



High-Tech Justice for All

An Innovative Computer Program for the Criminal Courts

Two Bar-Ilan University researchers, Professors Ruth Kannai and Uri Schild, have created a unique "Criminal Justice Decision Support System" that helps judges properly assess a defendant's criminal history when handing down a sentence.

Translated and adapted from the Hebrew article by Dr. Haggai Harif,
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Since ancient times, blind justice – a statue of a woman holding a set of scales – has symbolized the moral force that underlies our legal system. But while justice can be blind, can it also be computerized? That's what two Bar-Ilan University researchers intend to find out.

Prof. Ruth Kannai of the Bar-Ilan University Faculty of Law, together with Prof. Uri Schild of the Department of Computer Science, have developed a computer program that helps judges make decisions about the punishments meted out to criminals. The software generates a graphic interface that summarizes a convicted offender's previous convictions, making it easier for individual judges to determine the most appropriate and effective punishment.

"Society cannot exist without a system of rules and regulations, nor can it exist without enforcement of this system," says Prof. Kannai, who received her doctorate in law from Bar-Ilan. She has been interested in how judges deliberate and determine punishments ever since she assisted BIU Law Professor Aharon Enker with the writing of his book, *The Suspended Sentence* in 1981. She has since published extensively on the subject.

Jewish jurisprudence was structured to prevent civil society from deteriorating into anarchy. In *Pirkei Avot*, our Rabbis taught: "Pray for the welfare of the government, for were it not for the fear of it, men would swallow each other alive." This phrase is the basis of criminal law – a series of "shall not" commandments that each and every citizen is compelled to observe. Concurrently, certain sanctions are established for those breaking these commandments and the implementation of these sanctions is known as criminal justice.

According to Prof. Kannai, punishment can be based on a number of different goals, and this is reflected in the attitudes of judges and their sentencing patterns.



One judge may choose to focus on "desert" – the moral obligation to punish a criminal for his crime, under the principal of "measure for measure." Another may emphasize deterrence, seeing punishment as a tool that keeps the convicted criminal from repeating his acts, and dissuades others from acting in a similar fashion. A third way of looking at criminal punishment is to focus on prevention – meaning that the goal of prolonged incarceration would be to deprive the criminal of the opportunity to repeat his crime. A fourth goal of criminal justice is the rehabilitation of the criminal. In this case, the punishment can contribute to a criminal's safe and legal return to society.

Nine years ago, Prof. Kannai began working on a "Criminal Justice Decision Support System" – a computer program that analyzes an offender's complete criminal record. She collaborated with Prof. Uri Schild of Bar-Ilan's Computer Science Department, a noted expert in artificial intelligence who between 1990 and 1997 led the team that developed the Israel-Prize winning Global Jewish Database (Responsa) Project.

According to Prof. Kannai, criminal records constitute one of the most significant factors in determining the proper sentence. However, in their traditional form, they can run to many pages of written data gathered from different jurisdictions describing a wide range of events, and are notoriously difficult to summarize.

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A presentation of a criminal record diagram attached to a penalization system diagram

"The offender's criminal record is usually handed to the judge in a report of several dense, written pages," Prof. Kannai says. "The problem is that the information is not displayed clearly, and therefore it can be difficult to assess the severity of the defendant's criminal past and determine which punishment is appropriate. This is made more difficult by the intense pressure experienced by the judge, who is asked to make a decision in as short a time as possible."

The situation is further exacerbated by the great discretion granted to judges to determine both the type and extent of punishment, and the absence of specific guidelines. According to Prof. Kannai, this situation creates inequality in sentencing among different judges, to the point that the punishment meted out can sometimes contradict the rule of law.

Serving Justice – Succinctly

The software created by Prof. Kannai and Prof. Schild helps criminal court judges to understand each defendant's criminal record – at a glance. A graphic display summarizes different aspects of the criminal's record, including the crime, the time of its occurrence, past convictions, the dates of previous crimes, sentencing dates, punishments handed down, and prison terms served.

This data is also correlated in the form of a chart that indicates trends and developments in the offender's criminal activity, with the X-axis representing the time the criminal activity occurred, and the Y-axis representing the severity of the punishments received. While on the top level, the chart limits itself to the main crime of each criminal case, it is possible to "drill down" to receive the defendant's full list of crimes. With another click, the judge can access graphically presented information about maximum punishments associated with crimes in question.

The new system makes it easier for the judge to view and absorb complex information about a criminal's historical behavior and past sentencing by visual presentation. The availability of this "long view" also provides important insight about the present trial, helping the judge determine the truthfulness of current allegations.

The second, more ambitious goal of the system is to provide judges with a tool for making the punishment fit the crime – as well as the particular criminal. As part of their deliberation, judges can view the number of charges accumulated in the past; the severity of



Implementation of criminal record analysis on the prevention approach



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the crimes; the level of past punishments (whether in fines or prison time); the similarity between current and prior crimes; the increase in numbers of offenses and criminality of offenses; and the charges accumulated as a juvenile and as an adult. This multi-parameter context gives a complete visual picture of the defendant's criminal record, allowing the judge to determine a sentence that is both fair and effective.

Balancing Data Analysis with Judge's Priorities

The software doesn't just present raw data – it allows judges to analyze this data in terms of different parameters that must be taken into account when determining a sentence.

“Different judges have different penalty criteria,” says Prof. Kannai. “There are those that uphold the utilitarian approach – one that strongly emphasizes elements such as rehabilitation, prevention and deterrence in passing a sentence. For utilitarians, a criminal's past record, and previous punishments play a strong role in determining the right sentence. On the opposing side, there are those judges that uphold desert as their main determinant – meaning that the punishment should fit the crime and the weight of the criminal's past criminal activity is smaller. Using our system, the judge can analyze the data in terms of the parameters that are most important to him for the particular case, and get recommendations.”

Prof. Kannai emphasizes that the choice between these two different approaches to sentencing – the utilitarian vs. the desert-oriented – is a question of values. Therefore, the software does not categorically assign a certain weight to the criminal record that should be considered when meting out punishment. Rather, the judge uses the software to



view the record in terms of each approach, in order to help him make a decision that matches his own worldview.

Computer Science Meets Criminal Justice

In order to create the data analysis engine for the software, Prof. Kannai conducted an extensive review of literature dealing with the evaluation of criminal records, and the relevant sentencing laws in various countries including Israel. In designing the

software, Prof. Schild and Prof. Kannai were assisted by MA computer science students, Zion Hasson and Roni Stern, who created a model system based on 15 authentic criminal records. These records were provided by the Israeli Police Department, after all personal identifying information was deleted.

Together with research associate Hanan Mandel, Prof. Kannai and Prof. Schild also conducted extensive interviews with individuals charged with enforcing criminal law: judges, prosecutors, defense lawyers and parole officers, as well as academic researchers and law students. At different stages of development, the system was presented to judges for examination and feedback, and their comments contributed to the system's improvement.

Prof. Kannai emphasizes that, at the current time, the Criminal Justice Decision Support System is still an experimental program that cannot be used in the courts, because the database does not include all the crimes covered by criminal law. To achieve full implementation, the system would also have to be connected with the criminal record computer system of the Israeli Police Department. Still, the software represents an exciting development in the modernization of the judiciary, and a scientific step toward achieving justice for all. ❖

The work of Professors Kannai and Schild was supported by a grant from the Israeli Science Foundation. In 2005, the two researchers were awarded the Minister of Public Security Award for Research and Development.



Professor Ruth Kannai, an associate professor in the Bar-Ilan Faculty of Law, was a member of a 1997 public commission on judicial discretion in sentencing, which was chaired by then Supreme Court Justice Eliezer Goldberg. The commission's influential report led to a draft bill of Amendment 92 of the Criminal Code 2006. Professor Kannai received her LLB magna cum laude from Hebrew University, and both her LLM magna cum laude and her PhD summa cum laude from Bar-Ilan University.

Professor Uri Schild, an associate professor of Computer Science at Bar-Ilan University, served as the director of the University's noted Responsa project from 1990-1997. When Bar-Ilan established an independent department for computer science in 2000, Professor Schild was appointed as its head for the first two years. A native of Denmark, he immigrated to Israel when he was 18 years old. He received his undergraduate degree in mathematics and physics from Bar-Ilan University, his MA from Hebrew University and PhD in computer science from the Imperial College, London.