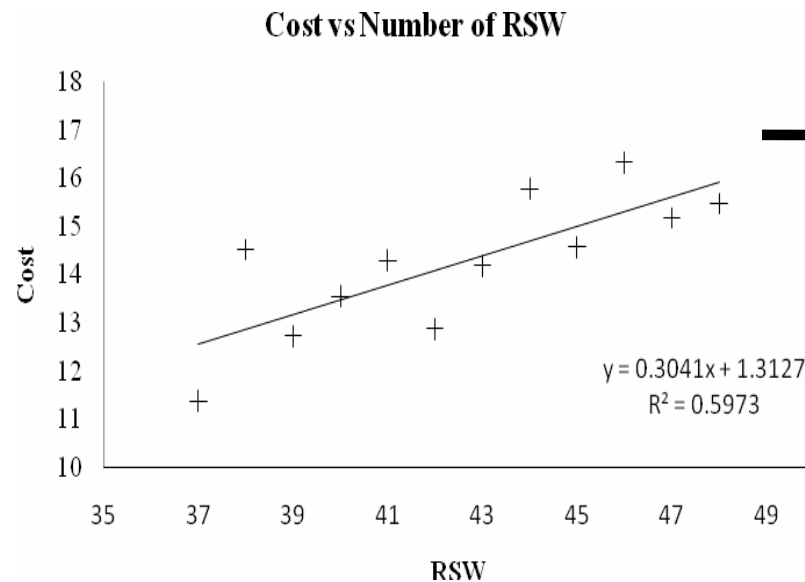
Where:
T: the new (Target) case
S: the past (Source) case.
j: one of the past cases.
n: the number of characteristics in each case.
i: one of the n individual case feature.

MyCar SP5 KBPIE
Total Result – Regression Analysis Diagram

$$Cost = 0.3041 * RSW + 1.3127$$

$$w_i = a_i \Big/ \sum_i^n a_i$$

$$Cost_{NewCase} = \left(\sum_{i=1}^{n} w_i \times \frac{x_i^t}{x_i^s} \right) \times \left(\frac{I_{NewCase}}{I_{PastCase}} \right) \times Cost_{PastCase}$$

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MyCar SP5 KBPIE
Adaptation - Estimation

$$Cost_{NewCase} = \left(\sum_{i=1}^{n} w_i \times \frac{x_i^t}{x_i^s} \right) \times \left(\frac{I_{NewCase}}{I_{PastCase}} \right) \times Cost_{PastCase}$$

Where,

w_i: the weighting factor of characteristic *i*.

x_i^t : the i_{th} feature of the target (new) case.

$x_i{}^s$: the i_{th} feature of the source (past) case.

$I_{NewCase}$: the business cost index of the new case

$I_{NewCase}$: the business cost index of the past case

$Cost_{PastCase}$: the cost of the past case, i.e. of past product.

$Cost_{NewCase}$: the estimation of the new product cost.

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