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Toulmin-based computational modelling of judicial discretion in sentencing

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ABSTRACT: A number of increasingly sophisticated technologies are now being used to support complex decision-making in a range of contexts. This paper reports on work undertaken to provide decision support in the discretionary domain of sentencing by referring to a recently created Toulmin argument based model that involves the interplay and weighting of relevant rule-based and discretionary factors used in a decisional process. Judicial discretion, particularly in the sentencing phase, is one of the mainstays of justice systems that favour individualised justice. The study discusses the modelling process in Victorian courts in Australia, where the handing down of an appropriate custodial or non-custodial sentence requires the consideration of many factors. Tools and techniques used to capture relevant expert knowledge and display it both as a paper model and as an online prototype application are discussed.

KEY WORDS: Toulmin arguments, judicial discretion, sentencing, knowledge engineering

INTRODUCTION

This paper reports on the continuing process of developing an online sentence support system for Victoria Legal Aid (VLA). VLA provides legal advice to clients in more than eighty percent of criminal cases in the Victoria court system and the vast majority of these in lower jurisdiction courts. The aim is to supply VLA with a system that they can use to assist inexperienced lawyers in arguing for more fair/lenient sentences for their clients. While the outcome of the research will be of some practical help for VLA, it must be underpinned with a strong theoretical framework. The main problem to overcome is how to model judges' discretionary powers in sentencing.

Sentencing research has been confined traditionally to the fields of criminology (Lovegrove, 1997 2004), law (Zdenkowski, 2001; Fox and Freiberg, 1999), sociology (Samuelson and Schissel, 1991), and to some extent psychology (Kapardis, 2003). Previous attempts at judicial support system construction have focussed on providing a sentencing judge with an indicative sentence and support information, such as statistical trends (Schild, 2000 and Hall *et al*, 2005). In the first part of the paper the idea of discretion and its role in sentencing will be examined. In the second section of the paper a variation of the original Toulmin (1958) argument model will be discussed in relation to modelling discretion in judicial sentencing. In the final part the results of modelling the sentencing environment in Victoria will be presented.

DISCRETION

While there has been a large body of work describing 'discretion' in its myriad forms in the legal domain, there has been little work on modelling discretionary action within the same arena. More

interest has been shown in the results of discretionary action and in attempting to identify the source than in modelling the processes behind it (Gelsthorpe and Padfield, 2003). Dworkin's (1978: 31) famous 'hole in the doughnut' analogy is probably the best known in the legal arena. Discretionary action is the hole in a doughnut with a belt of surrounding restriction. Dworkin is interested in defending his case for individual rights, downplays the importance of discretion, and argues that judicial decisions are based on arguments of principle. He believes that courts should decide 'hard cases' on grounds of principle; individualised justice is extremely important. Dworkin is responding by and large to the legal positivism of Hart. Hart (1961) concludes that where rules conflict, or where there are irreconcilable rules, judges must use discretion and employ their own conception of what is just to invent the law. Hart (1994: 252) suggests the role of discretion with respect to open texture:

> My view ... is that legal rules and principles ... often have, what I call frequently 'open texture', so that when the question is whether a given rule applies to a particular case the law fails to determine an answer either way and so proves partially indeterminate. Such cases are not merely 'hard cases' ... but the law in such cases is fundamentally incomplete: it provides no answer to the question at issue in such cases. They are legally unregulated and in order to reach a decision in such cases the courts must exercise the restricted law-making function which I call 'discretion'.

Dworkin (1978: 32ff) defines two types of discretion: weak and strong. Weak discretion in Dworkin's opinion consists of two distinct types. The first type is simply that an official must use judgement in applying the standards set by an authority. The second type of weak discretion occurs when an official is a final arbiter because there will be no review of that judgement. The strong sense of discretion is characterised by an official not being bound by standards set by an authority. Davis (1969: 4) indicates that a public officer has discretion whenever the effective limits on power leave free the choice among a number of possible courses of action. Davis' view of discretion is tempered by the fact that he feels that the 'effective limits' require special emphasis, because not all limits on power are in fact legal. Davis is concerned with the discretion in the vast mass of discretionary justice that is beyond the reach of the judicial process. Zeleznikow (2000: 334) has noted that the degree of discretion in legal domains can be placed into four broad categories: (1) domains where there is no discretion, exemplified by jurisdictions with mandatory sentencing; (2) narrow discretionary domains that have clear norms expressed in legislation, cases or legal opinions—typically with sentencing guidelines—from which judges may deviate and exercise some minimum discretion; (3) bounded discretion domains without explicit norms but with the factors that judges must take into account specified in legislation or cases, where judges still have considerable discretionary power (an example being the sentencing environment in Victoria); and (4) unfettered discretionary domains with no norms and no specification of the factors that judges should base their decisions upon are also not specified (examples being Refugee law and the area of Family Law in Australia dealing with the welfare of children). Zeleznikow further suggests that these categories are useful in identifying the types of approaches that are appropriate for modelling reasoning in a legal domain.

The *Oxford English Dictionary* suggests that discretion involves a liberty or power of deciding, or of acting, according to one's own judgement or as one thinks fit. If we accept Dworkin's view of discretion, then acting according to one's own judgement is an important reality in understanding discretionary action. Judgements and choices in reality are very constrained, not only by formal rules but also by many social, economic and political constraints. Baumgartner (1992) goes so far as to suggest that legal decision-making is far more influenced by sociological factors than is usually accepted. It is also necessary to point out that discretion,

while a generic term, is used in different senses in different parts of the criminal justice system. At each stage in the criminal justice system where decisions need to be made, discretion is present. Sometimes discretion is more constrained, usually where the accountability of the decision maker is not rigorously reviewed.

JUDICIAL DISCRETION

Judicial discretion, and in particular that relating to the sentencing process, involves discretion in the sense that one has to make decisions based on one's own judgement. Legislation dictates that certain factors need to be taken into account when sentencing convicted criminals. In the state of Victoria, sentencing discretion is constrained by the *Sentencing Act* 1991. In Victoria the idea of individualised justice is enshrined within this act. Judicial discretion in sentencing in Victoria is not so much due to the effects of vagueness of terms, open texture or defeasible rules but as to the fact that judges have a choice of what they believe is an appropriate sentence. This falls more into line with Dworkin's view of justice, highlighting principles as the main underpinning of the justice system. Judges may well be influenced by factors or biases other than those of a particular case before them, and if they reveal in their sentencing decisions their own personal biases (the 'real' reasons) behind a particular sentence they would leave themselves open to ridicule and more importantly appeal. Judges must frame their decisions in terms of the particular limiting legislation and precedent cases. In the case of Victoria it is the *Sentencing Act* 1991.

The *Sentencing Act* 1991 covers penalties and procedural guidelines that are incumbent on the judiciary when passing sentence. Section 5 of the act details the only purposes for which sentences maybe imposed. The purposes are: just punishment, deterrence, rehabilitation, denunciation, community protection, or any combination of them. It is the tendencies in these particular categories that give a hint to the influence of social values on the judiciary. The current practice of judicial decision-making is also influenced by precedent cases, so while there are within the purview of the *Sentencing Act* 1991 details of what constitutes a guideline judgement[1] they are not supported by a majority of Supreme Court judges because they believe judicial discretion will be limited (Fox and Freiberg, 1999: 34). Lovegrove (1989: 9) argues that judges in exercising their discretion must deliberate on three interrelated matters: (1) the appropriate goals of sentencing and their relative weights in view of the particular case facts, (2) how to give effect to these aims in the circumstances of the case, (3) the specific sentence that this particular set of fact ought to attract. It is discretion in this sense, where justice is individualised, that has attracted a good deal of scholarship,. The *Sentencing Act* 1991 also gives some idea of factors the judiciary should have regard to but in no way indicates how they should be weighed. The current practice is not to reveal how each aggravating and mitigating factor is weighted in a given judgement. This idea has been enshrined in a very important precedent Court of Criminal Appeal case (Williscroft, 1975: 300):

> …ultimately every sentence imposed represents the sentencing judge's instinctive synthesis of all the various aspects involved in the punitive process … it is profitless … to attempt to allot to the various considerations their proper part in the assessment of the particular punishments presently under consideration …

[1] Judicial guideline judgements, handed down by Appeal Courts, are those 'that go beyond the point raised in the particular case and suggest a sentencing scale for various common forms of the category of crime before the court identifying the main aggravating and mitigating factors or indicating how particular types of sanctions are to used' (Fox and Freiberg, 1999: 33). There are no judicial guideline judgements in Victoria.

It is necessary to employ a method of knowledge engineering that effectively captures the discretion that is available to sentencing judges. The judiciary are free in some respects to give any sentence they deem appropriate to the circumstances even if it seems manifestly inadequate. However, the reasons articulated in a sentencing decision can only be those indicated as appropriate in the *Sentencing Act* 1991.

TOULMIN ARGUMENT MODEL

Toulmin (1958: 94-145) proposed a method of structuring an argument that was not mathematical in nature. The Toulmin model is jurisprudential. It is concerned with showing that logic can be seen as a kind of jurisprudence rather than science. The jurisprudential nature of the Toulmin argument structure means that it is process focussed and more useful in structuring an argument after it has been articulated. It is able to capture arguments regardless of content. The focus on the principles of legal reasoning and on the rigours involved in advancing and then defending that argument indicates that Toulmin might have been more concerned with dialectical argumentation. So does the inclusion of the rebuttal element. Toulmin does not however indicate explicitly a concern with dialectical argumentation. The procedural nature and simplicity of the Toulmin model mean that argument chains can be constructed by linking together single argument units. The claim of one argument can be used as the data item for the next.

The Toulmin argument structure offers those interested in knowledge engineering a method of structuring domain knowledge. It also makes it possible for the reasoning behind certain claims to be made explicit. In any system that will be of use to decision makers, reasons for decisions are important, especially for transparency. Stranieri and Yearwood (2005) present a list of other attempts to use the Toulmin argument model as a method of structuring reasoning and modelling discourse. Knowledge representation has fallen into two main areas, dialectical and non-dialectical. The Toulmin argument model is used in structuring the reasoning in judicial sentencing in a non-dialectical manner, as it is delivered by the judiciary. A sentence verdict is not a dialogue between two parties; it stands like a tombstone unless challenged by an appeal. Stranieri *et al* (2000: 326) have suggested that discretion is intimately associated with the way knowledge is represented. They suggest that the way in which discretion is operationalised in particular knowledge representations is important for the design of computer-based systems that support decision makers. While this may be particularly obvious to policy makers who construct complex legislation, it has not been recognised or articulated very often in information systems research. A rule-based system offers no discretionary action to a user; similarly, a mandatory sentencing scheme offers little discretion to a sentencing judge. It would be inappropriate to attempt to capture the complicated discretionary area of sentencing by a rule-based system, since there would be too many rules and as a result the system would be virtually useless to all but the most patient users. Davis (1969: 217) argued that, while discretion is necessary, it is essential to find the optimal level of discretion available for decision makers to ensure justice for individuals. For the same reason of ensuring justice for individuals, it is important to find the optimal vehicle for modelling discretionary action.

Stranieri *et al* (2001) and Stranieri and Yearwood (2005) have described in detail the workings of the variation to the Toulmin argument structure known as the Generic/Actual Argument Model (GAAM), which has been used to model other legal domains (Split-Up in family law, Stranieri *et al*, 1999, Zeleznikow *et al*, 2001).

A TOULMIN BASED MODEL OF SENTENCING

The GAAM represents a variation of the model advanced by Toulmin (1958). Arguments are represented at two levels of abstraction: the generic and actual. The main changes to the original structure include: (1) a variable-value representation of claim and data items, (2) a certainty variable associated with each variable-value rather than a modality associated with the entire argument, (3) reasons for relevance of the data items in place of the warrant, (4) a list of inference procedures that can be used to infer a claim value from data values in place of the warrant, (5) reasons for appropriateness of each inference procedure, (6) context variables, (7) absence of the rebuttal feature and (8) the inclusion of a claim value reason. The following diagram represents the GAAM template.

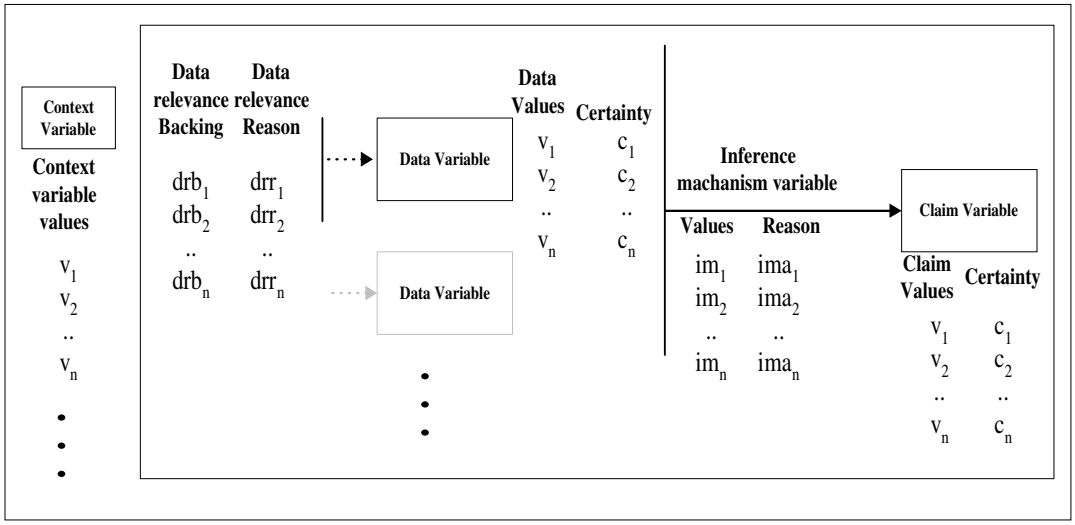

Figure 1. GAAM template.

The generic argument is a representation of the particular domain being modelled, where the following components are set: (1) claim, data, and context variables are specified but no values are assigned, (2) relevance reason statements and backing statements are specified, (3) inference procedures are listed, (4) reason for inference procedure is specified, (5) claim and data variables are not assigned certainty values. The generic argument is general enough to model the discretionary behaviour of a judge in deciding a sentence. It is contended by Stranieri *et al* (2001: 341) that this method of representing knowledge corresponds to a non-dialectical perspective. It does not model the direct exchange of views between discursive participants, but instead describes assertions made from premises and a way that multiple claims can be organised.

These changes to the original Toulmin model facilitate a machine-based implementation of knowledge representation. Context variables allow the actual argument to be contextualised, for example to a sentence for client John Doe. The Toulmin warrant has been replaced by two components: an inference procedure and a reason for relevance. Stranieri and Yearwood (2005) show that the warrant can indicate a reason for the relevance of a data item and on the other hand the warrant can be interpreted as a rule which, when applied to the data items, leads to a claim inference. The inference method can be an algorithm or some other method used to infer a claim. One of the most important variations to the original Toulmin structure is the removal of the rebuttal element, which makes the GAAM model firmly non-dialectical in character.

Stranieri *et al* (2000) have presented a discussion concerning the way discretion manifests itself in different modelling techniques. They contend that the original Toulmin model facilitates

discretionary action in constructing arguments, and suggest three manifestations: (1) a decision-maker can add or remove data item factors, (2) a decision-maker can use an inference procedure of their own choice to infer a claim from data items, (3) a decision-maker can leave reasons for relevance, inference procedure and reasons for appropriateness of inference procedures implicit. This is further expanded in Stranieri and Yearwood (2005) where they suggest that discretionary action by decision-makers is further enhanced by the GAAM by (1) adding data items in the actual argument not in the generic tree, (2) removing data item factors from the actual argument that is in the generic tree, (3) selecting data, claim or context variable value from those specified in the generic tree, (4) selecting data, claim or context variable value that has not been specified in the generic tree, (5) selecting an inference procedure from the list specified in the generic tree, (6) leaving data items, reasons for relevance, inference procedure and reasons for the appropriateness of inference procedures implicit, (7) introducing a claim value reason statement, and (8) selecting certainty values.

The modelling framework integrates two techniques: decision trees[2] and argument trees which derive from the GAAM. Discretion is operationalised as the selection of alternate ways to combine existing factors and to include or ignore new factors, and is therefore appropriate for modelling reasoning in 'bounded discretion' fields such as sentencing. Figure 2 illustrates a decision tree. Nodes represent decision points and the possible outcomes of each decision are captured in arcs emerging from the node and ending in leaf nodes.

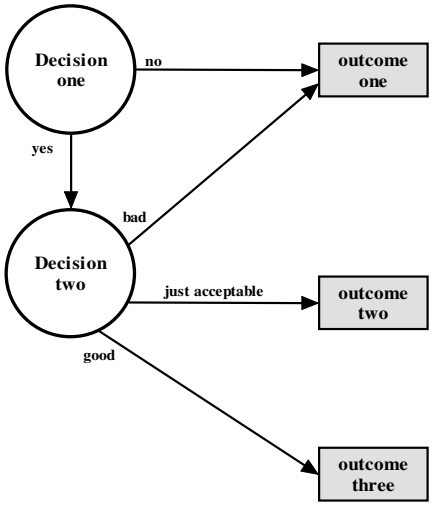

Figure 2. Rule-based procedural knowledge model.

Decision one in Figure 2 has two possible outcomes: *'no'* leading to a conclusion (outcome one) and *'yes'* leading to a second decision. Decision two in Figure 2 has three possible outcomes: *'good'*, *'bad'* and *'just acceptable'* with no explicit rules for deciding between them. The shadow indicates that further information about this decision is available in a second diagrammatic model. Such decisions with discretionary elements are modelled using an argumentation technique.

[2] A decision tree is an explicit representation of all scenarios that can result from a given decision. The root of the tree represents the initial situation, while each path from the root corresponds to one possible scenario (Zeleznikow and Hunter, 1994).

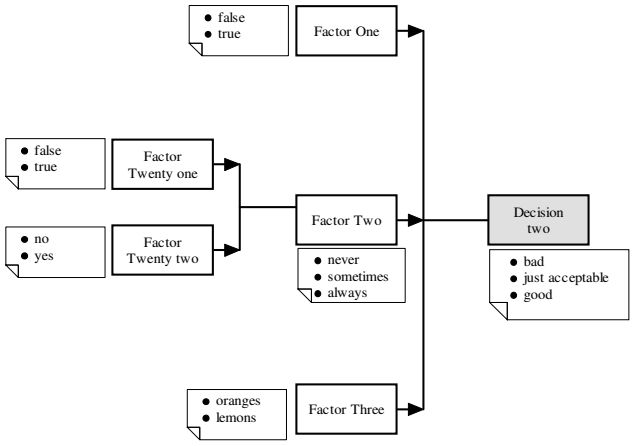

Figure 3. Argument tree

Argument trees derive from a model of structured reasoning called the GAAM advanced by (Stranieri *et al,* 2001). The trees are hierarchies of relevant factors where the root node or culminating factor is a decision tree node. When discretion is present, argument trees are used to further refine the knowledge depicted as directed graph nodes as for example, Decision two in Figure 2 is further elaborated in Figure 3.

Figure 3 illustrates an argument tree with nodes representing factors that are relevant for inferring nodes higher in the tree. For example, Figure 3 shows that '*Factor One*', '*Factor Two*' and '*Factor Three*' are all relevant for inferring '*Decision Two*'. However, how these three factors combine is left unspecified. Further, the value of '*Factor Two*' is inferred in some discretionary way from the values of '*Factor Twenty One*' and '*Factor Twenty Two*'. The values of '*Factor One'*, '*Factor Two*' and '*Factor Three*' are used to infer whether the '*Decision Two*' outcome is '*bad*', '*good*' or '*just acceptable'*. This in turn is fed back to the decision tree depicted in Figure 2.

The argument tree provides a diagrammatic representation of the structure of reasoning. The tree can be elicited from experts in a 'bounded discretion' field of law. Once the structure is explicated a variety of methods can be used to model the way in which factors are combined to infer values at the next level. Stranieri and his colleagues trained neural networks, a machine learning technique from artificial intelligence, from past cases in family law (Zeleznikow *et al,* 1996; Stranieri *et al*, 1999).

The modelling phase was conducted by knowledge engineers in conjunction with domain experts to establish the practical nature of the sentencing environment in Victoria. After reading the relevant parliamentary acts governing the Victorian sentencing system, both knowledge engineers and domain experts developed the decision and argument trees. The modelling procedures and steps are more fully discussed by Hall *et al* (2005). The decision trees (figures 4 and 5) for the project are present below, along with two of the argument trees (figures 6 and 7).

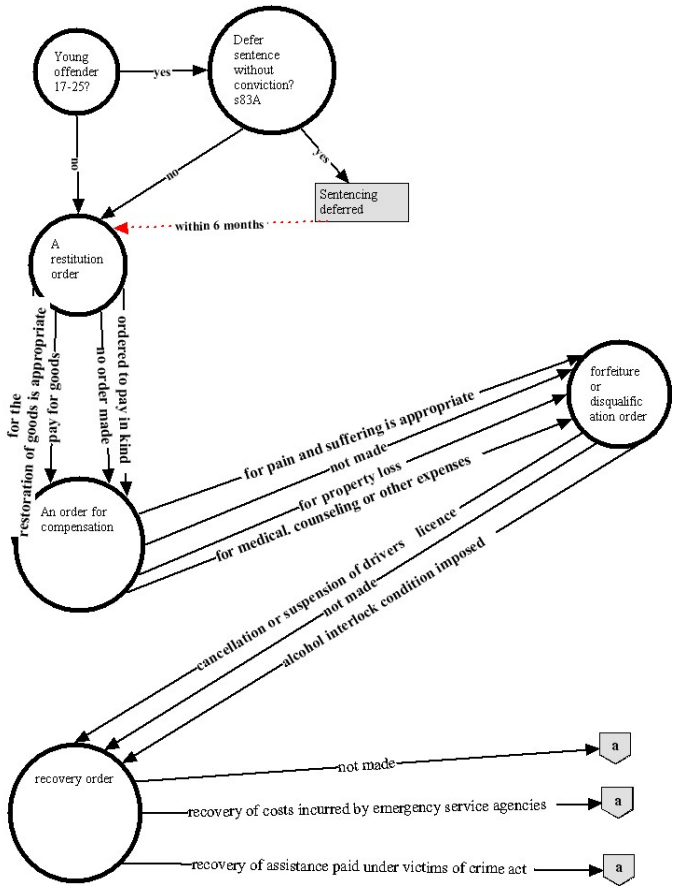

Figure 4. Decision tree 1.

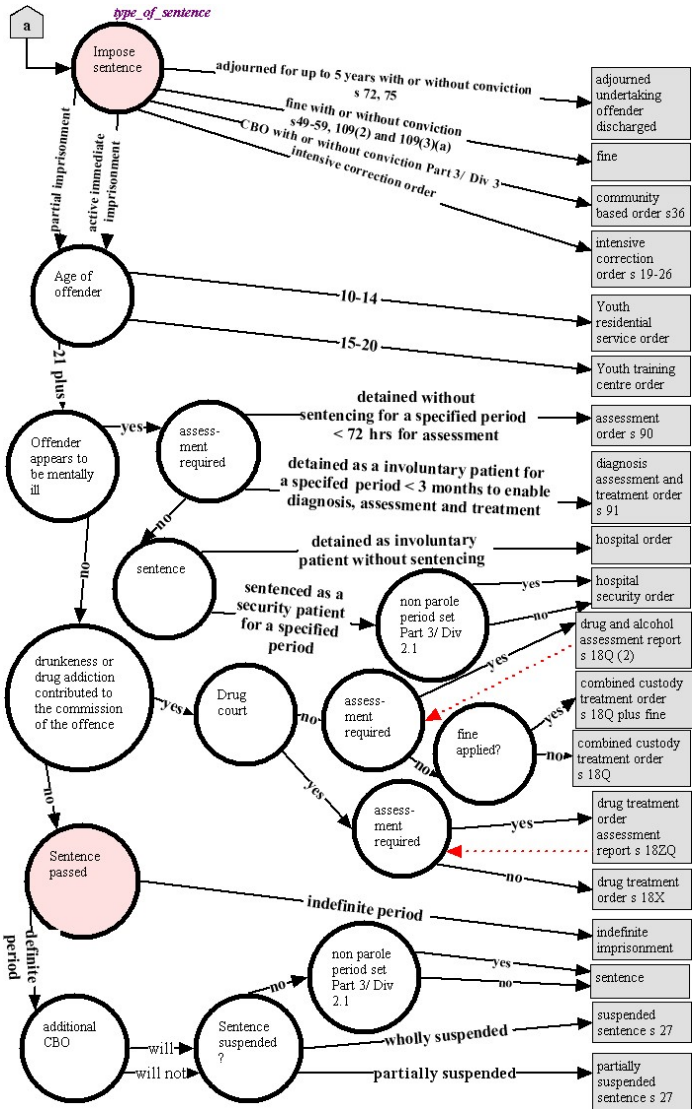

Figure 5. Decision tree 2.

Figure 5 represents the procedural decision tree. The 'impose sentence' area is a discretionary element and the factors which influence the decision are shown below (figures 6 and 7).

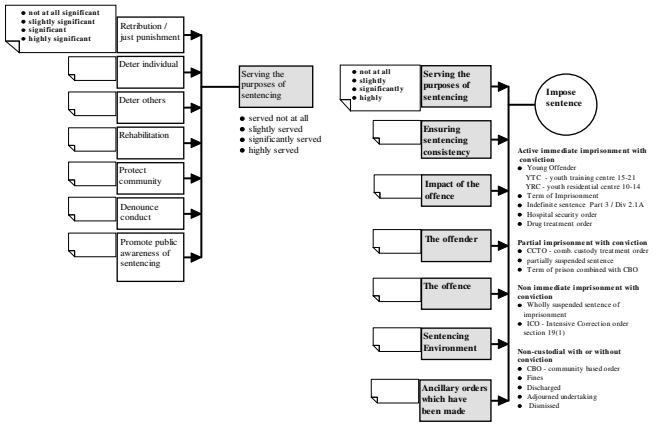

Figure 6. Top level argument tree with expansion to the first node.

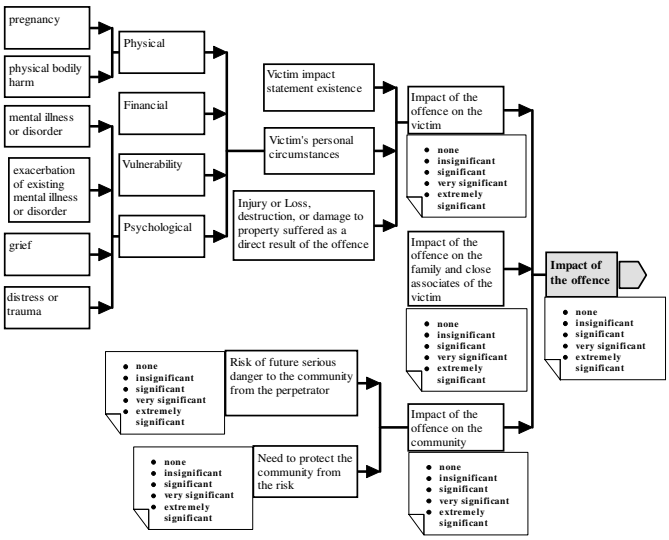

Figure 7. Argument tree for the 'impact of offence' node.

In each of figures 6 and 7 there are data values for only a few of the nodes. The argument trees are the most contentious elements of the modelling process and require many iterations of refinement involving both knowledge engineers and legal experts. A working prototype system without weights has been constructed but is being reviewed to take account of legislative change. It was constructed using an expert system shell justReason[3]. This is open source software designed for encoding knowledge as decision and argument trees for the rapid generation of web programs. The open source version of the shell program has a built-in weighted sum mechanism for implementing argument tree inferences. A system (GetAid) that utilises the same software has been constructed for VLA by JustSys and has been rolled for use by VLA assessors. Below in figure 8 is a one of the screens from the prototype system. It can be seen in the figure below that the argument tree represented in figure 5 (above) is represented as the 'not sure' button. Selection of this button drills the user down into the list of prompts that derive from figure 6.

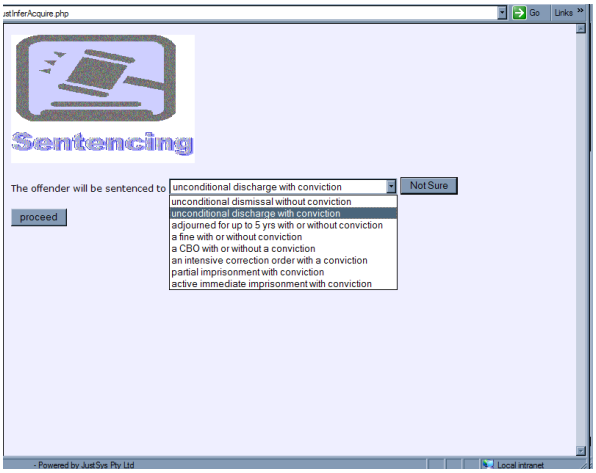

Figure 8. Screen shot of justReason constructed sentencing prototype

The figure below (figure 9) shows the screen that the knowledge engineer uses in conjunction with the domain experts to set weights for the weighted sum formula that the program uses to model the way decision makers combine factors in sentencing.

[3] The software is available for download at www.justsys.com.au

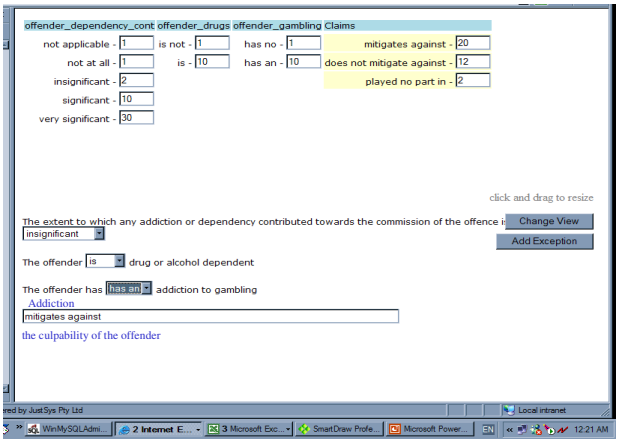

Figure 9. Inference weights capture page.

At present weights and thresholds cannot be derived from databases of past sentencing decisions because the data either are not available[4] or if available are stored only in narrative form as in higher court judgements. Besides, ensuring legislative consistency for the knowledge represented data for the system is the next major hurdle.

CONCLUSION

The Toulmin model, although probably intended as a method of exploring arguments in a more theoretical setting, is finding itself used more and more in representing knowledge in different types of decision support systems. The GAAM presented above shows that it is possible to represent complex knowledge in a non-dialectical manner and that discretionary action can be modelled and hopefully predicted. The great benefit of this type of system comes about as it begins to make the 'art' of sentencing more transparent and open to scrutiny. Even though the system is not designed for the judiciary to use for decision support for their own sentencing requirements, it could be used in helping to train judges and magistrates. This system, once in use by VLA, will hopefully provide a method for lawyers, both experienced and inexperienced, to make better arguments for sentences for client before the bench.

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[4] This is especially the case in the lower courts in Victoria where, even though a sentence is handed-down by a magistrate, the reasons for the sentence are often not recorded. The only way to capture these reasoning behind the sentences in these situations is to be present at sentence pronouncement.

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