



DR.10 DOCTORAL THESIS EVALUATION REPORT ¹		
DOCTORAL CANDIDATE		
First and last name:	Matija Kontak	
Registration number:	399691	
GENERAL INFORMATION ABOUT THE STUDY PROGRAMME		
Institution responsible for organizing the studies:	University of Zagreb, Faculty of Law	
Name of study programme:	Postgraduate doctoral studies in legal sciences	
Name of partner institution (in case of dual doctorate):		
Name of doctoral study programme at partner institution (in case of dual doctorate):		
Area / field / branch (if the doctoral study programme is performed within a branch):	Social sciences/Law/European public law	
INFORMATION ON THE DOCTORAL THESIS		
Thesis language	English	
Thesis title:	<i>In the language of the thesis</i>	Biometric Law in Migration and Asylum in the European Union
	<i>In Croatian</i>	Biometric pravo u migracijama i azilu u Europskoj uniji
	<i>In English</i>	
MENTOR(S)		
	Full name, title:	Institution, country:
Mentor:	Iris Goldner Lang, prof. dr. sc	University of Zagreb, Faculty of Law, Croatia.
Mentor:	Niovi Vavoula, Assoc. Prof.	Université du Luxembourg, Faculté de Droit, d'Économie et de Finance, Luxembourg.
THESIS EVALUATION COMMITTEE		
Appointed Thesis Evaluation Committee ² :	Full name, title:	Institution, country:
	1. Snježana Vasiljević, prof. dr. sc	University of Zagreb, Faculty of Law, Croatia
	2. Goranka Lalić Novak, prof. dr. sc	University of Zagreb, Faculty of Law, Croatia

¹ Forward the completed and signed DR.10 form to the appropriate Student Office in digital and print format.

² Committee members 6 and 7 only in case of a dual doctorate



	3. Dunja Duić, izv. prof. dr. sc	University of Osijek, Croatia
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Session of the competent body and agenda item within which the Committee was appointed:		
DOCTORAL THESIS EVALUATION		
Thesis form:	<input checked="" type="checkbox"/> monograph <input type="checkbox"/> Scandinavian model <input type="checkbox"/> artistic work	
Thesis is evaluated:	<input checked="" type="checkbox"/> for the first time	<input type="checkbox"/> after revision
Thesis should be:	<input checked="" type="checkbox"/> accepted <input type="checkbox"/> revised <input type="checkbox"/> rejected	
Explanation for the above opinion (specifying original scientific or artistic contribution and new discovery):		
<p>Topic of the thesis</p> <p>This thesis focuses on legal issues raised by the use of biometric technologies in migration in the EU. In this thesis, doctoral candidate Matija Kontak critically analysed the legal aspects of biometrics in the sphere of EU law. He analysed whether encryption methods, which are in essence mathematical methods which hide the content of information, can be used as legal tools to eliminate negative effects of biometrics on fundamental rights. Doctoral candidate determined that encryption is a necessary tool in order to limit negative effects of biometrics, but encryption in itself is not sufficient to achieve an adequate level of protection of fundamental rights when biometrics are applied.</p> <p>The overview, including research questions, hypothesis and methodology</p> <p>The doctoral thesis has more than 280 pages and over 1100 footnotes. The text is preceded by a note on the thesis supervisors, summary of the thesis with a list of keywords and the table of contents. Following the text are bibliography and list of sources, and the doctoral candidate's short biography.</p> <p>The main part of the thesis consists of six chapters: 1. Introduction, Methodology, Research Questions and Biometric Terminology, 2. EU Biometric Lex Generalis, 3. Biometric data in Migration and Asylum: Analysis of Biometric Law Through Case Law, Information Systems of the EU, and Interoperability, 4. Fundamental Rights Analysis of Biometrics Applied in Migration and Asylum, 5. Can Privacy Enhancing Tools Reduce the Limitations of Fundamental Rights Caused by the Use of Biometric Technologies in EU Migration and Asylum? and 6. The Conclusions and a Look to the Future.</p> <p>The research questions of the thesis</p>		

The main research question is specifically whether encryption as a privacy enhancing tool can be used as a legal solution to mitigate the negative effects of biometrics on fundamental rights of migrants and asylum seekers. In order to answer the main research question concerning encryption and biometrics, Matija Kontak conducted a number of steps in his doctoral thesis. First he had analysed the legal and technical vocabulary concerning biometrics and made recommendations on how legal vocabulary for explaining terms related to biometrics and processing of biometric data can be improved. Then he systematised the rules concerning the use of biometrics in EU law, particularly in the context of migration and asylum. After he determined these rules which he named biometric law, he analysed the case law of the CJEU and the ECtHR concerning the use of biometrics to determine how these courts resolve biometric cases and he provided a critique on points where the approach towards biometrics, by these courts, can be improved. Matija Kontak then analysed how biometrics impact fundamental rights of migrants and asylum seekers. He concluded that privacy and data protection are the fundamental rights which are used to frame legal issues concerning biometrics, but that biometrics may negatively affect fundamental rights to human dignity and to non-discrimination as well. With these questions answered, the doctoral candidate answered that encryption may contribute to resolving the negative effects caused by biometrics, but that encryption by itself is not enough to address fundamental rights problems raised by biometrics.

Methodology of the thesis

The doctoral candidate clearly explains that the thesis primarily uses the methods of legal doctrinal research. The choice of this method the candidate justifies on the grounds that the research questions are of a legal nature, the main method is the interpretation of texts, and the main objective is normative, that is giving a recommendation on how the law should be. Since the thesis is predominantly legal doctrinal research, the research methods are those of legal science. The main method is the interpretation of legal texts and case law. This includes methods of textual interpretation, including contextual and teleological interpretation.

Research data includes predominately legal sources such as EU primary and secondary law, including the Charter of Fundamental Rights in particular. The case law of the CJEU on biometrics is analysed in detail, with the author critically analysing a number of related cases before the CJEU which he describes as representing biometric case law. The thesis analyses the law of the Council of Europe, particularly Article 8 ECHR. The research contains an analysis of soft law sources, including recommendations of EU stakeholders, such as EUDPB and eu-Lisa and communications and reports from the EU Commission and parliament on biometrics. The candidate has in his research relied on technical vocabulary concerning biometrics, primarily ISO standards, in order to fill the gaps in legal terminology concerning biometrics.

The doctoral candidate Matija Kontak has stated in his thesis that he also used interviews with experts. It was clearly explained in the methodological part of the thesis how these interviews were conducted and used as a subsidiary research method to the main method of doctrinal research.

Overview of the thesis

The first chapter explains the basic terms related to biometrics and gives recommendations on how to improve legal biometric terminology. Most important terms of biometric law are biometric data, biometric identification, verification and categorisation and biometric template. The thesis presents an analysis of these terms in the legal sense and determines how they currently are interpreted in EU law and how they should be interpreted.

The second chapter represents the analysis of elements that make the EU biometric law. Doctoral candidate in a detailed manner conducts a textual analysis of the elements that make the definition of biometric data. According to the analysis, biometric data as the law stands, should be interpreted to represent sensitive personal data in the meaning of Article 9(2) GDPR, even though the research of the candidate in a clear manner shows that there exist uncertainties in the way that biometric data is currently defined in GDPR. This thesis provides recommendations on how the definition of biometric data could be improved and what would be the benefits. The

term biometric recognition should be used instead of the less precise notions of allowing and confirming identification, and characteristics mentioned in the definition should be simplified to refer to behavioural and biological characteristics, according to the analysis of the author.

This thesis explained how the concept of biometric data should be interpreted as the law stands but also added recommendations on how the definition of biometric data should be improved upon. The second chapter contains a systematisation of rules that make the EU biometric law, which includes, besides GDPR, the provisions of the Directive (EU) 2016/680 (LED), Regulation (EU) 2018/1725 (EUDPR) and the Regulation (EU) 2024/1689 (AI Act). In an original manner, the doctoral candidate puts forward arguments that part of data protection law which concerns the use of biometrics should be named biometric law, given the specific characteristics of processing of biometric data and its importance. The analysis of the AI Act in view of its provisions concerning biometrics also represents a novel scientific contribution to legal science.

The third chapter of the thesis of Matija Kontak represents a critical analysis of both legislation and case law that makes biometric law in the more specific context of migration and asylum. The doctoral candidate reaches the conclusion that the CJEU uses the framework of privacy and data protection to resolve cases concerning processing of biometric data. However, the thesis criticised the approach of the Court as lacking consistency by showing it on the example of the biometric case law which was analysed. The thesis provides strong arguments that there are nevertheless certain facts, or biometric parameters which are important for assessing any biometric scheme in view of requirements of EU privacy and data protection law. In the second part of the third chapter, the thesis constructs a template for analysis of a biometric system by defining biometric parameters, such as place or length of storage of biometric data, or the conditions for access to biometric data. This may be considered an original scientific contribution of the thesis because the model of biometric parameters may allow practitioners or researchers to assess whether a certain biometric system broadly adheres to the conditions which were developed in EU legislation and case law and systematised by the author of the thesis. Final part of the third chapter examined interoperability of EU biometric systems, and the biometric template. Doctoral candidate in the thesis provides arguments that biometric templates should be regarded as biometric data.

Fourth chapter represented the fundamental rights analysis of biometrics. This part was necessary as a subsidiary research question in order to determine what are the effects that biometrics have on fundamental rights. The doctoral candidate concluded that privacy and data protection are the most important fundamental rights for the regulation of the use of biometric data in the EU, by analysing existing case law relating to processing of biometric data. Here, the thesis explains how and why it is exactly the fundamental rights to privacy and data protection which emerged as most relevant fundamental rights in cases concerning biometrics. Nevertheless, the doctoral candidate Matija Kontak proceeds to examine other fundamental rights in view of biometrics.

The doctoral candidate provides original argumentation for the position that human dignity, as a fundamental rights, is infringed by the practice of forced fingerprinting of vulnerable people, including children, for purposes of Eurodac biometric system. The thesis also raises an original insight that the legal requirement to provide fingerprints may be interpreted as effectively changing the meaning of the right to asylum and the definition of a refugee, because a person needs to provide their fingerprints in order to be recognised as a refugee.

The thesis argues that the fundamental right to non-discrimination may be relevant particularly in context of facial recognition biometric algorithms. The doctoral candidate conducts a critical analysis of the legal framework for non-discrimination and of the technical aspects of bias raised by facial recognition. He concludes that non-discrimination, unlike privacy, is difficult to successfully apply against the use of biometrics because of the stringency of the legal discrimination framework, particularly in cases of AI and algorithms which may be opaque in their operation. The doctoral candidate states a number of practical recommendations and insights. In order to reduce algorithmic bias, algorithms need to be the best and newest available and 'trained' on data of sufficient quality, as a legal requirement in use of facial recognition. The doctoral candidate makes a number of original conclusions based on the analysis conducted, including

that bias caused by facial recognition tools should be put into perspective by measuring it against the tools it replaces, since humans can show significant bias themselves. The doctoral candidate further provides reasoning that biometric algorithms may force a choice their fairness and accuracy, since in order to have highly accurate biometric algorithms these systems need to process sensitive personal data, which may affect their fairness.

These previous chapters, in the opinion of this committee, clearly set the path to answer the main research question. In the fifth chapter of the thesis, Matija Kontak presents original research that shows that there are encryption methods which can protect biometric templates and therefore significantly reduce the negative effects of biometrics on privacy and data protection. Furthermore, that there are already rules in place which can be interpreted as a legal basis for requiring the encryption of biometric data, both in EU law and in national law (using primarily Croatian law in the analysis as national law). The methods which the author highlights as particularly promising encryption methods are bloom filters and homomorphic encryption. It was explained how these methods may have legal effects. on pseudonymity and anonymity of personal data, along with an explanation of their positive benefits in terms of irreversibility and revocability of biometric templates. These notions should be defined as legal terms in legislation concerning the use of biometrics, as the doctoral candidate argues with conviction. The thesis raises the issue that modern methods of encryption lead to a dilemma for public authorities in the EU between seeing encryption as an emerging data protection right and the need to have any personal data decrypted for purpose of security of the society and the state. In the end, Matija Kontak concludes his thesis by providing reasons that the main hypothesis was thus only partially affirmed by the research, since encryption is a necessary, but not a sufficient element of privacy and data protection in the context of what the author establishes to represent the EU biometric law.

Original scientific contribution of the thesis

The committee holds that the thesis of Matija Kontak „Biometric Law in Migration and Asylum in the European Union“ has made significant original scientific contribution, both in the context of Croatian and European legal scholarship.

The original scientific contribution of the thesis has several important aspects. First, the doctoral candidate has successfully in this research produced a systematisation of rules concerning the use of biometrics in the sphere of EU law, which he termed ‘biometric law.’ The thesis further makes important recommendations and provides solutions on how to improve and enrich the legal vocabulary needed to properly regulate the use of biometric technologies, mostly by aligning the legal vocabulary with the developed technical vocabulary concerning biometrics. The research also in an original manner shows that the current understanding of the concept of biometric data in EU law is unclear, and shows how to resolve this by improving on the legal definition of biometric data. The original contribution of the research furthermore consists in the careful analysis of case law concerning biometrics, from which the doctoral candidate develops biometric parameters which can be used to assess the conformity of a biometric system with data protection and privacy. The research adopts a original and critical approach to judgments of the CJEU concerning biometrics. Finally, the original contribution of this thesis should be considered to be contained in the interpretation of encryption as not merely a technical tool, but as a legal tool which produces legal effects which may improve fundamental rights. Thereby the thesis in an original manner helps to bring certain technical developments concerning biometrics into the legal sphere.

The thesis represents an original scientific contribution in the context of a wider EU legal community as well. This thesis can serve to practitioners to inform themselves on the legal aspects of biometrics in context of EU migration, particularly EU information systems such as Eurodac. Legal scholars can also benefit from the thesis by using the question framed here and this research for future scientific contributions.

The doctoral candidate has conducted an extensive research of multiple types of legal sources and has analysed a large amount of relevant legal literature. He has shown competence for a critical analysis and has covered an important legal topic that has not been



previously researched in Croatian legal literature. His doctrinal legal research has produced results that are an original scientific contribution which enables acquiring the degree of doctor of sciences (dr. sc.)

Opinion and proposal:

In view of all the foregoing considerations, the members of the Committee appointed to evaluate the doctoral thesis entitled 'Biometric Law in Migration and Asylum in the European Union', submitted by the doctoral candidate Matija Kontak, propose to the Council of the Faculty of Law, University of Zagreb:

to approve it as a successfully written and completed doctoral thesis with an original scientific contribution, which enables the candidate to continue with the procedure for obtaining a degree of the doctor of sciences (dr. sc.); and in accordance with that, to appoint a committee for final public defence of the doctoral thesis.

Separate opinion (only if a member of the Thesis Evaluation Committee has a separate opinion):

Signature

(full name of Committee member)

Additional comments (optional)

Signatures of Thesis Evaluation Committee members ³	Full name, title, institution, country	Signature
	1. Snježana Vasiljević, University of Zagreb, Faculty of Law, Croatia. (Chair of the Committee)	
	2. Goranka Lalić Novak, prof. dr. sc, University of Zagreb, Faculty of Law, Croatia.	
	3. Dunja Duić, izv. prof. dr. sc, University of Osijek, Croatia.	
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³ Committee members 6 and 7 only in case of a dual doctorate.



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In Zagreb, on (place and date)		