

PhD: I received my PhD from Department of Computation of University of Manchester Institute of Science and Technology (UMIST) Feb. 1996. My Area of research was in (Artificial Intelligence) (AI), using (Case-Based Reasoning) (CBR) to design an expert system in the domain of law, called LASER (Legal Advisory System for Employment Regulation).

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•THE AREA OF RESEARCH

My Research is concerned with the development of a Case-Based Reasoning (CBR) system in the domain of law (Legal Reasoning). The application task is to support an exhaustive search of a legal case-base using available information as indices, in order to retrieve the most relevant cases. The main aim was to improve the retrieval process, guided by the experts' (lawyers) methodology, to provide a flexible yet efficient and accurate retrieval mechanism.

Standard case representation, isomorphic to the original knowledge source (legal precedents), is used to store legal cases in a flat memory organization. Standardized cases have a predefined case structure with a fixed number of features. The features are selected to reflect the important aspects of a legal case. The feature values are used as dynamic indices in order to do the exhaustive search of the case-base.

Two matching mechanisms are used in the retrieval process, corresponding matching and cross-structural matching. Corresponding matching, matches the equivalent parts of the target and the source cases and calculates the degree of similarity according to the number of features matched, and their degree of importance (weights). Cross-structural matching is used in a complementary way to the corresponding match. The cross-structural matching is used to compare non-equivalent features, in the same category or related categories, even though there is a weak correspondence between the features.

To increase the retrieval robustness, a mechanism for feature importance value assignment is required. Different approaches to the weight assignment are investigated, and assigning weights dynamically through a training procedure is proposed. This approach takes into account experts' opinions to generate a set of weights. In the training procedure, for a target case a positive and a negative cases are selected in order to fine tune the features. The features shared between the target and positive cases

are strengthened and features shared between target and negative cases are weakened. The effect on similarity assessment is described and empirically tested.

A Case-Based Reasoning prototype called LASER (Legal Advisory System for Employment Regulations) has been implemented in the domain of UK Employment Law. LASER is a multi-retrieval system. It uses interactive retrieval when there is not enough information available, and uses dynamic retrieval when a full description of the new problem is present. LASER uses classification and conceptual thresholding to categorise its retrieved cases. Finally, in order to elaborate LASER to retrieve relevant cases even though there are not any matches between the present corresponding features, a legal terms thesaurus is used to select synonym legal terms and to use them as new indices in the retrieval process.