



The Application of Judicial Intelligence and ‘Rules’ to Systems Supporting Discretionary Judicial Decision-Making^{*}

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Abstract. This article critically examines approaches to the production of systems of support for discretionary judicial decision-making in sentencing. The aim of the article is to attempt to illuminate the character of discretionary judicial decision-making and how academic research has informed the attempt to model the exercise of judicial discretion. Briefly placing the development of decision support systems for judicial sentencing in the context of world-wide themes in sentencing reform, the article proceeds to focus on various attempts to produce systems of decision support for sentencing. It then briefly explores two of the key issues (‘impact’ and ‘institutional authority’) which may determine the future support of such systems. If systems of decision support for judges are to have a future then they must not only be accepted at an institutional level, but also be seen as valuable by those for whom they are designed. Thus, the application of ‘judicial intelligence’ is unavoidable. Underlying the judicial sentencing decision process is some conception of ‘similarity’ between cases. How, then, should this ‘similarity’ be represented? Traditionally, representations of similarity have tended to be informed by ‘the legal-analytical’ paradigm. The supposedly basic building blocks of case information (‘offence’ and ‘offender’ and ‘aggravating and mitigating’ factors) are critically considered. It is argued that systems based on a ‘legal-analytical’ paradigm are limited in their representation of the decision process. These limitations, it is suggested, may be overcome by adopting an approach which tries to represent the informal schema of understanding which decision-makers employ and the holistic way in which they think about a case. It is argued, therefore, that judicial decision-making is amenable to modelling through the use of computer technology, but that there is a need to re-model our conception of judicial ‘intelligence’ on which such technology relies.

1. Introduction

Is it possible to build a system of computer-support to aid discretionary judicial decision-making? If so, how can that decision process be understood and that understanding be most appropriately represented? This article discusses the appli-

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cation of different conceptual approaches to information technology to the judicial sentencing process. Perhaps more than any other group of users in legal domains, the effectiveness of a decision support system for judges is determined by judicial acceptance. While in other areas, users may feel obliged to consult a decision support system, in sentencing, judges who may be confronted with a system which seems alien to judicial intuition can immediately invoke the powerful currency of 'judicial independence' to eliminate the expectation that judges ought to be influenced by a such computer system, or, indeed any other form of systematic information or education (see for example, Armytage, 1995).¹ Thus judges enjoy wide legally-defined 'discretion' in deciding whether or not to accept the introduction of a decision support system. How can decision support systems be accepted by judges and be genuinely effective? This article examines how the conceptual content of computer programmes intended to support judicial decision-making can increase the likelihood of their acceptance and usefulness to their users.

Consideration of judicial sentencing support systems as a means of allowing reform of sentencing practice necessitates at least some discussion of reforms world-wide in recent years. Over the last twenty years, many Western jurisdictions have taken various steps to reform the sentencing process (Ashworth, 1992b; Tata, Hutton, Wilson, & Paterson, 1996; Hutton & Tata, 1995).

2. International Reforms in Sentencing

The primary aim of this wave of international reforms has been to reduce disparity and promote consistency in sentencing (Ashworth, 1992a). Consistency in sentencing requires that like cases are treated in a similar way and conversely that dissimilar cases receive different sentences (Council of Europe, 1993; Hutton, Paterson, Tata, & Wilson, 1996).

It has been the 'just deserts' approach to sentencing which has, in part, influenced most of the approaches to sentencing reform (Ashworth, 1992a). This approach argues that sentence ought to be proportionate to the seriousness of the offence and not based on the character or past conduct of the offender (von Hirsch, 1976, 1993). Reforms in Scandinavia have used a narrative form of guidelines to guide sentencers as to how the principle of desert should be properly applied (von Hirsch & Jareborg 1989; Jareborg, 1994). Arguably, the Criminal Justice Act (1991) adopted a similar approach for England and Wales. In general, the US approach to sentencing reform has been to construct numerical guidelines which specify a limited range of penalty for particular offence categories (Wilkins et al.,

¹ It is, of course, arguable that sentencing does not necessarily have to be located at a judicial level. Location of sentencing powers within Executive institutions would not necessarily offend classical scholarly theories of 'judicial independence' (indeed many sentencing or quasi-sentencing functions have been acquired by the Executive, such as the prosecutor fine, parole and remission etc.). However, my point here is to stress the power of assumed 'commonsense' notions of 'judicial independence' which proclaim judicial ownership of sentencing.

1978). These were introduced into a number of state jurisdictions, the most well known being the Minnesota Guidelines (Tonry, 1996), and most controversially, in 1987 the U.S.-wide Federal Guidelines were introduced. The relative inflexibility of numerical guidelines considerably reduces the element of judicial discretion in sentencing and they have thus not been popular with judges (see Tonry, 1987, 1992 and 1993; Freed, 1992; De Benedictis, 1993).

These U.S. guidelines were all formulated by a sentencing commission or committee appointed by the government for the purpose. Sentencing commissions have also been formed to provide advice for governments, e.g. in Canada, the state of Victoria in Australia and a number of US states (Ashworth, 1992b). These have had a very mixed reception from governments. The Canadian guidelines have not been implemented while the Victorian Sentencing Act was passed in 1991.

3. Computer Support to Aid Sentencing Decision Making

Computer systems have been used both to support sentencing reform, and as a reform in themselves. However, in developing such systems we need to pay close attention to conceptualising the decision process of that domain. Oskamp, Tragter, and Groendijk (1995) suggest that in AI and law research, “[t]he impression is sometimes given that the (legal) assignment to be carried out by the system is of secondary interest”. (1995: 213) Instead, they argue, research needs to focus more explicitly upon the appropriateness of different strategies of system modelling for different domains and for different purposes (Oskamp, Tragter, & Groendijk, 1995). By implication, closer examination of the appropriateness of different strategies necessitates the need to pay closer attention to the nature of that domain. In the following section, I review briefly the attempts which have been made to develop decision support systems for judicial sentencing focusing on the model of judicial discretion upon which these systems have been based.

3.1. THINKING ABOUT MODELLING JUDICIAL DISCRETION

Bench-Capon (1994) and Zeleznikow and Hunter (1994) have argued in favour of the development of computerised representation of legal rules to assist decision-making. Zeleznikow and Hunter (1994) take the reader through a brief tour of legal theory in relation to building intelligent information systems. They present a debate between ‘Legal Positivists’ who argue that law can be represented by “... a settled body of rules ...” (p. 63) and ‘Legal Realists’ who take “... a more extreme approach and reject the categorisation of law as fundamentally about rules” (p. 53). Having acknowledged the centrality of the debate they introduce, the authors conclude that “... the majority of cases should be decided on something approaching a positivist approach”. However, this conclusion seems to be more as a result of a pragmatic preference than of a theoretical argument, (other than to say that strong legal realism is “... an unlikely conclusion and one which many would not

accept”). Why is there a temptation to prefer a positivist approach over other (such as ‘legal realism’, or, sociolegal) perspectives? Alldridge (1997) suggests that in thinking about the relationship between computers and law there is a tendency “. . . towards a highly formalistic positivism”. He raises the question as to whether this form of “‘legal reductionism’” (involving “if p then q ”) is, in one sense, highly practical:

[T]he advantage in computers and law is that as soon as the ‘legal’ operation is characterised as an *if p then q* operation, then it becomes easy to perform it with a computer If you are going to use computers in legal contexts, the pressure which computers generate is towards a rule-bound framework, because it is what they do best The link is a contingent one – there is no logical one, but a practical one. (Alldridge, 1997: 3–4, original emphasis retained)

Allridge argues that the most significant changes in law over recent years have been brought about by computers. He argues that sociolegal study has not engaged sufficiently with these developments and that they demand its consideration. Although not dealing directly with decision support systems, Allridge implies that the challenge for the sociolegal tradition is to research and develop systems which avoid the seduction offered by the practical convenience of positivist ‘legal reductionism’.

I would suggest that this positivistic, legal reductionist approach to decision-support systems is founded on a restrictive view of the sentencing process as one which is fundamentally prescribed by formal rules. There sometimes appears to be a presumption in this positivist rule-based approach that ‘rules’ are (or should be) formal legal rules, rather than behavioural rules (Hawkins, 1992). This presumption ignores the inter-connection between social and legal processes during the criminal process which set the agenda for the formal sentencing decision. Reliance on such an approach may help to explain the difficulties which confront the design and application of current rule-based systems. (See for example, difficulties reported by Hassett (1993) in producing a ‘Bail Advisor’). This is not to say that decision support systems based on a positivist legal reductionist model do not have a role to play, but simply that, as Oskamp, Tragter, and Groendijk (1995) imply, more critical attention needs to be paid to the application of such approaches to discretionary judicial decision process. I would suggest that alternative approaches merit serious consideration when we think about developing judicial decision support systems even if the implementation of such approaches may still be relatively uncharted.

However, attempts have been made to move away from a simple positivist ‘if p then q ’ image of judicial sentencing. A hybrid approach involving both rule based and case based systems has been developed by Bain (1989). The programme begins with an empty case-library and a handful of heuristics for deciding sentences when no cases can be applied to a new situation. After only a few cases, however, it begins to retrieve ‘reminders’ of its own cases from memory and to modify the strategies associated with those cases to form new sentences.

The idea of a case based reasoning system unsupported by heuristics has also been used as a basis for modelling the sentencing process. Murbach & Nonn (1991) report progress on a project to develop a sentencing support system for fraud cases in Canada. Their system provides information about penalties but also includes information on case factors not included in the categories of offence used in the penal code but agreed by judges to be relevant to sentencing. There is thus an attempt to include information which reflects judicial perceptions of seriousness in order to make the system more sensitive and thus more useful to sentencers. Computer technology has been used to assist these reforms and to encourage greater consistency in sentencing. ASSYST (Applied Sentencing systems) has been developed by the US Federal Court system so that criminal justice personnel could easily compute, record, archive and examine the implications of the US Sentencing Commission Guidelines (Simon & Gaes, 1989; Simon, Gaes, & Rhodes, 1991).

Schild (1995) reports work in progress to develop a case-based advisory system for sentencing. The domain knowledge was elicited from a senior judge, and the system uses "hierarchical discrimination trees" in order to retrieve relevant information. Schild notes that:

[i]t is obvious that the area of sentencing is associated with an enormous amount of both common-sense and domain knowledge. However, a model which would include this knowledge was considered impracticable and so it was therefore decided to use only the domain knowledge without any additional common-sense knowledge..(Schild, 1995: 232)

A part-simple retrieval system, part-expert system approach to sentencing support has been reported by Bainbridge (1991). The system focuses on sentencing practice in magistrate courts in England and Wales and contains components covering sentencing law and penalty statistics. The sentencing law component is intended to assist the magistrate by checking that the chosen sentence complies with relevant sentencing law. This part of the system is arguably more like an expert-system than a simple retrieval system, although it only answers the question, 'Is this sentence legally competent?' rather than, 'What is the appropriate sentence for this case?'. When a judge has selected a legally competent sentence, it is then possible to consult the penalty information section of the system. This shows the distribution of penalties for the offence in the form of probability calculations. Information is only available for two statutory offences of theft and burglary and for only 600 cases from four magistrate courts.

Database technology has been used in a number of large scale information systems. Such systems, generally referred to as 'Sentencing Information System', have been implemented in a variety of jurisdictions and used in practical, day-to-day basis to support the sentencing process. What is perhaps striking about such systems is that appear, at least at first blush, to be simple databases. They are not intended to carry out any retrieval process which is not transparent to the judge; all the machine is doing is counting cases. However, as every statistician knows: anyone can count but does s/he know what and how s/he is counting? First,

however, it is useful to examine attempts to build, implement and institutionalise such information systems.

3.2. SENTENCING INFORMATION SYSTEMS

A Sentencing Information System provides users with information about the range of penalties which have been passed by the court for similar cases in the past. The system allows the judge to enter certain information about the case which he is considering and the range and quantum of penalties passed by the court for similar cases is displayed.

Formally, a Sentencing Information System is descriptive rather than prescriptive. That is, it contains no guidance as to how a sentencer might use this information to help in making the sentencing decision in a particular case. A Sentencing Information System (SIS) can display the range of sentences for the particular combination of offence and offender characteristics selected. The sentencer is given no instruction as to what extent and in what direction the appropriate sentence for the case at hand should vary from the average. This decision is a matter for the discretionary judgement of the sentencer. However, the frequency distribution indicates the highest and lowest sentences previously passed for the type of case at hand. In a well trodden area it might be assumed that a sentencer would have to have good reasons for straying outside the upper and lower limits.

Jurisdictions in Canada and Australia have experimented with Sentencing Information Systems. These are described briefly below.

3.2.1. *Doob and Park System*

One of the earliest systems was designed by Doob and Park in Canada and it operated for six years in four provinces (British Columbia, Manitoba, Saskatchewan, Newfoundland) (Doob & Park, 1987). By 1990 only the Saskatchewan system was still in operation, in the latter stages, using only Court of Appeal information. Doob has explained why he thinks judges did not make sufficient use of the system. There are two main reasons. First, judges in Canada had little interest in information about current court practice. They are not accustomed to using information in this numerical form nor does their legal tradition give any weight to current sentencing practice. Second, such authority as exists in sentencing comes from the Court of Appeal. The Sentencing Information System carried no institutional authority (Doob, 1990).

3.2.2. *The British Columbia System*

This system operated in British Columbia from 1987 to 1992 (Hogarth, 1988) but is no longer operating. A private communication with the IT director suggests there were two main reasons. First, there was insufficient judicial consultation and involvement, particularly in the early stages of the project. Judges therefore felt that

the information provided by the system was not helpful to them. Second, the costs of the system, although not revealed in detail, were very high. Schild (1995) has suggested that Hogarth's system may be subject to criticism because "... the statistical knowledge embodied ... is based on a very small number of characteristics. This does not suffice to express the actual complexity of the sentencing process". He also criticises the structure of system: it quickly runs out of cases since there are no hierarchies between 'variables'.

3.2.3. *The Australian New South Wales Sentencing Information System*

The New South Wales (NSW) SIS is now a discrete component of a larger judicial information system known as the 'Judicial Information Research System' (JIRS) which also includes components on industrial, land and environmental law. Nonetheless, it is probably fair to say that the SIS remains the most consulted component.² The New South Wales SIS is connected to all NSW Judicial Officers and contains a Court of Criminal Appeal Judgements Component containing over 3,000 full text judgements mainly dating from 1990. Cases can be retrieved by case name or by a word search. Allied to this is a Court of Criminal Appeal summaries component retrieving summaries prepared by staff of the Commission. A hypertext link allows the user to view 'sentencing principles' database which is also prepared by the staff of the Commission. The Sentencing Statistics Component is split into Local Court data (with around 170,000 cases over the past two years, and Higher Courts' (District and Supreme Court) data with around 20,000 cases over the last six years. Data is drawn from the NSW Bureau of Crime Statistics and Research. Other NSW SIS components include a Sentencing Law; a Facilities Component (concerning the availability of various services and disposals), and a Sentencing Date Calculator (used to calculate the exact date for the commencement and ending of minimum and additional custodial terms) (Potas, 1997; Potas et al., 1998).

The progressive expansion and development of the NSW SIS could be seen as a sign that judicial officers have found (or discovered) a need for easy access to systematic information about 'normal' sentencing practice and that the system is both supported and regularly consulted by judges. There has, however, been no programme of systematic evaluation of the extent of and nature of usage of the system. At first blush, this seems rather surprising given the resources that the system requires for development, maintenance, training etc. However, it could be argued by the Commission that there are good reasons for delaying evaluation of the nature and extent of consultation.³ The NSW Judicial Commission has recently re-engineered the system and, the argument might go, there would need to be a

² Reports from the NSW Judicial Commission.

³ The Judicial Commission does however maintain evaluation material informally including for example the number of 'log-ins' to the system and it is possible to see where and for how long the system was used by any particular judge. (One judge has refused to use the system because of this ability to track usage).

period of around two years before a systematic programme of evaluation became meaningful.

3.2.4. *The Scottish Sentencing Information System*

The initiative for this project came from the Lord Justice-Clerk, the second most senior judge in Scotland, who had seen the New South Wales system demonstrated in Canada at a Conference of the Commonwealth of Learning and decided that it might be useful to have a similar system for the High Court of Justiciary. With the support of the Lord Justice-General, The Lord Justice Clerk approached the Law School at the University of Strathclyde where there was existing relevant expertise. The Scottish Office provided funding for a feasibility study which ran from June 1993 to January 1995 which produced a prototype.⁴ The operation and description of the taxonomic issues is documented elsewhere (e.g., Hutton, Tata, & Wilson 1995; Tata, Hutton, Wilson, Paterson & Hughson, 1998).

The Scottish Courts Administration is currently funding (from November 1995) the first phase in the implementation of the prototype. This involves the delivery of the system to up to fifteen judges over the course of one year and on-going study of how the system functions when operated within the day-to-day judicial and sentencing environment; as well as its utility so as to identify weaknesses and areas needing further development (see Tata, 1998a). This first phase of implementation has also begun conceptual work on an Appeal Court Judgements Database to be subsequently incorporated into the SIS (Tata, Hutton, Wilson, Paterson, & Hughson, 1998). Perhaps a distinctive feature of the Scottish SIS is that the data which it uses is not drawn from official sources but is collected specifically for the system. This allows a relatively high degree of flexibility and specificity in the representation of data. However, not only must decision support systems deal with the source, quality, and structure of data, but perhaps equally important is institutional acceptance and support to which I will not turn.

3.2.5. *The Institutionalisation of Information Systems*

In its White Paper (Scottish Office Home Department, 1994), the government welcomed the Sentencing Information System initiative and indicated that if it was workable and successful, similar systems might also be considered for the lower courts. It would therefore appear that there is some government support for sentencing information systems. While the future of the Scottish SIS seems to enjoy generally strong judicial support there are perhaps two broad issues which will require further attention. First, unlike the New South Wales SIS, an operational Scottish SIS may well need to enjoy direct institutional protection. There does not yet appear to be any long-term plan for the system to be run by an official body

⁴ This was developed in close consultation with the High Court judiciary. Regular and frequent meetings were with a 'judicial sub-group' and successive early prototype versions were also presented to 'judicial seminars'. See Hutton, Paterson, Tata, and Wilson (1996) for fuller details.

directly responsive to judicial needs. In New South Wales, on the other hand, the SIS is administered by the Judicial Commission of New South Wales. In Scotland, however, the possible absence of an official body with a direct interest in defending the system from criticism and resource pressure may leave it vulnerable. Secondly, given this possible future vulnerability to public and resource pressures, it may be difficult to lobby for funding to improve and expand the system in response to judicial requests for more or different information. As with any computer system, the SIS will require to evolve and improve over time. The apparent ability of the New South Wales system to do this may help to explain its longevity and apparent success compared with its North American forebears.

Closely inter-related with the question of institutionalisation are the questions of the 'impact' and institutional authority of systems.

3.2.6. *Impact and Institutional Authority*

One of the most intriguing questions which will need to be explored will be the extent to which the introduction of information technology will change the nature of sentencing practice. Although there may be no formal requirement for judges to consult the system and take note of its information, there are reasons to suppose that judges may feel informally encouraged to use the system and indeed that it may significantly impact on judicial sentencing behaviour. Indeed, the very process of building such systems in close consultation with judges means that systematic discussion of issues and practice is disseminated within the judicial community. (For further explanation of this point see Hutton, Tata, & Wilson, 1995).

Some commentators have suggested that, given the relative dearth of systematic information about sentencing practice "judges ought not only to be provided with, but would positively delight in, access to detailed information [about sentencing practice]" (sic, Zdenkowski, 1986: 232; see also Ashworth, 1997; Hedderman & Gelsthorpe, 1997). However, Doob's reflections on judicial use of the system which he developed in Canada are sobering. He has described the slow "closing out" of that project and questioned the assumption that (Canadian) judges, far from 'delighting' in knowledge about current practice, actually '... want to have easily accessible to them knowledge of current sentences being handed down in comparable cases ...' (Doob, 1990: 2). Indeed the claim that judges report that they are more concerned with 'internal' or personal consistency than with inter-judge consistency has been documented by other studies (Tarling, 1979; Hutton & Tata, 1995). The reason for this, Doob argues, is simply that judges operate within an environment which does not reward attention to "current practice". Essentially, Doob has argued that from his experience, and also (he implies) from the similar fate met by Hogarth's system, judges do not perceive there to be a need for this kind of information about 'normal practice'. Since judges cannot be coerced into paying attention to such information systems, then judges do not perceive a 'need' for such information. The crucial determinant of authority, Doob suggests, may lie in the legitimation of such systems by the Appeal Court:

Our experience in Saskatchewan, where the project seems to be most successful, suggests that it is important to have the system 'legitimized' by a part of the system that has the authority to do this. I am reasonably sure that it is very important that the prime authority for our involvement in Saskatchewan is the Court of Appeal. (Doob, 1990: 12)

To what extent has this institutional involvement been possible in Scotland and NSW? In Scotland the initiative for the SIS came from the Lord Justice-Clerk, the second most senior judge in Scotland, with the support of the Lord Justice-General and a number of other senior (Appeal) judges. However, while it has enjoyed this informal senior judicial support it is too early to say whether it will enjoy the more formal institutional support of the Appeal Court. The system has not yet been referred to by the Court of Appeal and its current status is as an informal, private judicial aid (Tata et al., 1998). While the initiative for the system in NSW appears to have been rather different (the Judicial Commission and its system were initially imposed on the judges (see for example, Basten, 1980; Basten, 1995)), it is now beginning to be possible to discern the formal institutional attitude of the Appeal Court towards the NSW SIS. Wetherburn & Lind (1996) argue that given the traditional reliance on appellate review in sentencing, "... the response of the NSW Court of Criminal Appeal is likely to prove to be pivotal in determining its usage". (Weatherburn and Lind 1996: 162) They remark that, "[a]t this stage the court's attitude to the SIS could best be described as lukewarm" (Weatherburn & Lind, 1996: 162), although more recent examination perhaps reveals that the picture may be more mixed than this and may be becoming 'warmer' (Tata, 1998b).

However, looking at the introduction of information systems with a rather more critical eye, a "lukewarm" judicial attitude in New South Wales can at least partly be explained by a limitation in the ability to retrieve what are seen by judges to be genuinely 'similar' cases. Arguably this weakness is, at least in part, derived from the use of official (typically police) data sources (Tata, 1997: 397–401). While the institutional support (particularly from the Court of Criminal Appeal) may be one key factor in ensuring judicial acceptance and use, another crucial factor relates to how judicial intelligence about sentencing is modelled and represented, an issue to which I shall now turn.

4. How can the Representations of Knowledge Enhance the Utility of Decision-Support Systems for Sentencers?

Aside from questions of political support and the relationship between information systems and judicial culture, a key question must concern the conceptual character of a system intended to support decision-making so strongly characterised by formal discretion. Although in one sense every case is unique (because each individual, social situation and context are unique), it is possible, at least in principle, to compare cases and therefore to say that some cases are 'similar' (Hood, 1962). The critical question, then, must be: 'how is 'similarity to be understood?'

Traditional academic understanding has largely been informed by 'legal analysis'. Below I argue that to-date attempts to construct systems of computer support for sentencing decision-making have tended to be rooted in a perspective which is primarily legalistic in outlook and analytical in its thinking. I would argue that systems based on this paradigm offer at best only a restricted understanding of judicial discretionary decision-making and therefore computerised representations modelled on such a perspective will be of only limited intelligibility to judges.

4.1. THE WEAKNESS OF THE LEGAL-ANALYTICAL PARADIGM

What are the characteristics of the 'Legal-Analytical' paradigm in its attempts to represent 'similarity' and what limitations does it have? Let us consider 'legal reductionism' and 'analysis' in turn.

4.1.1. *Legal Reductionism*

In developing decision-support systems for judicial sentencing, the starting point for representations of 'similarity' has tended to be a legalistic one (Bainbridge, 1991; Doob, 1990; Gruner, 1991; Henham, 1997; Hogarth, 1988; Potas, 1997). Systems search for 'like' cases or representations of 'like' cases primarily in terms of official legal convictions. However, in designing the Scottish SIS the appropriateness of such a starting point became increasingly unclear. From work with judges (Hutton, Paterson, Tata, & Wilson, 1996) and previous research with sentencers (Ashworth et al., 1984; Hogarth, 1971; Hutton & Tata, 1995; Wilkins et al., 1978) there was strong reason to doubt the view that judges think primarily in terms of classifications represented by official headline categories of the official criminal law 'headline' offence. Previous research (Fitzmaurice & Pease, 1986; Ashworth et al., 1984; Hood, 1962; Hood, 1992; Hutton & Tata, 1995), suggests that sentencing is determined by far more than the legal definition of the offence(s). Judges consider the circumstances surrounding the commission of offences as important. However, can the famous elasticity of common law offences or the famed precision of 'statutory offences mean that they would be sufficient building blocks for a decision support system? I argue below that neither would tend to be appropriate.

As in other countries where sentencing is conducted in a predominantly common law jurisdiction, in Scotland the strict common law headline offence category often provides little information as to the seriousness of the offence from the perspective of sentencing. A sentencer must not only consider the common law conviction, but also the circumstances of the events surrounding the commission of the offence. The 'headline' offence(s) (for example, 'Robbery', 'Rape', 'House-breaking', 'Theft' etc.), with which an offender is charged and convicted may be of limited relevance in deciding sentence. Very frequently, the common law headline conviction does not provide a sentencer with sufficient information about the circumstances surrounding the commission of the offence.

If common law offence classifications provide insufficient information about the circumstances of an offence and its attendant seriousness, it might be thought that statutory based offences provide sufficient precision for the consideration of sentence. After all, could the organisation of information not simply replicate all offences as they appear in Acts of Parliament? Aside from the practical considerations of operating such a system, there is a conceptual difficulty. While the creation of offences on the statute books are used to charge persons, they may often be of limited assistance when judges consider sentence. It is not clear how to organise statutory offences. One possibility would be simply to reproduce every section or even every subsection of every Act of Parliament relating to sentencing. However, this typically means that 'similarity' is determined less from the perspective of judicial sentencing and rather more from the perspective of the parliamentary draftsman (Hutton, Paterson, Tata, & Wilson, 1996).

An alternative course of action would be to arrange offence information in a way which is relevant from the perspective of sentencing. This might consequently mean that the arrangements of offences would not necessarily reflect the divisions within the criminal law. Thus the assumption that a decision support system's taxonomy should begin with the official criminal law headline offence category is very doubtful. Rather, the single most important criterion which judges consider is not the official criminal offence category, but its relative 'seriousness' (Wilkins et al., 1978; Fitzmaurice & Pease, 1986; Hutton & Tata, 1995). Although decision-support systems for sentencing have recognised the need to incorporate information relating to offence seriousness, the organisation of that information has still tended to privilege a legalistic starting point.

4.1.2. *Analysis*

While representations of similarity have tended to assume a formal legalistic starting point, conventionally there has been a recognition that there needs to be some account taken of factors which 'aggravate' and 'mitigate' the seriousness of the headline conviction. Typically, having selected the 'appropriate' criminal law classification the judge is then invited to add in standard aggravating or mitigating factors (Chan, 1991; Hogarth, 1988; Murbach & Nonn, 1991). What is striking about this approach is the additive and analytical nature of the representation of similarity. I would suggest that this analytical process of abstracting additive 'factors' from the whole case is an artificial representation of similarity. The abstraction of independent factors which purport to describe seriousness denies the relational meaning of information in a case. It assumes that a case can be meaningfully fragmented into discrete and abstract individual factors which can be analysed as if they each have a power independent of their own over the decision process. However, 'aggravating and mitigating factors' only make practical sense to the sentencer *in relation* to each other and to the whole case.

As an illustration, the reader is invited to consider one issue which has received surprisingly little attention: cases where an offender is convicted of more than one

charge. The legal-analytical approach would try to record each conviction separately, or, just one 'main' conviction. However, this does not appear to be the way that sentencers tend to think about cases (Hutton, Paterson, Tata, & Wilson, 1996). In considering sentence, judges do not seem to think about each conviction in a multi-charge indictment in isolation from each other and from the circumstances of the commission of the offences. Rather, they tend to view the case as a whole incident or narrative of events (Alschuler, 1991; Parton, Hansel, & Stratton, 1991). Therefore, in attempting to reveal the process of the decision-making of sentencers, empirical research has used sentencing vignettes (Ashworth et al., 1984; Corkery, 1992) rather than necessarily relying on criminal law classifications which are necessarily limited in the relevant information which they can offer the sentencer.

While the legal-analytical approach to representing 'similarity' of cases for the purposes of sentencing may be limited, there is a possible alternative perspective which I suggest below.

4.2. A SCHEMATIC AND HOLISTIC REPRESENTATION OF 'SIMILARITY'

Judges frequently turn to the cumulative and evolved wisdom of judicial experience represented by precedent for their decisions and also place particular emphasis on their personal experience. This 'experience' helps judges to interpret and schematise the mass of information with which they are presented. In developing this argument, let us consider research into discretionary legal decision-making more generally.

It has been established by cognitive psychology that humans are limited processors of information. From his field experimental research into the psychology of prosecutorial decision-making in criminal sentencing, van Duyne (1987) found that despite the considerable discretion which it afforded, prosecutorial decision-making could be characterised as "...one dimensional: the Prosecutor selected out of the total information on the case only those aspects which were consistent with a particular 'dimension' (e.g., 'professional', 'social misfit' or rehabilitation) and fitted these into simple conceptual schema". (at 147) Giller and Morris (1981) found that social workers use 'operational philosophies' (the means by which professional ideologies are mediated through the demands of practice):

Having located the moral character of the case, the social workers were able to respond with a repertoire of provisions which routinely met the case as portrayed. In this way, social work with offenders became ordered and rational and a work priority was established. Decisions were not 'made'; they emerged as natural logical, even inevitable ... (at 79-80)

If discretionary decision-makers are quickly able to characterise a case before them by making use of simple conceptual schema, why is it that discretionary decision-makers so often report experience of 'difficulty' with cases? Van Duyne (1987) concludes that the results from his study suggest that "[i]f sentencing is difficult,

it is because of its uncertainty, not because of its complexity In problem solving, (it is) necessary to restrict the information to one manageable dimension in order to avoid overload and uncertainty . . .” (at 151–152). Lawrence (1988) reports similar findings about the inferences magistrates made about available data. “Expert-novice differences were in the inferences they made . . . [E]xperts built up a picture of [the offender] or a patterned expectation . . .” (at 241). In a similar vein Emerson (1995) argues that “ ‘seriousness’ becomes routinized, institutionalized, built into the typification, as it were, rather than standing as an experiential feature . . . (at 167).

The model that decisions are in practice taken through a legal-analytical process characterised by a sequential, linear process comprised of formal and deductive reasoning is doubtful. Rather like other problem-solvers, lawyers and judges make use of experience to help them to schematise new cases. For example, Crombag, Wijkerslooth and van Serooskerken (1975) asked experienced legal problem-solvers to think aloud while solving a concrete problem. They found that,

[t]he most striking result was that what was said while thinking aloud created a rather chaotic and unsystematic impression. Often a person seemed to have a solution, although a provisional one, at an early stage for which he subsequently tried to find supporting arguments. Moreover, during the reasoning process, the subject did not seem to complete one part after another, but rather to jump wildly back and forth (at 169)

There has tended to be an assumption fostered both by the opinions delivered by judges in court (and sometimes reported by law journals) and also taken up by legal writers and researchers (e.g., Fox, 1994; Hogarth, 1971) that cases are most logically understood by breaking them down into two main components. As we saw above, the seriousness of the offence is often said to be broken down into legalistic classifications with aggravating and mitigating factors (e.g., Henham, 1997; Lovegrove, 1989; Moxon, 1988). Similarly, a conceptual distinction is made between the offence and ‘the offender’. So for example, it appears to have become received wisdom that it is normal practice for sentencers to begin by considering the criminal law conviction, then balance this according to the weight of ‘aggravating and mitigating factors’ and then turn to consider the previous convictions of the offender and finally his or her personal circumstances (e.g., Fox, 1994; Boyle & Allen, 1990). Rather, sentencing is better understood as an intuitive and relatively impressionistic process, but is not necessarily any less reliable for that. Indeed, Chi (1988) suggests that one of the differences between novices and expert decision-makers is the ability of the expert to arrive at a decision quickly but yet consistently and defensibly. Novices on the other hand tend to try to come to a decision according to a rather formalistic, linear, sequential and analytical structure. Expert decision-makers are in fact more reliable and consistent in their decisions since they are able to process information and make judgements on the basis of informal intuitive structures of ‘knowledge’ and associations.

Therefore, a more schematic and holistic approach would attempt to classify different narrative types of criminal conduct exclusively from the perspective of sentencing. In the shape of this more schematic-holistic approach there may be the ability for judicial decision support systems to capture the practical nature of discretionary decision-making rather than positing it as a sequential, legal-analytical set of discrete stages. The idea behind a schematic-holistic approach is to attempt to derive classifications from the mental schema around which judges, like all decision-makers, tend to operate. Thus, this approach would aggregate or split legal constructs, or, indeed 'invent' terms to sum-up informal judicial intelligence.

4.3. IS A SCHEMATIC-HOLISTIC APPROACH SIMPLISTIC?

It might be objected that the notion of a computer system which retrieves cases on the basis of a very small number of selections is too crude. Since it does not rely on official criminal law categories as a necessary starting point, it might be argued that such an approach overly-simplifies the intricate knowledge represented in each case by the criminal law. The attempt to produce such a typological representation of information about offences may be thought to be overly simple since the very idea of 'types' of cases denies the delicate and subtle complexities of the 'knowledge' represented by the criminal law. However, to make such an argument is to lose sight of the fact that this officially defined 'knowledge', or 'reality' is itself constructed for a particular purpose: securing convictions and acquittals. All criminal convictions are themselves typologies (Sudnow, 1964). Categories of criminal convictions do not, and necessarily cannot, reflect the full precise occurrences of 'what happened' during a criminal incident or series of related incidents (Bennett & Feldman, 1981). Rather, the criminal conviction for which a person may be sentenced is *necessarily* the result of a simplified and normalised representation of events. (Shapland, 1987; Curran & Chambers, 1982; Giller & Morris, 1981).

Both Shapland (1981) and Ashworth et al. (1984) suggest that what legal rhetoric refers to as the 'facts of the case' should not properly be regarded as 'facts' but as "... constructions of the circumstances forming the offence, stemming from the constructions made by the police (themselves very much negotiable and influenced by the individual views of detectives and the wishes of victims and witnesses) (Ericson, 1981; Ericson, 1982)". (Shapland, 1987) Thus the criminal process brings to the sentencer a typified stream of cases which intuitively suggest typical and schematic meaning about the nature and seriousness of the case. These provide the sentencer with cues about how the criminal process has constructed the seriousness of the case and its expectations of the sentencing outcome. From this vantage point of the criminal process, it becomes clear that the formal judicial sentencing decision is only one decision in the overall processing of a case for sentence. That decision is based on typical constructions of cases by their flow through the whole criminal process. Therefore, the attempt to analytically unscramble the judicial sentencing decision into individual factors so as to try to represent sentencing as a

formally sequential and deductive process is naturally likely to encounter judicial resistance.

What then of the attempt to model judicial thinking about criminal history ?

4.4. JUDICIAL INTELLIGENCE AND CRIMINAL HISTORY

How are understandings of similarity concerning criminal history represented by systems of decision support? The NSW system posits four groups of criminal histories (derived from official data): no prior convictions; prior convictions but not of the same offence type; prior convictions of the same type; prior convictions with imprisonment.⁵ Currently, the Scottish SIS records and retrieves information according to three *dimensions*: 'Jurisdiction' (whether previous convictions were under solemn or summary jurisdiction⁶); 'nature' (whether they were broadly 'analogous' or 'non-analogous'⁷); sentence type (whether they received a custodial or non-custodial sentence). To each of these dimensions are recorded the options of 'yes', 'no' or 'unknown'. In retrieval judges can also choose the default option 'ignore' which retrieves 'yes', 'no', and 'unknown'. These 'factors' therefore combine to form a matrix of choices for the recording and retrieval of information about criminal history (Tata et al., 1998). How adequate are such taxonomies, (which rely on a limited number of 'factors'), as a basis for representing judicial intelligence on the seriousness of previous criminal history?

It may initially seem that the dimensions used in the Scottish system cannot record enough qualitative information about the nature of an offender's previous convictions because it only provides associative measure of seriousness. However, it should be recalled that associative information is all that is available to the judge. In other words, judges normally have to make a judgement about prior criminal record on the basis of association of terms such as 'solemn'; and the bald criminal law conviction. Schedules of previous convictions are the major source of information about prior criminal history and the information they list can only provide an association with the prior case before the previous judge rather than a full replay of the offender's life.

However, judges also find that this matrix of three dimensions provides them with inadequate information about the seriousness of the record. They are also interested in recording and retrieving information about a multitude of dimensions such as the length of previous custodial histories; the number of convictions of particular types of offences; the chronology of offending and custodial institutionalisation and so on, and the inter-relationship between these dimensions. However, as it already stands the specification of the previous convictions characteristics dra-

⁵ This four-fold taxonomy applies only in the 'higher courts' module. In the local courts module there is a simple distinction between 'priors' and 'no priors'.

⁶ 'Solemn' jurisdiction tend to deal with more serious cases and necessitate a jury trial, whereas summary cases do not involve a jury and tend to deal with relatively less serious cases.

⁷ The definitions of what is 'analogous' and 'non-analogous' were decided by the judges.

matically reduces the number of sentences which are retrieved by the SIS. Judges have reported that selecting three or four combinations of previous convictions will often reduce the number of cases retrieved to zero and that this can become frustrating. There are potentially, 6,561 possible combinations of previous convictions alone (a figure which is equivalent to the number of sentences passed over seven years which is held by the system). No wonder then that this is the gate through which judges find that they frequently lose potentially similar cases!

So on the one hand we have the justifiable complaint that such a matrix is overly-specific and complex; and yet on the other hand, there is the equally justifiable complaint that there is not enough information about seriousness. Is this just another instance of judges' unquenchable thirst for the availability of information which then leads to a frustrating hunt for similar cases (Hutton, Tata, & Wilson, 1995)? In thinking about possible resolutions of this apparent dilemma, there are three options which might be explored. However, as I shall argue none of these provides a satisfactory model of judicial 'knowledge' about criminal history. An alternative perspective will then be offered.

Option A: Groupings arranged according to broad seriousness

A simpler classification than the existing matrix may be presented as say three broad groupings of previous convictions according to their relative seriousness. This might work according to groups of cases according to broad bands which relate to their relative seriousness. For example, previous sentences where the offender had a record of solemn analogous custodial convictions might be grouped under the 'very serious previous convictions', while sentences where the offender had no solemn, no analogous of custodial sentences might be grouped under the 'less serious previous convictions' classification. Obviously, these are two relatively straightforward examples of cases at the 'extreme' ends of the spectrum and it would have to be for judges to decide a workable set of groupings for the purposes of the system.

The benefit of this kind of grouping is that it would allow judges to retrieve cases with previous criminal convictions of very broadly similar seriousness without the frustration of losing large numbers of cases.

Option B: The simple reduction of information available

A second option to make the existing matrix less complex lies in the simple reduction of 'factors' present in the matrix. Thus for example, the ability to include only those cases where the offender has prior convictions under summary jurisdiction, or where the offender received a non-custodial sentence could be completely removed. The obvious problem with this is that the simple reduction of the number of factors does nothing to address the complaint that matrix does not provide sufficient information to gain a sense of the seriousness of criminal histories. In-

Table I. Number of cases retrieved for a sample using AND and OR

Previous conviction settings	No. of cases
Summary analogous custodial AND Solemn analogous custodial	3
Summary analogous custodial OR Solemn analogous custodial	13

deed, it has not proven possible for judges to decide which of the three dimensions ('jurisdiction', 'analogusness', 'custody-non custody') should be sacrificed.

Option C: Logical operations 'AND' and 'OR'

The Scottish SIS is based on the assumption that factors identified by the user as important in a case are combined (i.e., 'ANDed') together. Experience suggests that, in general, this is a valid assumption. An exception to this may be the incorporation of previous convictions in the case details. Combining a number of previous conviction categories using an 'AND' operator will quickly limit the number of cases returned to the user. Using an 'OR' operator to combine the same characteristics causes no such restriction. For example, in the case of an assault involving a firearm and a victim vulnerable by dint of his/her occupation, the numbers of cases retrieved when previous conviction choices are 'AND'ed and when they are 'OR'ed are shown in Table I.

While this may appear to provide the judge with greater flexibility in how s/he constructs searches of the database, it is still felt by judges to go not much further forward in the ability to capture the seriousness of criminal records. The problem is felt by judges to lie in the insufficiency of available dimensions and crucially the inter-relationship of those dimensions.

Option D: Statistical modelling of previous criminal history

It would also be possible to construct a model of sentencing behaviour in dealing with criminal history on the basis of previous judicial practice (e.g., Lovegrove, 1989, 1997) through for example the use of multiple regression analysis and a model of statistically weighting various criminal history 'factors'.⁸ The difficulties

⁸ Using such an approach it might also be possible to employ the techniques of Case-Based Reasoning (e.g., the 'Judge' System (Bain, 1986, 1989). As I argue below it is not the fundamental aims of Case Based Reasoning or Neural Networks (Warner, 1990), or, indeed a combination of a Rule-Based System and Neural Networks (Zelesnikow, Stranieri, & Gawler, 1996; Zelesnikow & Stranieri, 1997); which are necessarily problematic, but I rather I am concerned to show that it is possible to conceive of an alternative (and perhaps in this 'domain' more appropriate) way of modelling the discretionary decision process rather than rather formalised and deductive analysis. (See also the difficulties discussed by Edwards and Huntley (1992) in attempting to produce a rule-based reasoning approach in the discretionary area of Family Law).

with this broad approach, as I argue below, are two-fold. First, it assumes that it is possible to split up a judge's understanding of criminal history (in the context of the whole case narrative) into independent factors or variables which are posited as having a universal, discrete power over the sentencing decision. While it is of course possible to demonstrate that there is a statistical association between the presence of 'variables *X* and *Y*' and 'outcome *Z*', causality can only be inferred. Thus, a second difficulty inherent in this approach is that it inevitably requires arbitrary judgements to be made as to what constitutes the 'variables' (how one 'variable' can be distinguished from another etc.).

One promising approach to resolving the danger of fragmenting the meaning criminal history could be to employ a Neural Network. This would enable the decision support system to learn the weights of each of the relevant attributes of criminal history in sentencing outcomes. In this way the neural network 'learns' the statistically expected combinations between different factors (Zelevnikow, Stranieri, & Gawler, 1996; Zelevnikow & Stranieri, 1997). While the concept of neural networks is refreshing in the way in which it takes seriously the inter-relationship between different characteristics and recognises that typical patterns may emerge, in common with the Options A–C outlined above, it nonetheless begins from the starting point that information about criminal history (indeed the whole case narrative) can be dissected into discernable pieces of meaningful information. It must begin by trying to fragment a case into identifiable abstract and discrete 'bits' of criminal history as if they enjoyed meaning and power when abstracted from their case context.

Below I suggest a possible alternative perspective from which we might think about modelling previous criminal history in the context of the 'whole case'.

4.4.1. *Modelling Qualitative Judicial 'Knowledge' about Criminal Histories*

None of these options outlined above resolves the problem of the qualitative understanding which judges have of prior criminal records. Judges often report that they do not necessarily analyse a schedule at-length but get 'a feel' of the kind of offender with whom they are dealing by asking themselves simple questions such as 'is this man salvable or not?' Experienced judges quickly process a great deal of information not as isolated components or details but *in relation to each other* (e.g., Hedderman & Gelsthorpe, 1997: 55–57), so that they build up a meaningful picture of the criminal experience of the offender: a 'feel' for the criminal life history of the offender.

Thus it would be fruitful to explore with judges the possibility of identifying 'typical' criminal histories (e.g., see Parker, Sumner, & Jarvis, 1989; Allen, 1987); for example, 'the repeat petty offender'; 'the one-off serious violent offender'; 'the petty economic offender'; 'the large scale crook'; 'the young first time offender'; 'the persistent child sex abuser'; 'the petty drug dealer'; 'the organised drug dealer' and so on. Doubtless, such typical classifications would be different to, fuller and richer than the examples given here, but it seems that judges do build up notions

of typical kinds of criminal lives. It may be that these typical schematic classifications are consonant with the criminological literature relating to studies of criminal histories (e.g., Barnett et al., 1992; Greenberg, 1991). However, that is not really the issue here. Rather, it is the attempt to try to represent judicial understandings of types of criminal histories which capture the sense, (if not the futile quest to capture the entire detail), of the information which routinely comes before sentencers.

It is suggested that the tabular information contained in the schedules of previous convictions should not be represented in isolation, but rather the schedule is imbued by the sentencer with relational meaning by other information submitted to the court such as Social Inquiry Reports, Pre-trial Reports, Psychiatric Reports. All of these assist the sentencer in identifying the broad type of criminal history. However, they do not just build up pictures of the criminal histories of different types of offenders, but they also help to calibrate and explain the seriousness of the offence at-hand. The pictures built up about criminal life stories shape and contextualises the understanding of the offender's behaviour. Similarly, Lloyd-Bostock (1988) has observed,

Prior record provides information on how set the offender is on a criminal career. This may lead to a moral judgement that the individual is more (or less) wicked, and hence more or less deserving of a more (or less) severe sentence. It may also be seen as one dimension of the concept of responsibility. (at 73)

Prior criminal record tells the sentencer about the meaning of the offence at-hand and motivation of the offender and his responsibility and culpability in the offence-at-hand. If it is true that judges build up an intelligent and meaningful picture of both 'the offence' and 'offender history' then representations of sentencing need to try to reflect this. Thus, what is required is not just schematic-holistic representations of 'offence' and then 'offender', but rather an integrated understanding of short typical narratives of the whole case.

From this perspective decision support systems could record and retrieve cases by attempting to capture qualitatively judicial 'knowledge' of a limited number of different types of typical sentencing vignettes. The task for researchers and designers of systems to support sentencing, and perhaps other areas of discretionary decision-making, is to try to describe and represent this decision process which I have characterised as one which constructs recognisable 'schema' in which the context of the whole case is critical to its meaning (i.e., schematic-holistic).

However, can this be done? Two potential difficulties might be encountered. First, a schematic-holistic approach is informed by a recognition of the way in which cases are constructed and patterned in recognisable ways. However, is this view of the criminal process (which sets the agenda for the sentencing decision) one which is recognisable in a variety of jurisdictions? The second potential problem is that it might be felt that this perspective of the sentencing decision as a process of patterning whole cases is too intangible to be modelled by computer technology. Below I deal first with the question of jurisdictional specificity and

then with the question of whether in principle such an approach can be modelled by computer.

5. Can it be Done? (Is a ‘Schematic-Holistic Approach’ Applicable and Open to Modelling by Computer Technology)?

5.1. JURISDICTIONAL SPECIFICITY?

Let us first turn to the question of jurisdictional specificity: is this ‘schematic-holistic’ perspective to modelling judicial intelligence applicable to continental, civil law systems? It might be argued that although this process of the construction and re-construction of the typification of cases may be a reasonable portrayal of Anglo-American adversarial legal systems rather than inquisitorial continental European systems. However, in their comparison of the German and US systems of criminal process Frase & Weigend (1995) conclude that “the two systems of criminal justice appear to be converging towards a single model that incorporates both adversarial and ‘inquisitorial’ elements”. (Frase & Weigend: 318) Similarly, the Dutch scheme is becoming increasingly ‘adversarial’. (Jörg, Field, & Brants, 1995).

However, whether or not it is true that “. . . Western systems of criminal Justice are similar in a number of important respects and may be converging” (Frase & Weigend, 1995: 359), my argument is that no system of criminal process can find the ‘objective truth’ about a criminal incident, but must inevitably interpret and re-interpret, actively historicise and re-historicise behaviour in a way which it can comprehend. It can only perform this function according to a necessarily limited set of typical schematic case constructions. These constructions necessarily undergo a process of typification and standardisation through the criminal process which in turn sets the sentencing agenda (Tata and Hutton, 1998). I have tried to show that it is in the nature of (legal) discretion that the decision-maker needs to limit and typify the process of trying to make sense of ‘new’ information so that it is as similar as possible to a limited range of typical case scenarios. Rather than trying to analyse and dissect each element of an individual case, (‘offence’ from ‘offender’; the seriousness of each individual conviction; ‘aggravating and mitigating factors’ etc.), an alternative approach would be to try to identify typical narrative case constructions. Such an approach would accept these case constructions as whole entities; rather than trying to break them down into discrete parts the cost of which is the meaning of the whole case.

5.2. CAN SUCH A QUALITATIVE PERSPECTIVE BE MODELLED? (RE-THINKING RULES AND DISCRETION)

There has been judicial resistance to the attempt to represent sentencing according to some mathematical model associated with the addition and subtraction of ‘independent’ ‘factors’ (Lovegrove, 1989; Kapardis, 1987; Wilkins et al., 1978).

Although this might be explained by the invocation of the concept of 'judicial independence' (e.g., Armytage, 1995), it can also be understood in terms of the difficulty in trying to account logically and analytically for their decisions. Judges stress their treatment of cases as a 'whole' and an intuitive 'feel' for individual cases. Does this mean that the use of a schematic-holistic perspective to try to model decision support in sentencing is in fact too informal, amorphous and intangible to be modelled by a computer?

In thinking about the possibility of modelling discretion for a decision support system without reliance on reasoning justified in official sources, an (understandably) pessimistic view appears to be taken by writing in the AI and law field. Zeleznikow & Hunter (1994), for example, state that while a 'positivist' or legal reductionist perspective enables the easy production of decision support systems, if according to "legal realists...each decision is made according to a series of factors not articulated in the judgements and not amenable to modelling, then we can never hope to use computers in legal reasoning". (Zeleznikow & Hunter, 1994: 63) Similarly, in trying to answer the question of whether computers can understand legal reasoning, Tito (1987) succinctly states that, "[c]omputers can only do what humans program them to do". However, Tito presents two views of how lawyers decide: "[Do lawyers] ... apply *rules* to decide when two situations are similar within a legal context? Or, do lawyers just get a 'hunch' or have a flash of insight that alerts them to similarities?" (original emphasis retained, Tito, 1987: 411) Tito presents the latter view as "ruleless" and therefore not amenable to understanding by a computer because it is not understandable to humans. However, I wish to suggest that it is possible to argue that legal decision-making may be both based on an 'instinctive hunch' *and* amenable to 'rules'.

Like other legal-analysts, Tito's conception of 'rules' seems to ignore the possibility of non-legal rules of behaviour (Hawkins, 1994). Likewise, Dworkin, for example, neatly envisages discretion as "like the hole in a doughnut, does not exist except as an area left open by a surrounding belt of restriction" (Dworkin, 1977: 31). However, one danger of this formulation is that it leads us to regard social behaviour as being regulated only by 'law' and that without law behaviour is (or must inevitably be) unpatterned. However, as Lempert writes "... discretion is not only a property of legal rules it is also a property of behavior ... [Social forces other than law] may give rise to patterns of behaviour that look, and in a sociological sense are more rule-bound than behavior that is in theory rigorously structured by law" (Lempert, 1994: 186-7). Thus, I would suggest it is, at least in principle, possible to model legal decision-making from a perspective which accepts that legal rules may often be peripheral to the decision environment and still be able research and develop 'rules' (or predictable patterns) of discretionary legal practice.

If it is true, then, that legal decision-making can be both strongly characterised by formal, legal discretion *and also* produce decisions that are patterned, predictable and comprehensible (Baumgartner, 1994), then any model of discretionary decision-making on which decision-support system is based should attempt to se-

riously study informal behavioural rules.⁹ I have suggested that this may uncover a more holistic, schematic model rather than a legal-analytical one. In this sense then sentencing is discretionary not because the judge runs out of legal rules (e.g.: Hart, 1994: 251–3), or, because s/he is unconstrained by legal precedent, but because s/he is required to make a substantively (rather than procedurally) just decision patterned by routine social and organisational practices.

Thus, it is not the idea itself of a computer model of decision-making based on some notion of ‘rules’ that presents a difficulty, but the normally assumed interpretation and representation of ‘rules’ as formal dogma implying an analytical, mathematical style of reasoning. Further research examining the character of judicial intelligence and informal behavioural patterns is likely to help to model the ‘rules’ of discretionary judicial decision-making.

I mentioned at the beginning of this subsection that the pessimism in AI & law about the potential for modelling decision-making which is revealed as determined by social and sociolegal rules rather than rules of ‘legal’ dogma is understandable. I say this because, as Alldridge (1997) has argued, the sociolegal study ‘movement’ has failed to take serious interest in work theorising the relationship between law and computers (including applications). Such work has tended to be ignored by sociolegal scholarship which has tended to regard sociolegal insights and perspectives as unnecessary for such a ‘technical’ area. Given this failure to engage seriously with thinking about computer modelling and application design, it is possible to understand why such perspectives and insights into the nature of discretion have barely been recognised in the work to design and theorise applications, and why this results in (misplaced) pessimism. Yet the opportunities for enhancing the understanding of discretionary judicial decision-making, legal reasoning and how these insights might be implemented appear to be immense. I have tried to show in this article that research and insights from sociolegal studies and the sociology of law can provide invaluable assistance in the task of understanding the nature of judicial ‘intelligence’ and discretion. This discretion is relatively undetermined by formal legal dogma. However, judicial discretion is revealed as patterned, predictable, and intelligible (rather than irrational, arbitrary, and chaotic) and therefore amenable to computer modelling to produce judicial applications.

⁹ This may link in with the complaint that the development of legal knowledge-based applications supporting legal practice is “rather slow”. (Oskamp, Tragter, & Groendijk, 1995: 209). They suggest that greater attention needs to be paid to studying the appropriateness of applying different strategies to different areas of legal activities (Oskamp, Tragter, & Groendijk, 1995: 213–4). This in turn, of course, necessitates further study and conceptualisation of the practice of legal decision processing in its natural environment.

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References

- Alschuler, A. (1991) The Failure of Sentencing Guidelines: A Plea for Less Aggregation *University of Chicago Law Review* 58, 901–951.
- Alldrige, P. (1997) Anoraks Among the Suits and Jeans: Computers, Law and the Legal Academy. *Journal of Law, Information and Technology* 1997 (2), <http://elj.warwick.ac.uk/jilt/wip/97_2aldr/>.
- Allen, H. (1987) *Justice Unbalanced: Gender, Psychiatry, and Judicial Decisions*. Open University Press.
- Armytage, L. (1995) Evaluating the Impact of Judicial Education. *Journal of Judicial Administration* 4(3), 143–170.
- Ashworth, A. (1997) ‘Sentencing by Computer: What Next?’ *Criminal Law Review* 153–154.
- Ashworth, A. (1992a) *Sentencing and Criminal Justice*. London: Weidenfeld and Nicholson.
- Ashworth, A. (1992b) Sentencing Reform Structures. In Tonry, M. (ed.), *Crime and Justice: A Review of Research*, Vol. 16. Chicago: University of Chicago Press.
- Ashworth, A., Genders, E., Mansfield, G., Peay, J., and Player, E., (1984) *Sentencing in the Crown Court: Report of an Exploratory Study*. University of Oxford Centre for Criminological Research, Occasional Paper No. 10.
- Bain, W. (1986) *Case Based Reasoning: A Computer Model of Subjective Assessment*. PhD Thesis. Department of Computer Science, Yale University.
- Bain, W. (1989) ‘Judge’ in Christopher K. Reisbeck and Roger C. Schank (1989) ‘Inside Case-based Reasoning’, New Jersey: Lawrence Erlbaum Associates.
- Bainbridge, D. (1991) CASE: Computer Assisted Sentencing in Magistrates’ Courts, Paper presented to the *BILETA Conference 1991*.
- Barnett, A., Blumstein, A., Cohen, J., Farrington, D. (1992) Not all Criminal Careers are Equally Valid. *Criminology* 30(1), 133–147.
- Basten, J. (1980) Judicial Accountability: A Proposal for a Judicial Commission. *The Australian Quarterly* 468–485.
- Basten, J. (1995) ‘Should Judges Have Performance Standards?’ Paper Delivered to the *1995 New South Wales Legal Convention*.
- Baumgartner, M.P. (1994) The Myth of Discretion. In Hawkins, K. (ed.), *The Uses of Discretion*. Oxford: Oxford Socio-Legal Studies Clarendon Press.
- Bench-Capon, T.M.J. (1994) In Defence of Rule-Based Representations for Legal Knowledge-Based Systems, *Law, Computers and Artificial Intelligence* 1, 15–28.
- Bennett, W., Feldman, M. (1981) *Reconstructing Reality in the Courtroom*. Tavistock Publications.
- Boyle, C.K. and Allen, M.J. (1990) *Sentencing in Northern Ireland*. SLS Publications (NI).
- Canadian Sentencing Commission (1987) *Sentencing Reform: A Canadian Approach*.
- Chan, J. (1991) A Computerised Sentencing System for New South Wales Courts. *Computer Law and Practice* 137
- Chi, M. (1988) *The Nature of Expertise*. Lawrence Erlbaum Associates.
- Corkery, J.M. (1992): The Use of Vignettes in Sentencing Studies of English Magistrates. *International Journal of the Sociology of Law* 20, 253–270.
- Council of Europe (CDPC) (1993) *Consistency in Sentencing* R (02) 17, October 1993, Strasbourg.

- Crombag, H.F., De Wijkerslooth, J.L., and Van Tuyl Van Serooskerken, E.H. (1975) On Solving Legal Problems. *Journal of Legal Education* 27, 168–201.
- Curran, J. and Chambers, G. (1982): *Social Enquiry Reports in Scotland*. HMSO, Edinburgh.
- Doob, A. (1990) *Sentencing Aids: Final Report to the Donner Canadian Foundation*. Centre of Criminology University of Toronto: Toronto.
- Doob, A. and Park, N. (1987) Computerised Sentencing Information for Judges: An Aid to the Sentencing Process *Criminal Law Quarterly* 30, 54.
- Dworkin, R. (1977) *Taking Rights Seriously*. Harvard University Press.
- Edwards, L. and Huntley, J. (1992) Creating a Civil Jurisdiction Adviser. *Law, Computers and Artificial Intelligence* 1(1), 5–40.
- Emerson, R.M. (1995) Holistic Effects in Social Control Decision-Making. In Abel, R. (ed.), *The Law and Society Reader*. New York: New York University Press.
- Ericson, R. (1981) *Making Crime: A Study of Detective Work*. Toronto, Butterworth.
- Ericson, R. (1982) *Reproducing Order: A Study of Police Patrol Work*. Toronto: University of Toronto Press.
- Fitzmaurice, C. and Pease, K. (1986) *The Psychology of Judicial Sentencing*. Manchester: Manchester University Press.
- Fox, R. (1994) The Meaning of Proportionality in Sentencing. *Melbourne University Law Reviews* 19(3), 489–511, at 510.
- Fox, R. and Freiberg, A. (1985) *Sentencing: State and Federal Law in Victoria*. Oxford University Press.
- Freed, ?. (1992) Federal Sentencing in the Wake of Guidelines: Unacceptable Limits on the Discretion of Sentencers. *Yale Law Journal* 101(8), 1681.
- Giller, H. and Morris, A. (1981) “What Type of Case if This?” Social Workers’ Decisions about Children Who Offend. In Adler, M. and Asquith, S. (eds.), *Discretion and Welfare*. London: Heinemann Educational Books.
- Greenberg, D. (1991) Modelling Criminal Careers. *Criminology* 25(1), 17–46.
- Gruner, R. (1991) Sentencing Advisor: An Expert Computer System for Federal Sentencing Analyses. Paper presented at *BILETA Conference*.
- Hart, H. (1994) *The Concept of Law*. Second Edition, Clarendon Press.
- Hassett, P. (1993) Can Expert System Technology Contribute to Improved Bail Decisions? *International Journal of Law and Information Technology* 2.
- Hawkins, K. (1992) The Use of Legal Discretion: Perspectives from Law and Social Science. In Hawkins, K. (ed.) *The Uses of Discretion*. Oxford: Oxford Socio-Legal Studies Clarendon Press.
- Hedderman, C. and Gelsthorpe, L., eds. (1997) *Understanding the Sentencing of Women: Home Office Research Study*, p. 170. Home Office.
- Henham, R. (1997) *Criminal Justice and Sentencing Policy*. Dartmouth.
- Hogarth, J. (1971) *Sentencing as a Human Process*. Toronto: University of Toronto Press in Association with the Centre of Criminology University of Toronto.
- Hogarth, J. (1988) *Sentencing Database System: User’s Guide*. Vancouver: University of British Columbia.
- Hutton N., Paterson A., Tata C., and Wilson J. (1996) *A Prototype Sentencing Information System for the High Court of Justiciary: Report of the Study of Feasibility*. Edinburgh: Scottish Office Home and Health Department, Central Research Unit.
- Hutton, N., Paterson, A., Tata, C., and Wilson, J. (1995) Decision Support for Sentencing in a Common Law Jurisdiction. *The Fifth International Conference on Artificial Intelligence and Law: Proceedings of the Conference*. Maryland.
- Hutton, N. and Tata, C. (1995) *Patterns of Custodial Sentencing in the Sheriff Court*. Edinburgh: Scottish Office Home and Health Department Central Research Unit.
- Hutton, N., Tata, C. and Wilson, J. (1995) Sentencing and Information Technology: Incidental Reform? *International Journal of Law and Information Technology* 2(3).

- Jareborg, N. (1994) The Swedish Sentencing Law. *European Journal on Criminal Policy and Research* 2(1).
- Jörg, N., Field, S., and Chrisje, B. (1995) Are 'inquisitorial' and 'adversarial' systems converging?. In Fennell, P., Harding, C., Jorg, N., and Swart, B. (eds.), *Criminal Justice in Europe: A Comparative Study*. Clarendon Press.
- Lawrence, J. (1988) Expertise on the Bench: Modelling Magistrates' Judicial Decision-Making. In Chi, M., Glaser, R., and Marshall, J. (eds.), *The Nature of Expertise*. Lawrence Erlbaum Associates.
- Lempert, R. (1994) Discretion in a Behavioural Perspective. In Hawkins, K. (eds.) *The Uses of Discretion*. Clarendon Press. First published 1992.
- Lloyd-Bostock, S. (1988) *Law in Practice: Applications of Psychology to Legal Decision-Making and Legal Skills*. British Psychological Society/Routledge.
- Lovegrove, A. (1989) *Judicial Decision Making, Sentencing Policy and Numerical Guidance*. New York: Springer-Verlag.
- Lovegrove, A. (1997) *The Framework of Judicial Sentencing*. Cambridge University Press.
- Moody, S.R. and Tombs, J. (1982) *Prosecution in the Public Interest*. Edinburgh: Scottish Academic Press.
- Moxon, D. (1988) *Sentencing Practice in the Crown Court*. Home Office Research Study No. 103, London, HMSO.
- Murbach, R. and Nonn, E. (1991) Sentencing by Artificial Intelligence Tools: Some Possibilities and Limitations Paper presented at *The Joint Meeting of the Law and Society Association and the Research Committee of the Sociology of Law of the International Sociological Association Amsterdam 1991*.
- Oskamp, A., Tragter, M., and Groendijk, C. (1995) AI and Law: What about the Future?. Letter to the Editor. *Artificial Intelligence and Law* 3: 209–215.
- Parker, H., Sumner, M., and Jarvis, ?. (1989) *Unmasking the Magistrates*. Milton Keynes: Open University Press.
- Parton, D.A., Hansel, M., and Stratton, J.R. (1991): Measuring Crime Seriousness: Lessons from the National Survey of Crime Severity. *The British Journal of Criminology* 31, 72–85.
- Potas, I., Ash, D., Sagi, M., Cumines, S. and Marsic, N. (1998) Informing the Discretion: The Sentencing Information System of the Judicial Commission of New South Wales. *International Journal of Law and Information Technology*, 6(2).
- Potas, I. (1997) Consistency in Approach to Sentencing: A Description of the Judicial Commission's Sentencing Information System. *Proceedings of the Judicial Decision Support Workshop*. Melbourne.
- Potas, I. (1991) The Sentencing Information System of New South Wales: Promoting Consistency in Sentencing Through Computerisation. Paper presented to *The Commonwealth Magistrates and Judges Association Sydney 1991*.
- Scottish Office Home Department (June 1994) *Firm and Fair: Improving the Delivery of Justice in Scotland*. H.M.S.O.
- Schild, U.J. (1995) Intelligent Computer Systems for Criminal Sentencing, *The Fifth International Conference on Artificial Intelligence and Law: Proceedings of the Conference, Maryland 1995*, pp. 229–238.
- Shapland, J. (1981), *Between Conviction and Sentence: the Process of Mitigation*, Routledge & Kegan Paul.
- Shapland, J. (1987) Who Controls Sentencing? Influences on the Sentencer. In Donald C. Pennington and Sally Lloyd-Bostock (eds.), *The Psychology of Sentencing: Approaches to Consistency and Disparity*. Oxford: Centre for Socio-Legal Studies.
- Simon, E. and Gaes, G. (1989) ASSYST – Computer Support for Guideline Sentencing. *The Second International Conference on Artificial Intelligence and Law: Proceedings of the Conference, Vancouver 1989*, pp. 195–200.

- Simon, E., Gaes, G., and Rhodes, W. (1991) ASSYST – The Design and Implementation of Computer Assisted Sentencing. *Federal Probation* 55, 46.
- Spears, D. (1993) *Providing Computerised Sentencing Information to Judicial Officers: The New South Wales Experience*. Sydney: NSW Judicial Commission.
- Sudnow, D. (1964) Normal Crimes: Sociological Features of the Penal Code in a Public Defender Office. *Social Problems* 12, 255–276.
- Tata, C. (1998a) “Neutrality”, “Choice”, and “Ownership” in the Construction, Use, and Adaptation of Judicial Decision Support Systems. *International Journal of Law and Information Technology*, 6(2).
- Tata, C. (1998b) Problematising the “Structure” in Sentencing Discretion. *Paper Presented to the Annual Meeting of the Law and Society Association, 2–6 June 1998, Colorado*.
- Tata, C. (1997) Conceptions and Representations of the Sentencing Decision Process. *Journal of Law and Society* 24(3), 395–420.
- Tata, C. and Hutton, N. (1998) What “Rules” in Sentencing? *The International Journal of the Sociology of Law*, 26(3).
- Tata, C., Hutton, N., Wilson, J., Paterson, A., and Hughson, I. (1997) *A Sentencing Information System for the High Court of Justiciary of Scotland: Report of the Study of the First Phase of Implementation and Enhancement*. Scottish Courts Administration.
- Tata, C., Wilson, J., and Hutton, N. (1996) Representations of Knowledge and Discretionary Decision-Making by Decision-Support Systems: the Case of Judicial Sentencing. *The Journal of Information, Law and Technology* <<http://elj.warwick.ac.uk/elj/jilt/artifint/2tata/>> No. 2.
- Tata, C., Hutton, N., Wilson, J., Paterson, A., and Hughson, I. (1998) *A Sentencing Information System for the High Court of Justiciary of Scotland: Report of the Study of the First Phase of Implementation and Enhancement*. (Scottish Courts Administration).
- Tito, C. (1987) Artificial Intelligence: Can Computers Understand Why Two Legal Cases are Similar? *Computer/Law Journal* 7, 409–437.
- Tonry, M. (1987) Sentencing Guidelines and Sentencing Commissions: The Second Generation. In Wasik and Pease (eds.) *Sentencing Reform: Guidance or Guidelines?* Manchester: Manchester University Press.
- Tonry, M. (1992) Judges and Sentencing Policy – The American Experience. In Munro and Wasik (eds.), *Sentencing, Judicial Discretion and Training*. London: Sweet and Maxwell.
- Tonry, M. (1993) The Failure of the U.S. Sentencing Commission’s Guidelines. *Crime and Delinquency* 131.
- Tonry, M. (1996) *Sentencing Matters*. Oxford: Oxford University Press.
- Van Duyne, P. (1987): Simple Decision Making. In Pennington, D.C. and Lloyd-Bostock, S. (eds.), *The Psychology of Sentencing: Approaches to Consistency and Disparity*. Oxford: Centre for Socio-Legal Studies.
- Van Noortwijk, K. and De Mulder, R. (1997) The Similarities of Text Documents. *Journal of Information, Law, and Technology* http://jilt.law.strath.ac.uk/jilt/artifint/97_2noor/noor.htm.
- Von Hirsch, A. (1976) *Doing Justice: The Choice of Punishments*. New York: Hill and Wang.
- Von Hirsch, A. (1993) *Censure and Sanctions*. Oxford: Clarendon Press.
- Von Hirsch, A. and Jareborg, N. (1989) Sweden’s Sentencing Statute Enacted. *Criminal Law Review* 275.
- Warner, D. (1990) The Role of Neural Networks in Law Machine Development. *Rutgers Computers and Technology Law Journal* 16: 129–144.
- Wilkins, L., Kress, J., Gottfredson, D., Calpin, J., and Gelman, A. (February 1978) *Structuring Guidelines: Structuring Judicial Discretion. Report on the Feasibility Study*. U.S. Justice Department.
- Zdenkowski, G. (1986) Sentencing: Problems and Responsibility. In Chappell, D. and Wilson, P. (eds.) *Australian Criminal Justice System*. Butterworths.

- Zeleznikow, J. and Hunter, D. (1994) *Building Intelligent Legal Information Systems*. Computer Law Series 13, Kluwer Law and Taxation Publishers.
- Zeleznikow, J. Stranieri, A. and Gawler, M. (1996) Project Report: Split-Up – A Legal Expert System which Determines Property Division upon Divorce. *Artificial Intelligence and Law* 3, 267–275
- Zeleznikow, J. and Stranieri, A. (1997) Modelling Discretion in the Split-Up System. *Proceedings of the Workshop on Judicial Decision Support Systems, The Sixth International Conference on Artificial Intelligence and Law*. Melbourne.