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Courtroom Decision Support System Using Case Based Reasoning

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Abstract

The legal practices in our country have not seen any major changes in terms of technology advancement for decades. While decision support system finding inroads in many other specialized areas, there has been no work done to bring decision support system into legal environment. It is extremely a lengthy waiting period of time to bring a case to court, let alone the whole process of trial until the judgment day. To address this problem, it is suggested to convert our current legal practice into an intelligent based decision support system. A study was conducted by developing a prototype applying a decision support technique to serve as a "virtual courtroom" to plaintiff and defendant in solving their legal cases without the involvement of actual trial. To ensure the system produces fair solutions, case based reasoning was identified as the most suitable technique. This paper proposes the application of case based reasoning in solving legal cases due to the characteristics of the technique which resembles human cognition in solving problems..

Keywords: Case based reasoning, Decision support system, Court room system, Intelligent legal system

1. Introduction

Decision support system has become increasingly in use in various areas such as medical, engineering, technology, management, sales and marketing. This paper presents research on development of an intelligent decision support system using case based reasoning which will be used to

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efficiently decrease the number of cases brought for hearing in courts. Courtroom Decision Support System (CDSS) is a new concept since there is no similar systems are known to exist. All existing legal softwares are merely a management system to manage documents, to calculate bills, to store documents, to prepare legal documents for clients and etc. The suggested Courtroom Decision Support System (CDSS) is developed to facilitate police officers in police stations throughout the nation. By using CDSS, police officers able to provide a "virtual courtroom" to solve simple cases such as accident cases. This system encourages out of court settlement thus reducing the number of pending cases to be solved in a country.

Why CDSS is first of all needed in this world? Take a typical car accident case as an example. Two vehicle involved in a car accident takes years to reach settlement due to the lengthy process of investigation needed when the case reaches for hearing in a court. As a result, both defendant and plaintiff waste their energy and money throughout the hearing. Imagine having an intelligent system that is able to greatly reduce this situation? We developed an online based CDSS using case based reasoning. Why case based reasoning was chosen? It is a straightforward technique that applies past experiences in solving new cases (Slade, 1991).

Many researchers have highlighted the ability of our memory in remembering and recovering similar incidents based on some new events. Farhi Marir and Ian Watson (1994), has also mentioned in their paper titled "Case-based reasoning: a categorized bibliography" that case based reasoning receives increasing attention from expert system developers as well as from novices due to the resemblance of the cognitive model to human reasoning. Researchers like Petra Perner have even used Case Based Reasoning for image segmentation and image processing in computer vision environment. Another example will be the groupings of user behaviour through CBR and clustering technique (Cocea & Magoulas, 2012). The application of CBR technique in various fields has encouraged the authors to develop a decision support system incorporating the very same technique as the base of the system.

2. Literature Review

Many studies have been reported on the application of case based reasoning as a decision support system in various fields over the years; however none was in legal system. The only well known system being used in legal environment is WinJuris. However, WinJuris is merely a management system rather than a decision support system. The actual task one can accomplished using WinJuris is to maintain basic information on defendants, witnesses, offences, fines, costs payments, minutes, court documents, accounting module and etc (PTS Solution, 2011). Therefore the authors of these paper has decided to plug in the idea of applying case based reasoning into courtroom decision support system and to produce a prototype to be tested with selected police station, plaintiffs and defendants at the end of this project.

Case-based reasoning is a problem solving paradigm that in many respects is fundamentally different from other major AI approaches. Instead of relying solely on general knowledge of a problem domain, or making associations along generalized relationships between problem descriptors and conclusions, CBR is able to utilize the specific knowledge of previously experienced, concrete problem situations (cases)" was found quoted in a published work of Aamodt (1994). Referring to Figure 1. Case Based Reasoning Diagram (Pal & Shiu, 2004) the processes involved in solving a case are divided into four (de Mantaras & Plaza, 1997) . These processes are better known as the four "R's."