

# THE BIG DATA OF INTERNATIONAL MIGRATION: OPPORTUNITIES AND CHALLENGES FOR STATES UNDER INTERNATIONAL HUMAN RIGHTS LAW

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## ABSTRACT

*Technology, as the epitome of our contemporary society, permeates the realm of international migration. Migrants and refugees are increasingly using mobile phones and digital features available online to prepare for migration and while on the move. Concurrently, advances in computer science allow for progressively more accurate analysis of the data generated by mobile devices and online searches. In particular, big data can be used to determine specific behavioral patterns, geolocation, and human interactions. This Article investigates the implications of these technological advances for states under international human rights law. It argues that big data can and should be used as a tool for the protection of migrants' human rights by enhancing both decision-making and measures to prevent unnecessary deaths at sea, ill-treatment and human trafficking of migrants. Consequently, the article examines whether the development of new technologies can affect states' capabilities for the identification of individuals in need of protection. It posits that to the extent that protection is mandated by human rights instruments, states may have a positive obligation to use available technologies to identify and assist vulnerable migrants. It evaluates this possibility against the protection of migrants' right to life, the prohibition of torture, inhuman, and degrading treatment, and the prohibition of slavery and forced labor. In doing so, the article also emphasizes the limits and risks posed by the unrestrained use of new technologies, notably with respect to the protection of migrants' right to privacy and data protection.*

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I. INTRODUCTION

Technology is ever present in the ongoing global migration crisis.<sup>1</sup> Migrants and refugees are increasingly using mobile phones and digital features available on Facebook or Google to communicate with family members, to find better routes, and to stay informed about the situation in transit and destination countries.<sup>2</sup> At the same time, advances in computer science allow for progressively more accurate aggregation and analysis of the data generated by mobile devices and online searches, determining specific behavioral patterns and human interactions.<sup>3</sup> Yet, research is scarce on the use of big data analysis in international migration management and its implications for the protection of migrants’ human rights.<sup>4</sup>

Big data can be defined as the “large volumes of high velocity, complex and variable data that require advanced techniques and technologies to enable the capture, storage, distribution, management, and

1. The term migrants is used here to encompass regular and irregular immigrants as well as asylum-seekers.

2. See UNITED NATIONS HIGH COMM’R FOR REFUGEES [HEREINAFTER UNHCR], CONNECTING REFUGEES: HOW INTERNET AND MOBILE CONNECTIVITY CAN IMPROVE REFUGEE WELL-BEING AND TRANSFORM HUMANITARIAN ACTION 5 (Sept. 2016), <http://www.unhcr.org/5770d43c4> (affirming that refugees often spend up to a third of their disposable income on staying connected); *Phones are now indispensable for refugees*, Economist (Feb. 11, 2017), <https://www.economist.com/international/2017/02/11/phones-are-now-indispensable-for-refugees>.

3. See, e.g., ROB KITCHIN, THE DATA REVOLUTION: BIG DATA, OPEN DATA, DATA INFRASTRUCTURES & THEIR CONSEQUENCES (2014).

4. See, e.g., Fleur Johns, *Data, Detection, and the Redistribution of the Sensible in International Law*, 111 AM. J. INT’L L. 57 (2017) (analyzing the implications of new technologies in international law, with emphasis on machine learning and biometric data collected by the UNHCR); Elspeth Guild, *The Right to Dignity of Refugees: A Response to Fleur Johns*, 111 AM. J. INT’L L. UNBOUND 193 (reflecting on the implications of new technologies for human dignity and legal personality).

analysis of the information.<sup>5</sup> Part of this data originates in interactions mediated by social media channels or online platforms that allow users to create and exchange content.<sup>6</sup> This type of “big social data” constitutes a major part of human-generated data, such as text, images, audio, and video.<sup>7</sup> “Big social data” therefore can be defined as “large data volumes that relate to people or describe their behaviour and technology-mediated social interactions in the digital realm.”<sup>8</sup> Additionally, individuals leave digital footprints by simply searching for information via online search engines such as Google.<sup>9</sup> Migrants’ digital footprints, whether originating in social media interactions or relating to online searches, can be used to determine individual behavior and also to inform trends in migratory flows.<sup>10</sup>

Against the backdrop of the ongoing migration crisis, the protection of migrants’ human rights in the digital era and the potential

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5. TECH AMERICA FOUNDATION: FEDERAL BIG DATA COMMISSION, DEMYSTIFYING BIG DATA: A PRACTICAL GUIDE TO TRANSFORMING THE BUSINESS OF GOVERNMENT (2012), [https://bigdatawag.nist.gov/\\_uploadfiles/M0068\\_v1\\_3903747095.pdf](https://bigdatawag.nist.gov/_uploadfiles/M0068_v1_3903747095.pdf).

6. Social media is a term that encompasses social networks (e.g. Facebook), blogs (e.g. WordPress), microblogs (e.g. Twitter), social news (e.g. Reddit), media sharing (e.g. YouTube), wikis (e.g. Wikipedia), and review sites (e.g. Tripadvisor). See Amir Gandomi & Murtaza Haider, *Beyond the Hype: Big Data Concepts, Methods, and Analytics*, 35 INT. J. INFORM MANAGE 137, 142 (2014) (defining social media and a discussing social media analytics); Andreas M. Kaplan & Michael Haenlein, *Users of the World, Unite! The Challenges and Opportunities of Social Media*, 53 BUS. HORIZONS 59 (2010) (describing the concept of social media and discussing how it differs from related concepts such as Web 2.0 and User Generated Content).

7. Gandomi & Haider, *supra* note 6, at 138, 143 (explaining that text, images, audio, and video are examples of unstructured data which amounts to 95% of all big data, whereas structured data such as the tabular data found in spreadsheets or relational database constitutes only 5% of all existing data).

8. Ekaterina Olshannikova et al., *Conceptualizing Big Social Data*, 4 J. BIG DATA 1 (2017).

9. See Oguzhan Gencoglu et al., *Collecting a Citizen’s Digital Footprint for Health Data Mining*, CONF. PROC. IEEE ENG. MED. BIOL. SOC. 7626, 7626 (2015) (digital footprints are understood as “the trail of digital information created about us and by our actions” and can be categorized into two main groups: active and passive. Active corresponds to “the stored data which is deliberately shared by oneself” whereas passive relates to “the case when data is collected without one’s knowledge”).

10. See Emilio Zagheni & Ingmar Weber, *You Are Where You Email: Using E-Mail Data to Estimate International Migration Rates*, ACM WEB SCIENCE CONF. PROC. 497 (2012), <https://dl.acm.org/citation.cfm?id=2380764>; Bogdan State et al., *Studying Inter-National Mobility Through IP Geolocation*, ACM WEB SEARCH & DATA MINING CONF. PROC., 265 (2013), <https://dl.acm.org/citation.cfm>; Emilio Zagheni et al., *Inferring International and Internal Migration Patterns from Twitter Data*, 23 WORLD WIDE WEB CONF. PROC., 439 (2014), <https://dl.acm.org/citation.cfm>; U.N. Glob. Pulse, *Estimating Migration Flows Using Online Search Data*, GLOBAL PULSE PROJECT SERIES NO. 4 (2014), [http://www.unglobalpulse.org/sites/default/files/UNGP\\_ProjectSeries\\_Search\\_Migration\\_2014\\_0.pdf](http://www.unglobalpulse.org/sites/default/files/UNGP_ProjectSeries_Search_Migration_2014_0.pdf).

obligations of states to identify and assist vulnerable migrants are of great relevance. This Article investigates the implications of these technological advances for state obligations under international human rights law (IHRL). It argues that the development of modern technologies can enhance the capabilities of states for the identification of individuals in need of protection. It examines big data from an angle that has not yet been fully explored in the academic literature. Rather than analyzing big data solely as an instrument of surveillance and control, the Article argues that big data can and should be used as a tool for the protection of migrants' legal rights. It suggests that protection can improve decision-making and facilitate measures to prevent unnecessary deaths at sea, ill-treatment, and human trafficking of migrants. It posits that, to the extent that protection is mandated by human rights instruments, states may have a positive obligation to use the available technologies to identify and assist vulnerable migrants.

This possibility is evaluated against the protection of three core human rights set forth by universal and regional human rights treaties: the right to life;<sup>11</sup> the prohibition of torture, inhuman and degrading treatment;<sup>12</sup> and the prohibition of slavery and forced labour.<sup>13</sup> The choice of rights is based on their nature and significance. The prohibition of torture, inhuman, and degrading treatment and the prohibition of slavery and forced labour are absolute,<sup>14</sup> while the right to life is

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11. See G.A. Res. 217 (III) A, Universal Declaration of Human Rights art. 3 (Dec. 10, 1948) [hereinafter UDHR]; International Covenant on Civil and Political Rights art. 6, adopted Dec. 16, 1966, 999 U.N.T.S. 171 [hereinafter ICCPR]; European Convention for the Protection of Human Rights and Fundamental Freedoms art. 2, Nov. 4, 1950, 213 U.N.T.S. 221 [hereinafter ECHR]; American Convention on Human Rights art. 4, Nov. 22, 1969, 1144 U.N.T.S. 123 [hereinafter ACHR].

12. As respectively provided by Article 4 of the UDHR, *supra* note 11; Article 7 of the ICCPR, *supra* note 11; Article 3 of the ECHR, *supra* note 11; Article 5 of the ACHR, *supra* note 11.

13. As respectively provided by Article 5 of the UDHR, *supra* note 11; Article 8 of the ICCPR, *supra* note 11; Article 4 of the ECHR, *supra* note 11; Article 6 of the ACHR, *supra* note 11.

14. Article 15(2) of the ECHR provides no possibility of derogation from Articles 3 and 4 ECHR in times of emergency or war; Article 27(2) of the ACHR also establishes no derogations from the right to life, right to humane treatment and prohibition of slavery in times of war or emergency; Article 4(2) of the ICCPR also provides that there should be no derogation in relation to Articles 6, 7 and 8 of the ICCPR in times of public emergency. See also *Questions Relating to the Obligation to Prosecute or Extradite (Belg. v. Sen.)*, Judgment, 2012 I.C.J. 422, ¶ 99 (July 20) (affirming that “the prohibition of torture is part of customary international law and it has become a peremptory norm (*jus cogens*)”); *Soering v. United Kingdom*, App. No. 14038/88, 11 Eur. H.R. Rep. 439 ¶ 88 (Jul. 7, 1989) (affirming the absolute prohibition of torture and of inhuman or degrading treatment or punishment under the terms of the Convention); *Armed Activities on the Territory of the Congo (Dem. Rep. Congo v. Rwanda)*, Judgment, 2006 I.C.J. Rep. 86, ¶ 10 (Feb. 3) (separate opinion by Dugard, J.) (counting the prohibitions on aggression,

considered a fundamental right and a prerequisite for the enjoyment of all other human rights.<sup>15</sup> Additionally, questions relating to respect for the right to privacy and data protection are examined insofar as they set limits on the use of big data vis-à-vis international migration.<sup>16</sup> The Article draws upon the jurisprudence of international human rights courts and quasi-judicial bodies, in particular the European Court of Human Rights (ECtHR), the Inter-American Court of Human Rights (IACtHR), and the Human Rights Committee (HRC).

The analysis proceeds in three steps. Firstly, the article examines the changes in state capabilities and the uses of big data for better decision-making in international migration management. Secondly, it assesses the possibility of using big data as a tool for protecting vulnerable migrants. In particular, it investigates whether states have a positive obligation to use available technologies to identify and assist vulnerable migrants. Thirdly, it examines the limits and risks of the uses of big data in the field of international migration. The article concludes by calling on states to adopt a rights-based approach in this area as new technologies evolve.

## II. BIG DATA AS A COMPLEMENTARY TOOL FOR INTERNATIONAL MIGRATION MANAGEMENT

A good understanding of migratory patterns is a key asset for informed decision-making. However, traditional statistical tools based

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genocide, torture and slavery and the advancement of self-determination as norms of *jus cogens*); *Fazenda Brasil Verde Workers v. Brazil*, Preliminary Objections, Merits, Reparations, and Costs, Judgment, Inter-Am. Ct. H. R. (ser. C) No. 318, ¶¶ 412-13 (Oct. 20, 2016) (affirming that the prohibition of slavery has the status of *jus cogens*); Int'l Law Comm'n [hereinafter ILC], *Fragmentation of International Law: Difficulties Arising from the Diversification and Expansion of International Law*, ¶ 374, U.N. Doc. A/CN.4/L.682 (2006) (explaining that "the most frequently cited candidates for the status of *jus cogens* include: (a) the prohibition of aggressive use of force; (b) the right to self-defence; (c) the prohibition of genocide; (d) the prohibition of torture; (e) crimes against humanity; (f) the prohibition of slavery and slave trade; (g) the prohibition of piracy; (h) the prohibition of racial discrimination and apartheid, and (i) the prohibition of hostilities directed at civilian population"); Steven Greer, *Is the Prohibition Against Torture, Cruel, Inhuman and Degrading Treatment Really 'Absolute' in International Human Rights Law?*, 15 HRLR 101 (2015); Erika De Wet, *The Prohibition of Torture as an International Norm of Jus Cogens and Its Implications for National and Customary Law*, 15 EUR. J. INT'L L. 97 (2004).

15. *See* *McCann v. United Kingdom*, App. No. 18984/91, ¶ 147, Eur. Ct. H.R. (1995) (affirming that Article 2 ECHR providing for the right to life "enshrines one of the basic values of the democratic societies making up the Council of Europe"); *Baldeón Gacía v. Peru*, Merits, Reparations, and Costs, Judgment, Inter-Am. Ct. H.R. (ser. C) No. 147, ¶ 82 (Apr. 6, 2006) (affirming that "the right to life is a fundamental right, the full exercise of which is a prerequisite for the enjoyment of all other human rights").

16. *See infra* Section IV.B.

on administrative sources, national population censuses, and sample surveys present important disadvantages.<sup>17</sup> For instance, sample surveys and national population censuses can be resource-intensive and time-consuming. The accuracy and relevance of such traditional tools are also limited to the time at which the data is collected in the sense that they only measure past behavior.<sup>18</sup> These factors limit the utility of traditional tools for predicting migratory trends.

Reception of migrants and refugees in the context of large-scale displacement could be more efficiently planned and managed if state authorities in transit and destination countries were willing to use a combination of traditional statistical data and big data effectively. For instance, traditional statistical data and mobility forecasts were certainly available to European countries in the summer of 2015, when the upshots of the Syrian conflict were severely shown in terms of migration.<sup>19</sup> The European Border and Coast Guard Agency (Frontex)<sup>20</sup> had pointed out that “the unprecedented number of migrants crossing illegally the external borders has roots in the fighting in Syria that has resulted in the worst refugee crisis since the Second World War.”<sup>21</sup> Yet,

17. Marzia Rango, *How Big Data Can Help Migrants*, WORLD ECON. FORUM, 2 (Oct. 5, 2015), <https://www.weforum.org/agenda/2015/10/how-big-data-can-help-migrants/> (explaining that these traditional statistical sources have important limitations); Peter Struijs et al., *Official Statistics and Big Data*, BIG DATA & SOC’Y 1, 2 (2014) (explaining that big data sources “may be used to substitute or supplement more traditional data sources, such as questionnaire and administrative data” in the context of location data).

18. See, e.g., Rango, *supra* note 17, at 2; Andrew McAfee & Erik Brynjolfsson, *Big Data: The Management Revolution*, HARV. BUS. REV. 1, 6 (2012) (explaining that real-time big data analysis in the context of real property retail was more efficient in predicting near-term forecasts on the housing market than the official sources).

19. See *EU Member States Granted Protection to More than 185 000 Asylum Seekers in 2014. Syrians Remain the Main Beneficiaries*, EUROSTAT, (May 12, 2015), <http://ec.europa.eu/eurostat/documents/2995521/6827382/3-12052015-AP-EN.pdf/6733f080-c072-4bf5-91fc-f591abf28176>.

20. The European Border and Coast Guard Agency (Frontex) was established by the European Parliament and Council Regulation (EU) 2016/1624, on the European Border and Coast Guard 2016 O.J. (L 251) 1. This regulation replaces the former European Agency for the Management of Operational Cooperation at the External Borders of the Member States of the European Union and repeals the former Council Regulation (EC) 2007/2004, 2004 O.J. (L 349) 1. See, e.g., VIOLETA MORENO-LAX, *ACCESSING ASYLUM IN EUROPE: EXTRATERRITORIAL BORDER CONTROLS AND REFUGEE RIGHTS UNDER EU LAW 155-80* (2017) (for a comprehensive overview of Frontex’s origins, development, structure, tasks and powers); Efthymios Papastavridis, *Fortress Europe’ and FRONTEx: Within or Without International Law?*, 79 NORDIC J INT’L L 75 (2010) (for an analysis of Frontex operations in light of the International Law of the Sea).

21. FRONTEx, *ANNUAL RISK ANALYSIS 2015*, 9 (Apr. 2015), [http://frontex.europa.eu/assets/Publications/Risk\\_Analysis/Annual\\_Risk\\_Analysis\\_2015.pdf](http://frontex.europa.eu/assets/Publications/Risk_Analysis/Annual_Risk_Analysis_2015.pdf) (explaining that the “the unprecedented number of migrants crossing illegally the external borders has roots in the fighting in Syria that has

the European response to the large influxes of asylum-seekers from Syria was highly unsatisfactory.<sup>22</sup> As summarized by Professor Guy Goodwin-Gill, “the current crisis in the movement of people was, if not predictable, then at least foreseeable as a consequence of demographic pressure, turmoil, civil strife and long-standing conflicts.”<sup>23</sup> Indeed, large movements of refugees and migrants could have been better addressed if decision-makers had paid more attention to the existing indicators, intelligence, and available statistical data in 2015.<sup>24</sup>

Big data could provide an additional advantage for decision-makers as the information is not exclusively obtained through traditional state bodies and authorities.<sup>25</sup> Data collection relates, for instance, to mobile phone usage, social media and other types of online service usage, and online searches.<sup>26</sup> All of these are person-generated data. Individuals have in principle consented to the collection, storage, and sometimes use of their data by the social media

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resulted in the worst refugee crisis since the Second World War. Indeed, most of the detections at the borders concerned migrants from Syria, who later applied for asylum within the EU.”)

22. See Sergio Carrera et al., *The EU's Response to the Refugee Crisis: Taking Stock and Setting Policy Priorities*, at 20, CEPS (2015), [www.ceps.eu](http://www.ceps.eu) (for a comprehensive analysis of the main results and policy outputs from the EU's interventions to the refugee crisis).

23. Guy Goodwin-Gill, *Setting the Scene: Refugees, Asylum-Seekers, and Migrants at Sea – the Need for a Long-Term, Protection-Centred Vision*, in ‘BOAT REFUGEES’ AND MIGRANTS AT SEA: A COMPREHENSIVE APPROACH: INTEGRATING MARITIME SECURITY WITH HUMAN RIGHTS 17, 19 (Violeta Moreno-Lax & Efthymios Papastavridis eds., 2016).

24. *Asylum Applicants and First Instance Decisions on Asylum Applications: 2014*, EUROSTAT 8, 23 (Mar. 20, 2015), <http://ec.europa.eu/eurostat/documents/4168041/6742650/KS-QA-15-003-EN-N.pdf/b7786ec9-1ad6-4720-8a1d-430fcfc55018> (explaining that there was a substantial increase in the number of asylum applicants during 2014 in the twenty-eight member states of the EU with a breakdown by applicants' nationalities. This dataset was entirely based on administrative sources provided to Eurostat by the member states relevant authorities and agencies, indicating that traditional statistical tools were available for consultation). See also *FRAN Quarterly Quarter*, FRONTEx 4, 8 (2015), [http://frontex.europa.eu/assets/Publications/Risk\\_Analysis/FRAN\\_Q4\\_2014.pdf](http://frontex.europa.eu/assets/Publications/Risk_Analysis/FRAN_Q4_2014.pdf) (mainly using statistical data provided by participating States); FRONTEx, *supra* note 21, at 9 (indicating that the main sources originate in statistical data from member States and other EU agencies); Satoko Horii, *The Effect of Frontex's Risk Analysis on the European Border Controls*, 17 EUR. POL. & SOC'Y 242, 247 (2016) (explaining how the common risk analysis model operates within the context of Frontex and how EU member states provide key data for the risk assessment).

25. See, e.g., UNHCR, *New World Bank-UNHCR Joint Data Centre to Improve Global Statistics on Forced Displacement* (Oct. 20, 2017), <http://www.unhcr.org/news/press/2017/10/59ea0f984/new-world-bank-unhcr-joint-data-centre-improve-global-statistics-forced.html> (affirming that one of the objectives of this new data center is to “promote innovations to enhance forced displacement data through satellite imagery, cell phones, and other new technologies”).

26. See WORLD ECON. FORUM, *RETHINKING PERSONAL DATA: STRENGTHENING TRUST* (2012), [http://www3.weforum.org/docs/WEF\\_IT\\_RethinkingPersonalData\\_Report\\_2012.pdf](http://www3.weforum.org/docs/WEF_IT_RethinkingPersonalData_Report_2012.pdf), at 34 (providing a detailed diagram of all aspects of life covered by personal data).

channels and online services.<sup>27</sup> Furthermore, research demonstrates that it is possible to use a Wireless Fidelity (WiFi) network connected to mobile devices such as smartphones to identify the device and estimate its location.<sup>28</sup> Besides, migrants leave digital footprints as a result of their activities online.<sup>29</sup> Such footprints can be used to determine migratory patterns. For example, researchers have successfully traced migratory patterns in the Mediterranean region by comparing online data aggregated by Google Trends<sup>30</sup> with official data provided by governments and the United Nations High Commissioner for Refugees (UNHCR).<sup>31</sup>

Big data, and in particular social media data, has been effectively used for risk assessment and disaster management, healthcare and economic predictions.<sup>32</sup> Analogously, big data analytics could prove useful

27. See Fred H. Cate & Viktor Mayer-Schonberger, *Notice and Consent in a World of Big Data*, 3 INT'L DATA PRIVACY L. 67, 68 (2013) (discussing the formality of notice and consent in collecting and processing big data).

28. Alfredo Alessandrini et al., *WiFi Positioning and Big Data to Monitor Flows of People on a Wide Scale*, PROC. EUR. NAV. CONF. 2017, 322, 322 (2017), <https://ec.europa.eu/jrc/en/publication/wifi-positioning-and-big-data-monitor-flows-people-wide-scale> (“Smartphones, tablets and many other devices use wireless connectivity. Whenever one of these tools is active, the device broadcasts probe requests to identify known networks. For each device, the probe request contains a unique identifier: the Media Access Control (MAC) address. A MAC address is a 12-character hexadecimal identifier: the first 6 digits identify the manufacturer, while the remaining digits identify the device. This identifier is visible to a network whenever the user is in its range; so, the MAC address can potentially be used to collect information on the activities of users, tracking the movements of the device.”).

29. *Digital footprint*, OXFORD ENGLISH DICTIONARY (2017) (“the information about a particular person that exists on the Internet as a result of their online activity”).

30. Google Trends is a publicly available online tool provided by Google in which search terms are showed in relation to their total search-volume across different regions of the world and different languages used. See GOOGLE, <https://trends.google.co.uk/trends/> (last visited July 29, 2018).

31. PEW RESEARCH CTR., *The Digital Footprint of Europe's Refugees* (June 8, 2017), <http://www.pewglobal.org/2017/06/08/digital-footprint-of-europes-refugees>.

32. Huiji Gao et al., *Harnessing the Crowdsourcing Power of Social Media for Disaster Relief*, 26 IEEE INTELLIGENT SYSTEMS 10-14 (2011) (about the advantages and disadvantages of using social media for disaster relief); Xiangyang Guan & Cynthia Chen, *Using Social Media Data to Understand and Assess Disasters*, 74 NAT. HAZARDS 837 (2014) (about the uses of social media and notably Twitter activities for rapid damage assessment); Jonathan Cinnamon et al., *Evidence and Future Potential of Mobile Phone Data For Disease Disaster Management*, 75 GEOFORUM 253 (2016) (for a critical analysis of uses of mobile phone data derived from call detail records and two-way short message service platforms for managing and responding to humanitarian disasters); Michael Ettredge et al., *Using Web-based Search Data to Predict Macroeconomic Statistics*, 48 COMM. ACM 87 (Nov. 2005), <https://cacm.acm.org/magazines/2005/11/6078-using-web-based-search-data-to-predict-macroeconomic-statistics/abstract> (suggesting that online web searches data can be useful for forecasting economic statistics); Philip Polgreen et al., *Using Internet Searches for Influenza Surveillance*, 47 CLIN. INFEC. DIS. 1443



in the field of international migration.<sup>33</sup> Insofar as the rules on data protection and privacy are respected,<sup>34</sup> big data and in particular big data analytics, could be a useful complement to traditional statistical tools.<sup>35</sup> Big data analytics are the “techniques used to analyze and acquire intelligence from big data,” including extracting meaningful information from text, audio, video, and data from social media channels.<sup>36</sup> In addition, predictive analytics techniques, which “seek to uncover patterns and capture relationships in data” can be useful in capturing trends in migration flows.<sup>37</sup> For instance, data scientists could use data generated by individuals during natural disaster or conflict (e.g., Facebook check-in function, videos on online channels such as YouTube, photographs posted publicly via online platforms such as Instagram or Pinterest, online searches for specific terms on Google) to predict migratory flows as the conflict or a natural disaster unfolds.<sup>38</sup>

If correctly used, big data technology could contribute to achieving fairer and better-planned reception and integration strategies in the context of large movements of migrants and asylum-seekers.<sup>39</sup> For

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(2008) (on how online web search data could be useful for predicting the incidence of diseases such as influenza); Jeremy Ginsberg et al., *Detecting Influenza Epidemics Using Search Engine Query Data*, 457 NATURE 1012 (2009) (on how online web search data could be useful for predicting the incidence of diseases such as influenza); Hyunyoung Choi & Hal Varian, *Predicting the Present with Google Trends*, 88 ECON. REC. 2 (2012) (explaining that Google Trends data can help in predicting the present).

33. See *Dynamic Data Hub*, Knowledge Centre on Migration and Demography, EUR. COMM’N, <https://bluehub.jrc.ec.europa.eu/migration/app/index.html> (last visited May 17, 2018) (an interactive mapping tool that gives access to single datasets and provides visualisation of migration and demography data and trends). See also Huub Dijkstra, *Migration Tracking is a Mess*, 543 NATURE 32 (2017) (arguing that technologies to monitor mobility are in reality political tools).

34. See *infra* Section IV.B.

35. See Rango, *supra* note 17; Piet J.H. Daas et al., *Big Data as a Source for Official Statistics*, 31 J. OFFICIAL STAT. 249, 259 (2015) (affirming that “the official statistics community can greatly benefit from the possibilities offered by Big Data”).

36. Gandomi & Haider, *supra* note 6, at 140.

37. *Id.* at 143 (“Some techniques, such as moving averages, attempt to discover the historical patterns in the outcome variable(s) and extrapolate them to the future. Others, such as linear regression, aim to capture the interdependencies between outcome variable(s) and explanatory variables, and exploit them to make predictions.”).

38. Junaid Qadir et al., *Crisis Analytics: Big Data-Driven Crisis Response*, 1 J. INT’L HUMANITARIAN ACTION 1, 1-2 (2016).

39. See Yann Algan et al., *Introduction: Perspectives on Cultural Integration of Immigrants*, in CULTURAL INTEGRATION OF IMMIGRANTS IN EUROPE 1, 4-7 (Yann Algan et al. eds., 2012) (for an overview of the different integration theories in social sciences); LUIGI M. SOLIVETTI, IMMIGRATION, SOCIAL INTEGRATION AND CRIME: A CROSS-NATIONAL APPROACH 132 (2010) (identifying three forms of integration: social integration, cultural assimilation, and political participation).

example, decision-makers could anticipate the nature and density of upcoming migratory inflows by using tools based on a combination of big data and traditional statistical data analysis.<sup>40</sup> Similarly, big data and traditional statistics can be used to map the diversity of migrant communities in cities.<sup>41</sup> This would allow decision-makers to foresee which areas or neighborhoods could attract specific migrant flows and would necessitate additional infrastructure such as housing, schools, or health care provision.<sup>42</sup> However, all of these uses of big data relate to the management of migratory flows. Accordingly, the next section explores the extent to which big data could be used as a tool for the actual protection of vulnerable migrants.

### III. BIG DATA AS A VALUABLE TOOL FOR THE PROTECTION OF VULNERABLE MIGRANTS

New technologies based on big data could also play an important role as a tool for the protection of vulnerable migrants<sup>43</sup> and potentially affect the way in which a country effectively protect their rights within its jurisdiction. This section examines the uses of these new technologies against the existing legal framework on state obligations under IHRL. It builds an argument in favor of an emerging range of state obligations towards migrants who are at risk of death, ill-treatment and human trafficking.

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40. See, e.g., PEW RESEARCH CTR., *supra* note 31 (“Turkey-based searches for the word ‘Greece’ in Arabic closely mirror 2015 and 2016 fluctuations in the number of refugees crossing the Aegean Sea to Greece.”).

41. See *Mapping Migrant Communities Across Europe to Support Local Integration*, EUR. COMM’N JOINT RESEARCH CTR. (Oct. 11, 2017), <https://ec.europa.eu/jrc/en/news/mapping-migrant-communities-across-europe-support-local-integration>; EUR. COMM’N, KNOWLEDGE CTR. FOR MIGRATION AND DEMOGRAPHY, *Migrants Tend to Go Where They Know Someone* fig.1 (2017).

42. See, e.g., *Mapping Migrant Communities*, *supra* note 41.

43. For a discussion on the concept of vulnerability, see Martha Albertson Fineman, *The Vulnerable Subject and the Responsive State*, 60 EMORY L. J. 251, 268-69 (2010). See also *id.* at 255 (“Vulnerability is posited as the characteristic that positions us in relation to each other as human beings and also suggests a relationship of responsibility between the state and its institutions and the individual.”); BRYAN TURNER, *VULNERABILITY AND HUMAN RIGHTS* (2006) (arguing that vulnerability should be the common basis of human rights); Ana Beduschi, *Vulnerability on Trial: Protection of Migrant Children’s Rights in the Jurisprudence of International Human Rights Courts*, 36 B.U. INT’L L.J. 55 (2018) (arguing that vulnerability operates as a magnifying glass for state obligations in the context of the protection of migrant children’s rights); Lourdes Peroni & Alexandra Timmer, *Vulnerable Groups: The Promise of an Emerging Concept in European Human Rights Convention Law*, 11 INT’L J. CONST. L. 1056 (2013) (for a comprehensive analysis of the concept of vulnerability in the case law of the European Court of Human Rights).

A. *Jurisdiction and State Obligations*

Under IHRL, state parties owe treaty obligations only to individuals who fall within their jurisdiction.<sup>44</sup> State jurisdiction can be triggered when individuals find themselves in a state's territory<sup>45</sup> or when a state exercises "effective control" over an area outside its national territory.<sup>46</sup> Additionally, states have jurisdiction over individuals who are within their state agents' authority and control.<sup>47</sup> The hypothesis under examination relates to the use of big data for the identification and assistance

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44. See generally Frederick Alexander Mann, *The Doctrine of Jurisdiction in International Law*, in 111 COLLECTED COURSES OF THE HAGUE ACADEMY OF INTERNATIONAL LAW (1964), [http://referenceworks.brillonline.com/entries/the-hague-academy-collected-courses/\\*-ej.9789028614826.001\\_162](http://referenceworks.brillonline.com/entries/the-hague-academy-collected-courses/*-ej.9789028614826.001_162); Bruno Simma & Andreas T. Müller, *Exercise and Limits of Jurisdiction*, in THE CAMBRIDGE COMPANION TO INTERNATIONAL LAW 134, 135 (James Crawford & Martti Koskeniemi eds., 2012); MARKO MILANOVIC, EXTRATERRITORIAL APPLICATION OF HUMAN RIGHTS TREATIES (2011); Marko Milanovic, *Al-Skeini and Al-Jedda in Strasbourg*, 23 EUR. J. INT'L L. 121, 132 (2012).

45. See Malcolm N. Shaw, *Territory in International Law*, 13 NETH. Y.B. INT'L L. 61 (1982) (for a comprehensive analysis of the concept of territory).

46. See *Loizidou v. Turkey* (Preliminary Objections), 310 Eur. Ct. H.R. (ser. A) at 18 (1995). See also *Delia Saldias de Lopez v. Uruguay*, Communication No. 52/1979, Views Under Article 5(4) of the Optional Protocol, ¶ 12.3, U.N. Doc. CCPR/C/OP/1 88 (1984) ("Article 2(1) of the Covenant places an obligation upon a State party to respect and to ensure rights 'to all individuals within its territory and subject to its jurisdiction,' but it does not imply that the State party concerned cannot be held accountable for violations of rights under the Covenant which its agents commit upon the territory of another State, whether with the acquiescence of the Government of that State or in opposition to it."); Human Rights Comm., *General Comment No. 31 [80]: The Nature of the General Legal Obligation Imposed on States Parties to the Covenant*, ¶ 10, U.N. Doc. CCPR/C/21/Rev.1/Add. 13 (May 26, 2004) ("[A] State party must respect and ensure the rights laid down in the Covenant to anyone within the power or effective control of that State Party, even if not situated within the territory of the State Party."); *Legal Consequences of the Construction of a Wall in the Occupied Palestinian Territory*, Advisory Opinion, 2004 I.C.J. 136, ¶ 111 (July 9) ("[T]he Court considers that the International Covenant on Civil and Political Rights is applicable in respect of acts done by a State in the exercise of its jurisdiction outside its own territory."); *Rights and Guarantees of Children in the Context of Migration and/or in Need of International Protection*, Advisory Opinion OC-21/14, Inter-Am. Ct. H.R. (ser. A) No. 21, ¶ 219 (Aug. 19, 2014) ("Evidently, the fact that a person is subject to the jurisdiction of the State is not the same as being in its territory. Consequently, the principle of non-refoulement can be invoked by any alien over whom the State in question is exercising authority or who is under its control, regardless of whether she or he is on the land, rivers, or sea or in the air space of the State.").

47. See *Al-Skeini v. United Kingdom*, 2011-IV Eur. Ct. H.R. 99, 168 ("[I]n certain circumstances, the use of force by a State's agents operating outside its territory may bring the individual thereby brought under the control of the State's authorities into the State's Article 1 jurisdiction."). The criteria of State authority and control over individuals giving way to extraterritorial jurisdiction was later confirmed by the ECtHR. See *Hirsi Jamaa v. Italy*, 2012-II Eur. Ct. H.R. 97, 132; *Hassan v. United Kingdom*, 2014-VI Eur. Ct. H.R. 1, 49; *Jaloud v. Netherlands*, 2014-VI Eur. Ct. H.R. 229, 297. See also generally MAARTEN DEN HEIJER, EUROPE AND EXTRATERRITORIAL ASYLUM (2012).

of individuals at risk of death at sea, ill-treatment, or human trafficking. Consequently, the present analysis concerns scenarios in which migrants have either entered a state's territory (including its territorial waters) or are in an area that is effectively controlled by that state. However, it is worth noting that states may incur responsibility if there is evidence of aid and assistance in the commission of a wrongful act by a third state.<sup>48</sup> In addition to IHRL, the law of the sea sets forth certain rules that bear on the protection of individuals on the high seas.<sup>49</sup> For instance, there is a general duty to render assistance to any person found at sea in danger of being lost and to rescue people in distress.<sup>50</sup> These rules fall outside of the realm of international human rights regimes and are therefore excluded from the present analysis.<sup>51</sup>

With respect to obligations within IHRL, states agree to respect, protect, and fulfill the legal rights set forth by the treaties that they ratify.<sup>52</sup>

48. For example, this could be the case in the context of maritime operations undertaken by Libyan forces which received financial aid and training from the EU and its member states if an internationally wrongful act were committed (e.g. ill-treatment of migrants), if there were enough evidence that EU member states had the knowledge of the circumstances of the internationally wrongful act, and if the act would be internationally wrongful if committed by one of the EU member states as per Article 16 of the U.N. International Law Commission's Draft Articles on Responsibility of States for Internationally Wrongful Acts. *See* U.N. Int'l L. Comm'n, Rep. on the Work of Its Fifty-Third Session, U.N. Doc. A/56/10, at 65-67 (2001). *See also* U.N. Human Rights Office of the High Comm'r, UN Human Rights Chief: Suffering of Migrants in Libya Outrage to Conscience of Humanity (Nov. 14, 2017), <http://www.ohchr.org/EN/NewsEvents/Pages/DisplayNews.aspx?NewsID=22393&LangID=E> ("We cannot be a silent witness to modern day slavery, rape and other sexual violence, and unlawful killings in the name of managing migration and preventing desperate and traumatized people from reaching Europe's shores."); Thomas Gammeltoft-Hansen & James C. Hathaway, *Non-Refoulement in a World of Cooperative Deterrence*, 53 COLUM. J. TRANSNAT'L L. 235 (for a comprehensive analysis of states' shared responsibility and liability for aiding or assisting and its relationship to international refugee law).

49. United Nations Convention on the Law of the Sea, art. 98, Dec. 10, 1982, 1833 U.N.T.S. 3 [hereinafter UNCLOS]; International Convention for the Safety of Life at Sea, reg. 33, Nov. 1, 1974, 1184 U.N.T.S. 278 [hereinafter SOLAS]; International Convention on Maritime Search and Rescue, reg. 2.1.1, Apr. 27, 1979, 1405 U.N.T.S. 97 [hereinafter SAR Convention].

50. *See, e.g.*, UNCLOS, *supra* note 49, at art. 98(1) (a)-(b).

51. For a discussion of state obligations on the high seas, *see* notably EFTHYMOS PAPANASTAVRIDIS, *THE INTERCEPTION OF VESSELS ON THE HIGH SEAS* (2013); Lisa-Marie Komp, *The Duty to Assist Persons in Distress: An Alternative Source of Protection Against the Return of Migrants and Asylum Seekers to the High Seas?*, in "BOAT REFUGEES" AND MIGRANTS AT SEA: A COMPREHENSIVE APPROACH: INTEGRATING MARITIME SECURITY WITH HUMAN RIGHTS 222 (Violeta Moreno-Lax & Efthymios Papanastavridis eds., 2016).

52. *See* Asbjørn Eide (Special Rapporteur on the Right to Food), *The Right to Adequate Food as a Human Right*, U.N. Doc. E/CN.4/Sub.2/1987/23 (1987) (proposing a tripartite typology of state obligations in relation to respect, protection and fulfilment of human rights); HENRY SHUE, *BASIC*

The obligation to respect implies that the state must not deprive individuals of their rights.<sup>53</sup> The obligation to protect entails that states should protect individuals against human rights abuses, even if those originate in actions or omissions by private persons, insofar as the state can be seen as responsible.<sup>54</sup> The obligation to fulfill requires states to take positive steps to facilitate the enjoyment of an individual's human rights.<sup>55</sup> States must respect, protect, and fulfill human rights with respect to all individuals within their jurisdiction, including foreigners.<sup>56</sup> Additionally, the European Court of Human Rights (ECtHR) and the Inter-American Court of Human Rights (IACtHR) have distinguished between negative and positive obligations, which in many aspects correspond to the obligations to respect, protect, and fulfill.<sup>57</sup>

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RIGHTS: SUBSISTENCE, AFFLUENCE, AND US FOREIGN POLICY 52 (1980) (proposing the following typology of duties owed by states in relation to human rights: to avoid depriving individuals of rights, to protect individuals from deprivation, to aid the deprived); Rolf Künemann, *A Coherent Approach to Human Rights*, 17 HUM. RTS. Q. 323, 328 (1995) (arguing that states have the obligation to respect, protect and fulfill the existential status of human beings, or "how human beings are entitled to live in relation to the State under these human rights"); Comm. on Econ., Soc. and Cultural Rights, *General Comment No 12: The Right to Adequate Food (Art. 11)*, ¶ 15, U.N. Doc. E/C.12/1999/5 (May 12, 1999).

53. See Künemann, *supra* note 52, at 328 ("The obligation to respect obliges the State to avoid depriving a human being of this existential status in situations where that status has been attained."); Comm. on Econ., Soc. and Cultural Rights, *supra* note 52, ¶ 15 ("The obligation to respect existing access to adequate food requires States parties not to take any measures that result in preventing such access.")

54. See John H. Knox, *Horizontal Human Rights Law*, 102 AM. J. INT'L L. 1 (2008) (on the imposition of duties vis-à-vis violations of human rights by private actors such as corporations); Eric Engle, *Third Party Effect of Fundamental Rights (Drittwirkung)*, 5 HANSE L. REV. 165 (2009) (for a general overview of the doctrine of third party effect); Stephen Gardbaum, *The "Horizontal Effect" of Constitutional Rights*, 102 MICH. L. REV. 387 (2003) (in the context of comparative constitutional law).

55. See Künemann, *supra* note 52, at 328 (arguing that the obligation to fulfill should not be understood as an obligation to provide as the latter has a subsidiary nature and prevents the state from incorporating the whole life of society).

56. See Human Rights Comm., *General Comment No. 15: The Position of Aliens Under the Covenant*, ¶ 7, U.N. Doc. HRI/GEN/1/Rev.6 140 (Sept. 1986) ("[A]liens thus have an inherent right to life, protected by law, and may not be arbitrarily deprived of life. They must not be subjected to torture or to cruel, inhuman or degrading treatment or punishment; nor may they be held in slavery or servitude.")

57. Insofar as negative obligations relate to the obligation to respect human rights and positive obligations relate to the obligations to protect and fulfill human rights, see ALASTAIR MOWBRAY, *THE DEVELOPMENT OF POSITIVE OBLIGATIONS UNDER THE EUROPEAN CONVENTION ON HUMAN RIGHTS BY THE EUROPEAN COURT OF HUMAN RIGHTS* (2004) (an authoritative reference relating to the study of positive obligations in the European Convention on Human Rights system); Dinah Shelton & Ariel Gould, *Positive and Negative Obligations*, in *THE OXFORD HANDBOOK OF INTERNATIONAL HUMAN RIGHTS LAW* 562, 563 (Dinah Shelton ed., 2013) ("Global and regional

Negative obligations entail that states should refrain from interfering in the exercise of rights, while positive obligations mean that states should adopt all measures necessary to safeguard the effective respect of rights.<sup>58</sup> The Human Rights Committee (HRC) has also emphasized that the legal obligation to respect and to ensure the rights recognized in the International Covenant on Civil and Political Rights (ICCPR) “is both negative and positive in nature.”<sup>59</sup> Accordingly, with this taxonomy in mind, the following analysis focuses primarily on the positive obligations of states.

B. *The Positive Obligation to Prevent Migrant Deaths at Sea*

It is generally accepted that states are obliged not only to refrain from the intentional and unlawful taking of life, but also to take appropriate steps to safeguard the lives of those within their jurisdiction.<sup>60</sup> Therefore, states have a positive obligation to adopt measures to protect the lives of individuals, including against the criminal acts of a third party, and to investigate these situations effectively.<sup>61</sup> This obligation should be considered an obligation of conduct or means and not an

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human rights bodies have since then adopted the duality of positive and negative duties in judging a state’s compliance with its human rights obligations.”); Frédéric Sudre, *Les Obligations Positives dans la Jurisprudence Européenne des Droits de L’Homme*, REV. TRIM. DR. H. 363 (1995) (for an overview of the positive obligations in the ECtHR’s jurisprudence); LAURENCE BURGORGUE-LARSEN & AMAYA UBEDA DE TORRES, THE INTER-AMERICAN COURT OF HUMAN RIGHTS: CASE LAW AND COMMENTARY 141 (Rosalind Greenstein trans., 2011) (“[T]he Court [IACtHR] has taken bold decisions in the matter of positive obligations and has every intention of imposing on the States the provision of effective remedies, whatever this takes.”); Laurens Lavrysen, *Positive Obligations in the Jurisprudence of the Inter-American Court of Human Rights*, 2 INTER-AM. & EUR. HUM. RTS. J. 95, 96-97 (2014) (discussing the positive obligations recognized by the IACtHR).

58. See *Airey v. Ireland*, 32 Eur. Ct. H.R. (ser. A) at 14 (1979); *Marckx v. Belgium*, 31 Eur. Ct. H.R. (ser. A) at 10-11 (1979).

59. U.N. Human Rights Comm’n, *supra* note 46, ¶ 6.

60. See *L.C.B. v. United Kingdom*, 1998-III Eur. Ct. H.R. ¶ 36; *Osman v. United Kingdom*, App. No. 23452/94, ¶ 115 Eur. Ct. H.R. (1998); *Pueblo Bello Massacre v. Colombia*, Merits, Reparations and Costs, Judgment, Inter-Am. Ct. H.R. (ser. C) No. 140, ¶ 120 (Jan. 31, 2006); Human Rights Comm’n, *CCPR General Comment No 6: Article 6 (Right to Life)*, ¶ 3 (Apr. 30, 1982).

61. See, e.g., *Kayak v. Turkey*, App. No. 60444/08, Eur. Ct. H.R. ¶ 59 (2012) (concerning the murder of a fifteen year-old child who was stabbed in front of his school); *Pueblo Bello*, Inter-Am. Ct. H.R. (ser. C) No. 140, ¶ 120 (relating to extrajudicial executions by paramilitary groups); Human Rights Comm’n, *supra* note 46, ¶ 8 (about state obligations under the Covenant in general and not only relating to the right to life). For the conceptual framework of positive obligations and horizontal effect of international treaties on human rights, see ANDREW CLAPHAM, HUMAN RIGHTS IN THE PRIVATE SPHERE (1996).

obligation of result,<sup>62</sup> as states cannot be subjected to an impossible or disproportionate burden while attempting to prevent deaths.<sup>63</sup> Those falling within the state's jurisdiction are entitled to the protection in the same manner as nationals.<sup>64</sup> In the context of the protection of migrants' right to life and the prevention of deaths at sea, Professor Goodwin-Gill argues that states have a "positive due diligence obligation to save lives."<sup>65</sup> The instant question is whether this duty must be carried out, when possible, by the use of new technologies relying on big data analysis.

Typically, states have a certain margin of appreciation with regard to implementing positive obligations.<sup>66</sup> However, the margin of appreciation

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62. Constantin P. Economides, *Content of the Obligation: Obligations of Means and Obligations of Result*, in *THE LAW OF INTERNATIONAL RESPONSIBILITY* 371, 372 (James Crawford et al. eds., 2010) ("obligations of means impose on a State the obligation to do the best they can in furtherance of a specific goal, but without the guarantee that this goal will be reached. By contrast, obligations of result require a State to guarantee the achievement of the prescribed result"); Jean Combacau, *Obligations de Résultat et Obligations de Comportement: Quelques Questions et Pas de Réponse*, in *LE DROIT INTERNATIONAL: UNITÉ ET DIVERSITÉ. MÉLANGES OFFERTS À PAUL REUTER* 181, 184-87 (Daniel Bardonnnet et al. eds., 1981) (for an overview of the origins of this typology of obligations in French civil law and its transposition into international law); *Osman v. United Kingdom*, App. No. 23452/94, 29 Eur. Ct. H.R. 245, ¶116 (1998) ("not every claimed risk to life can entail for the authorities a Convention requirement to take operational measures to prevent that risk from materialising").

63. *Osman*, 29 Eur. Ct. H.R. 245 at ¶ 116 ("bearing in mind the difficulties involved in policing modern societies, the unpredictability of human conduct and the operational choices which must be made in terms of priorities and resources, such an obligation must be interpreted in a way which does not impose an impossible or disproportionate burden on the authorities"); *Kilic v. Turkey*, App. No. 22492/93, 2000-III Eur. Ct. H.R. 75, ¶63 Eur. Ct. H.R. ("the positive obligation must be interpreted in a way which does not impose an impossible or disproportionate burden on the authorities"); *Opuz v. Turkey*, App. No. 33401/02, 2009-III Eur. Ct. H.R. 107, ¶ 129 ("the scope of the positive obligation must be interpreted in a way which does not impose an impossible or disproportionate burden on the authorities").

64. See ECHR, *supra* note 11, at art. 1 (providing that "[t]he High Contracting Parties shall secure to everyone within their jurisdiction the rights and freedoms defined in Section I of this Convention"); ACHR, *supra* note 11, at art. 1(1) (providing that "[t]he States Parties to this Convention undertake to respect the rights and freedoms recognized herein and to ensure to all persons subject to their jurisdiction the free and full exercise of those rights and freedoms"); ICCPR, *supra* note 11, at art. 2(1) (providing that "[e]ach State Party to the present Covenant undertakes to respect and to ensure to all individuals within its territory and subject to its jurisdiction the rights recognized in the present Covenant"). See also Human Rights Comm'n, *supra* note 56, ¶ 2 (affirming that "the general rule is that each one of the rights of the Covenant must be guaranteed without discrimination between citizens and aliens").

65. Goodwin-Gill, *supra* note 23, at 25.

66. The margin of appreciation is understood as "tool to define relations between the domestic authorities and the Court" as per *A. and others v. United Kingdom*, App. No. 3455/05, 2009 Eur. Ct. H.R. 301, ¶ 184. This doctrine was developed by the ECtHR and directly relates to

and deference to domestic decisions is limited vis-à-vis absolute rights and the right to life.<sup>67</sup> Accordingly, importance is attached to the criterion of reasonableness, which becomes essential in defining the scope of the obligation to protect human rights in the context of these rights.<sup>68</sup> As observed by Professor Yuval Shany, international courts review the reasonableness of state measures vis-à-vis the object and purpose of the governing norm.<sup>69</sup> Nevertheless, as indicated by the International Court of Justice (ICJ), “what is reasonable and equitable in any given case must depend on its particular circumstances.”<sup>70</sup> In this regard, the circumstances of maritime migration can

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the principle of subsidiarity. Protocol No. 15 amending the Convention on the Protection of Human Rights and Fundamental Freedoms, CETS No. 213 (June 24, 2013); see Yuval Shany, *Toward a General Margin of Appreciation Doctrine in International Law?*, 16 EUR. J. INT'L L. 907, 910 (2005) (explaining that the two principal elements at the basis of the doctrine are judicial deference and normative flexibility); George Letsas, *Two Concepts of the Margin of Appreciation*, 26 OXF. J. LEG. STUD. 705, 706 (2006) (proposing a substantive and a structural analysis of the margin of appreciation); Michael R. Hutchinson, *The Margin of Appreciation Doctrine in the European Court Of Human Rights*, 48 INT'L & COMP. L. Q. 638, 640 (1999) (explaining the width of the margin of appreciation in relation to existence of consensus, nature of rights and aims protected such as national security); Dominic McGoldrick, *A Defence of the Margin of Appreciation and an Argument for Its Application by the Human Rights Committee*, 65 INT'L & COMP. L. Q. 21, 41 (2016) (discussing the non-use of the margin of appreciation doctrine by the Human Rights Committee and its consequences for the protection of rights provided by the ICCPR); Andreas Follesdal, *Exporting the Margin of Appreciation: Lessons for the Inter-American Court of Human Rights*, 15 INT'L J. CONST. L. 359, 362 (2017) (arguing that the IACtHR should consider the margin of appreciation doctrine that “duly developed and specified, can contribute to alleviating the tension between human rights protection and due deference to sovereignty in a defensible way”); Jorge Contesse, *Contestation and Deference in the Inter-American Human Rights System*, 79 LAW & CONTEMP. PROBL. 123, 141 (2016) (arguing that the IACtHR referred to the margin of appreciation doctrine in several decisions, albeit inconsistently).

67. ANDREW LEGG, *THE MARGIN OF APPRECIATION IN INTERNATIONAL HUMAN RIGHTS LAW: DEFERENCE AND PROPORTIONALITY* 205-08 (2012) (explaining that only in limited circumstances courts can allow a margin of appreciation or a certain deference to states vis-à-vis the right to life and the prohibition of torture, inhuman, and degrading treatment); STEVEN GREER, *THE MARGIN OF APPRECIATION: INTERPRETATION AND DISCRETION UNDER THE EUROPEAN CONVENTION ON HUMAN RIGHTS* 27 (2000) (analyzing the lack of reference to the doctrine of margin of appreciation in ECtHR decisions relating to Articles 2, 3, and 4 of the ECHR). *But see* Stephen Skinner, *Deference, Proportionality and the Margin of Appreciation in Lethal Force Case Law Under Article 2 ECHR*, 1 E.H.R. L.R. 32 (2014) (for a critical analysis of the use of the margin of appreciation in the context of the ECtHR decisions relating to the use of lethal force by states).

68. Olivier De Schutter, *International Human Rights Law* 462 (2d ed. 2014).

69. Shany, *supra* note 66, at 910.

70. Interpretation of the Agreement of 25 March 1951 between the WHO and Egypt, Advisory Opinion, 1980 I.C.J. 96, ¶ 49 (Dec. 20).



hardly be described as anything other than alarming.<sup>71</sup> Reportedly, the number of lives lost at sea in recent years is unprecedented.<sup>72</sup> This is notably due to the shocking precariousness of vessels used for migrant smuggling.<sup>73</sup> Therefore, these particular circumstances may affect what is reasonably expected from state authorities, which could include the use of new technological means.

For instance, analysis of data generated by migrants and asylum-seekers (e.g., mobile applications recording geolocation, online searches, phone calls) can contribute to identifying their movement patterns.<sup>74</sup> Moreover, data from other sources such as the Automatic Identification System (AIS)<sup>75</sup> and the Broadcast Warning System<sup>76</sup> can also be used for search and rescue of migrants in distress at sea, as demonstrated by an International Organisation for Migration (IOM) study

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71. For the academic discussion of contemporary maritime migration, see 'BOAT REFUGEES' AND MIGRANTS AT SEA: A COMPREHENSIVE APPROACH: INTEGRATING MARITIME SECURITY WITH HUMAN RIGHTS (Violeta Moreno-Lax & Efthymios Papastavridis eds., 2016); ITAMAR MANN, HUMANITY AT SEA: MARITIME MIGRATION AND THE FOUNDATIONS OF INTERNATIONAL LAW (2017); VIOLETA MORENO-LAX, ACCESSING ASYLUM IN EUROPE, *supra* note 20, chapter 6. For a historical perspective on maritime migration into Australia, see CLAIRE HIGGINS, ASYLUM BY BOAT: ORIGINS OF AUSTRALIA'S REFUGEE POLICY (2017).

72. See, G.A. Res. 71/1, New York Declaration for Refugees and Migrants, ¶ 28 (Oct. 3, 2016) (expressing profound concerns about "the large number of people who have lost their lives in transit"); EUROPEAN POLITICAL STRATEGY CTR., *Irregular Migration via the Central Mediterranean: From Emergency Responses to Systemic Solutions*, 22 EPSC STRATEGIC NOTES 1, 1 (Feb. 17, 2018), [https://ec.europa.eu/commission/sites/beta-political/files/irregular-migration-mediterranean-strategic\\_note\\_issue\\_22\\_0\\_en.pdf](https://ec.europa.eu/commission/sites/beta-political/files/irregular-migration-mediterranean-strategic_note_issue_22_0_en.pdf) (estimating that more than 13,000 lives were lost in the Central Mediterranean between 2011 and 2016); INT'L ORG. FOR MIGRATION [hereinafter "IOM"], *Missing Migrants*, <https://missingmigrants.iom.int/> (last visited July 29, 2018) (a database of the IOM project tracking the deaths of migrants worldwide).

73. EUROPEAN POLITICAL STRATEGY CTR., *supra* note 72, at 7 (estimating that 70% of vessels are made of rubber and unfit for sail).

74. See PEW RESEARCH CTR., *supra* note 31.

75. An automated tracking system fitted in ships which can provide real time information to other ships and to coastal authorities. SOLAS, *supra* note 49, reg. 19(2.4) (requesting that ships of more than 500 tons or operating internationally should be fitted with the automatic identification system [hereinafter AIS]). That would include vessels operating search and rescue missions at sea. See IOM, *Improving Data on Missing Migrants*, 3 FATAL JOURNEYS 1, 28 (2017), [http://publications.iom.int/system/files/pdf/fatal\\_journeys\\_volume\\_3\\_part\\_1.pdf](http://publications.iom.int/system/files/pdf/fatal_journeys_volume_3_part_1.pdf) (explaining how AIS data can be captured and used).

76. Broadcast warnings are disseminated by the Worldwide Navigational Warning Service (WWNWS). This is a broadcast system based on radio and satellite technology and used for maritime safety. See NAT'L GEOSPATIAL INTELLIGENCE AGENCY, [http://msi.nga.mil/NGAPortal/MSI.portal?\\_nfpb=true&\\_pageLabel=msi\\_wwnws](http://msi.nga.mil/NGAPortal/MSI.portal?_nfpb=true&_pageLabel=msi_wwnws) (for general information about the WWNWS); IOM, FATAL JOURNEYS, *supra* note 75, at 29 (for an explanation of how the WWNWS data can be used in the context of international migration).

in 2017.<sup>77</sup> Data from all these sources could be useful for the identification of vulnerable groups of migrants at risk of dying in vessels unfit for sail at sea. Yet, should states be expected, and therefore required, to use such technologies to prevent migrant deaths at sea?

An analogy to disaster prevention may be useful in this respect. Pursuant to Article 9 of the International Law Commission (ILC)'s Draft Articles on the Protection of Persons in the Event of Disasters, states shall reduce the risk of disasters by taking appropriate measures including risk assessments for the prevention and mitigation of and preparation for disasters.<sup>78</sup> Similarly, the ECtHR identified an obligation to prevent and mitigate disasters within the scope of Article 2 of the ECHR.<sup>79</sup> Acknowledging the ECtHR's jurisprudence in this area, the Special Rapporteur Valencia-Ospina emphasized that "a State therefore incurs liability when it neglects its duty to take preventive measures when a natural hazard is clearly identifiable and effective means to mitigate the risk are available to it."<sup>80</sup> Identification of natural disasters is nowadays in large part dependent on satellite imagery and computerized technologies.<sup>81</sup> Furthermore, Article 3 of the Tampere

77. IOM, *FATAL JOURNEYS*, *supra* note 75, at 25-42 (demonstrating how these two data sources can be used for the purposes of studying rescue patterns in the Mediterranean).

78. Int'l Law Comm'n, Draft Articles on the Protection of Persons in the Event of Disasters, Article 9(1)-(2), U.N. Doc. A/71/10 (2016).

79. See *Budayeva and others v. Russia*, App. Nos. 15339/02, 21166/02, 20058/02, 11673/02 and 15343/02, 2008 Eur. Ct. H.R. 32, ¶ 132 (about recurrent and deadly mudslides) ("[a]s regards the substantive aspect, in the particular context of dangerous activities the Court has found that special emphasis must be placed on regulations geared to the special features of the activity in question, particularly with regard to the level of the potential risk to human lives...."). The relevant regulations must also provide for appropriate procedures, taking into account the technical aspects of the activity in question, for identifying shortcomings in the processes concerned and any errors committed by those responsible at different levels. *Öneryıldız v. Turkey*, App. No. 48939/99, 2004-XII Eur. Ct. H.R. 79, ¶ 89 (about a methane explosion in a slum near Istanbul and the consequent death of nine individuals) ("[T]his positive obligation entails above all a primary duty on the State to put in place a legislative and administrative framework designed to provide effective deterrence against threats to the right to life").

80. Eduardo Valencia-Ospina (Special Rapporteur), *Sixth Rep. on the Protection of Persons in the Event of Disasters*, ¶ 53, U.N. Doc. A/CN.4/662 (May 3, 2013).

81. See UNHCR Charter on Cooperation to Achieve the Coordinated Use of Space Facilities in the Event of Natural or Technological Disasters Rev. 3 (25/4/2000).2 Art. 2 (affirming that one of its objectives is to "supply during periods of crisis, to States or communities whose population, activities or property are exposed to an imminent risk, or are already victims, of natural or technological disasters, data providing a basis for critical information for the anticipation and management of potential crises"); *United Nations Platform for Space-based Information for Disaster Management and Emergency Response* (UN-SPIDER), <http://www.un-spider.org/space-application/satellite-technology> (explaining the types of services that satellites can provide for disaster risk management and emergency response); Thomas W. Gillespie et al., *Assessment and Prediction of*

Convention on the Provision of Telecommunication Resources for Disaster Mitigation and Relief Operations expressly encourages states to deploy satellite telecommunication equipment to predict, monitor and provide information concerning natural hazards, health hazards and disasters.<sup>82</sup> Accordingly, when state authorities have the capabilities to use satellite imagery and computerized new technologies to foresee a natural disaster such as an earthquake or a tsunami, they must do so in order to prepare for it as efficiently as possible and to prevent losses of lives and damage to individuals and property within their jurisdiction.<sup>83</sup> The use of these technologies can be an effective means for the prevention of damage and for the delivery of technical assistance during such disasters.<sup>84</sup> It therefore follows that a state has a duty to use such technologies if this is within its technical capabilities and, at the same time, if it is the most effective way to prepare for, prevent, and mitigate natural disasters.

A similar logic applies to the use of new technologies based on big data as means of preventing migrant deaths at sea. Specifically, states have a duty to use new technological means to prevent migrants' deaths at sea if and when: (1) states have the technical capability to do so as evidenced by the use of these new technological means in a related field; (2) the use of such technologies does not amount to an impossible or disproportionate burden on them; and (3) it is reasonable to believe that the use of these means is the most effective way to fulfill the obligation.

Firstly, states which already use such technologies have the technical capability to transform them into tools for the much-needed protection of migrants' lives at sea, at least in some circumstances. This is illustrated, for instance, by the fact that big data has been increasingly used

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*Natural Hazards from Satellite Imagery*, 31 *PROG. PHYS. GEOGR.* 459, 459 (2007) (explaining that "since 2000, there have been a number of spaceborne satellites that have changed the way we assess and predict natural hazards").

82. Intergovernmental Conference on Emergency Telecommunications, Tampere Convention on the Provision of Telecommunication Resources for Disaster Mitigation and Relief Operations art. 3(2)(a), Jun. 18, 1998, 2296 U.N.T.S. 5.

83. Valencia-Ospina, *supra* note 80, ¶ 53 ("[A] State's duty is triggered when a disaster becomes foreseeable, which mirrors the foreseeability requirement within the principle of due diligence.").

84. See Eduardo Valencia-Ospina (Special Rapporteur), *Eighth Rep. on the Protection of Persons in the Event of Disasters*, ¶ 168, UN. Doc. A/CN.4/697 (Mar. 17, 2016) (recalling that the European Union recommended that a specific mention should be made in the commentary of the ILC's Draft Articles on the Protection of Persons in the Event of Disasters according to which satellite imagery can be used as an important means of delivering technical assistance during emergency response).

by many states, from Europe to the Americas, for surveillance, including bulk surveillance.<sup>85</sup> In this regard, developing states may not be capable of employing such technologies until the digital divide between developing and developed world has been bridged or until a stronger international cooperation for technical matters has been established.<sup>86</sup>

Secondly, it is accepted that states are not expected to bear an impossible or disproportionate burden while complying with their positive obligations.<sup>87</sup> In this regard, the ECtHR emphasizes that state authorities will be deemed to have violated a positive obligation only if they “knew or ought to have known at the time of the existence of a real and

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85. See G.A. Res. 68/167, The Right to Privacy in the Digital Age, ¶ 25 (Jan. 21, 2014) (affirming that “[m]ass or ‘bulk’ surveillance programmes may thus be deemed to be arbitrary, even if they serve a legitimate aim and have been adopted on the basis of an accessible legal regime”). See also Roman Zakharov v. Russia, App No. 47143/06, Eur. Ct. H.R., ¶ 160 (Dec. 4, 2015), <http://hudoc.echr.coe.int/eng?i=001-159324> (about blanket interception of mobile phone communications data); Szabó and Vissy v. Hungary, App No. 37138/14, Eur. Ct. H.R., ¶ 73 (Jan 12, 2016), <http://hudoc.echr.coe.int/eng?i=001-160020> (assessing the use of cutting-edge surveillance technologies by Hungarian authorities); Escher et al. v. Brazil, Preliminary Objections, Merits, Reparations and Costs, Judgment, Inter-Am. Ct. H. R. (ser. C) No. 200, ¶¶ 114-15 (July 6, 2009) (on surveillance by state authorities via new technological tools); Big Brother Watch and Others v. the United Kingdom, App Nos. 58170/13, 62322/14 and 24960/15, Eur. Ct. H.R., ¶¶ 311-20 (Sep. 13, 2018) and the pending cases before the ECtHR: Bureau of Investigative Journalism and Alice Ross v. the United Kingdom App No. 62322/14; Human Rights Organisations and Others v. the United Kingdom, App No. 24960/15 (all three relating to the bulk interception of external communications by the UK authorities and the sharing of information between UK and US authorities); Hilde Bos-Ollermann, *Mass Surveillance and Oversight*, in SURVEILLANCE, PRIVACY AND TRANSATLANTIC RELATIONS 139, 140 (David D. Cole et al. eds., 2017) (discussing the state practice of “bulk collection” of untargeted data in mass surveillance technics); David Lyon, *Surveillance, Snowden, and Big Data: Capacities, Consequences, Critique*, BIG DATA & SOC’Y 1, 5 (2014) (affirming that big data “intensify surveillance by expanding interconnected datasets and analytical tools”).

86. See PIPPA NORRIS, DIGITAL DIVIDE: CIVIC ENGAGEMENT, INFORMATION POVERTY AND THE INTERNET WORLDWIDE 4-9 (2001) (on the global divide amongst countries); Rio Declaration on Environment and Development, *Mutatis Mutandis*, U.N. Doc. A/CONF.151/26 (Vol. I); 31 ILM 874 (1992), Principle 7 (“[i]n view of the different contributions to global environmental degradation, States have common but differentiated responsibilities”); Virginie Barral, *Sustainable Development in International Law: Nature and Operation of an Evolutive Legal Norm*, 23 EUR. J. INT’L L. 377, 381-82 (2012) (for an analysis of the principle of common but differentiated responsibilities in the field of international environmental protection). See also ACHR, *supra* note 11, at art. 26 (“[t]he States Parties undertake to adopt measures, both internally and through international cooperation, especially those of an economic and technical nature, with a view to achieving progressively, by legislation or other appropriate means, the full realization of the rights implicit in the economic, social, educational, scientific, and cultural standards set forth in the Charter of the Organization of American States as amended by the Protocol of Buenos Aires”).

87. Osman, App. No. 23452/94, at ¶ 116; Kilic, App. No. 22492/93, at ¶ 63; Opuz, App. No. 33401/02, at ¶ 129.

immediate risk to the life of an identified individual or individuals . . . and [if] they failed to take measures within the scope of their powers which, judged reasonably, might have been expected to avoid that risk.”<sup>88</sup> The IACtHR has adopted similar criteria.<sup>89</sup> State authorities can indeed acquire sufficient knowledge about the existence of a real risk to migrants’ lives in specific migratory routes where individuals are smuggled in vessels unfit for sail. Specifically, UN agencies, non-governmental organizations (NGOs), charities, and private service providers operating in the field all regularly assess the situation on the ground and inform state authorities about the existence of real risks to migrants’ lives.<sup>90</sup> For instance, the UNHCR has gathered and published evidence that the risk to migrants’ lives is heightened on certain maritime routes, such as the Central Mediterranean route from North Africa to Italy.<sup>91</sup> Once state authorities have the knowledge of the risk, they are required to act, adopting measures to prevent migrant deaths

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88. *Osman*, App. No. 23452/94, at ¶ 116.

89. See *Velásquez Rodríguez v. Honduras*, Preliminary Objections, Judgment, Inter-Am. Ct. H.R. (ser. C) No. 1, ¶¶ 174-75 (Jun. 26, 1987); *Sawhoyamaya Indigenous Community v. Paraguay*, Merits, Reparations and Costs, Judgment, Inter-Am. Ct. H.R. (ser. C) No. 146, ¶ 155 (Mar. 29, 2006); *Pueblo Bello Massacre v. Colombia*, Merits, Reparations and Costs, Judgment, Inter-Am. Ct. H.R. (ser. C) No. 140, ¶ 123 (Jan. 31, 2006); *Valle Jaramillo et al. v. Colombia*, Merits, Reparations and Costs, Judgment, Inter-Am. Ct. H.R. (ser. C) No. 192, ¶ 78 (Nov. 27, 2008).

90. See IOM GLOB. MIGRATION DATA ANALYSIS CTR., *Dangerous Journeys – International Migration Increasingly Unsafe in 2016*, Data Briefing Series 2 (Aug. 2016), [https://publications.iom.int/system/files/gmdac\\_data\\_briefing\\_series\\_issue4.pdf](https://publications.iom.int/system/files/gmdac_data_briefing_series_issue4.pdf) (for the recorded numbers of migrant deaths and disappearances by region between January and June 2016); *Mediterranean: Nearly 600 People Rescued but Unknown Number Missing Presumed Drowned*, Doctors Without Borders (Nov. 3, 2017), <http://www.msf.org/en/article/mediterranean-nearly-600-people-rescued-unknown-number-missing-presumed-drowned> (explaining that “once at sea on a flimsy and overcrowded inflatable dinghy, all are vulnerable and need to be rescued and brought to safety. Many people cannot swim and most do not have life jackets with them. It is an imminent life and death situation and the risk of drowning is always present”). See also Watch the Mediterranean, <http://watchthemed.net/index.php/main> (last visited July 29, 2018) (an online mapping platform that monitors real time maritime migration in the Mediterranean Sea); Vessel Finder, <https://www.vesselfinder.com> (last visited July 29, 2018) (a vessel tracking service provider using AIS data); Maritime Traffic, <http://www.marinetraffic.com/> (last visited July 29, 2018) (a private service provider using AIS data to monitor maritime traffic).

91. The UNHCR provides information about the situation in the Mediterranean via its data portal available at <https://data2.unhcr.org/en/situations/mediterranean> (last visited July 29, 2018). See also UNHCR, *Dead and Missing at Sea* (Nov. 16, 2017), <https://data2.unhcr.org/en/documents/download/60779>; UNHCR, *Desperate Journeys: Refugees and Migrants Entering and Crossing Europe via the Mediterranean and Western Balkan Routes* 6-7 (Feb. 2017), <http://www.unhcr.org/58b449f54> (“The number of deaths of refugees and migrants in the Mediterranean as they attempted to reach Europe in 2016 is the highest on record, primarily due to 4,578 deaths in the central Mediterranean, compared to 2,913 in the whole of 2015.”).

at sea.<sup>92</sup> New technologies based on big data analysis (e.g., analysis of mobile applications recording geolocation, online searches, phone calls, AIS data, and Broadcast Warning System data) should, if available, figure amongst these measures.<sup>93</sup>

Thirdly, the principle of effectiveness entails that the parties to a treaty have intended it “to have a certain effect, and not to be meaningless.”<sup>94</sup> As Professor Hugh Thirlway has noted, “an interpretation which would make the text ineffective to achieve the object in view is, again, *prima facie* suspect.”<sup>95</sup> The ECtHR and the IACtHR have interpreted the right to life as encompassing a positive obligation for a state to “take appropriate steps to safeguard the lives of those within its jurisdiction”<sup>96</sup> in order for that right to be effective.<sup>97</sup> If the use of new technologies based on big data analysis becomes a feasible way to identify individuals whose lives are at risk at sea, as this is the case with the use of satellite imagery for the prevention and mitigation of natural disasters, not using such technologies would deplete the obligation of its effect.<sup>98</sup> In other words, failure to use feasible technologies would amount to

92. See *supra* note 60 and accompanying text.

93. See *supra* notes 74-77 and accompanying text.

94. OPPENHEIM'S INTERNATIONAL LAW 1280 (Robert Jennings & Arthur Watts eds., 9th ed., vol. I, 1992).

95. Hugh Thirlway, *The Law and Procedure of the International Court of Justice 1960–1989: Part Three*, 62 BRIT. Y.B. INT'L LAW 1, 44 (1991).

96. *Osman*, App. No. 23452/94, at ¶ 115.

97. *Id.* at ¶ 116; *Pueblo Bello Massacre v. Colombia*, Merits, Reparations and Costs, Judgment, Inter-Am. Ct. H.R. (ser. C) No. 140, ¶ 111 (Jan. 31, 2006); see also Human Rights Comm'n, *supra* note 46, ¶ 6 (on the “continuous and effective protection of Covenant rights”).

98. See *supra* notes 81-84 and accompanying text (on the use of satellite imagery). Comparatively, see on the concept of feasibility as applied in International Humanitarian Law: Article 57(2)(a)(ii) of the Protocol Additional to the Geneva Conventions of 12 August 1949, and Relating to the Protection of Victims of International Armed Conflicts, June 8, 1977, 1125 U.N.T.S. 3 (“those who plan or decide upon an attack shall: . . . take all feasible precautions in the choice of means and methods of attack with a view to avoiding, and in any event to minimizing, incidental loss of civilian life, injury to civilians and damage to civilian objects”); INT'L COMM. OF THE RED CROSS (ICRC), CUSTOMARY INTERNATIONAL HUMANITARIAN LAW 56, Rule 17 (Jean-Marie Henckaerts & Louise Doswald-Beck eds., 2005) (“[e]ach party to the conflict must take all feasible precautions in the choice of means and methods of warfare with a view to avoiding, and in any event to minimising, incidental loss of civilian life, injury to civilians and damage to civilian objects”); MICHAEL N. SCHMITT, TALLINN MANUAL 2.0 ON THE INTERNATIONAL LAW APPLICABLE TO CYBER OPERATIONS, 479 (2017) (“[f]easible’ has been widely interpreted as that which is ‘practicable or practically possible, taking into account all circumstances ruling at the time, including humanitarian and military considerations’”); Michael N. Schmitt & John J. Merriam, *The Tyranny of Context: Israeli Targeting Practices in Legal Perspective*, 37 U. PA. J. INT'L L. 53, 133 (“[i]n some cases, feasibility may be an issue of asset availability” – which could relate for example to advanced technologies).

unnecessary loss of lives, emptying the obligation under the right to life of effectiveness.

The following example could be used for illustrative purposes. Arguably, Italy and the European Border and Coast Guard Agency (Frontex)<sup>99</sup> had access to sufficiently clear information provided by the UNHCR that a precise maritime route (the Central Mediterranean route) had been consistently deadly in the past.<sup>100</sup> However, extensive search and rescue operations had been ruled out, as they were controversially deemed to increase the number of migrant smuggling attempts.<sup>101</sup> Consequently, this may have led in practice, to a larger number of migrant deaths in this maritime route.<sup>102</sup> Big data analysis could have been useful to predict and map migratory paths in near real-time.<sup>103</sup> Frontex already performs risk analysis and has a dedicated data science team to carry out big data analytics.<sup>104</sup> Italy may have already the capability to conduct big data analysis, notably as its

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99. European Parliament and Council Regulation (EU) 2016/1624, *supra* note 20 (establishing the Frontex). This regulation replaces the former European Agency for the Management of Operational Cooperation at the External Borders of the Member States of the European Union and repeals the former Council Regulation (EC) 2007/2004, 2004 O.J. (L 349) 1. *See* notably, MORENO-LAX, *supra* note 20, at 155-80 (for a comprehensive overview of Frontex's origins, development, structure, tasks and powers); Papastavridis, *supra* note 20, at 75 (for an analysis of Frontex operations in light of the International Law of the Sea).

100. *See supra* note 91.

101. The Italian operation *Mare Nostrum* was discontinued in October 2014 and was followed by the Frontex-led operation Triton. In parallel, the so called "EU NavFor/Sophia" operations were launched in June 2015 with a specific anti-smuggling mission. *See* EUROPEAN POLITICAL STRATEGY CTR, *supra* note 72, at 3 (for a detailed overview of the different operations in the Central Mediterranean route); MORENO-LAX, *supra* note 20, at 195 ("in October 2014 Mare Nostrum was terminated on account of excessive costs—and perhaps due to a perceived 'call effect' attracting continuous arrivals. Frontex operation Triton took over, but with a much less ambitious remit (citation omitted).").

102. *See* UNHCR, *Dead and missing at sea*, *supra* note 91 (for the number of deaths in the central Mediterranean route since 2015).

103. *See* PEW RESEARCH CTR., *supra* note 31, fig. 1; IOM, *supra* note 75, at 29; Aude Hofleitner, *Coordinated Migration*, Facebook Data Sci. (Dec. 17, 2013), <https://www.facebook.com/notes/facebook-data-science/coordinated-migration/10151930946453859> (mapping migration by contrasting Facebook users' data about their declared "hometown" and their declared "current city").

104. *See supra* note 24; *see also* Frontex Analytics, <http://frontex.europa.eu/intelligence/analytics/> (last visited May 25, 2018) (explaining that "[t]he Analytics Sector was established to expand the Risk Analysis Unit's data and geo analysis capabilities and to sustain the high quality level of knowledge delivered and managed by it. The sector consists of two teams supporting the Strategic and Operational Sectors in their ad-hoc and bespoke exploitation of data and intelligence (Data Team) and through the provision and development of geospatial services (GIS Team).").

authorities seem to use such technology for mass surveillance operations.<sup>105</sup> Moreover, Frontex can provide technical assistance to EU member states and could in theory assist Italian authorities with data science support.<sup>106</sup> Therefore, Italy could potentially use big data analysis to inform targeted search and rescue operations in this specific maritime route if they had sufficient knowledge about the existence of real risks to migrants' lives entering their jurisdiction. Such operations could help prevent unnecessary migrant deaths. If such targeted operations were considered as more effective than non-targeted operations, recourse to new technologies based on big data would be required.

Accordingly, if new technologies based on big data were the most effective tools for the prevention of migrants' deaths, and their use did not impose any impossible or disproportionate burden on states that have the technical capabilities to operate them, it is submitted that, due to the particular circumstances of maritime migration, it is reasonable to expect those states to use such technologies in order to fulfill their positive obligation. The next section examines whether the same approach could also be applied in relation to the protection of migrants at risk of ill-treatment and human trafficking.

### C. *Protection of Migrants at Risk of Ill-Treatment and Human Trafficking*

Migrants and asylum-seekers in large migratory movements are particularly vulnerable to abuse, human trafficking, and exploitation.<sup>107</sup> This is especially concerning in relation to migrant and asylum-seeking

105. See Disegno di legge S. 2886, Disposizioni per l'adempimento degli obblighi derivanti dall'appartenenza dell'Italia all'Unione europea - Legge europea 2017, A.C. 4505-B, art. 24 (allowing the use of mass surveillance in the fight of terrorism).

106. EU Regulation 2016/1624, *supra* note 20, art. 8(1)(f) ("provide technical and operational assistance to Member States and third countries in accordance with Regulation (EU) No 656/2014 and international law, in support of search and rescue operations for persons in distress at sea which may arise during border surveillance operations at sea").

107. See UNITED NATIONS OFFICE ON DRUGS AND CRIME (UNODC), GLOBAL REPORT ON TRAFFICKING IN PERSONS 2016 10 (Dec. 2016), [http://www.unodc.org/documents/data-and-analysis/glotip/2016\\_Global\\_Report\\_on\\_Trafficking\\_in\\_Persons.pdf](http://www.unodc.org/documents/data-and-analysis/glotip/2016_Global_Report_on_Trafficking_in_Persons.pdf) (emphasizing that conflicts create favorable conditions for trafficking in person and that migrants and refugees are "easily targeted by traffickers"); G.A. Res. 71/1, *supra* note 72, ¶ 35 (recognizing that "refugees and migrants in large movements are at greater risk of being trafficked and of being subjected to forced labour."); IOM, *Abuse, Exploitation and Trafficking: IOM Reveals Data on the Scale of the Danger and Risks that Migrants Face on the Mediterranean Routes to Europe* (Oct. 18, 2016), <https://unitedkingdom.iom.int/blog/news/abuse-exploitation-and-trafficking-iom-reveals-data-on-the-scale>.



children.<sup>108</sup> According to the United Nations International Children's Fund (UNICEF) and the IOM, seventy-seven percent of migrant and asylum-seeking children travelling in the Mediterranean region have reported experiencing abuse, exploitation, and practices that may amount to ill-treatment and human trafficking.<sup>109</sup>

Torture, inhuman, and degrading treatment or punishment are forms of ill-treatment which human rights treaties prohibit and condemn.<sup>110</sup> Defined criteria allow for the identification of situations falling within the scope of each of these types of ill-treatment.<sup>111</sup> The protection afforded by these instruments applies to all individuals, including foreigners, within the jurisdiction of the state parties to the treaties.<sup>112</sup>

Human trafficking is defined by Article 3 (a) of the Palermo Protocol and Article 4 (a) of the Anti-Trafficking Convention.<sup>113</sup> According to both identically worded provisions, trafficking in persons

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108. The term "children" is defined in Article 1 of the Convention on the Rights of the Child, Nov. 20, 1989, 1577 U.N.T.S. 3 ("For the purposes of the present Convention, a child means every human being below the age of eighteen years unless under the law applicable to the child, majority is attained earlier.").

109. IOM & UNICEF, *Harrowing Journeys: Children and Youth on the Move Across the Mediterranean Sea, at Risk of Trafficking and Exploitation* 8 (Sept. 2017), [https://www.iom.int/sites/default/files/press\\_release/file/Harrowing\\_Journeys\\_Children\\_and\\_youth\\_on\\_the\\_move\\_across\\_the\\_Mediterranean.pdf](https://www.iom.int/sites/default/files/press_release/file/Harrowing_Journeys_Children_and_youth_on_the_move_across_the_Mediterranean.pdf).

110. See ICCPR, *supra* note 11, at art. 7; ECHR, *supra* note 11, art. 3; ACHR, *supra* note 11, art. 5; Convention against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment art. 2, Dec. 10, 1984, 1465 U.N.T.S. 85 [hereinafter "CAT"].

111. See notably CAT, *supra* note 110, at art. 1; Ireland v. United Kingdom, App No. 5310/71, 1978 Eur. Ct. H.R. at ¶ 167, Eur. Ct. H.R. <http://hudoc.echr.coe.int/eng?i=001-181585>; Tyrer v. United Kingdom, App No. 5856/72, 1978 Eur. Ct. H. R. at ¶ 30, <http://hudoc.echr.coe.int/eng?i=001-57587>; Soering, App. No. 14038/88, at ¶ 100; Selmouni v. France, App No. 25803/94, 1999 Eur. Ct. H.R. at ¶ 96, <http://hudoc.echr.coe.int/eng?i=001-58287>; Tibi v. Ecuador, Judgment of September 7, 2004, IACtHR, (ser. C) No. 114, ¶¶ 145-46 (2004).

112. See Human Rights Comm'n, *supra* note 56, ¶ 7 (affirming that aliens "must not be subjected to torture or to cruel, inhuman or degrading treatment or punishment"); Chahal v. United Kingdom, App No. 22414/93, 1996 Eur. Ct. H.R. at ¶¶ 73-74, <http://hudoc.echr.coe.int/eng?i=001-58004> (on the applicability of Article 3 ECHR to aliens in expulsion cases); Rights and Guarantees of Children, *supra* note 46, ¶ 225 (on the relationship between the prohibition of torture, inhuman and degrading treatment and the principle on non-refoulement).

113. G.A. Res. 55/25, Protocol to Prevent, Suppress and Punish Trafficking in Persons Especially Women and Children, supplementing the United Nations Convention against Transnational Organized Crime, art. 3(a), Nov. 15, 2000 [hereinafter "Palermo Protocol"]; Convention on Action Against Trafficking in Human Beings art. 4(a), May 16, 2005, C.E.T.S. 197 [hereinafter "Anti-Trafficking Convention"].

shall mean the recruitment, transportation, transfer, harbouring or receipt of persons, by means of the threat or use of force or other forms of coercion, of abduction, of fraud, of deception, of the abuse of power or of a position of vulnerability or of the giving or receiving of payments or benefits to achieve the consent of a person having control over another person, for the purpose of exploitation. Exploitation shall include, at a minimum, the exploitation of the prostitution of others or other forms of sexual exploitation, forced labour or services, slavery or practices similar to slavery, servitude or the removal of organs.

It is generally accepted that states are required to adopt measures to ensure that individuals within their jurisdiction are not subjected to ill-treatment, even if such treatments are administered by private individuals.<sup>114</sup> Likewise, the ECtHR recognizes that states have the positive obligation to adopt operational measures to protect victims, or potential victims, of trafficking.<sup>115</sup> The IACtHR has also imposed positive obligations on states with the view to ensure respect for Article 6 of the American Convention on Human Rights (ACHR).<sup>116</sup> Amongst these obligations, the IACtHR emphasized the positive obligation to adopt preventive measures vis-à-vis defined groups of people at risk of falling into slavery and human trafficking.<sup>117</sup>

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114. See *A. and others v. United Kingdom*, App. Nos. 100/1997/884/1096 at ¶ 22 (confirmed thereafter by the ECtHR); *Z. and others v. United Kingdom*, App. No. 29392/95, 2001 Eur. Ct. H. R. at ¶ 73, <http://hudoc.echr.coe.int/eng?i=001-59455>; *Opuz*, App. No. 33401/02, at ¶ 159; *Đurević v. Croatia*, App. No. 52442/09, 2011 Eur. Ct. H.R. at ¶ 102, <http://hudoc.echr.coe.int/eng?i=001-105691>; *Begheluri and others v. Georgia*, App. No. 28490/02, 2014 Eur. Ct. H.R. at ¶ 97, <http://hudoc.echr.coe.int/eng?i=001-146769>. See also *Velásquez Rodríguez v. Honduras*, Preliminary Objections, Judgment, Inter-Am. Ct. H.R. (ser. C) No. 1, ¶¶ 174-75 (Jun. 26, 1987); Human Rights Comm'n, *supra* note 46, ¶ 8 (about state obligations under the ICCPR).

115. Curiously, Article 4 of the ECHR does not expressly refer to human trafficking. However, using evolutive interpretation, the ECtHR considered that human trafficking, as defined by the Palermo Protocol and the Anti-Trafficking Convention, fell within the scope of Article 4 of the ECHR. See *Rantsev v. Cyprus and Russia*, App. No. 25965/04, 2010 Eur. Ct. H.R. at ¶ 286; *C.N. v. United Kingdom*, App. No. 4239/08, 2012 Eur. Ct. H.R. at ¶ 67, <http://hudoc.echr.coe.int/eng?i=001-114518>; *M. and Others v. Italy and Bulgaria*, App. No. 40020/03, 2012 Eur. Ct. H.R. at ¶ 151.

116. *Fazenda Brasil Verde Workers*, Inter-Am. Ct. H. R. (ser. C) No. 318, ¶¶ 319-20. Noteworthy, Article 6 of the ACHR, unlike Article 4 of the ECHR, explicitly refers to slave trade and traffic in women. ACHR, *supra* note 11, at art. 6(1) (“[n]o one shall be subject to slavery or to involuntary servitude, which are prohibited in all their forms, as are the slave trade and traffic in women”); ECHR, *supra* note 11, at art. 4(1) (“[n]o one shall be held in slavery or servitude.”).

117. *Fazenda*, Am. Ct. H. R. (ser. C) No. 318, ¶ 320 (also recognizing that this obligation is reinforced by the imperative character of the peremptory norm of international law prohibiting

The same analytical framework proposed above<sup>118</sup> can be used to verify whether state positive measures to protect migrants against ill-treatment and human trafficking should also encompass the use of new technologies building on big data analysis. It is certainly not possible to infer that states generally have an all-encompassing duty to use new technological means to protect individuals from ill-treatment and human trafficking. However, states may have a duty to use new technological means in specific circumstances.<sup>119</sup>

As discussed in the previous section, a growing number of states have mass surveillance programs drawing upon big data already in place, demonstrating their capability to use such technological tools.<sup>120</sup> Yet, state authorities enjoy some discretion as to the types of measures adopted within the scope of their powers to fulfil their obligations,<sup>121</sup> notably when they are obligations of conduct or means.<sup>122</sup> Moreover, state responsibility can be engaged only when the legal framework fails to adequately protect individuals<sup>123</sup> or when the authorities have failed to take reasonable steps to prevent ill-treatment and human trafficking though they knew or ought to have known about the specific risks.<sup>124</sup>

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slavery and the severity and intensity of the violation of rights); Rights and Guarantees of Children, *supra* note 46, ¶ 92 (imposing the obligation upon states to adopt specific border control measures in order to prevent, detect, and prosecute any type of trafficking of persons).

118. *See supra* Section III. B.

119. *Id.* (for the three criteria proposed above — state capability, no impossible or disproportionate burden, and effectiveness of the measure adopted).

120. *See supra* notes 85, 106.

121. *See* Paolo G. Carozza, *Subsidiarity as a Structural Principle of International Human Rights Law*, 97 AM. J. INT'L L. 38, 62-3 (2003) (affirming that “the institutional supervision and enforcement of international human rights law is notable mostly for the extent that it still relies so heavily on states’ discretion regarding the degree and manner of implementation of human rights domestically.”); Samantha Besson, *Subsidiarity in International Human Rights Law—What is Subsidiary about Human Rights?*, 61 AM. J. JURIS. 69, 84 (2016) (discussing “the protection of the discretion of States in specifying and implementing human rights duties in their local circumstances”); Nino Tsereteli, *Emerging Doctrine of Deference of the Inter-American Court of Human Rights?*, 20 I. J. H. R. 1097, 1102 (2016) (discussing the IACtHR willingness to allow for more deference to domestic authorities in the norm application as opposed to less or in-existent room for deference in norm interpretation).

122. *See supra* note 62.

123. *A. v. United Kingdom*, App. Nos. 100/1997/884/1096, at ¶ 22.

124. *Mahmut Kaya v. Turkey*, App. No. 22535/93, 2000 Eur. Ct. H.R. at ¶ 115, <http://hudoc.echr.coe.int/eng?i=001-58523>; *Đurević*, App. No. 52442/09, at ¶ 138; *El-Masri v. the former Yugoslav Republic of Macedonia*, App. No. 39630/09, 2012 Eur. Ct. H.R. at ¶ 198, <http://hudoc.echr.coe.int/eng?i=001-115621>. *See also* *Opuz*, App. No. 33401/02, at ¶ 159; *Rantsev*, App. No. 25965/04, at ¶ 286; *Pueblo Bello Massacre v. Colombia*, Merits, Reparations and Costs, Judgment, Inter-Am. Ct. H.R. (ser. C) No. 140, ¶ 123 (Jan. 31, 2006); *Valle Jaramillo et al. v. Colombia*, Merits, Reparations and Costs, Judgment, Inter-Am. Ct. H.R. (ser. C) No. 192, ¶ 78 (Nov. 27,

Knowledge of the risk may be more difficult to establish in this context than that of migrants at sea, where states are regularly warned about the risks of death on specific migratory routes.<sup>125</sup> By contrast, instances of human trafficking and ill-treatment of migrants are less well reported.<sup>126</sup>

However, as protection is strongly intertwined with fighting criminality, states may have a strong interest in using new technologies. Arguably, big data analysis and, in particular, predictive analytics techniques could become a fundamental asset for the effective fight against criminality in relation to ill-treatment and human trafficking.<sup>127</sup> Such technologies could be used to identify and map areas at risk where human trafficking and ill-treatment may be taking place within the state territory.<sup>128</sup> For instance, human traffickers use mobile phones and the internet for recruitment, advertisement, and communication of their activities.<sup>129</sup> The data that they generate could be used for the

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2008); *Ríos et al. v. Venezuela*, Preliminary Objections, Merits, Reparations and Costs, Judgment, Inter-Am. Ct. H.R. (ser. C) No. 194, ¶ 110 (2009); *Fazenda Brasil Verde Workers v. Brasil*, Preliminary Objections, Merits, Reparations and Costs, Judgment, Inter-Am. Ct. H. R. (ser. C) No. 318, ¶ 323 (Oct. 20, 2016).

125. *See supra* notes 90, 91.

126. *But see* IOM & UNICEF, *supra* note 109, at 16 (affirming however that “those [children] whose journeys take them along the Central Mediterranean route are at substantially higher risk [of trafficking]”).

127. *See* Artur Dubrawski et al., *Leveraging Publicly Available Data to Discern Patterns of Human-Trafficking Activity*, 1 J. HUM. TRAFFICKING 65, 85 (2015) (affirming that “the publicly available information can be used as an effective, relevant, timely, constant, and inexpensive proxy source of evidence that can be leveraged to enhance quantitative analysis of the problem”); Julia Muraszkiwicz, *Alternative Ways to Address Human Trafficking: Technology and Human Trafficking*, in *IRREGULAR MIGRATION, TRAFFICKING AND SMUGGLING OF HUMAN BEINGS: POLICY DILEMMAS IN THE EU 87* (Sergio Carrera & Elspeth Guild eds., 2016) (for a general discussion about the uses of technology for combatting human trafficking).

128. *See* Renata A. Konrad et al., *Overcoming Human Trafficking Via Operations Research And Analytics: Opportunities For Methods, Models, And Applications*, 259 EUR. J. OPERATIONAL RES. 733, 741 (2017) (“OR [operational research] and similar analytical techniques have a unique potential to have a powerful effect in efforts against human trafficking”); Kena Fedorschak et al., *Data Analytics and Human Trafficking*, 8463 DESRIST 2014 LNCS 69, 69 (2014), [https://link.springer.com/chapter/10.1007/978-3-319-06701-8\\_5](https://link.springer.com/chapter/10.1007/978-3-319-06701-8_5) (affirming that data analytics can be useful to elucidate trends in complex social data and inform future policy).

129. Hao Wang et al., *Data Integration from Open Internet Sources to Combat Sex Trafficking of Minors*, PROC. 13<sup>TH</sup> DIG. GOV. RES. CONF. 246, 247 (2012) (“[a]s with licit activities, the use of the Internet in child sexual abuse is increasing with greater use of digital media”); Mark Latonero et al., USC Annenberg Ctr on Comm’n Leadership & Policy, *Human Trafficking Online: The Role of Social Networking Sites and Online Classifieds 8* (2011), <http://ssrn.com/abstract=2045851> (“[t]he rapid expansion of the Internet and online technologies is affecting numerous aspects of daily life around the globe, including facilitating domestic and international trafficking in persons”).

identification of trafficking networks in the physical world.<sup>130</sup> Although such operations are not yet widespread, they are certainly not hypothetical either. For instance, big data science was used to successfully map human trafficking networks in India and to help foster prevention tools in the civil society.<sup>131</sup> If effectively used by states for fighting criminality, these new technologies could also be applied for the protection of individuals. Nonetheless, that would depend significantly on political will and, as discussed below, would not be without risks.

#### IV. LIMITS AND RISKS OF USING BIG DATA IN INTERNATIONAL MIGRATION

New technologies based on big data are increasingly present in many areas of societal interests.<sup>132</sup> As discussed above,<sup>133</sup> these technologies have the potential to contribute to better international migration management and enhance the protection of migrants at risk. However, unrestrained use of such technologies could in fact pose serious risks to the safety of migrants, as well as amount to unjustified interference with their right to privacy and data protection.

##### A. Migrant Safety and Protection

Big data analysis has the potential to provide accurate and detailed breakdown not only of human migration patterns,<sup>134</sup> but also of one's individual behaviors and potentially one's identity.<sup>135</sup> It is presently possible to determine with precision behavior relating to virtually all areas of one's life. Examples include behavior ranging from personal care to eating habits and from shopping preferences to health concerns.<sup>136</sup>

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130. Konrad et al., *supra* note 128, at 738 (enumerating the technologies that can be used to analyze data from the Internet and potentially assist victim protection).

131. At the initiative of the Indian NGO My Choices Foundation. See Nital Bhalla, *Big Data Maps India's Human Traffic Hot Spots*, REUTERS (May 31, 2017), <http://www.reuters.com/article/us-india-trafficking-technology/big-data-maps-indias-human-traffic-hot-spots-idUSKBN18R21N>.

132. See *supra* note 32.

133. See *supra* Sections II and III.

134. See PEW RESEARCH CTR., *supra* note 31.

135. See KITCHIN, *supra* note 3, at 100-12 (for a detailed explanation of data analytics); WORLD BANK, *Principles on Identification for Sustainable Development: Toward the Digital Age* (2017), <http://documents.worldbank.org/curated/en/213581486378184357/pdf/112614REVISED425web-English-final-ID4D-IdentificationPrinciples.pdf>; Ana Beduschi et al., *Building Digital Identities: The Challenges, Risks and Opportunities of Collecting Behavioural Attributes for New Digital Identity Systems* (2017), <https://ore.exeter.ac.uk/repository/handle/10871/28297>; Bronwen Manby, *Identification in the Context of Forced Displacement. Identification for Development (ID4D)*, WORLD BANK GROUP (2016), <http://documents.worldbank.org/curated/en/375811469772770030/pdf/107276-WP-P156810-PUBLIC.pdf>.

136. See Beduschi et al., *supra* note 135; Visualising Life, Coelition (2017), <https://coelition.org/business/resources/visualising-life/> (last visited May 25, 2018).

Data mining techniques can extract information such as individual names, locations, dates, search terms, or product terminology from large datasets, and link them together in order to determine, for example, how a person's name relates to a location or to an opinion expressed online about a precise item.<sup>137</sup> These techniques are already used by businesses to promote their products and target specific consumers<sup>138</sup> and may also conceivably be used in the domain of international migration.

Besides the obvious issues of respect for privacy and compliance with data protection legislation,<sup>139</sup> there is a risk that states might use these technologies to further criminalize migration and deny protection to vulnerable groups of migrants. In the context of large movements of migrants and asylum-seekers, it is important to ensure that these new technologies based on big data do not aggravate the risks of refoulement<sup>140</sup> and extreme borders securitization.<sup>141</sup> For example, big data analysis could provide states with the means to identify and locate

137. KITCHIN, *supra* note 3, at 105 (explaining data mining and how semantics and taxonomies are used to recognize patterns and extract information from documents).

138. See GORDON S. LINOFF & MICHAEL J. A. BERRY, *DATA MINING TECHNIQUES: FOR MARKETING, SALES, AND CUSTOMER RELATIONSHIP MANAGEMENT* (2011) (for a general overview of the uses of data mining in business-related matters); Tao Zang et al., *Mining Target Users for Mobile Advertising Based on Telecom Big Data*, 16 *ISCIT* 296, 296 (2016) (on telecom big data mining and mobile advertising targeting customers more accurately).

139. See *infra* Section IV.B.

140. See Convention Relating to the Status of Refugees art. 33(1), U.N.T.S. 189, 137 (Jul. 28, 1951) [hereinafter "Refugee Convention"] ("[n]o Contracting State shall expel or return ("refouler") a refugee in any manner whatsoever to the frontiers of territories where his life or freedom would be threatened on account of his race, religion, nationality, membership of a particular social group or political opinion"); JAMES C. HATHAWAY & MICHELLE FOSTER, *THE LAW OF REFUGEE STATUS* 21 (2d ed. 2014) ("Refugee status secures access to protection against *refoulement*, the right not to be sent back to the country of origin for the duration of the risk."); JANE McADAM, *COMPLEMENTARY PROTECTION IN INTERNATIONAL REFUGEE LAW* 136 (2006) (affirming that "the scope of non-refoulement is recognized under international law as extending beyond Article 33 of the Refugee Convention to encompass torture").

141. See Christina Boswell, *Migration Control in Europe After 9/11: Explaining the absence of securitization*, 45 *J. COMMON MKT. STUD.* 589 (2007) (for a definition of securitization); EDWARD ELGAR PUBLISHING, *HANDBOOK ON MIGRATION AND SECURITY* (Philippe Bourbeau ed., 2017) (for a general overview of the issue of securitization of migration); Benjamin J. Muller, *Risking It All at the Biometric Border: Mobility, Limits, and the Persistence of Securitisation*, 16 *GEOPOLITICS* 91, 97 (2011) (on the application of biometrics to the contemporary border security and the uses of risk management in the field of migration and mobility); Celia Rooney, *Exploiting a Tragedy: The Securitization of EU Borders in the Wake of Lampedusa*, Oxford L. Blog (Nov. 18, 2013), <http://bordercriminologies.law.ox.ac.uk/exploiting-a-tragedy> (for a short overview of the securitization of migration before Summer 2015 and the subsequent migration crisis).

migrants heading towards their territory.<sup>142</sup> This information could be used to streamline pushbacks of individuals without a thorough examination of their claims. Hence, big data could be used as an instrument of exclusion of undesirable migrants at increasingly closed and secured borders.<sup>143</sup> In addition, relying primarily on big data to profile migrants and distinguish them from terrorists, criminals and human traffickers could lead to automated decision-making, which might intensify the threat of discrimination.<sup>144</sup> For example, research demonstrates that this is already the case with facial recognition software in relation to racial and ethnic minorities.<sup>145</sup>

Furthermore, information falling into the wrong hands, like state authorities engaged in the persecution of asylum-seekers or non-state actors such as criminal and terrorist groups, can have drastic consequences. If not appropriately used, big data could harm more than help the protection of migrants' human rights. For example, human traffickers and other criminal groups theoretically could use big data analytics or hack into official databases to estimate where migrants tend to concentrate, identify the routes they use, and target vulnerable migrants more efficiently.<sup>146</sup> The information also could be used, for instance, to incite violence against specific migrant groups by communicating their geolocation to extremist groups.

Consequently, it is important to create systems that can harness data and metadata<sup>147</sup> in large quantities but that are also consistent with

142. See *supra* notes 31 and 75-77.

143. See Peter Andreas, *Redrawing the Line. Borders and Security in the Twenty-first Century*, 28 INT'L SEC. 78 (for a comprehensive analysis of the relationship between borders and security interests in the United States and the European Union).

144. See CATHY O'NEIL, *WEAPONS OF MATH DESTRUCTION: HOW BIG DATA INCREASES INEQUALITY AND THREATENS DEMOCRACY* (2016) (calling for a more responsible use of algorithms and for more regulation of big data usages); Brent Daniel Mittelstadt et al., *The Ethics Of Algorithms: Mapping The Debate*, BIG DATA & SOC'Y 3, 8 ("[p]rofilng algorithms identify correlations and make predictions about behaviour at a group-level . . . [p]rofilng can inadvertently create an evidence base that leads to discrimination").

145. See Clare Garvie et al., *The Perpetual Line-Up: Unregulated Police Face Recognition in America*, Ctr on Privacy & Tech. Geo. L. (Oct. 18, 2016), <https://www.perpetuallineup.org/> (about the use of face recognition technology by the police in the United States and its implications for the protection of civil liberties and the rights of racial and ethnic minorities); Joy Buolamwini, *InCoding—In The Beginning*, MIT Media Lab (May 16, 2016), <https://medium.com/mit-media-lab/incoding-in-the-beginning-4e2a5c51a45d> (explaining the existence of embedded bias in coding).

146. Konrad et al., *supra* note 128, at 737 (demonstrating that mapping of victims and traffickers networks via analytics is possible).

147. *Data*, OXFORD ENGLISH DICTIONARY (2017) ("[t]he quantities, characters, or symbols on which operations are performed by a computer, which may be stored and transmitted in the form

human rights protection.<sup>148</sup> Public-private initiatives have been placing a greater emphasis on user's data ownership, notably when it comes to big social data.<sup>149</sup> This is certainly an interesting development where more research is needed, notably insofar as privacy rights and data protection are concerned.

### B. Migrant Privacy and Data Protection

Telecommunications and personal data in electronic format are encompassed in the right to respect for one's private life and correspondence.<sup>150</sup> State action in this regard should not result in a

of electrical signals and recorded on magnetic, optical, or mechanical recording media"); *Metadata*, OXFORD ENGLISH DICTIONARY (2017) ("[a] set of data that describes and gives information about other data"). See also Jenn Riley, *Understanding Metadata. What is Metadata, and What is it for?*, Nat'l Info. Standards Org. (2017), [http://www.niso.org/apps/group\\_public/download.php/17446/Understanding%20Metadata.pdf](http://www.niso.org/apps/group_public/download.php/17446/Understanding%20Metadata.pdf).

148. See ORG. FOR THE ADVANCEMENT OF STRUCTURED INFO. STANDARDS (OASIS), *Classification of Everyday Living (COEL) TC* (2017), [https://coelition.org/business/resources/coel-standard/\(supporting collection and processing of behavioral data in a way that personal data is pseudonymized at the source\)](https://coelition.org/business/resources/coel-standard/(supporting%20collection%20and%20processing%20of%20behavioral%20data%20in%20a%20way%20that%20personal%20data%20is%20pseudonymized%20at%20the%20source)).

149. For instance, the ID2020 initiative aiming at making digital identities available for all individuals who do not have an official proof of identity by 2020, relies on public-private partnerships including start-ups, technology companies and United Nations agencies such as the UNHCR (see <http://id2020.org/>).

150. See, e.g., UDHR, *supra* note 11, at art. 12; ECHR, *supra* note 11, at art. 8; ICCPR, *supra* note 11, at art. 17; ACHR, *supra* note 11, at art. 11. In the European Union context, see Article 7 (Respect for private and family life) and Article 8 (Protection of personal data) of the Charter of Fundamental Rights of the European Union Dec. 12, 2000, 2000 O.J. (C 346) 10 [hereinafter CFREU]. See also G.A. Res. 68/167, *supra* note 85, ¶ 3 (affirming that "the same rights that people have offline must also be protected online, including the right to privacy"); *Klass v. Germany*, App No. 5029/71, 1978 Eur. Ct. H.R. at ¶ 41, <http://hudoc.echr.coe.int/eng?i=001-57510> (affirming that telephone conversations fall within the realm of Article 8 of the ECHR under the notions of private life and correspondence); *P.G. and J.H. v. United Kingdom*, App No. 44787/98, 2001 Eur. Ct. H.R. at ¶ 57, <http://hudoc.echr.coe.int/eng?i=001-59665> (using the definition of personal data as "any information relating to an identified or identifiable individual" as per Article 2 of the Council of Europe's Convention of 28 January 1981 for the protection of individuals with regard to automatic processing of personal data, ETS No. 108); *Liberty and others v. United Kingdom*, App No. 58243/00, 2008 Eur. Ct. H.R. at ¶ 56, <http://hudoc.echr.coe.int/eng?i=001-87207> (affirming that "telephone, facsimile and e-mail communications are covered by the notions of "private life" and "correspondence" within the meaning of Article 8"); *Uzun v. Germany*, App No. 35623/05, 2010 Eur. Ct. H.R. at ¶ 52, <http://hudoc.echr.coe.int/eng?i=001-100293> (relating to GPS surveillance and use of the data obtained thereby); *Bărbulescu v. Romania*, App No. 61496/08, 2017 Eur. Ct. H.R. at ¶ 74, <http://hudoc.echr.coe.int/eng?i=001-100293> (affirming that internet instant messaging services "is just one of the forms of communication enabling individuals to lead a private social life"); *Tristán Donoso v. Panamá*, Preliminary Objections, Merits, Reparations and Costs, Judgment, Inter-Am. Ct. H. R. (ser. C) No. 193, ¶ 55 (Jan. 27, 2009) (relating to surveillance of telephone communications); *Escher et al.*, Inter-Am. Ct. H. R.



disproportionate restriction upon these rights.<sup>151</sup> In principle, this general rule should apply to all individuals, including foreigners who fall within the jurisdiction of a state party to a human rights treaty providing for the protection of these rights.<sup>152</sup> Accordingly, migrants' telecommunications and personal data should receive the same level of protection as the one offered to nationals. Nevertheless, domestic legal regimes such as those in the United States and Canada treat foreigners located outside of their territory differently insofar as data protection and privacy rights are concerned.<sup>153</sup> Concerns about the lack of protection of foreign individuals have intensified since the U.S. National Security Agency (NSA) affair in 2013.<sup>154</sup> The ready availability of large

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(ser. C) No. 200, ¶¶ 114-15 (relating to telephone communications and use of new technological tools); MICHAEL N. SCHMITT, TALLINN MANUAL 2.0 ON THE INTERNATIONAL LAW APPLICABLE TO CYBER OPERATIONS, Rule 35 (Cambridge Univ. Press, 2d ed. 2017) (“[i]ndividuals enjoy the same international human rights with respect to cyber-related activities that they otherwise enjoy”).

151. See, e.g., Uzun, App No. 35623/05, at ¶ 78 (affirming that “the notion of necessity implies that the interference corresponds to a pressing social need and, in particular, that it is proportionate to the legitimate aim pursued”); Bărbulescu, App No. 61496/08, at ¶ 121 (affirming that despite the rapid developments in the area of electronic communications, “proportionality and procedural guarantees against arbitrariness are essential”); Escher et al., Inter-Am. Ct. H. R. (ser. C) No. 200, at ¶ 116 (affirming that “the right to privacy is not an absolute right and can be restricted by the States, provided interference is not abusive or arbitrary; to this end, it must be established by law, pursue a legitimate purpose and be necessary in a democratic society”); United Nations High Commissioner for Human Rights, *The Right to Privacy in the Digital Age*, ¶ 23, U.N. Doc. A/HRC/27/37 (Jun. 30, 2014) (affirming that “any limitation to privacy rights reflected in article 17 must be provided for by law,” “must be necessary for reaching a legitimate aim, as well as in proportion to the aim and the least intrusive option available (...) must not render the essence of the right meaningless and must be consistent with other human rights, including the prohibition of discrimination”).

152. UDHR, *supra* note 11, art. 12, ICCPR, *supra* note 11, art. 17, ECHR, *supra* note 11, art. 8, and ACHR, *supra* note 11, art. 11, employ the terms “no one” and “everyone” to define the subjects of protection in relation to privacy, home and correspondence. See also Article 5(1)(b) of the Declaration on the Human Rights of Individuals Who Are Not Nationals of the Country in Which They Live, G.A. Res. 40/144, at 252 (Dec. 13, 1985) (affirming that aliens shall enjoy the protection against arbitrary and unlawful interference within their privacy rights).

153. United States Foreign Intelligence Surveillance Act, 50 U.S.C. §1881a(a) (2018) (“[n]otwithstanding any other provision of law, upon the issuance of an order in accordance with subsection (j)(3) or a determination under subsection (c)(2), the Attorney General and the Director of National Intelligence may authorize jointly, for a period of up to 1 year from the effective date of the authorization, the targeting of persons reasonably believed to be located outside the United States to acquire foreign intelligence information”); Canada National Defence Act, R.S.C., 1985, c N-5, s. 273.64 (2)(a) (Can.) (“[a]ctivities carried out under paragraphs (1)(a) and (b); (a) shall not be directed at Canadians or any person in Canada”).

154. Human Rights Comm’n, *Concluding Observations on the Fourth Periodic Report of the United States of America*, ¶ 22(a), U.N. Doc. CCPR /C/USA/CO/4 (Apr. 23, 2014) (affirming that the United States should adopt “measures to ensure that any interference with the right to privacy

amounts of data has indeed contributed to expanding the options for mass surveillance of nationals and foreigners alike.<sup>155</sup>

Surveillance based on new technologies and big data can place state authorities on the top of a digital Panopticon.<sup>156</sup> Individuals seem to know that they might be observed but might not know how exactly and by whom. As in Foucault's model of Panopticon, they are those "[who are] seen, but [do] not see; [who are] the object of information, never a subject in communication."<sup>157</sup> In the digital era, our smallest deeds and gestures can become highly visible and therefore subjected to surveillance. The safeguard of public interests plays a considerable role in limiting the scope of one's rights to privacy and data protection in this digital Panopticon model of state surveillance. For instance, the ECtHR has held that surveillance via GPS and use of the data obtained thereby in criminal proceedings was proportionate to the interests of national security and public safety, the prevention of crime, and the protection of the rights of the victims, as the criminal investigation had concerned "very serious crimes" relating to terrorist activities.<sup>158</sup> The ECtHR also noted that when acting in the interests of national security or for the prevention of serious crimes, state authorities are not expected to exhaustively disclose all the circumstances and conditions in which they can resort to secret surveillance measures.<sup>159</sup>

Clearly, the public interest is not alone sufficient to restrain one's right to the protection of private life and correspondence. Any interference must be "strictly necessary" and proportionate, striking a fair

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complies with the principles of legality, proportionality and necessity regardless of the nationality or location of individuals whose communications are under direct surveillance"). See also PRIVACY AND POWER: A TRANSATLANTIC DIALOGUE IN THE SHADOW OF THE NSA-AFFAIR (Cambridge Univ. Press, Russel A. Miller ed., 2017) (for an insightful discussion of the NSA affair); Davor Jancic, *The Role of the European Parliament and the US Congress in Shaping Transatlantic Relations: TTIP, NSA Surveillance, and CIA Renditions*, 54 J. C. M. S. 896, 903 (2016) (for a discussion about the role of EU institutions in the aftermath of the revelations in the NSA affair).

155. See Bos-Ollermann, *supra* note 85, at 140 (discussing the "bulk collection" of untargeted data in mass surveillance technics); Lyon, *supra* note 85, at 5 (affirming that big data "intensify surveillance by expanding interconnected datasets and analytical tools").

156. The Panopticon, as proposed by Jeremy Bentham, is a circular building structured around a central watch tower from which a watchperson can monitor the individuals placed in cells below her, without being noticed. See 4 JEREMY BENTHAM, WORKS OF JEREMY BENTHAM (John Browning ed. 1843); see also RHEINGOLD HOWARD, THE VIRTUAL COMMUNITY: FINDING CONNECTION IN A COMPUTERIZED WORLD 289 (1994) (introducing the term digital Panopticon).

157. Michel Foucault, *Discipline & Punish: The Birth of the Prison* 200 (Alan Sheridan trans., 1995).

158. *Uzun*, App No. 35623/05, ¶¶ 52, 80.

159. *Kennedy v. United Kingdom*, App No. 26839/05, Eur. Ct. H.R. ¶ 159 (May 18, 2010).

balance between the competing public and private interests at stake.<sup>160</sup> Accordingly, any uses of big data by states for migration management or for the protection of vulnerable migrants should conform to these exigencies, even if state action is motivated by legitimate interests such as public safety or the protection of the rights and freedoms of others.<sup>161</sup> For instance, the protection of vulnerable migrants' personal data and privacy should be taken into account while states put forward efforts to prevent irregular migration and fight human trafficking and people smuggling.<sup>162</sup>

Big data can also have important consequences with respect to horizontal relationships between private parties. Individuals voluntarily consent to the collection, storage, and occasional use of their data by the companies that provide the service they benefit from.<sup>163</sup> Moreover, they voluntarily upload information on social networks such as Facebook, Instagram, YouTube, or Twitter, and they allow mobile applications to track their activities, movements, or even health statuses and sleep patterns. Therefore, non-state actors potentially have access to a goldmine of information about individuals' behavior, including migrants' behavior. This has implications for their expectations as to privacy and data protection. Accordingly, it is necessary to factor non-state actors such as private companies into the equation as well. As Sarah Horowitz correctly observes, "Foucault's model of the Panopticon is more helpful in thinking about state surveillance – which is not voluntary – than it is for thinking about our interactions with private data collection efforts."<sup>164</sup> In this regard, the contemporary digital Panopticon has not one but several watchpersons, pursuing a plurality of objectives not always based on the safeguarding of the public interest.

Consequently, more rigorous control of the use of new technologies in the field of international migration is necessary. The existing legal frameworks should be strengthened to regulate collection, usage, and

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160. See *Klass*, App No. 5029/71, ¶ 42, Eur. Ct. H.R.; Szabó and Vissy, App No. 37138/14, ¶ 73.

161. See ECHR, *supra* note 11, art. 8(2).

162. See G.A. Res. 71/1, *supra* note 72, ¶¶ 23, 35.

163. For an analysis of the issue of consent, see Bart W. Schermer, *The Limits Of Privacy In Automated Profiling and Data Mining*, 27 COMP. L. & SEC. REV. 45, 49 (2011) (explaining that despite giving consent for the processing of personal data, individuals underestimate the risks that certain uses of this data can have, such as in the case of automated profiling); Fred H. Cate & Viktor Mayer-Schonberger, *Notice and Consent in a World of Big Data*, 3 INT'L DATA PRIVACY L. 67, 68 (2013) (discussing the formality of notice and consent in collecting and processing big data).

164. Sarah Horowitz, *Foucault's Panopticon: A Model for NSA Surveillance?*, in PRIVACY AND POWER: A TRANSATLANTIC DIALOGUE IN THE SHADOW OF THE NSA-AFFAIR 39, 62 (Russel A. Miller ed., 2017).

storage of personal data and metadata by state and non-state actors alike.<sup>165</sup> Otherwise, the misuse of such technologies could bring about serious negative outcomes to already vulnerable migrants.

## V. CONCLUSION

As new technologies evolve, they present important challenges and valuable opportunities for states under IHRL. Because the development of new technologies based on big data affects states' capabilities, they can be used as a tool for protection of vulnerable individuals.<sup>166</sup> Firstly, big data analysis can be a helpful asset, informing decision-making processes and possibly contributing to better management of migratory movement and the adoption of sensible policies for reception and integration of migrants and refugees.<sup>167</sup>

Secondly, big data can also play a greater role beyond international migration management, as a tool for the identification of individuals in need of protection, such as migrants at risk of dying at sea and potential victims of ill-treatment and human trafficking.<sup>168</sup> As new technologies evolve and improve state capabilities, the interpretation of what is reasonably expected from states should also evolve. Whereas it is not possible to generally infer that states have a comprehensive obligation to use new technological means to protect migrants' lives and against ill-treatment or human trafficking, state positive obligations under IHRL may encompass such means in specific circumstances, such as in the case of the prevention of migrant deaths at sea.<sup>169</sup>

However, the uses of new technologies based on big data analysis are not without risks. They could be used as an additional tool of control leading to further criminalization of migration and increased risks of refoulement.<sup>170</sup> Moreover, in the wrong hands, behavioral digital data could be used to increase the oppression of already exposed groups of people, amplifying their vulnerability and even preventing them from seeking asylum abroad. Besides, unbridled digital surveillance by public

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165. See Regulation 2016/679 of the European Parliament and of the Council of 27 April 2016 on the Protection of Natural Persons with regard to the Processing of Personal Data and on the Free Movement of Such Data, and Repealing Directive 95/46/EC (General Data Protection Regulation) 2016 O.J. (L. 119) (the EU is pioneering a more restrictive data protection system with the adoption of the new General Data Protection Regulation).

166. See *supra* note 43 (on the concept of vulnerability).

167. See *supra* Section II.

168. See *supra* Sections III.B, III.C.

169. See *supra* Section III.B.

170. See *supra* Section IV.A.

authorities could amount to unjustified interference with the right to the protection of one's private life and correspondence.<sup>171</sup>

Therefore, as new technologies are being developed, they should be regulated by laws and covered by policies at the international level. Data collection, storage, and accessibility of information should be considered and regulated prior to any comprehensive use of behavioral digital data for migration management or protection purposes. States should agree to adopt a rights-based approach in this area. Ideally, that should have been discussed during the negotiations of the Global Compacts on Migration and on Refugees.<sup>172</sup> New technologies and innovation have the potential to be used as a powerful instrument for the protection of migrants' legal rights. However, they can also be used to deny refuge or exclude individuals from protection. Accordingly, they should evolve within the existing legal framework of IHRL.

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171. *See supra* Section IV.B.

172. G.A. Res. 71/1, *supra* note 72, ¶ 21. See also Thomas Gammeltoft-Hansen et al., What is a Compact? Migrants' Rights and State Responsibilities Regarding the Design of the UN Global Compact for Safe, Orderly and Regular Migration, Raoul Wallenberg Inst. Hum. Rts. & Humanitarian L. (2017), [http://rwi.lu.se/app/uploads/2017/10/RWI\\_What-is-a-compact-test\\_101017-senaste-1.pdf](http://rwi.lu.se/app/uploads/2017/10/RWI_What-is-a-compact-test_101017-senaste-1.pdf) (for an analysis of the Global Compact for Safe, Orderly and Regular Migration nature, normativity and relationship with other instruments of international law).