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Applying ICTs in Juridical Decision-making bij Government Agencies in The Netherlands: Problems and Prospects

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Applying ICTs in Juridical Decision Making by Government Agencies

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INTRODUCTION

Electronic government is developing throughout Europe. Increasingly, central, regional, and local governments use ICT applications to perform their tasks. In the 1970s and 1980s, computers were mainly used to perform administrative tasks (including word processing). In the 1990s, *juridical expert systems* were introduced within government organizations: software programs which can solve juridical problems, either without any human interference or with limited human interference, by means of a reasoning mechanism and a “knowledge database” (Groothuis, 2004). Furthermore, government agencies started to use new ICT applications such as the Internet and e-mail to communicate electronically with citizens.

This article examines the juridical aspects of automatic decision making and electronic communication by government agencies in The Netherlands and addresses the following questions:

1. What is the legal framework for automatic decision-making by government agencies in The Netherlands?
2. What is the juridical quality of decisions made by expert systems in practice?
3. What is the legal framework for electronic communication between government agencies and citizens in The Netherlands?
4. To what extent does *electronic government* exist in The Netherlands and what are its prospects for the period 2005-2007?

AUTOMATIC DECISION MAKING BY GOVERNMENT AGENCIES

Increasingly, government organisations in The Netherlands use expert systems to make juridical decisions in

individual cases under the Dutch General Administrative Law Act (*Algemene wet bestuursrecht*). Examples of juridical decisions that are made by expert systems are tax decisions, decisions under the Traffic Law Act (traffic fines), decisions under the General Maintenance Act (maintenance grants), and decisions under the Housing Assistance Act (Bovens, Groothuis, & Van den Hoogen, 2003).

There are two categories of juridical expert systems. Expert systems in the first category support the process of juridical decision making by a civil servant. The decision is taken in “cooperation” between the computer and the civil servant. Expert systems in the second category draft juridical decisions without any human interference. In these cases the decision making process is fully automatic.

The Legal Framework

To what extent and under which conditions is automatic decision making by government agencies legal? Under Dutch administrative law, there are no specific rules for automatic decision making.¹ Therefore, government agencies are entitled to use expert systems, or other ICT applications, in their decision-making processes if they wish to do so. This does not mean, however, that the use of ICT is not bound by any rules. When government agencies make decisions, the general rules of Dutch administrative law apply. Most of these rules can be found in the *General Administrative Law Act*. Among them are several *general principles of proper administration*: rules which administrative bodies should observe in all their acts. The *justification principle*, for example, holds that an administrative body should give grounds for its decision, and that these grounds must be mentioned in the decision itself (article 3:46 and 3:47 of the General Administrative Law Act). If a decision is made by an expert system (or another ICT application),

the *justification principle* requires that the reasoning (or logic) behind the automatic decision be explained. This means that the working of the ICT tool has to be transparent.

Besides the *general principles of proper administration* a second set of principles has been developed in Dutch jurisprudence: *general principles of proper use of ICT*. According to some scholars (Bovens, 1999; Franken, 1993) these principles—accessibility, confidentiality, integrity, authenticity, flexibility, and transparency—should be respected when government organizations use ICT. If, for example, a government agency uses an expert system in its decision-making process for residents permits, this system should be accessible for applicants and other citizens (principle of accessibility), function correctly (principle of integrity), and its working should be transparent (principle of transparency).

Finally, the Dutch Privacy Act (*Wet bescherming persoonsgegevens*) contains a specific provision on automatic decision making (article 42). This provision, which applies equally to government and nongovernment organisations and which forms the implementation of an EU directive², holds in its first section that:

every person has the right not to be subject to a decision which produces legal affects concerning him or significantly affects him and which is not based on automatic processing of data intended to evaluate certain personal affects relating to him.

The second section of this provision gives an exception to this main rule. It states that a person can be subject to a decision as referred to in the first section if—in short—suitable measures are taken to safeguard his legitimate interests, such as allowing him to put his point of view. This provision implies that automatic decision making by government agencies is allowed under the condition that citizens who have a legitimate interest in the decision are given the opportunity to present their views (e.g., in a public hearing).

Quality of Electronic Decision Making: Two Case Studies

What is the juridical quality of automatic decision making by government agencies in daily practice? In the period 1999 to 2002 I performed empirical research on the quality of automatic decision making by government agencies.³ In two case studies I examined whether automatic decision making meets the requirements of the applicable statutes and rules of unwritten law. The first case study examined the daily use of an expert system in

the field of housing assistance in the Dutch Ministry of Planning. The second case study investigated the daily use of an expert system in the field of general assistance in one Dutch municipality.

In each case study, three steps were taken. First, a *checklist* was developed. Next, this checklist was *applied* to a selection of individual decisions. Third, the *results* of this application were categorised and interpreted.

Each of these individual decisions involved intensive file research. For each of the selected decisions the pertinent file was obtained and studied with respect to the criteria in the checklist. It was determined whether each decision fulfilled all of the requirements in the checklist. Below, the results of the two case studies are summarised.

Case Study I: An Expert System for Housing Assistance

The first case study examines the daily use of an expert system in the field of housing assistance: *IHS*. This expert system was developed by the Dutch Ministry of Planning in the late 1980s and has “produced” millions of decisions since then. The system is run on a “mainframe”, which is connected to a number of personal computers.

Seventy-five percent of all application forms for housing assistance are processed fully automatically by *IHS*: in these cases the decision is made without any interaction by a human being. In the remaining 25% of the cases, a civil servant is involved in some part of the decision-making process. In those cases the decision is made by “cooperation” between the expert system and the civil servant. An *interface* enables communication between the expert system and the civil servant. Via the interface the expert system asks the civil servant to enter specific data. After each question the expert system presents an intermediate conclusion on the computer screen.

In all cases, the reasoning mechanism of *IHS* formulates a decision in the individual case. No human being is involved in the formulation of the text. Each decision is automatically printed out and put into an envelope. No human being reads the decisions before they are sent.

To make correct decisions under the Housing Assistance Act, the Minister of Planning in The Netherlands needs to follow two sets of rules. The first set is the rules from the Housing Assistance Act. The second set consists of the general rules of administrative law, most of which can be found in the General Administrative Law Act. Among these are several *general principles of proper administration*: rules which administrative bod-

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Table 1. Categorisation of the 21 errors detected in the study of 200 decisions made with the support of IHS



Level of support by HIS	Type of quality criteria			Total
	Content	Wording	Procedure	
Full support	0	16	3	19
Incomplete support	0	0	2	2
No support	0	0	0	0
<i>Total</i>	<i>0</i>	<i>16</i>	<i>5</i>	<i>21</i>

ies must observe in all their acts. A small number of general principles of proper administration have not been codified in the General Administrative Law Act; they are considered part of unwritten law⁴. These rules (or criteria) together formed the checklist.

For the purpose of the investigation the criteria contained in the checklist were divided into three subgroups:

1. Criteria with regard to the *content* of the decision;
2. Criteria with regard to the *wording* of the decision;
3. Criteria with regard to the *procedure* of making a decision.

The above checklist was applied to a selection of decisions made with the help of IHS. The period of investigation for the case study was 1999 to 2000; the decisions under investigation were made between July 1, 1997 and July 1, 1998. In this time span the Ministry of Planning made 1,031,000 decisions on a first application for a benefit under the Housing Assistance Act. Of those 1,031,000 decisions, 200 decisions were selected randomly and became the object of further investigation.

The investigation of the 200 cases revealed 21 errors which can be divided in the three categories of quality criteria in the checklist. These 21 errors can, however, also be categorised with respect to an important second dimension: level of expert system support, where three categories are distinguished:

1. Tasks for which the expert system offers full support
2. Tasks for which the expert system offers incomplete support
3. Tasks for which the expert system does not offer any support

Thus, the 21 errors detected can be categorised according to the criteria and according to the level of support delivered by the IHS system (Table 1).

As Table 1 shows, in none of the 200 cases was an error made with regard to the *content* of the decision. This result is remarkable. It can be explained by looking at the way IHS works. In this expert system, the provisions of the Housing Assistance Act have been translated into algorithms. In these algorithms, as in the Provisions of the Act, the rules for calculating the sum of housing assistance have been laid down. These rules are complicated, but they are all closed norms: there is no space for judgment during the decision-making process. The algorithms clearly prescribe step by step how the sum of housing assistance must be determined. The expert system—an application of ICT—never fails to apply the rules. In each case it applies the same algorithms, without ever making a mistake.

Table 1 further shows that in 16 out of 200 cases an error was made with regard to the *wording* of the decision. In each of these 16 cases, there was a breach of the justification principle, which holds that an administrative body should give grounds for its decision, and that these grounds must be mentioned in the decision itself (article 3:46 and 3:47 of the General Administrative Law). Decisions on housing assistance are formulated automatically by IHS: no human being is involved in the formulation of the grounds for the decision. The errors with regard to the wording of the decisions were caused by the way the expert system works. It produces standard text blocks for standard situations. A few standard text blocks, however, are incomplete: some steps of the reasoning process are left out. Thus, the grounds for the decisions become incomprehensible.

Finally, Table 1 shows that five errors were made with regard to the *procedure* for the decision-making process. In three of these cases, the error was caused by the expert system: it failed to check whether data were correct in situations where the General Administrative Law prescribes that such verification should be performed. In the other two cases, the error was made

Table 2. Categorisation of the 25 errors detected in the study of 30 decisions made with the support of MR-ABW

Level of support by MR-ABW	Type of quality criteria			Total
	Content	Wording	Procedure	
Full support	1	0	0	1
Incomplete support	5	11	0	16
No support	2	1	5	8
<i>Total</i>	8	12	5	25

by the human factor. In these cases, (typing) mistakes were made when a civil servant entered data from the application form into the expert system. These mistakes, however, did not affect the final outcome of the decision-making process (the calculated sum of housing assistance was correct).

Case Study II: An Expert System for General Assistance⁵

The second case study investigates the daily use of an expert system in the field of general assistance in one Dutch municipality. This expert system, *MRE-ABW*, was developed by a Dutch software company in the 1990s and is now in daily use in about 20% of the Dutch municipalities. The system, which can be run in a network environment and on a personal computer, contains three parts: (1) a *database*, (2) an *interface*, and (3) a *reasoning mechanism*.

The *database* contains rules from the General Assistance Act, additional local regulations, case law for general assistance, rules from the General Administrative Law Act, and unwritten rules of general administrative law. Thus it offers the user the legal information with which to make decisions under the General Assistance Act.

The *interface* enables communication between the expert system and the user. In most cases the user will be a civil servant working in the social security department of a municipality. Via the interface the expert system questions the user, asking him or her to enter specific data (for example: date of birth and income of the applicant, etc.). After each question the expert system presents an intermediate conclusion on the computer's screen. The system can also generate an advisory report and a draft text for the decision in each individual case.

The *reasoning mechanism* or core of the expert system, is a set of algorithms into which all the steps that the expert system takes to deal with individual cases have been programmed. The reasoning mechanism applies the input data to the rules stored in the database. Thus it formulates intermediate conclusions, which are presented to the user via the interface. After asking a number of questions, the reasoning mechanism formulates a draft advisory report and a draft text of the decision in the individual case and exports both texts via the interface to a word processor, after which the user can either adjust them or print them as is.

In order to make correct decisions under the General Assistance Act, a municipal executive in The Netherlands needs to follow two sets of rules. The first set consists of the rules from the General Assistance Act itself. The second set is made of the general rules of administrative law, as described under case study I. These rules (or criteria) together formed the checklist.

For the purpose of the inquiry these criteria were divided into three subgroups:

1. Tasks for which the expert system offers full support
2. Tasks for which the expert system offers incomplete support
3. Tasks for which the expert system does not offer any support

The above checklist was applied to a selection of decisions made with the help of MR-ABW in one municipality. The period of investigation for the case study was January to December 1999. In this time span the social security department of the municipality in question made 1145 decisions on a first application for a benefit under the General Assistance Act. Of those decisions,

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30 were selected randomly and became the object of further investigation.

The investigation of the 30 cases revealed 25 errors with respect to the three categories of quality criteria in the checklist⁶. These 25 errors can also be categorised as to the “level of expert system support”, similar to case study I.

Thus, the 25 errors detected can be categorised according to the criteria and according to the level of support delivered by the MR-ABW system (Table 2).

As Table 2 shows, only a single error was made while performing a task for which the expert system offered full support. This error concerned article 43 (m) of the General Assistance Act. According to this provision, part of the work income of parents with children under the age of five may be disregarded (which leads to a higher benefit). The expert system offers full support for the task of interpreting whether a person qualifies for this provision. However, although the person in this case qualified, article 43 (m) was not applied. This was not the result of an error in the expert system. The civil servant probably did not give a correct answer to all the questions of the expert system. Based on wrong input, the system could only conclude that the provision did not apply.

Sixteen errors were made in performance of a task for which the expert system offered incomplete support to the civil servant. In 11 of the 16 cases, the decision did not fulfill the requirements for the wording of the decision. In all these cases, there was a breach of the justification principle, which holds that an administrative body should give grounds for its decisions, and that these grounds must be mentioned in the decision itself (article 3:46 and 3:47 of the General Administrative Law). ~~In each case, the expert system offered a draft text for the decision, which contained grounds, but this draft text did not meet the requirements of the principle.~~ In some cases the reasons that were given in the draft text were incomplete, with only some of the reasons specified in the decisions. In other cases, a calculation of the assistance allowance was given, but this calculation was incomprehensible, because important steps were missing. The civil servants could have amended the draft text for the decision manually, but they failed to do so.

In 5 of the 16 cases, the decision did not meet the requirements for the content of the decision. These cases all showed the same type of error in the application of article 14(2) of the General Assistance Act. This provision specifies the circumstances that must be taken into account when imposing a sanction upon the person applying for or receiving an allowance. The expert sys-

tem offers support for the application of this provision, but its support is incomplete. That is, the system offers a draft text for imposing a sanction, but it does not support how the civil servant takes into account the circumstances specified in article 14(2). It appeared that the civil servants skipped the unsupported part of the task: the relevant circumstances were not taken into account.

Eight times an error was made in performing a task for which the expert system did not offer any support to the civil servant. Here the civil servant had to rely on his or her own knowledge. Without the help of the expert system, errors were made in all categories: errors in the content of the decision (two cases), errors in the wording of the decision (one case), and errors in the application of procedural rules (five cases).

To my knowledge this is the first investigation into the extensive use of expert systems in the daily practice of handling a complex juridical task within government organizations⁷. The results of these case studies show the problems that may arise when expert systems are put into practice, as well as their ability to improve the quality of the decision-making process. Expert systems may indeed be useful to improve the quality of decisions, especially when they make complex calculations. More specifically, the use of expert systems can further compliance with the principle of legal equality and the prohibition of arbitrariness. However, the use of expert systems does not guarantee juridically correct decisions. Errors—especially breaches of the justification principle and breaches of the principle of due care—are made if the system offers only limited support to its users. There is a risk that users will rely too much on the expert system and will not use their own knowledge when necessary.

These results underline the need for users of juridical expert systems to be aware of their limitations and to know how to use them. Government agencies that decide to use expert systems should take additional measures to maintain control over the quality of the decisions in fields which are not, or not completely, covered by these systems. Such measures may include:

- analysis of complaints by citizens and case law and, where necessary, adjustment to the expert system or the instructions to the users;
- additional training for the users of the expert systems in order to make them more aware of the risks of too much reliance on the expert system.

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ELECTRONIC COMMUNICATION BETWEEN GOVERNMENT AGENCIES AND CITIZENS

Increasingly, government agencies and citizens communicate with each other by electronic means. Citizens send e-mails to government agencies to apply for permits and grants and to submit objections or appeal against government decisions which affect them. Government agencies, in turn, open Web sites on which citizens can download forms, collect government information, submit applications, and so forth. To what extent and under which conditions is electronic communication between government agencies and citizens legal under Dutch administrative law?

In April 2004 the Dutch parliament adopted the Electronic Administrative Communications Act (*Wet elektronisch bestuurlijk verkeer*). This Act, which entered into force on July 1, 2004, regulates electronic communication in administrative procedures. This law is aimed at removing the legal obstacles for electronic communication between government agencies and citizens⁸.

A key issue in this context is the term "in writing". Under Dutch administrative law, several acts are required to be in writing. Applications for individual decisions and objections against those decisions, for example, have to be submitted in writing. How should this term be interpreted in an electronic context: are electronic letters (e-mails) considered in writing? Since the late 1990s—when e-mail and Internet became common means of communication—there has been uncertainty about these issues under Dutch law.

The new Electronic Administrative Communications Act removes this uncertainty. It leaves the term "in writing" as is, and indicates in its explanatory memorandum that this term should be interpreted as "expressing signs on a data carrier". The data carrier can, according to the memorandum, be paper, but also an electronic carrier, such as a computer disk. Thus, the legislator has adopted a wide interpretation of the term "in writing". The requirement that applications for decisions have to be submitted in writing, for example, means that applications can be made by a letter on paper, but also via e-mail. The same applies for the submission of views, objections, and so forth.

The new Act further regulates under which conditions electronic communication between government agencies and citizens is allowed. Two principles are central in this context. The first principle is that electronic communication is allowed if both the government

agency and the citizen(s) involved agree to permit it. Citizens are not obliged to communicate electronically with government agencies; on the other hand they have no right to do so if the government agency chooses not to use electronic ways of communication. The second principle is that the electronic message meets requirements of "reliability" and "confidentiality": an electronic message may be sent if the electronic system by which it is sent is sufficiently reliable and confidential, given the nature of the communication.

The Electronic Administrative Communications Act also contains a provision on *electronic signature*: art. 2:16. This article holds that the requirement of "signature" is met by an electronic signature "if the method which is used for authentication is sufficiently reliable, taking into account the nature and the content of the electronic message and the object for which it is used." The provisions on electronic signature in the Dutch Civil Code (art. 15a, section 2-6, and art. 15b of Book 3) apply to the extent that the nature of the message does not oppose to this. These provisions of the Dutch Civil Code are part of the Dutch Electronic Signature Act which forms the implementation of Directive 1999/93/EC of the European Parliament and the Council of the of 13 December 1999 on a Community framework for electronic signatures.⁹

PLANS AND PROSPECTS FOR E-GOVERNMENT IN THE NETHERLANDS

Plans for E-Government: An Overview of the Government Program 2004-2007

In September 2004 the Dutch government published the report "Towards the Electronic Government" (Ministry of the Interior and Kingdom Relations, 2004), in which it presented its policy program for e-government in the period 2004 to 2007. In this program the government has formulated four targets:

1. Companies and citizens should be required to submit certain information to the government only once.
2. There is to be an electronic system which enables all companies and citizens to be uniquely identified for official purposes.
3. In its communication, both internal and external, the government is to use open standards, thus

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- decreasing reliance on any one supplier or platform.
4. By the year 2007, 65% of all public services (at national, regional, and local authority levels) should be provided via the Internet.

In order to reach these targets the Dutch government has started a number of policy programs since 2004. These include a program to develop an infrastructure for electronic identification and a program for electronic authentication.

The object of the program for electronic identification is to enable all persons to be identified with just one type of document. At present, identification relies on various official documents such as a passport or National Identity Card for those persons registered with local authorities, a *SoFi card* for EU residents, and a *Foreign Citizens Card* for others. All such documents carry a unique number. The introduction of the new electronic identification—a chip card—will enable information to be read from the document electronically. Such information shall include the unique biometric characteristics of the holder. The chip card will enable government agencies to provide a wide range of public electronic services for which unique identification is required.

The object of the program for electronic authentication is that users—government agencies, citizens, and companies—can be certain that information can only be accessed in an authorized manner, and that it is impossible for anyone to assume another person's identity. To reach this goal, the government has started the development of a *Universal Government Access Facility*. This facility will have three layers of security:

1. A high security level, providing an electronic signature as defined and required by art. 2:16 of the Electronic Administrative Communications Act
2. A medium security level, in line with the current tools used for Internet banking and the software certificates (as proposed by the Chambers of Commerce)
3. A basic security level, requiring an identification number and/or password, as currently used by the Tax and Customs Administration

The *Universal Government Access Facility* shall enable government agencies to offer a range of "services" (e.g., maintenance grants, parking licenses, building licences) *online* to citizens and companies, rather than in offices.

The program "Towards the Electronic Government" has not yet been completed: the targets which the Dutch government has set for itself are for 2007. It is too early to estimate whether the goals will actually be reached. At present (2005) both the program for electronic identification and the program for electronic authentication are at an early stage of development. Plans have been presented and pilot projects have started in several municipalities.¹⁰ At a national level, however, there is not yet an electronic identification or a means of electronic authentication for electronic transactions between government agencies and citizens.

Prospects for E-Government: Challenges and Opportunities

What are the prospects for e-government in The Netherlands in the near future? We can conclude from the above paragraphs that the legal infrastructure for e-government is ready but the practical infrastructure is not yet. The new *Electronic Administrative Communications Act* regulates under which conditions electronic communication between government agencies and citizens is allowed. The new Act also contains a provision on "electronic signature", clarifying under which conditions an electronic signature can be qualified as a signature under the Dutch Administrative Law Act. However, ~~in practice there is not yet a national infrastructure for~~ electronic identification and authentication. It will last a few more years until each citizen in The Netherlands has his or her own electronic identification card which can be used in contacts with all government organizations. It will also last a few more years until there will be a national infrastructure for electronic authentication—available for electronic transactions with all local, regional, and national public organizations.

If the goal of a national electronic identification card and a national infrastructure for electronic authentication is reached in 2007, the prospects for e-government in The Netherlands in the period thereafter are positive. Empirical research in 2003 already showed that there is a demand for electronic government services among citizens and companies (Bovens et al., 2003; Groothuis, 2004). All municipalities in The Netherlands and nearly all other government agencies have Web sites. Already now citizens use e-mail to apply for grants and licenses and to submit objections against decisions by government citizens. Many municipalities and other government organisations develop plans for electronic transactions and have started implementing them at a small scale

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in daily practice. The main challenge for the Dutch government in the period until 2007 will be to develop and implement a national—harmonized—infrastructure for electronic identification and authentication.

CONCLUSION

The use of ICT by government agencies offers, from a legal point, both challenges and opportunities. A first opportunity is that ICT facilitates communication between government agencies and citizens. Citizens now have a new choice in their contacts with government agencies: they can communicate not only orally (in an office) or in writing (on paper) but also via e-mail and other new forms of electronic communication. Government agencies, in turn, can use Internet and other ICT applications to actively involve citizens in the process of developing new policies, prepare decisions, and so forth. This means that the interests and opinions of citizens can be better taken into account. An important condition for electronic communication between government agencies and citizens is that it meets requirements of reliability and confidentiality. These requirements have been laid down in the new Dutch *Electronic Administrative Communications Act*, which entered into force on July 1, 2004. To meet these requirements the Dutch government has started to develop a national infrastructure for electronic identification and authentication.

A second opportunity is the use of juridical expert systems in the process of decision making by government agencies. Investigations into the extensive use of expert systems by government agencies indicate that expert systems can indeed be useful to improve the quality of decisions, especially when they make complex calculations.

However, expert systems do not guarantee juridically correct decisions. Empirical research in The Netherlands has shown that errors are especially made if the system offers only limited support to its users.

There is a risk that users will rely too much on the expert system and will not use their own knowledge when necessary. These results underline the need for users of juridical expert systems to be aware of their

limitations and to know how to use them. Government agencies that decide to use expert systems should take additional measures to maintain control over the quality of the decisions in fields which are not, or not completely, covered by these systems.

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KEY TERMS

Algorithm: A series of instructions for the performance of tasks and their sequence.

Automatic Decision Making: Decision making based on automatic processing of data.

Electronic Signature (under Dutch Law): An electronic method for authentication which is sufficiently reliable, taking into account the nature and the content of the electronic message and the object for which it is used.

General Principles of Proper Use of ICT: Principles which should be respected when government agencies use ICT (e.g., principles of accessibility, confidentiality, transparency).

In Writing (under Dutch Law): Expressing signs on a data carrier (paper or an electronic carrier).

Juridical Expert Systems: Software programs which can solve juridical problems, either without any human interference or with limited human interference, by means of a reasoning mechanism and a knowledge database.

Universal Government Access Facility: A means of authentication which enables government agencies to offer a range of services (e.g., maintenance grants, parking licenses, building licences) on line to citizens and companies.

ENDNOTES

- 1 There are two provisions of European Union law on automatic decision making, the articles 12 and 15 of Directive 95/46/EC of the European Parliament and of the Council of 24 October 1995 on the protection of individuals with regard to the processing of personal data and on the free movement of such data: Official Journal 23/11/1995, L 281/31. These provisions, and their implementation into Dutch law, are addressed in this article.
- 2 Art. 15 and 12 of Directive 95/46/EC of the European Parliament and of the Council of 24 October 1995 on the protection of individuals with regard to the processing of personal data and on the free movement of such data: Official Journal 23/11/1995, L 281/31. An analysis of these provisions of the directive is made in Bygrave (2001).
- 3 This empirical research was part of my PhD studies into the legal aspects of electronic decision making by government agencies (Groothuis, 2004).
- 4 These rules of unwritten law, such as the principle of legal equality, were developed in the Dutch case law and jurisprudence.
- 5 This overview, which is part of my PhD studies, was earlier published in Groothuis and Svensson (2000).
- 6 Each of the 25 errors, as well as the overall results of the case study, were discussed with the manager of the social security department of the municipality. The manager agreed with the finding that there had been errors in these cases.

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7. Experiments with juridical expert systems in
laboratorium settings were described in
Nieuwenhuis (1989), De Bakker and Wassink (1991),
and De Vey Mestdagh (1997).
8. An analysis of the new Act can be found in
Groothuis and Voermans (2001). A comparative
law study on electronic communication and its
impact on administrative law can be found in Prins,
Eifert, Girot, Groothuis, and Voermans (2002).
9. Official Journal L 013, 19/01/2000 p. 0012-0020.
10. Examples are the municipalities of Dordrecht
<www.dordrecht.nl> and Enschede <www.enschede.nl>.