

THE APPLICATION OF ALGORITHMS AND ARTIFICIAL INTELLIGENCE IN CROATIAN PUBLIC ADMINISTRATION

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Abstract

The aim of this paper is to analyse the application of algorithms and artificial intelligence (AI) in the daily work of public administration in Croatia. The authors examine to what extent Croatian public administration has been computerised and digitalised and how long these processes have existed in Croatia. The main research question is: in which areas and for what purposes are the management of public affairs and the provision of public services based on the use of algorithms and AI. First, the strategic framework of the digitalisation of public administration is discussed in order to show the goals that the central government is trying to achieve. Then, the use of algorithms and AI in keeping official public administration records ('official records') and issuing certificates is analysed. In addition, the applicability of algorithms and AI in the adjudication of administrative matters is assessed. Lastly, the use of algorithms and AI in the management of administrative court proceedings is also considered. The research was conducted using the legal analysis method, teleological and descriptive methods, and an analysis of the web portals and official websites of administrative bodies in Croatia.

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1. Introduction

Over the last three decades, information and communication technology (ICT) tools have significantly changed traditional social relationships and the way society and the economy function. They have accelerated the flow of communication, made information more accessible, improved existing products and services and created some new ones¹. The tools of ICT have significantly influenced the attitude of public administration toward citizens and various social groups, especially the business community². These tools have led to a faster and now unstoppable transition from the traditional handling of administrative tasks to the so-called e-administration as a way of handling administrative tasks in the future. E-administration encompasses the use of ICT in daily public administration with the aim of improving its efficiency and cost-effectiveness and increasing the quality of work. At the same time, it contributes to the transparency of the work of the public authorities as one of the fundamental values to be achieved in modern society. As part of the concept of good governance, e-administration implies not only the use of ICT tools in the daily work of public servants and their e-communication with citizens and other subjects, but also brings a qualitative change in public administration oriented toward its users. The quality of management in each country, and thus the success of public administration in meeting the challenges of current economic and social trends, depends to a large extent on the actual impact of the use of the modern technological potential. Therefore, ICT tools play an important role not only in the daily work of citizens and

¹ J. Müller, *Upravljanje informacijskom tehnologijom u suvremenim tvrtkama te hrvatska poslovna praksa korištenja informacijskih tehnologija*, 52: 5-6 Ekonomski pregled 587 (2001).

² L. Budin, *O hrvatskom nazivlju u području računarstva i informacijske tehnologije*, 1:1 J. Comp. & Inf. Tech. 75 (1993).

entrepreneurs but also in the work of the public authorities in Croatia today³.

The use of ICT tools in the public administration follows the trends of global technological challenges, computerisation, digitalisation, and the application of AI in work processes. AI, as a set of rapidly developing technologies, can bring a number of benefits to a variety of economic and social activities⁴. As AI improves forecasting, optimises workflows, helps allocate resources to users, and personalises the services offered, its use can contribute significantly to achieving the results that benefit society and provide the economy with important competitive advantages. The use of AI has proven to be particularly useful in the areas of finance, home affairs, transportation, agriculture, public health protection, protection of nature and environment, etc. The application of AI is very broad and diverse and includes numerous work processes such as machine translation, the creation of expert systems and simulations, the use of robotics (kinesthetic AI), text creation and 'chatbots', the creation of images, pattern or object recognition, spatial analysis, data search, and automatic programming, etc⁵.

The development of AI is based on so-called machine learning, that is, on neural networks that enable these systems to analyse a large amount of information, communicate with humans via natural language, but also with inanimate systems, learn based on experience, draw conclusions, behave adaptively, plan in a complex way, etc. The functioning of AI is based on algorithmic technologies increasingly being used in business, but also in public administration⁶. This is because the algorithm can be expressed in

³ On this issue, see N. Vrčec & A. Musa, *E-uprava u Hrvatskoj: Izazovi transformacija uprave u digitalnom društvu* (2016).

⁴ Artificial intelligence is the ability of computers to perform operations equivalent to human learning and decision-making. See *Veliki rječnik standardnog hrvatskog jezika* (2015) 433.

⁵ For comment, see *Hrvatska enciklopedija – mrežno izdanje* (2013-2024), available at <https://enciklopedija.hr/clanak/umjetna-inteligencija>, last accessed 25 July 2024.

⁶ An algorithm represents a set of symbols and a general procedure for systematically solving individual tasks from a certain class of mathematical problems, such as Euclid's algorithm for determining the greatest common measure of two natural numbers, Eratosthenes' sieve for determining prime numbers or Gauss' algorithm for solving systems of linear equations. Initially, the name 'algorithm' referred to the Arabic system of decimal notation, which was introduced in Europe in the ninth century by al-Khwarizmi, from whose

numbers and words, which makes it very suitable for performing public administration tasks with the help of ICT⁷. However, unlike the ability of humans to perform various functions simultaneously, AI systems are usually specialised in performing a narrower range of specific processes, which should be taken into account when choosing this working method.

The aim of this paper is to analyse the application of algorithms and AI in the daily work of public administration in Croatia. The authors examine to what extent Croatian public administration has been computerised and digitalised today and how long these processes have existed in Croatia. The main research question is: in which areas and for what purposes are the management of public affairs and the provision of public services based on the use of algorithms and AI. First, the strategic framework of the digitalisation of public administration is discussed in order to show the goals that the central government is trying to achieve. Then, the use of algorithms and AI in the management of official records and issuing certificates is analysed. In addition, the applicability of algorithms and AI in the adjudication of administrative matters is assessed. Lastly, the use of algorithms and AI in the management of administrative court proceedings is also considered. The research was conducted using the legal analysis method, teleological and descriptive methods, and an analysis of the web portals and official websites of administrative bodies in Croatia.

2. The Strategic Framework for the Informatisation and Digitalisation of Public Administration

A systematic approach to the introduction of ICT tools in Croatian public administration began in 2002 with the adoption of the Strategy for Information and Communication Technology – Croatia in the 21st Century. With this Strategy, the Government of

name it was derived. It was then applied to counting with Arabic numerals and to arithmetic skills. Generally speaking, an algorithm is any general solution to an equation to search for specific solutions. For example, the formula $P=a^2$ is an algorithm for calculating the area of a square. The term 'algorithm' is broader than the terms 'formula', 'equation,' 'criterion', and others, because it includes them all. See *Hrvatska enciklopedija*, sv. 1 (1999) 151; *Hrvatski opći leksikon* (1996) 19; *Rječnik hrvatskog jezika* (2000) 16.

⁷ See J. Etscheid, *Artificial Intelligence in Public Administration*, in I. Lindgren et alii (eds), *Electronic Government. EGOV 2019. Lecture Notes in Computer Science* (2019).

the Republic of Croatia defined the role of ICT in the future functioning of public administration and confirmed its orientation towards the development of the information society⁸. The importance of computerisation in the work of public administration increased over time, so that five years later the E-Croatia 2007 Programme was adopted, which aimed to create a system that would enable citizens and entrepreneurs to communicate with the state administration and use various services via the Internet⁹. The Central State Office for E-Croatia was established as the central body of the state administration responsible for designing, monitoring, and evaluating public policies to develop the information society. By 2008, a number of new e-services of the state administration were developed and made available to users. Furthermore, the Central State Portal was introduced as a single point of access to public administration information, and significant investments were made in the computerisation of administrative matters and the digitalisation of official registers. The creation of many applications that should help public administrations in their work is usually entrusted to actors outside the public sector, who have taken on the obligation to maintain them, ensure their high-quality functioning, as well as to preserve and protect the data stored. At the same time, efforts were made to train public servants through various state-level training courses focused on the use of ICT resources.

The systematic approach to the development and implementation of ICT tools in the work of public administration continued with the adoption of the Strategy for the Reform of Public Administration for the period 2008-2011¹⁰. This Strategy aimed to promote the use of these tools in order to improve the efficiency and cost-effectiveness of state administration, increase the quality of public services provided to individuals, and make state administration bodies more accessible to citizens and entrepreneurs. The Strategy was followed by the Strategy for the

⁸ Government of the Republic of Croatia, *Information and Communication Technology Strategy – Croatia in the 21st Century of 2002* (2002).

⁹ Program e-Hrvatska 2007, at https://rdd.gov.hr/UserDocsImages/MURH_migracija%20s%20weba/Arhiva%20projekata/Operativni_plan_provedbe_Programa_e-Hrvatska_2007_za_2006.pdf, accessed 25 July 2024.

¹⁰ *Strategija reforme državne uprave za razdoblje 2008-2011*, 8:2 Hrvatska javna uprava 315–342 (2008).

Development of Electronic Administration in the Republic of Croatia for the period from 2009 to 2012, which defined the framework and objectives of existing and new e-administration activities, improved the communication networks of state administration bodies, established a system for managing public data and documents, and defined services to be implemented in the form of e-administration¹¹.

In addition, the importance of providing fast and reliable public services was confirmed by the Croatian Parliament in the Public Administration Development Strategy for the period from 2015 to 2020¹². This was followed by the adoption of the E-Croatia 2020 Strategy, whose mission is to use ICT to improve the quality of life of citizens, increase the competitiveness of the economy, and provide society with high-quality electronic public services¹³. In 2021, the Croatian Parliament adopted the National Development Strategy of the Republic of Croatia until 2030, which emphasised that one of the strategic goals is the availability and efficiency of digital administration. This is to be achieved by increasing the number of automated and computerised processes, increasing the availability of official records for public administration bodies, increasing the availability of digital public services for citizens and entrepreneurs, and taking into account the protection of personal data¹⁴. This Strategy aims to improve the legal framework that regulates the impact of AI and 'big data' analysis on fundamental human rights and ensures the protection of citizens and entrepreneurs from all forms of discrimination.

The Strategy for Digital Croatia until 2032 is the latest act supporting the aforementioned national strategies¹⁵. This Strategy envisages the application of advanced technologies such as 5G and 6G, AI, machine learning, cloud computing, big data, and blockchain technology in the public and private sectors over the

¹¹ *Strategy for the Development of Electronic Administration in the Republic of Croatia for the period from 2009 to 2012*, at https://rdd.gov.hr/UserDocsImages/MURH_migracija%20s%20weba/Arhiva%20projekata/strategija_e_Uprave_HRV_final.pdf, accessed 25 July 2024.

¹² Public Administration Development Strategy for the period from 2015 to 2020 of 2015.

¹³ *E-Croatia 2020 strategy*, at https://www.nipp.hr/UserDocsImages/dokumenti/dok-nippa/Strategija_e-Hrvatska_2020_OCR.pdf?vel=1823370, accessed 27 July 2024.

¹⁴ National Development Strategy of the Republic of Croatia until 2030 of 2021.

¹⁵ Strategy for Digital Croatia until 2032 of 2023.

next decade. It is also open to the implementation of disruptive technologies that may emerge in the future and whose application should enable better processing and use of data and thus contribute to the efficiency of the work of public administration, the creation of public policies, the personalisation of public services, the reduction of administrative burdens, more efficient communication between public administration and citizens, and greater cooperation between the public and private sectors.

The above-mentioned strategic documents and the activities carried out on their basis demonstrate Croatia's long-term commitment to the computerisation and digitalisation of public administration. It started with the interconnection of existing data and official records, which resulted in new, complex results that can be very useful for citizens and entrepreneurs, but also for public administration. One example is the Open Data Portal, a system that represents a data hub and serves to collect, categorise, and disseminate open public administration data. This data is produced by public administration and consists, for example, of geolocation data, traffic data, meteorological data, environmental data, etc., whose use for commercial and/or non-commercial purposes can create added value or economic benefits. Disseminating public and open data through a single centralised entity allows the creation of innovative non-commercial and commercial applications at the service of entrepreneurship and even citizens' daily lives, thereby bolstering economic and social activities. It is important to emphasise that the functionalities of the aforementioned applications are largely based on algorithmic technology and the use of AI in the functioning of public administration.

On the basis of the aforementioned strategic documents and with the aim of computerising and digitalising public administration, the HITRONet system was also established. This system is a communication network designed to connect various public administration bodies through a common computer and communication infrastructure. Through this system, state information resources are integrated via secure private broadband infrastructure that connects central and remote public administration locations to a common data network. This greatly facilitates the work of the state administration, local and regional self-government, and other legal entities that have public powers and enables easy exchange of data between them. This system provides secure and strictly controlled access to all public

administration facilities and the establishment of standard network services. In addition, this system also implements specialised services necessary for the daily work of the public administration, such as the Treasury system, the OIB system, e-File (Cro. *e-Spis*), etc., which significantly accelerate and facilitate the exchange of data from official records¹⁶. The interoperability of the public administration system has recently been further strengthened by the creation of the Government Service Bus, a database used by public administration bodies to comply with the legal obligation to obtain data *ex officio* from public registers, without requesting the same data from the parties in the proceedings they are conducting, which is particularly important for the adjudication of administrative matters¹⁷.

The organisation and introduction of such systems in Croatia have created a qualitative basis for the introduction of algorithmic and other digital technologies in the work of public administration related to keeping official records and issuing certificates, resolving administrative matters in proceedings initiated *ex officio*, and managing cases in court proceedings. However, despite the developed use of ICT and AI tools in public administration, there is no general legal regulation in Croatia that would regulate the use of such technologies, but their use should be in compliance with other laws and regulations that govern the actions of the public authorities.

3. Issuing Certificates and Providing Public Services Using Algorithms and Artificial Intelligence

In the last two decades, Croatia has made significant progress in the use of ICT resources and the computerisation and digitalisation of public administration. These developments first manifested in the digitalisation of official records. Although the digitalisation of some of these records began as early as the 1980s,

¹⁶ Since June 2009, HITRONet has been connected to the sTESTA network (secured Trans European Services for Telematics between Administrations), a special European Union network designed to connect public administration bodies at the European Union level and offer trans-European services between the public administrations of EU member states.

¹⁷ Government Service Bus, available at <https://rdd.gov.hr/istaknute teme/interoperabilnost-sustava-javne-uprave-drzavna-sabirnica-gsb/1873?lang=hr>, accessed 3 July 2024.

it was fully completed about 15 years ago. It was precisely the systematic digitalisation of official records that was the basic prerequisite for offering a number of services to citizens and entrepreneurs in electronic form.

An important step forward in the use of ICT tools in the work of public administration was taken in 2014 when the State Information Infrastructure Act was adopted. The Act defines the rights, duties, and responsibilities of the competent public administration bodies in connection with the establishment, development, and management of the state information infrastructure system, the system of official records, and the secure exchange of data between public administration bodies. The state information infrastructure system ensures the interoperability of information systems and official records of all public administration bodies and enables them to interact directly with citizens or other users¹⁸. A large amount of data contained in official records is made available to all public administration bodies as well as citizens and other users in accordance with the rules on the protection of personal data, confidentiality of data, information security rules, and rules on the right of access to information¹⁹.

Although the Act on the State Administration System, as a fundamental law that regulates the organisation and functioning of state administration, does not prescribe the mandatory keeping of official records and the issuance of certificates in e-form, today, these records are fully digitalised, and many certificates are issued electronically. These official records consist of structured, organised, interconnected, and harmonised data on the subject of registration and data related to the subject of registration. They are organised and maintained on the basis of a law, more rarely based on an international agreement, and are used to record and store data in the context of fulfilling prescribed public administration tasks. The data contained in these registers, as well as all elements necessary for their interpretation, are the property of the Republic

¹⁸ Public administrative bodies in Croatia are state administrative bodies and other organs of the state, local and regional self-government entities, and legal persons exercising public authority.

¹⁹ The state information infrastructure is a system consisting of a common state basis for secure data exchange and tools for interoperability, such as metaregisters, technical standards, classifications, public registers, the e-Citizens system, and the state information infrastructure networks HITRONet and CARNet. State Information Infrastructure Act of 2014, art 2 (3), art 4 (1), art 5 (1).

of Croatia²⁰. For example, the Register of Voters, the Register of Political Parties, the Register of Associations and the Register of Foreign Associations, the Register of Religious Communities, the Register of Councils, the Coordination of Councils and Representatives of National Minorities, the Register of Foundations, the Register of Foreign Foundations, the Register of Craftsmen and the Register of Residence and Domicile of Citizens, the registers of Croatian citizens, owners of vehicles, ships and airplanes, various tax registers, the registers of pension and disability beneficiaries, health insurers, and others are kept in digital form.

The State Administration System Act places particular emphasis on the fact that the official business of public administration is carried out exclusively in e-form²¹. To this end, a new Regulation on Office Correspondence was adopted in Croatia in 2021, to the effect that all office correspondence is to be carried out exclusively in e-form, thus significantly facilitating data exchange between public administration bodies²². This Regulation introduced a functional obligation to connect and exchange data from a given public administration office with other information systems maintained in specific administrative areas, as well as the obligation to connect and exchange data with the reporting system for adjudicating administrative matters.

Digitalised official records are not only of immense importance for the exchange of data required for administrative decisions and other administrative procedures; they are also necessary for issuing certificates to individuals concerning the data they contain, on the basis of which citizens and entrepreneurs exercise numerous rights. Today, the majority of certificates issued in Croatia are in electronic form, created through the use of algorithms and AI. This is the case, for example, with certificates of domicile or residence, vehicle ownership, building energy performance, birth and marriage certificates, etc. These certificates are usually issued on the same day they are requested, thanks to the application of algorithms and AI in the public administration. Through the functions of the state information infrastructure, a party can submit a digitally written request for a specific certificate, which is then generated on the basis of the data contained in the

²⁰ State Information Infrastructure Act of 2014, art 2 (10), art 3, art 19.

²¹ State Administration System Act of 2019, amended 2023, art 16 (1).

²² Regulation on Office Correspondence of 2021.

official records and delivered to the party in electronic format, electronically certified with a barcode that enables verification of its authenticity. In this way, the objectives of the 2010 General Administrative Procedure Act, as a fundamental law regulating the functioning of public administration as a whole, were achieved²³.

In order to facilitate and improve communication between both citizens and entrepreneurs and the public administration, the Central State Portal was established – a virtual centre where information on public services and other information and documents related to the work of public institutions is collected in one place in easily accessible formats. This portal has two basic functions. On the one hand, it serves as a platform for public administrations to publish information on public services and information and documents related to the implementation of measures in their area of responsibility. On the other hand, it enables them to communicate with citizens and other users by submitting information in electronic format via the personal user mailbox system²⁴. Thanks to the Central State Portal, citizens and entrepreneurs can search online for information related to the exercise of rights and the protection of their interests, the use of public services, and the monitoring of various political activities.

A special e-Citizens system has been integrated into this Portal, allowing citizens to access electronic public administration services through a unique electronic identity used for authentication. Using this System, citizens can request electronic extracts from birth, marriage, or civil partnership registers, electronic records of domicile, residence, or vehicle ownership, extracts from the pension system, criminal record certificates, student status certificates and many other documents. At the same time, using algorithms and AI, the system allows Croatian citizens to electronically register their place of domicile or residence, change their place of voting in Croatia and abroad, and register a marriage or a newborn child, as well as start a business, all without having to go to the public administration offices. Through this system, taxpayers can view their tax and accounting cards, and parents can also see their children's school marks.

²³ In 2010, the General Administrative Procedure Act prescribed the possibility of issuing certificates on facts about which public administrative bodies keep official records (art 159 (4)).

²⁴ Act on State Information Infrastructure of 2014, art 2 (16-17), art 7 (2, 4).

To keep citizens informed regarding their personal status, this system sends them personalised messages in electronic format relating to the public services they use and the procedures in which they participate. For example, algorithms are used to notify members of the public about the expiry of the registration of a vehicle, a firearms licence, or a licence to carry out a specific activity, as well as a notification to collect administrative and judicial decisions, scheduled specialist medical treatment, etc. The system sends personal messages to citizens and entrepreneurs informing them of what they need to do to comply with the regarding their personal status in some specific administrative areas²⁵. Today, more than 100 e-services are available in the e-Citizens system, and numerous messages and notifications about the personal status of citizens are delivered through this system. It allows citizens easy and rapid communication with the public authorities and improves the transparency of the public sector in providing public services. In addition to the e-Citizens system, almost 600 other electronic services from various ministries, state administrative organisations, central agencies, institutes, chambers, and local and regional self-government units are available to the public in Croatia today²⁶.

4. Adjudication in Administrative Matters Using Algorithms and Artificial Intelligence

One of the fundamental tasks of public administration is to adjudicate in administrative matters. This task is particularly sensitive because, with such decisions, public administration bodies assign numerous rights to individuals or impose obligations on them. Since decision-making by algorithms and AI uses a series of well-defined, computer-executable actions that are specific to the execution of a series of similar processes, the calculation of values and the expression of data, the adjudication process in administrative matters may seem very suitable for the use of this

²⁵ For example, citizens can receive a notification from the Ministry of the Interior that their ID card or passport is about to expire together with a request to renew it. The e-Citizens system has been operational since June 10, 2014.

²⁶ These are e-applications, e-forms, and services associated with web stores, interactive maps, and other e-services in Croatia, available at the Central State Office for the Development of the Digital Society – E-services in the Republic of Croatia, at <https://rdd.gov.hr>, last accessed 20 July 2024.

modern technology²⁷. The adjudication process in an administrative matter is carried out using the so-called legal syllogism, that is, rules based on the principles of logical reasoning. It draws a conclusion from certain premises, which constitutes the judgment of an administrative decision. Every legal decision, including an administrative decision, is made by applying the general rule of law to the conclusion drawn from the facts of the case. It derives the meaning of the general rule of law from the entire legal system, and the conclusion about the facts by applying the rules of logical syllogism to the facts found in the evidentiary proceedings. The application of legal rules in many administrative matters is not demanding, as these rules are often clearly and precisely laid down in the law itself. The data needed to draw a conclusion about the facts are often contained in the official records. The prerequisites for such decisions using algorithms and AI are therefore in place.

For example, in Croatia, tax on holiday homes is paid annually as a public benefit by the owners of residential buildings that are used occasionally or seasonally. It is calculated on the basis of the number of square metres of the usable area of such a building. The obligation to pay tax on a holiday home is therefore calculated by multiplying the usable area of the house or apartment that is used occasionally or seasonally by the fee coefficient established by the representative body of the local self-government unit²⁸. This means that the calculation of this tax requires precise data on the residential buildings in the territory of the local self-government unit, their usable area, the owners of the buildings, and the intensity of their use, while the method of calculating this tax is specified in

²⁷ Algorithms are always safe and they are most commonly used in practice for calculations, data processing, automated thinking, and solving typical tasks. An algorithm can be expressed in a limited space and time and in a well-defined formal language for the calculation of equivalent operations. Starting from an initial state or input, instructions describe actions that, when executed, go through a limited number of well-defined successive 'steps' and finally produce an 'output'. All of this corresponds to the process of making administrative decisions in accordance with categorical legal norms. So-called randomised algorithms, which use a random input of data from corresponding databases, are not suitable for use in the legal system precisely because of the logic of how the legal system works. On this issue, see F. Staničić & M. Jurić, *Pravni okvir za implementaciju informacijsko-komunikacijskih tehnologija u hrvatsko upravno postupovno pravo*, 65:5 Zbornik Pravnog fakulteta u Zagrebu 635–663 (2015).

²⁸ Local Taxes Act of 2016, amended 2017, 2022, 2023, arts 25–28.

the law. The utility fee – a monetary public benefit paid by owners or users of residential, business, and garage spaces, the construction land used for business activities, and undeveloped construction land – is calculated in a similar way. This fee is calculated by multiplying the number of square metres of the property, the coefficient of the purpose of use of the property and the point value of the utility fee, which is determined by the local self-government unit²⁹. Therefore, information on residential buildings, business buildings, garages, construction and undeveloped construction land, their area and the zone in which they are located, as well as on the owners or users of these buildings and land, is required for the collection of the utility fee. In Croatia, income tax is calculated using the same method. This tax must be paid by a citizen who earns income from self-employment, property and property rights, capital, and other sources in a calendar year. The total amount of income is reduced by the pension insurance contributions and the so-called personal deductions, which are accepted for various reasons. The remaining amount of income is taxed at a lower rate up to a certain amount and at a higher rate beyond that³⁰. To calculate the amount of a citizen's annual income tax liability, it is necessary to determine the amount of their total income in the calendar year, the amount of pension insurance contributions they have paid, and the amount of their personal deductions. The method for calculating this tax is prescribed by law and other regulations.

The rules for calculating all these benefits are prescribed by law so that, if the specified data are known, by including them in the corresponding formula, an adjudication in an administrative matter is made in an automated process that takes place using an algorithm and AI. Therefore, decisions in these administrative matters, as well as numerous others, have been made by these very tools for decades. The use of algorithms and AI in adjudication in administrative matters is particularly common in matters where individuals are asked to pay annual or periodic taxes, fees and other public benefits. The use of algorithms and AI in adjudicating administrative matters is far more common than their use in other legal, especially judicial, proceedings. The reason for this is certainly the precisely defined rules for adjudication in

²⁹ Utility Management Act of 2018, amended 2018 and 2020, arts 91–102.

³⁰ Income Tax Act of 2016, amended 2018, 2019, 2020, 2022, 2023, art 2 (1), art 5 (1), art 7 (1), arts 13–19.

administrative matters, formulated in categorical regulations, which only allow for one legal outcome under the given circumstances³¹. On the other hand, as already mentioned, digitalised official records containing various data relevant to such decisions contribute to this³².

Despite these assumptions, the General Administrative Procedure Act, which is applied in the adjudication of all administrative matters, imposes significant restrictions on the use of algorithmic technology and AI in the adjudication process by prescribing rules for the conduct of administrative proceedings. This law protects individuals from unlawful actions by the public authorities, and especially from unlawful decisions that could be taken arbitrarily and without following the procedure. According to this law, public authorities must act in accordance with nine principles when resolving administrative matters: lawfulness, proportion in protection of rights of parties and public interest, assistance to a party, establishment of material truth, independence and discretion in the evaluation of evidence, efficiency and cost-efficiency, access to data and data protection, legal remedy, and the principle of protection of acquired rights of parties³³. The aforementioned principle of establishment of material truth obliges the public administration to determine the true state of facts in the administrative procedure, that is, to establish all the facts and circumstances that are important for the lawful adjudication of the administrative matter. In other words, in order to find the only lawful solution, the facts to which the general rule is applied in the administrative matter have to be established accurately and truthfully³⁴. An error in establishing the facts of the case is the

³¹ A categorical legal provision is structured like this: “In the event of A, one should do B”. In contrast to the categorical, a disjunctive legal provision has the structure: “In the event of A, one can do B, C, or D”.

³² Official records are those created on the basis of regulations, that is, a general legal act of the state or local or regional self-government unit, and which public administration bodies are obliged to keep. According to the legal presumption of truth, the facts registered in the official records do not have to be proven and are considered true until proven otherwise. See General Administrative Procedure Act of 2009, amended 2021, art 58 (2), art 159 (3).

³³ General Administrative Procedure Act of 2009, amended 2021, arts 5–13.

³⁴ The truth in a judicial proceeding represents correspondence between the subjective knowledge of the person conducting the proceeding with objective reality, and the material truth as the highest degree of certainty that an entity can achieve in a judicial proceeding. See B. Ljubanović, *Načelo traženja materijalne istine i upravni postupak*, 19:4 Hrvatska komparativna i javna uprava 665 (2019).

reason for the unlawfulness of the administrative decision, which should then be annulled by ordinary or extraordinary legal remedies or in administrative litigation. The party's right to be heard, which obliges the administrative body conducting the administrative procedure to give them the opportunity to express their attitude toward all facts and legal issues important for the adjudication of the administrative matter, certainly also contributes to the importance of the correct and truthful finding of the facts in the administrative procedure. Without the party's prior statement, the administrative proceedings can only be conducted if the party's request is accepted or if the decision in the proceedings has no negative impact on the party's legal interests, or if it is required by law³⁵. It is clear from the above that, in Croatian administrative procedures, it is the task of the public administrative body to find the material truth, and to cooperate closely with the party throughout the procedure. These legal provisions will in many cases prevent the use of algorithms and AI in the adjudication of administrative matters.

The General Administrative Procedure Act, with its provisions on the manner of initiating administrative procedures and the provisions on the manner of their implementation, largely determines in which administrative matters it is possible to make decisions using algorithms and AI, and in which it is not. Administrative proceedings are always initiated by a public administrative body, either at the request of a party or *ex officio*³⁶. The decision in administrative procedure can be made through direct adjudication or an investigatory procedure. The direct adjudication of an administrative matter is exceptionally permitted in the cases prescribed by law if parties with conflicting interests do not participate in such a procedure. A public administration body is only authorised to adjudicate an administrative matter directly if, at the time of initiating the administrative procedure, the state of facts may be established on the basis of all the information available to administrative bodies or on the evidence submitted by the party³⁷. The power of public administrative bodies to decide on an administrative matter directly is sometimes prescribed by law in specific areas of administration. On the other hand, an investigatory procedure is conducted when it is necessary to establish facts and

³⁵ General Administrative Procedure Act of 2009, amended 2021, art 7, art 30.

³⁶ General Administrative Procedure Act of 2009, amended 2021, art 40 (1).

³⁷ General Administrative Procedure Act of 2009, amended 2021, arts 49-50.

circumstances important for clarifying things, when two or more parties with conflicting interests participate in the procedure or to enable the parties to realise and protect their rights and legal interests³⁸. It follows from the above that an administrative matter can be adjudicated directly solely if only one party is engaged in the process, if the public administrative body at the time of initiating the administrative proceeding had found all the facts necessary for adjudication, regardless of whether these facts are stored in official records or whether evidence of their existence has been provided to the public administrative body by the party, and if it is not necessary for the party to make a statement or clarification in the proceedings in order to protect their rights or legal interests. In all other cases, the public authority in question should conduct an investigatory procedure in which the party has the right to make a statement in order to protect their rights and legal interests which prevents the adjudication of the administrative matter exclusively using algorithms and AI.

Administrative procedures are initiated *ex officio* if this is required by law or necessary to protect the public interest. In the examples of the collection of taxes and other public benefits that are levied annually or periodically, the law prescribes that taxpayers' and their financial obligations be determined on an annual basis, usually on a specific date³⁹. Such procedures are initiated on the basis of data contained in the official records of taxpayers and the assets or activities they pursue. Therefore, it is the procedures that are initiated *ex officio* and based on a specific legal provision provided for in the law for a specific administrative area. Such proceedings are considered particularly suitable for adjudication using algorithms and AI. Administrative procedures that are initiated *ex officio* but aim to protect the public interest, as well as administrative procedures that are initiated at the request of a party, will only rarely be suitable for adjudication using such technical support.

Administrative procedures initiated to protect the public interest are usually initiated when carrying out an inspection or

³⁸ General Administrative Procedure Act of 2009, amended 2021, art 51. See I. Borković, *Upravno pravo* (2002) 420.

³⁹ For example, the data relevant to the deduction of tax for a holiday home must be submitted to the local self-government unit no later than March 31 of the year for which the tax for holiday home is adjudicated. See Act on Local Taxes of 2016, amended 2017, 2022, 2023, art 49 (2).

other surveillance when it is found that a citizen or legal entity is violating the law in the exercise of an activity or is disturbing public order and safety, devastating the space or the environment, etc. In such cases, the public administrative body should first find the facts relevant for adjudication, relying on conducting investigations, taking witness statements, or reviewing the findings and opinions of experts⁴⁰. Facts relevant to the adjudication of administrative matters are found with respect to the particular nature of a person's activities and are rarely recorded entirely in official records. Data from official records may provide only part of the information relevant to the determination of the facts; for example, whether a building is a cultural monument, whether an area is a maritime domain or public property, etc. However, they are never sufficient on their own to draw a conclusion on the facts.

The same applies to procedures initiated at the request of a party. As a rule, such procedures are initiated so that the party can enforce a right or reduce an obligation imposed on them. In order to initiate such procedures, there should always be a legal basis set out in the law governing the relevant administrative area, which regularly prescribes what must be included in a request to exercise rights and what evidence must be submitted with such a request. It is the task of the official conducting the administrative procedure to first determine whether the motion is comprehensible and whether it contains everything that is required by law in order to be able to pursue it. Furthermore, it is the task of the official to check whether or not all the requirements prescribed by law governing a particular administrative area have been met. It is therefore clear that a series of measures to be implemented prevent administrative decisions from being made exclusively by algorithms and AI.

The General Administrative Procedure Act prescribes the format and content of an administrative decision. It must be made in writing⁴¹ and include a header, introduction, disposition, explanation, instructions about legal remedies, the signature of the official, and the seal of the administrative body⁴². It is important to emphasise that an administrative decision under the mentioned Act

⁴⁰ See General Administrative Procedure Act of 2009, amended 2021, arts 58–70.

⁴¹ Exceptionally, an administrative decision may be made orally if it is necessary to take urgent measures to ensure public order and safety in order to eliminate an imminent danger to human life and health or to property of major value. See General Administrative Procedure Act of 2009, amended 2021, art 97 (1–2).

⁴² General Administrative Procedure Act of 2009, amended 2021, art 98 (1–6).

may also be issued on a template form, that is, printed on a form whose content and appearance are prescribed in advance. This legal provision made it possible to issue administrative decisions using algorithms and AI a long time ago, thus making the work of public administration more efficient and cost-effective. The computer programs used by the public authorities in their work contain template forms for some administrative decisions, the structure and content of which are harmonised with the requirements prescribed by the General Administrative Procedure Act. In other words, the administrative decisions drawn up on the template form contain all the elements required by law. With the amendment to the General Administrative Procedure Act of 2021, the legislator has permitted such decisions to be signed using the electronic signature of an official and/or authenticated via the electronic seal of a public administrative body⁴³. By eliminating the need to print and certify these administrative decisions, another important step has been taken toward the use of algorithms and AI in adjudicating administrative matters. Therefore, in Croatia, digitally signed and sealed administrative decisions can be delivered to the parties electronically to the email address specified in the application, to the address from which the application was sent, or to the party's user box in the information system connected to the state information infrastructure⁴⁴. Administrative decisions issued on template forms usually face the criticism that the explanations they contain are not sufficiently tailored to the individual parties but are standardised for a certain type of administrative matter. Therefore, the parties often consider that they are not specified precisely enough, which can be considered one of the shortcomings of such decisions.

It can be concluded that, in Croatia, adjudication in administrative matters can be made by algorithms and AI. Although there is no general legal regulation allowing this, numerous provisions of the General Administrative Procedure Act speak in favour of it. However, it is not permissible to adjudicate using algorithms and AI in all administrative matters. In general, this aid can be used primarily in procedures that are initiated *ex officio* and adjudicated directly, based solely on the data contained in the official records of the public administrative body. Only in

⁴³ General Administrative Procedure Act of 2009, amended 2021, art 98 (7-8).

⁴⁴ General Administrative Procedure Act of 2009, amended 2021, art 94.

proceedings of this kind does the public administrative body have all the information necessary to establish the facts required for an adjudication. The accuracy and truth of these facts does not need to be separately verified, and the party does not need to be heard in order to protect their rights and legal interests. Although at first glance it may appear that such strict provisions significantly restrict adjudication using algorithms and AI, this is not the case, since the number of such administrative cases on an annual basis is not significant.

The most serious criticism related to adjudication in administrative matters using algorithms and AI focuses on the possibility of basing the decision on incorrect facts resulting from inaccurate data in the official records, on which the party has not had the opportunity to comment. However, the possibility of making a wrong decision for this reason is no different from when the decision is made by an official of a public administrative body by direct adjudication. The reason for such errors is primarily changes in facts and circumstances that are not recorded in the official records because they were not even reported to the authority that keeps these official records.

In the event of an unlawful administrative decision due to any form of illegality, the party aggrieved by the decision has the right to appeal as a regular legal remedy. Filing an appeal is the beginning of a review procedure conducted by the court of second instance on the entire procedure of the administrative decision and its substantive correctness⁴⁵. Thus, if an error has been made in finding the facts when adjudicating, which may be due to incorrect data contained in the official records, the party may prove the incorrectness of this data in the appeal proceedings, whereupon it will be corrected in the official records and a new administrative decision will be issued on the basis of the correct data. Furthermore, an appeal is not the only legal mechanism by which an unlawful administrative decision made using algorithms and AI can be reversed. The authority that made an unlawful administrative decision, the second instance body, and the body exercising supervision are required to initiate an extraordinary legal remedy to annul an unlawful administrative decision that imposes an obligation on a party, even after the deadline for filing an appeal

⁴⁵ General Administrative Procedure Act of 2009, amended 2021, art 105 (1), arts 109, 113-121.

has expired⁴⁶. The reason for this is that citizens should have confidence in the work of the public authorities and that these are not authorised to use their powers, including powers of adjudication, to the detriment of the public contrary to the provisions of the law. In order to eliminate the illegality of administrative decisions, the parties have access to the judicial review of the legality of the work of the authorities in an administrative dispute, which must be initiated within 30 days of the administrative decision being duly delivered to the party by bringing an action before the administrative court⁴⁷.

5. Managing Administrative Court Proceedings Using Algorithms and Artificial Intelligence

Over the last 15 years, the Croatian judiciary has gradually introduced an integrated system for the management of court proceedings: the e-File. Today, this system is used by all types and levels of courts, from municipal courts to the Supreme Court of the Republic of Croatia. The functioning of this system is determined by a set of rules for working in the e-File system, which represents the beginning of the implementation of algorithms and AI in the field of administration and work on court cases⁴⁸. This system includes standard applications, computer and telecommunications equipment and infrastructure, system software, and tools, as well as all data entered, stored, and transmitted from the registers kept by the courts. The administrative courts also use algorithms to assign cases for resolution, which include rules for the automatic random and automatic circular assignment of cases to resolvers. Cases are assigned to judges according to the specialisations defined in the annual work plan, with the exceptions prescribed in the framework standards for the work of judges, which are determined by the annual work plan defined by the weight of each type of case, the area of processing of each type of case, and its location. On the other hand, they are also assigned through an automatic circular allocation, which is applied in cases where

⁴⁶ General Administrative Procedure Act of 2009, amended 2021, art 129 (1), art 131.

⁴⁷ See Administrative Disputes Act of 2024. On administrative dispute in Croatia, see Dario Đerđa, *Upravni spor*, (Rijeka: Pravni fakultet u Rijeci, 2017).

⁴⁸ Rulebook on the e-File system of 2015, amended 2015, 2016, 2017, 2018, 2020, 2021, 2022, 2023, 2024.

complete equality of allocation or urgency of action is required. In this system, each judge is randomly assigned a topic to work on. After all judges participating in the random assignment for a particular type of issue have received an issue to work on, the assignment process is repeated. In this way, uniformity is achieved within a certain type of cases and the number of cases⁴⁹.

The e-File system is also a database that provides public access to basic data on administrative court proceedings via the e-Case (Cro. *e-Predmet*) application⁵⁰. It is a public and free service for parties, lawyers, and other interested persons participating in court proceedings. Searching by court and case number allows parties to find out about the progress and dynamics of case resolution in regular and appeal proceedings. As the system updates the data on the cases once a day, the parties gain an almost immediate insight into the status of the proceedings and the administrative courts are relieved of daily inquiries. As a result, the judges of these courts can devote themselves more effectively to resolving cases. In addition, the parties to the proceedings have the opportunity to access the content of their cases in more detail by being able to download documents that are available in electronic form via the e-Communication (Cro. *e-Komunikacija*) application, which is also based on the algorithmic generation of documents⁵¹.

The latest investment in improving the e-File system will upgrade this system and all its modules, moving towards a centralised hardware and software solution, which should allow for better and more cost-effective upgrades and sustainable development, as well as the stability, functionality, and security of the e-File system. In addition to improved digitalisation measures, the advanced possibilities of keeping files in electronic format lead to a more efficient functioning of administrative and judicial authorities, as they allow a faster 'circulation' of data, faster statistical storage and analysis of data, connection with other information systems of various administrative authorities, and

⁴⁹ Rulebook on the e-File system of 2015, amended 2015, 2016, 2017, 2018, 2020, 2021, 2022, 2023, 2024, art 3.

⁵⁰ Ministry of Justice and Administration of the Republic of Croatia, e-Case, available at <https://e-predmet.pravosudje.hr>, accessed 20 July 2024.

⁵¹ E-Communication, available at <https://e-komunikacija.pravosudje.hr>, accessed 20 July 2024.

public monitoring of files, namely through online portals and e-bulletin boards, etc.⁵².

6. Conclusion

Algorithms and AI play an important role in Croatian public administration today. In the last 20 years, public administration in Croatia has become highly computerised and digitalised, and ICT tools are used intensively in the work of public administration. Public administrative bodies are connected through the state information infrastructure, which enables them to store official records, exchange data, simplify mutual communication, and facilitate communication with stakeholders. The digitalisation of official files of all public administrative bodies in Croatia was a prerequisite for the functioning of a number of online services through which parties can directly obtain electronic certificates of the data kept in official files.

It is worth noting that the possibility of solving some administrative issues with the help of algorithms and AI has existed in Croatia for several decades, especially those related to the financial obligations of natural persons, which are determined periodically. However, solving urgent problems with the help of these technologies is still subject to numerous limitations. For example, adjudication in administrative matters can only be made with the help of algorithms and AI in procedures that are initiated *ex officio*, based on a specific legal obligation and where all the facts relevant to the decision are known to the public authorities at the time the proceedings are initiated.

Digitalisation, which goes hand in hand with the use of algorithms and AI in public administration, is particularly prominent in Croatia's administration of court proceedings. Thus, it contributes significantly to the even workload of judges, the online availability of data on the status of files, and the recording of (and searching for) court proceedings. Unfortunately, the wider use of algorithms and AI in the administration of administrative cases has not taken hold, apart from the obligation to enter these cases into the APA IT system (Cro. *ZUP IT*).

⁵² B. Ljubanović & B. Britvić Vetma, *Sustav e-Spis u funkciji efikasnijeg djelovanja upravnih i sudskih tijela*, 41:1 Zbornik Pravnog fakulteta Sveučilišta u Rijeci 324 (2020).

Although AI is an integral part of the computer technology we use every day in our lives, its development and application are accompanied by numerous challenges and doubts, especially in terms of copyright, privacy, security, misuse of deepfake content, etc⁵³. At the same time, there are numerous challenges, such as the so-called black box problem, the difficult or even impossible assessment of the intention and consequences of using such systems that arise due to the way complex machine learning algorithms internalise and process data⁵⁴. Therefore, especially in recent times, in parallel with the technological development of the AI system, numerous ethical and legal questions have arisen regarding the possibility, justification, and limitation of its use, which each country must take into account when strategically planning normative activities in the future.

⁵³ For more on this issue, see J.I. Criado, R. Sandoval-Almazan, J.R. Gil-Garcia, *Artificial intelligence and public administration: Understanding actors, governance, and policy from micro, meso, and macro perspectives*, 39:4 Pub. Pol'y & Admin. (2024), and L. Tangi & S. Schade, *AI in Public Administration and Government: Benefits, challenges and risks* (2023), at <https://reform-support.ec.europa.eu/system/files/2023-10/Day%20%20-%20AI%20in%20Public%20Administration%20and%20Government%20-%20Benefits%2C%20challenges%20and%20risks.pdf>, accessed 20 July 2024.

⁵⁴ See P. Parycek, V. Schmid, A.-S. Novak, *Artificial Intelligence (AI) and Automation in Administrative Procedures: Potentials, Limitations, and Framework Conditions*, 15:2 J. Knowledge Econ. 8390-8415 (2024).