



5th BILETA Conference British and Irish Legal Technology Association

'CASE' Computer Assisted Sentencing in Magistrates' Courts

David Bainbridge

KEYWORDS: Expert systems - decision support systems - computer assisted sentencing - representing statutory provisions and guidance in a rule-based system - constructing a predictive model.

ABSTRACT: This paper provides the background to the development of a computer system to assist with the sentencing of offenders in Magistrates' Courts. In particular, the problems addressed by the system and the manner in which the system is implemented are described. The relevance of jurisprudence and of computer programming languages and techniques is discussed. A presentation of the computer system will be given.

Introduction

This paper describes research into and the development of a computer system to assist with the sentencing of offenders in Magistrates' Courts in England and Wales. The system comprises four main elements including a rule-based part which used statutory rules and Home Office guidance and a predictive model based on a survey of sentencing decisions in Magistrates' Courts. The computer system uses a variety of programming techniques. The rule-based part of the system was developed using "expert system" methods whilst other parts are programmed conventionally. The computer programs used by the system are written in Microsoft BASIC after preliminary prototyping work in micro-Prolog.

The principal aim of the research was to examine the feasibility of developing a computer sentencing system based on the sentencing process in England and Wales. The sentencing of offenders was selected as an area of study because of its complexity as a decision-making process and because of the large amount of criticism directed at present sentencing practice. Much of this criticism is related to the alleged disparity in sentencing decisions which is itself a measure of the wide ranging discretion afforded to magistrates.

It was considered that the development of a computer system to assist with the sentencing decision would demonstrate how computers could help to improve the quality of decision-making processes where the exercise of discretion is key feature.

The Sentencing Process

In developing the computer system, it was decided to concentrate on sentencing in Magistrates' Courts because of the variety of cases dealt with by these courts and the fact that the vast majority of

decision-makers, the magistrates themselves, are lay-persons without legal qualifications. The importance of Magistrates' Courts is confirmed numerically as ninety-five per cent of all offenders are sentenced there. Magistrates usually sit in benches of three, each bench assisted by a legally qualified clerk. Magistrates make decisions as to questions of bail, the mode of trial, the finding of guilt and the choice of sentence to be imposed on convicted offenders. These decisions are exercised within a complex framework of statutory rules and guidance from several sources. For example, the Criminal Justice Act 1982 was described as "... a bran tub of largely unrelated small items buried in a sawdust of cross-referencing to previous legislation" (Burney, 1985). The justices' clerk should not take part in the decision making processes apart from advising the magistrates as to the scope of their powers, such as which sentences are available in a particular case¹. However, it is inevitable that the clerk has a substantial influence on patterns of sentencing in his own court, especially as he often carries a responsibility for training magistrates and many clerks see their role as including the promotion of consistency within their particular court (Darbyshire, 1984).

One problem faced by magistrates is that there is a large range of possible sentences which may be imposed in a particular case. For example, a seventeen year old offender committing an imprisonable offence such as theft could be sentenced to any of the following; discharge (absolute or conditional), probation order, fine, community service order, attendance centre order, detention in a young offender institution in addition to lesser used disposals such as a hospital order, care order, binding over or deferment of sentence. An order for compensation may be made, either as a sentencing disposal in its own right, or combined with other sentences².

What are the constraints and influences on the sentencing decision? Constraints are relatively few, emanating from statute and being mainly concerned with the age limits for the different sentences. For example, a community service order is available only for offenders aged 16 years and over. Other statutory provisions are less rigid and do little more than reinforce the discretion of the sentencer. For example, a discharge is suitable if, inter alia,

"[the court] is of opinion... that it is inexpedient to inflict punishment"³.

This shows Parliamentary respect for judicial discretion in the choice of sentencing disposal and is bound up with wider questions such as the independence of the judiciary.

The Home Office issues guidance to magistrates containing common-sense suggestions as to the suitability of sentences for different types of offenders and offences, including the seriousness of the offence (Home Office, 1986). Unlike other areas of law, appellate guidance is fairly limited; this is a result of a "lop-sided" appeals system where only the defence has been able to appeal against sentence. Appeals against over-lenient sentences initiated by the Attorney-General are a new innovation but this power will only be exercised in extreme cases of some seriousness and is unlikely to affect Magistrates' Courts sentencing patterns⁴. Another problem is associated with the difficulty of trying to extrapolate general principles from particular cases, each with its own unique facts, a problem appreciated by Lord Justices of Appeal⁵.

Of course, there are other influences on magistrates' sentencing practices; for example, from the clerk to the justices, peer group pressure and public opinion. In some courts, guidelines are used by magistrates as "rules of thumb". For some time, the Magistrates' Association have issued guidelines for motoring offenders and, in the light of mounting criticism of inconsistency in sentencing, the Association have recently issued guidelines to the courts covering the 25 most common non-motoring offences⁶. In some cases, social reports are prepared and these frequently contain recommendations as to sentence. The extent of the influence of these reports is arguable but when disposals such as probation orders and community service orders are possibilities, the social report must be very influential.

Sentencing by magistrates is very much a human process (Hogarth, 1971) and the effect of the views of magistrates' on crime and punishment and their social background will be a factor in the sentencing process. Above all, sentencing by magistrates is a collective process which may control the worst excesses in decision making, but the chairman of the bench will have an influence on lesser experienced magistrates.

Criticisms Of Sentencing Practice

Sentencing as a decision making process attracts a large amount of criticism because of its perceived inconsistency. However, this is complicated by differences in court intake resulting from differences in police cautioning and offence and offender patterns. The popular press highlight disparity, but their reports frequently distort disparities because of lack of attention to some of the details of the case. The fact that the sentencer will have in his possession information which is not available to the press compounds this distortion. However, when differences in offender characteristics are controlled for, unacceptable disparities in sentencing between different courts still remain (Tarling, 1979). It is interesting to note that most courts seem to display an internal consistency which tends to strengthen suspicions of the influence of the clerk to the justices and the senior magistrates in that court.

Other problems are related to the complexity of the process which increases inconsistency, the difficulty of grappling with the mass of statutory provisions, which are in themselves poorly drafted and badly cross-referenced, and the variation in the amounts and quality of information on which the decision is based. All of these contribute to disparity.

Suggested Improvements to the Sentencing Process

Several suggestions have been put forward as ways of improving sentencing, and some of these, such as guidelines, have been in use for some time⁷. A guideline system, whether presumptive or descriptive, is susceptible to political manipulation and is unlikely to be acceptable in England and Wales, where such guidelines that do exist have no force in law and are merely suggestive of good practice. Guidelines which carry more authority than this would be unwelcome amongst magistrates. For similar reasons, a system of fixed sentences would also be unpalatable.

Other suggestions include requiring sentencers to give reasons for their decisions, setting up a council charged with the task of promulgating guidelines, structuring the sentencing decision and improving the training of magistrates. Ashworth champions the concept of a sentencing council (Ashworth, 1983), but this would suffer from the same defects as the present appellate system with respect to sentencing guidance; indeed, it could be less effective because of the artificiality of trying to generate guidance based on hypothetical cases. The last two suggestions (structuring the sentencing decision and providing more and better training for magistrates) are both practical and would be acceptable to magistrates as they would not fundamentally change the nature of the sentencing process. The use of the computer system described in this paper will bring structure to the sentencing decision and also has a training potential.

Can A Computer System Improve Sentencing Decision-making?

A computer system can help by handling the rules in a rational structured way. Without more, this alone should improve the quality of the decision-making, especially if other information concerning the rules, their scope and application is available to the sentencer as and when he needs them. For example, if the sentencer is using the rules applying to a probation order, he should, then and there, be able to inspect the relevant statutory provisions and subsidiary information such as summaries of

appellate cases relating to probation orders.

Structuring the rules and the information to back up those rules in this way frees the sentencer from the need to remember the authorities. This simplifies the process from the sentencer's viewpoint and makes it possible for him to concentrate on those areas which, rightly, fall within his discretion, such as the aims of sentencing.

Predictive information can help by promoting consistency, but it must be stressed that predictions are no more than another source of information and are not intended to interfere or fetter the sentencer's discretion. In any case, a predictive model based on statistics cannot provide a full picture, there will be many factors at play which cannot be measured statistically, such as the demeanour and contrition of the offender. There is also some degree of interaction between the magistrates on the bench and the offender which may affect the outcome but which cannot be predicted in a satisfactory manner.

The final way in which the computer system can help is with respect to training. The system can be used to simulate sentencing decisions, allowing newly appointed magistrates to gain a thorough insight into sentencing practice and the rules, norms and guidance that apply. The predictive model can be used to gain an insight into the influence of different factors; it may also highlight inconsistencies in sentencing practice, such as the effect of the offender's sex and occupation on the likelihood of some disposals; for example, community service orders.

Jurisprudential issues

Whether a study of jurisprudence can provide a useful touchstone for testing the validity of expert systems in law is a moot point. Susskind considers it to be essential (Susskind, 1987) but it has been argued that the acid test is whether the system will be used in practice, that is, whether it is marketable. This view is taken by Niblett who suggests that expert systems can make a positive contribution to the study of jurisprudence rather than the other way round because they may help in the identification and resolution of legal inconsistencies and ambiguities (Niblett, 1981). Whatever view is subscribed to, it can be argued that a consideration of jurisprudential aspects is useful because expert systems and decision-support systems in law necessarily make assumptions about the nature of legal reasoning. Practical jurisprudence (typified by the phrase "thinking like a lawyer") is certainly useful in that it can help in the development of a model or technique to be used to develop advice giving systems. Analytical jurisprudence provides the key to computer representations of decision-making processes in law and, because of the importance of Hart's work in this area, his theory provides a useful starting point. Hart's legal system comprised the union of primary rules of obligation and secondary rules of recognition, change and adjudication; but this does not give a complete picture, as Hart himself recognises (Hart, 1961). Difficulties arise in the "penumbra" of uncertainty, resulting from the open-texture of legal rules. It is here where questions of discretion arise. Does a judge have unfettered discretion or is he subject, consciously or otherwise, to some guiding standards?

Dworkin criticised Hart's model for failing to take principles into account (Dworkin, 1977). These principles come into play when the legal rules fail to provide an unequivocal answer to a legal problem. Raz developed Hart's model in terms of rules and principles and stressed the importance of social factors; obviously highly relevant in a sentencing context, because of the enormous amount of discretion remaining with magistrates and judges (Raz, 1979).

One approach, typified by the computer sentencing system, is to build a model which includes the clear rules and to leave the areas of discretion to the person using the system. Differences here result from differences in the conception and application of both legal and social principles. Unlike many areas in law, in sentencing there may be several different solutions which are legally acceptable in a strict sense. Theoretically, in most areas of substantive law, there is only one right answer; often, this can only be determined retrospectively after judicial pronouncement.

The American Realists identified the importance of prediction in law. They generally went too far in their apparent rejection of legal rules but, predicting how a court will decide is important, especially to a person contemplating litigation or to a person being prosecuted for a criminal offence. With respect to the latter, prediction is especially important in terms of charge and plea bargaining. In the realms of sentencing, prediction can give a sentencer information of how similar cases were decided in the past. This information can be useful by confirming the sentencer's initial views or by helping him choose between alternatives. On the other hand, it could lead a sentencer to reflect on and reconsider a preliminary decision.

The measure of discretion left with sentencers suggests the approach used to develop the computer system; that is, a sentencing model containing statutory rules, generally accepted guidance and predictive information but which does not compromise the sentencer's discretion. This is the method used in the CASE computer sentencing system. It is the reason why the system is described as computer assisted sentencing.

Computer Science Aspects

In simple terms, an expert system approach requires that the application involved is dealt with by three main parts, a knowledgebase, an inference engine and an interface with the user which includes an explanation facility. During the research, several methods of implementing the system were considered and evaluated. In particular, procedural and declarative computer languages were investigated as well as expert system shells.

Procedural computer programming languages such as COBOL, BASIC and FORTRAN, can be used to handle rules and facts but, with respect to an expert system approach, these languages can be criticised on the grounds of rigidity and a lack of transparency of the knowledge included in the system. This makes it difficult to inspect and subsequently modify the knowledge-base. Declarative languages, such as Prolog and Lisp, overcome these problems by separating out the knowledge-base from the manipulative parts of the system. This means that the rules and facts used by the system are much easier for the user and the programmer alike to inspect, modify and verify.

However, these features, seen so important by the advocates of declarative languages, can be implemented in procedural languages by isolating the knowledge-base in a separate file and keeping it distinct from the program code. The inference engine and the explanation facility can be programmed conventionally. The advantages of this approach are that the knowledge-base remains easy to read and modify whilst the manipulative parts of the system can be tailor made to suit the particular application concerned. Of course, in terms of effort, this will take considerably longer compared to other ways of developing an expert system.

An expert system shell, such as CRYSTAL II or EXPERTECH Xi plus, may be used as a quick way of producing a finished system. However tantalising they might appear there are drawbacks associated with the use of shells. For example, the system designer will often have to compromise to fit in with the properties of the shell, the explanation facility is weak with some shells and attempts at improving this and the interface with the user often lead to a degree of obfuscation which destroys the clarity of the explanation facility. This latter point is especially serious bearing in mind that the ability of expert systems to provide clear and plausible justification for their advice is seen to be of fundamental importance (d'Agapeyeff, 1984).

In developing the sentencing system, a simple expert system shell, Micro Expert⁸, was used but was soon found wanting. A later examination of CRYSTAL II⁹ produced similar disappointments. Expert system shells are perfectly well suited to some applications and can often provide a very quick and effective way of producing a system. Otherwise, shells may be useful as development tools. A great deal of the early development work of the sentencing system was carried out using micro-Prolog

with APES¹⁰ and this was found to be very effective for gaining an insight into the way the various rules operate and interact. However, because it was not considered feasible to produce a working system in micro-Prolog which could be used with ease by magistrates and justices' clerks, the final system was designed using Microsoft BASIC¹¹. This language was found to be quite satisfactory for building the inferencing part of the system, the knowledge-base being stored in a separate file and modified using a word processing system. Above all, BASIC provided the means of implementing the system so that it is very easy to use in practice. Bearing in mind the nature of the potential users of the system this was considered to be essential.

Description Of The Case Computer System

The "CASE" computer-assisted sentencing system comprises four main parts as follows:-

1. A rule-based part containing rules derived from statutes and the Home Office publication "The Sentence of the Court" (Home Office, 1986). During the application of these rules to the case being considered, various materials can be inspected. These include extracts from the statutes, "The Sentence of the Court" and summaries of relevant Court of Appeal judgments. The purpose of these materials is to assist magistrates understand and interpret the rules.
2. A predictive model based on a survey of actual cases in magistrates' courts. The factors present in these cases were analysed using the Statistical Package for Social Sciences to determine whether and to what extent these factors influenced the sentencing decision. A total of seven factors were found to have a good correlation with the choice of sentence; being the offence, the number of offences charged, the value of goods stolen, the sex, age and occupation of the offender and the number of previous convictions. Taken together, these factors accounted for about 30 per cent of differences in sentencing. The predictive part of the program was based on these factors built into a Bayesian probability model which determines percentages for the available disposals, thus indicating the relative use of those disposals in similar cases.
3. Information and regression equations for the purpose of helping the sentencer to choose the scale of a particular disposal, for example, the amount of a fine or the period for a probation order.
4. The choice of the sentence to be imposed in the case being considered. The sentencer also enters the scale of the sentence. The computer programs include checks to make sure that the sentencer cannot impose an illegal sentence. For example, it will not allow the imposition of a fine of over £100 on an eleven year old offender. If the sentencer chooses to impose a sentence which is not the one with the highest percentage from the predictive model, the reasons why an alternative sentence has been selected must be entered; there are some standard reasons available for the sentencer to choose from and a remark in free text form can also be entered. Note that the sentencer is allowed to depart from the computer "recommendation" but if he does so, he is expected to give reasons. Additionally, further details concerning the case may be entered and these are stored, together with details of the decision in a file which can be analysed later and used to update the predictive model, keeping it in tune with recent sentencing practice. The rule-based part of the computer system is described below in more detail.

Rule-based Part Of The System

The rules were obtained from the statutory provisions and parts of "The Sentence of the Court" which concern the choice of sentence. The ordering of the rules is important and the cases of R v Clarke and R v O'Keefe suggest an order for considering disposals and give a useful starting point¹². The following order was used in the computer system;

Discharge
 Probation order
 Supervision order
 Fine
 Community Service Order
 Attendance Centre Order
 Detention in Young Offender Institution
 Adult Custodial Sentence

Broadly speaking, this lists the disposals in a scale of increasing severity. The next aspect to be considered is the form in which the rules are structured. The method used was to consider each disposal separately and to make a list of the rules which apply to the disposal. The process is described below, using the attendance centre order as an example.

First, the statutory provisions applying to the choice of disposal were identified. For an attendance centre order, these provisions are contained in the Criminal Justice Act 1982, section 17 and are;

"17.-(1) Subject to subsections (3) and (4) below, where a court -
 a) would have power, but for section 1 above [no court shall pass a sentence of imprisonment on a person under 21 years of age ...], to pass a sentence of imprisonment on a person who is under 21 years of age or to commit such . . .[provisions concerning fine defaulters etc]; or
 b) [failure to comply with a probation order], the court may, if it has been notified by the Secretary of State that an attendance centre is available for the reception of persons of his description, order him to attend such a centre, to be specified in the order, for such number of hours as may be so specified.

3) No attendance centre order shall be made in the case of an offender who has been previously sentenced -
 a) to imprisonment;
 b) to detention under section 53 of the Children and Young Persons Act 1933;
 c) to borstal training;
 d) to youth custody or custody for life under this Act; or
 e) to detention in a detention centre,
 unless it appears to the court that there are special circumstances (whether relating to the offence or the offender) which warrant the making of such an order in his case.

7) An attendance centre order shall not be made unless the court is satisfied that the attendance centre to be specified in it is reasonably accessible to the person concerned, having regard to his age, the means of access available to him and any other circumstances

Certain key phrases can be extracted from the statutory rules and these are;

1. where a court would have power to pass a sentence of imprisonment
2. on a person under 21 years of age
3. if [the court] has been notified by the Secretary of State that an attendance centre is available for the reception of persons of his description.
4. No attendance centre order shall be made in the case of an offender who has been previously sentenced - (a) to imprisonment etc.
5. [if the offender has been previously sentenced to one of the sentences in 4. above - does it appear] to the court that there are special circumstances (whether relating to the offence or the offender) which warrant the making of [an attendance centre order]
6. the court [must be] satisfied that the attendance centre to be specified... is reasonably

accessible to the person concerned, having regard to his age, the means of access available to him and any other circumstances

These are fairly self explanatory. However, 1. above means that the offence involved must be an imprisonable offence (an offence for which imprisonment is available in the case of an adult offender). For an attendance centre order to be a possibility, the age of the offender must be less than 21 years but this is not sufficient in itself. The rule must also take into account the fact that the person must be at least 10 years old as a child under the age of 10 is below the age of criminal responsibility. Another point is that although the language of the statute is in terms of male offenders, using 'him' and 'his' etc., this is taken to include the female gender¹³.

The next stage is to represent the structure of the rules. The disposal itself is considered to be a goal to be resolved and the rules determine the success of that goal, their relationship to it being based on Boolean algebra (AND and OR), forming a shallow "logic tree". In the case of an attendance centre order this is equivalent to saying that:-

ATTENDANCE CENTRE ORDER succeeds as a goal IF

1. The age requirements are met AND
2. The offence is imprisonable AND
3. The court has been notified by the Sec. of State... AND EITHER
4. The offender has not been sentenced to... OR
5. If so sentenced there are special circumstances AND
6. Attendance centre reasonable accessible.

Some of the rules forming part of the 'rule tree' are in the form of questions, and the user of the system has to resolve the rule with a reply, choosing from the following options, YES, Likely, Neutral, Unlikely or NO. For example, if the rule concerns the court's opinion as to imprisonment, the question posed is:-

Is the court of the opinion that no other method of dealing with offender is appropriate?

To which the person using the system responds as appropriate. Other rules involve facts such as whether the offender's age falls within the range required for the sentence, whether the offence carries a fixed sentence or whether it is imprisonable. In many cases, there is no need to ask the sentencer to resolve the rule as the answer can be permanently stored, as a fact, in the computer system, for example;

Burglary s.9 Theft Act 1968 is an imprisonable offence
Theft s.1 Theft Act 1968 does not carry a fixed sentence

After proceeding through the rules a list of the disposals included is displayed together with their suitability. The sentencer may then "backtrack" through the rules to see how they combine to produce the results indicated.

After examining the rules, the sentencer moves on to the predictive model which ranks disposals in percentage terms based on sentencing patterns in previously decided cases.

Summary

Sentencing assisted by a computer system is feasible if the system is sensitive to the discretion

enjoyed by sentencers. This is reinforced by the results of demonstrations of the system given to magistrates and justices' clerks¹⁴. The advantages of using such a system lie in the improvements made possible to the quality of the decision-making process itself which should consolidate the concept of discretion and pave the way for a better application of that discretion. In the context of training, the CASE system can be a useful adjunct to guidance concerning the application and effectiveness of the aims of sentencing.

Bibliography

d'AGAPEYEFF, A. (1984), '*Report to the Alvey Directorate on a Short Survey of Expert Systems in U.K Business*', Alvey News, Supplement to Issue No.4, April 1984.

ASRWORTH, A. (1983), *Sentencing and Penal Policy*, Weidenfeld and Nicholson.

BURNEY, E. (1985), *Sentencing Young People: what went wrong with the Criminal Justice Act 1982*, Gower.

DARBYSHIRE, P. (1984), *The Magistrates' Clerk*, Barry Rose.

DWORKIN, R. (1977), *Taking Rights Seriously*, Duckworth.

HART, H.L.A. (1961), *The Concept of Law*, Clarendon Press.

HOGARTH, J. (1971), *Sentencing as a Human Process*, Toronto University Press.

Home Office (1986), *The Sentence of the Court*, 4th. edn., H.M.S.O.

NIBLETT, B. (1981), "*Expert Systems for Lawyers*", *Computers and Law*, No.29, August 1981, 2-4.

RAZ, J. (1979), *The Authority of Law*, Clarendon Press.

SUSSKIND, R. (1987), *Expert Systems in Law: a Jurisprudential Inquiry*, Clarendon Press.

TARLING, R. (1979), *Sentencing Practice in Magistrates' Courts*, Home Office Research Study No.56, H.M.S.O.

References

1 Practice Direction [1953] 2 All E.R. 1306 and Practice Direction [1981] 1 W.L.R. 1163 and section 28(3) Justices of the Peace Act 1979. See also R v Eccles Justices. Exparte Fitzpatrick Queen's Bench Divisional Court, The Times, February 28, 1989.

2 Powers of Criminal Courts Act 1973 section 35, as amended by the Criminal Justice Act 1982 section 67.

3 Powers of Criminal Courts Act 1973, section 7(1).

4 Criminal Justice Act 1988, sections 35 and 36, which came into force on February 1, 1989.

5 See for example, the judgment of Dunn L.J. in De Havilland(1983) 5 Cr. App. R. (5) 109 and the judgment of Lord Lane C.J. in Barrick (1985) 7 Cr. App. R. (5) 142.

6 The Magistrates' Association; Sentencing Guide for Criminal Offences (other than Road Traffic) March 1989. The Magistrates' Association is a professional body which most lay magistrates belong to. The guidelines are mainly concerned with financial penalties.

7 For example, the Minnesota guideline system. For a description of this and other guideline systems, see Tonry, M.H.; "More Sentencing Reform in America", [1982] Crim.L.R. 157-167.

8 ISIS Systems Ltd., Redhill, Surrey, 1984.

9 version 3 by Intelligent Environments Ltd., Richmond, Surrey, 1988.

10 micro-Prolog Professional, by Logic Programming Associates Ltd., London, 1985 and APES version 1.1 by Logic Based Systems Ltd., Richmond, Surrey, 1984.

11 GW-BASIC Interpreter version 3.2, 1986; the source code was compiled using the compiler available with QuickBASIC version 4.0 by Microsoft, 1987.

12 RvClarke [1982] 1 W.L.R. 1090; RvO'Keefe [1969] 2 Q.B. 29.

13 Interpretation Act 1978, section 6.

14 Demonstrations were arranged at four magistrates' courts and to the Magistrates' Association, Nacro (National Association for the Care and Resettlement of Offenders) and ITAC (Information Technology and the Courts).