"Face recognition, shoplifting and racial discrimination: A pre-emptive analysis in the Brazilian society"

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Chapter I – Introduction

1.1 Problem Statement

Retailers all over the world suffer from inventory shrinkage because of the action of shoplifters. In some places, such as the US, the UK, and even Russia, retailers are applying technologies to identify individuals entering retail stores while using Artificial Intelligence to compare their faces in a database of "dishonest consumers". In this context, this thesis is a pre-emptive analysis for applying the Artificial Intelligence technologies mentioned above as examples for in-store surveillance in the Brazilian scenario to identify which outcomes could be observed in this country, and which risks would bring for individuals entering the stores in Brazil. Thereafter, analyze whether a data protection impact assessment would be an efficient tool to enforce non-discriminatory measures while using this technology in Brazilian stores.

1.2 Background

Inventory shrinkage which consists of the loss of products related to shoplifting, theft, administrative error, or even employee or supplier fraud, has been a concern for retailers for several years. One of the major challenges for them is to measure the extent of crime they have suffered since they only have access to numbers of shrinkage that include damage caused by non-crime elements.[1] The last report of the National Retail Security Survey indicates that shoplifting is the leading source of inventory shrinkage.[2] Also, the Brazilian Association of Supermarkets – ABRAS publishes every year statistics of inventory shrinkage, and in 2019 the numbers indicate that after the loss of products from operational errors, shoplifters are the second on the list with 17%.[3] The matter extends where honest consumers can also be victims of shoplifters since this practice may result in increased prices through retailers attempting to recover their costs[4]. This means that the potential damage shoplifters generate for retailers is substantial in a way that makes them more willing to prevent this practice since it impacts directly on their profits and their store reputation.

Regarding retailers' willingness to protect their sales from shoplifters, some measures are taken as an attempt to decrease the number of inventory shrinkage by shoplifters. For instance, attaching tags in products, the implementation of cameras CCTV inside the stores, and even believing only in the action of security staff.[5] However, some

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[1] Joshua Bamfield, 'Shrinkage, shoplifting and the cost of retail crime in Europe: a cross-sectional analysis of major retailers in 16 European countries' [2004] International Journal of Retail & Distribution Management Volume 32, p. 235-241.

[2] NRF, 'National Retail Security Survey' [2018]. Available at: https://nrf.com/research/national-retail-security-survey-2018. Accessed 10 Feb. 2021

[3] ABRAS – Brazilian Association of Supermarkets, Available at: https://www.abras.com.br/economia-e-pesquisa/perdas/pesquisa-2020/. Accessed 10 Feb. 2021

[4] Michele Tonglet, 'Consumer misbehaviour: An explanatory study of shoplifting' [2001] Journal of Consumer Behaviour Vol.1, 4, p. 336-354

[5] Vania Ceccato, Rachel Armitage, 'Retail Crime: Aim, Scope, Theoretical Framework and Definitions' [2018] Retail Crime: International Evidence and Prevention, p. 3-31

problems with the implementation costs of tagging[6] and with the monitoring made by the stores' employees impact the effectiveness of these measures. The dependence on the security staff to monitor the CCTV cameras and to decide on who to approach or not is a challenge since discrimination is still a reality in human decision-making. 'Shopping While Black' (SWB)[7] or racial profiling is present in the retail sector all over the world where black people receive different treatment compared to white people.[8]

The prejudice entrenched in the decision-making process of human beings is a challenge since it has a social impact of injustice towards a certain group of people (i.e. black communities). Even unconsciously, envisaged decisions can perpetuate racial discrimination by reaffirming different and inferior treatment to black people. Not different from all over the world, retail stores in Brazil are still considered a place embedded with discriminatory abuses towards black individuals, even though a great part of the population self-report[9] as black.[10] In Brazil, the social categorization of black individuals includes all degrees of black skin color, from the light brown to the darkest one, and they represent the amount of 56,2 % of the total population.[11] Therefore, this is a problem that needs to be tackled, especially when considering in-store surveillance because the effects of discrimination while surveilling stores can affect fundamental guarantees and liberties from black people.

Considering the improvement of technological instruments in conjunction with retailers' willingness to prevent shoplifters from entering their store, the use of technologies based on artificial intelligence are emerging and shaping in-store environments. For instance, retailers in the US are using cameras working with face recognition analysis for in-store surveillance to identify a person whose face is already in a database list of "dishonest customers" compiled by retailers[12] [13]. When identifying a potential suspect, the technology warns the security staff to prevent the suspect customer while he/she is entering the store. Thus, preventing shoplifters or thefts from entering retail stores at the same time as reducing the problem of inventory shrinkage. The use of technology for preventing retail losses is promising according to the Brazilian Association

[6] Joshua Bamfield, 'Electronic Article Surveillance: management learning in curbing theft' [1994] Crime at work: Studies in security and crime prevention, Vol. 1, p. 155-173

[7] Joshua Bamfield, 'Electronic Article Surveillance: management learning in curbing theft' [1994] Crime at work: Studies in security and crime prevention, Vol. 1, p. 155-173

[8] George E. Schreer, Saundra Smith and Kirsten Thomas, '"Shopping While Black": Examining Racial Discrimination in Retail Setting' [2009] Journal of Applied Social Psychology, v. 39, p. 1432-1444.

[9] In Brazil, individuals self-report their skin color depending on which category they believe they belong.

[10] Nathália Afonso, 'Black conscience day: numbers showing racial inequality in Brazil' (Folha de São Paulo: Lupa, 20 November 2019). Available at: https://piaui.folha.uol.com.br/lupa/2019/11/20/consciencia-negra-numeros-brasil/ . Accessed on 19 Feb. 2021

[11] Daniel Silveira, G1, `Com alta crescente de autodeclarados negros e pardos, população branca tem queda de 3% em 8 anos, diz IBGE' (Globo: Economia, 6 May 2020). Available at: https://g1.globo.com/economia/noticia/2020/05/06/com-alta-crescente-de-autodeclarados-pretos-e-pardos-populacao-branca-tem-queda-de-3percent-em-8-anos-diz-ibge.ghtml . Accessed on 23 Oct. 2021.

[12] Leticia Miranda, 'Thousands of stores will soon use facial recognition, and they won't need your consent' [2018] Buzzfeed News, Available at: https://www.buzzfeednews.com/article/leticiamiranda/retail-companies-are-testing-out-facial-recognition-at. Accessed 18 Feb. 2021

[13] The pre-emptive analysis that is taking place in this work is based on a hypothetical idea that retailers in cooperation with police officers would elaborate watchlists with people already convinced of shoplifting and people that have been caught with suspicious behavior inside stores, which are detected by the security staff and shared with police authorities.

of preventing losses.[14] The discussion also involves whether this technology is good for combating losses in the retail sector and whether it wouldn't be so harmful to individuals.

Looking from retailers' lenses, this is a good procedure to catch potential shoplifters and as an outcome reduce problems of inventory shrinking. However, looking from Civil society's lens, this measure may not be the most adequate one regarding issues of inequality.[15] This means, despite problems concerning individuals' privacy, the use of artificial intelligence for recognizing potential shoplifters by matching individuals with a database of "dishonest customers" can be harmful to individuals' fundamental guarantees and freedoms.

This problem can be influenced by four factors that will be explained in detail in the next chapters. The first and the major one is the problem of retailers and public authorities compiling biased watchlists of "dishonest customers". The second one is the infrastructure on how the technology is being developed. The third one is the choice of target of where and who is being surveilled. The fourth one is the training data used to teach the technology how to work. For instance, besides the database where the technology is comparing faces is already biased, the lack of accuracy on the use of such technology can result in misidentification of individuals with black skin color. Therefore, for all the problems discussed in the sequence, the use of technologies based on artificial intelligence can reinforce racial inequality due to potential discrimination according to algorithmic decisions. The problem is treating differently individuals with diverse skin colors, especially in this case that technologies are identifying suspects of a criminal attitude, therefore, an investigation into the nature of this differentiation process is required.[16]

The matter of algorithmic discrimination against black individuals can be related to the methods used by machine learning that can misclassify examples that are only slightly different from the ones from the database[17] regardless of the biased database that they are being compared to. Algorithms are trained and operate in accordance with real-world facts that carry discrimination in their background[18], for this reason, they hold some discriminatory bias in their input. The fact is that discrimination is not only existent when humans have the power of decision, the problem goes further. Meaning that technologies are exacerbating these discriminatory abuses because of the influence of human beings in technologies through the factors above mentioned. In this respect, if detected in the early stages, algorithmic bias in the whole system for identifying shoplifters can be minimized, and this can help enforce non-discrimination measures when using technologies, therefore, easier to protect individuals' fundamental guarantees and liberties.[19]

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[14] Associação Brasileira de Prevenção de Perdas (Abreppe), Available at: https://www.abrappe.com.br/tecnologia-uma-aliada-no-combate-as-perdas-no-varejo/. Accessed 24 Jan. 2022

[15] Solon Barocas, Andrew D. Selbst, 'Big Data's Disparate Impact' [2016] California Law Review, Vol. 104, p.671-677

[16] Laurens Naudts, 'How machine Learning Generates Unfair Inequalities and How Data Protection Instruments May Help Mitigating Them' [2019] Data Protection and Privacy: The Internet of Bodies, p.71-92

[17] Ian J. Goodfellow, Jonathon Shlens & Christian Szegedy, 'Explaining and Harnessing Adversarial Examples' [2015] International Conference on Learning Representations, p. 1

[18] Anupam Chander, 'The Racist Algorithm?' [2017] Michigan Law Review V. 115, p. 1023-1044

[19] Yordanka Ivanova, 'The Data Protection Impact Assessment as a Tool to Enforce Non-Discriminatory AI' [2020] Forthcoming in Springer Proceedings of the Annual Privacy Forum, p.2, Available at: https://ssrn.com/abstract=3584219

Importantly, all decisions, even those made by artificial intelligence – while referring to humans – cannot violate fundamental guarantees and liberties of individuals in their outcome. The Brazilian legislation for the protection of personal data, the "*Lei Geral de Proteção de Dados*" (LGPD), mostly aligned with the General Data Protection Regulation, regulates situations that involve the processing of personal data, including when automated decision making takes place. For instance, in this case, in which retailers aligned with law enforcement authorities are compiling watchlists so the algorithms, using sensitive data (faces features) from customers entering the stores, automate decisions to identify suspects of shoplifting.

This regulation is important because data protection laws impose several principles to be considered when adopting technologies that affect individuals' freedoms and liberties, such as the principles of fairness, transparency, non-discrimination, and others. To demonstrate compliance with all principles stated in data protection laws, it is recommended for controllers to carry out a report on the impact of data protection, hereinafter RIPD, similar to the European data protection impact assessment when regarding high risky operations, which can function as a precautionary measure on enforcing technologies to not discriminate.[20]

Therefore, the concern is whether an RIPD would be feasible or would be sufficient, not only to mitigate risks on individuals' right to privacy but to assure justice on applying technologies based on artificial intelligence for in-store surveillance to prevent shoplifters in the Brazilian landscape.

1.3 Objective and research questions

For the record, the objective of this research is a pre-emptive analysis of the eventual use of Artificial Intelligence in cameras for in-store surveillance in Brazilian retail stores to identify shoplifters, and therefore outline the problems emerging from this practice and provide research to help it not occur.

In-store surveillance has been of high interest for retail stores all over the world, especially as an instrument to prevent shoplifters from causing inventory shrinkage. For this reason, some innovative technologies emerged, such as the use of artificial intelligence to assist in recognizing suspects of shoplifters and identifying suspicious activities from consumers. This is a challenge because the potential of these technologies on automated decision-making of who needs to be approached or not seems to be a great chance for retailers to decrease their inventory shrinkage in respect of shoplifters. Yet, it is important that one cannot overlook its possibility to result in discriminatory decisions, which violate fundamental guarantees and liberties from Brazilian citizens. Not only, but the use of face recognition technologies is amplifying problems of racial discrimination, and this can be harmful to a society like the Brazilian one which has historical racism embedded in it throughout the years. Therefore, this raises the necessity for adopting mechanisms to combat the unregulated use of technologies that are potentializing racism. In this respect, this is a pre-emptive analysis based on whether addressing a data protection impact

[20] Yordanka Ivanova, 'The Data Protection Impact Assessment as a Tool to Enforce Non-Discriminatory AI' [2020] Forthcoming in Springer Proceedings of the Annual Privacy Forum, p.2, Available at: https://ssrn.com/abstract=3584219

assessment, determined by the Brazilian data protection legislation as the *RIPD*, would be a good tool to help avoid discriminatory outcomes in the use of Artificial Intelligence for in-store surveillance to identify and recognize shoplifters in Brazil.

Therefore, this thesis will answer the following **main research question**:

> *What is the potential of an RIPD as a tool to enforce non-discrimination in the use of Artificial Intelligence for in-store surveillance in Brazil?*

To answer this question, several **sub-questions** must be dealt with first:

1. *To what extent can in-store surveillance for identifying shoplifters result in discrimination?*
2. *Are technologies based on Artificial Intelligence good alternatives to humans for in-store surveillance in Brazil?*
3. *What is the potential of an RIPD to mitigate risks and prevent discrimination in the use of Artificial Intelligence for in-store surveillance in Brazil?*

1.4 Significance

The importance to address issues emerging from new technologies comprises the need to ensure that fundamental guarantees and liberties are not being violated. The usage of artificial intelligence by retailers for in-store surveillance to recognize potential suspects of shoplifting, hence, to provide decisions on whether one needs to be approached or not, can harm individuals' rights in a way of misidentification towards one group of people (i.e. black people). This means that the decision made by this technology can result in racial discrimination which is a problem of injustice between different groups of individuals (i.e. blacks and whites)[21]. Therefore, the significance of this research is the pre-emptive analysis on the possibility to invoke the Brazilian data protection law regarding artificial intelligence to protect potential violations for fundamental guarantees and liberties against certain groups of individuals. This is because in Brazil there are a great number of thieves in stores and the percentage of loss of products by shoplifters is high, therefore, resulting in the need for retailers to combat this issue. Furthermore, analyze and tackle the possibility of elaborating a data protection impact assessment to potentially mitigate risks derived from the use of such technology and ensure non-discriminatory decisions

1.5 Preliminary remarks and limitations

[21] The Brazilian population is a mix of races, meaning that you can find white, indigenous, yellow and all the degrees of dark skin color individuals. However, this study is differentiating the population in white and black – the latter been all the degrees of dark skin colors because they are the ones who have been suffering from structural discrimination throughout the years.

The scope of this thesis focuses on the potential for addressing an RIPD to mitigate the risk of discrimination working as a tool to enforce non-discrimination regarding the use of cameras with artificial intelligence for in-store surveillance to identify and recognize shoplifters in the Brazilian landscape. However, this does not mean that is limited to the Brazilian framework. In this case, the EU literature will be used to help develop part of the analysis because both data protection laws from the EU and the Brazilian are similar. Especially because both regulations consider data protection impact assessments highly recommended when using technologies for face recognition because it provides high risks to individual's rights. Moreover, it is better to identify through different populations, as the EU and the Brazilian ones, challenges regarding discrimination since it is an issue that is real in all cultures even when both legal systems enshrine the right of equality as a fundamental right. Hence, this thesis will focus more on legal remarks provided by data protection laws regarding an RIPD in the Brazilian framework as a potential tool to provide justice and mitigate risks for individuals' rights, not extending to criminal observations about the practice of shoplifters.

1.6 Methodology

This thesis is primarily based on doctrinal legal research mainly on the Brazilian legislation, cases, and academic literature on data protection law. Some research will be made on the EU legal system as well, but as an instrument of example to better illustrate the analysis. Also, based on research regarding the particularities of the Artificial Intelligence technology applied in cameras for in-store surveillance and their influence on the modern market to recognize potential suspects of shoplifting in customers entering the stores as well as the challenges it poses from a social justice perspective. Moreover, the existing legal guides on how to address a report on the impact of data protection will be explored and evaluated whether feasible or not to minimize not only risks for black skin individuals' freedoms and liberties but to reduce inequality when using technologies that generate automated decisions.

1.7 Chapter Overview

The thesis is structured in the following way: The first chapter corresponds to the introduction where it explains the context and the background of where the topic is based. The second chapter will analyze the extent that in-store surveillance for identifying shoplifters results in discrimination, this means that here will be addressed problems of racial discrimination that are embedded in society and, especially, in the shopping environment. Afterward, the third chapter analyses how technologies interact with racial discrimination and that human beliefs are influencing technological outcomes to be discriminatory based on four aspects (watchlists, infrastructure, training data, and choice of target). Hence, the fourth chapter will be discussed and determined the potential for addressing a report of impact on data protection (RIPD) to mitigate risks and as a tool to enforce non-discrimination when using cameras with artificial intelligence for in-store surveillance to identify and recognize potential shoplifters in the Brazilian landscape.

Lastly in the fifth chapter, based on the analysis and results of the previous chapters, the conclusion will recapitulate the original conflict and summarize whether is possible and suffice to use an RIPD as a tool to enforce non-discrimination when using cameras with artificial intelligence for in-store surveillance in Brazil.

Chapter II – In-store surveillance and discrimination

2.1 Introduction

To understand to which extent in-store surveillance mechanisms for identifying potential shoplifters can result in discriminatory decisions in Brazil, it is important to establish three elements evolving this discussion. The first element concerns the degree of the use of cameras CCTV for in-store surveillance in Brazil and the impact of the recent implementation of Artificial Intelligence to provide automated decisions when identifying potential shoplifters. The second element entails the influence of the structural racism inside stores in Brazil by addressing the social problems and discrimination entrenched in decision-making processes. Then, the third element involves the discussion about technologies reflecting human bias and how this can be perceived in the Brazilian scenario. Afterward, by analyzing these three elements, raises the question addressed in the following chapter of how technology interacts with discrimination and what are the options for using it in the Brazilian retail sector?

2.2 The problem of shoplifting

A big concern for retailers is the loss of inventory as a consequence of shoplifters in their stores. In Brazil, for instance, the number of products taken by shoplifters in the supermarket sector represented 17% of the total of inventory shrinkage during 2019.[22] This issue impacts directly on retailers' profits, which makes them more willing to avoid shoplifters entering their stores. In this context, retailers have been adopting some measures such as the use of cameras CCTV to prevent inventory shrinkage. With the influence of the technological era, those cameras are being complemented with Artificial Intelligence technologies to generate automated decisions to identify potential shoplifters before they act.

A particular problem in Brazilian society is the great number of people still living in poverty.[23] This increases the number of shoplifters because, in general, the reasoning of shrinkage by thefts in stores relies' on consumers' financial problems and the low risk of

[22] ABRAS – Brazilian Association of Supermarkets, Available at: https://www.abras.com.br/economia-e-pesquisa/perdas/pesquisa-2020/. Accessed 23 Feb. 2021

[23] An estimate of 29,5 % of the Brazilian populations still lives in poverty. Ana Ferraz, ' Poverty rates spike in 24 of Brazil's 27 states' [2021] The Brazilian Report, Available at: https://brazilian.report/liveblog/2021/08/25/poverty-rates-spike-states/ . accessed on 7 March 2022.

being caught.[24] In other words, it's not that poverty generates crime but while individuals are in need of food or some items for living and without the fear of getting caught, they tend to steal or shoplift more and often.[25] This means that with the combination of the great dimension of societal issues with the systemic inefficiencies of combating methods developed by retailers, shoplifters tend to steel items from retail stores with a certain frequency.

The incipient market for in-store surveillance, by relying on outdated methods such as cameras CCTV, increases the willingness of Brazilians' retailers to invest in new technologies for preventing inventory shrinkage, raising a potential wonderland for the use of cameras with face recognition systems. In fact, the Brazilian Association of Electronic Security System Companies (ABESE) released a panoramic research indicating as 45% the expectation of growth for the electronic security sector in 2021.[26] This implies that the Brazilian market desires to develop this sector by implementing innovative instruments for security and surveillance inside stores.

2.3 In-store surveillance

Originally, closed-circuit television (CCTV) is a method of integration of cameras, monitors, and recording systems for image-based surveillance,[27] usually where security staff monitors customers while they are shopping. The expected outcome from this technique depends on two situations: (*i*) the recording of evidence with sufficient quality to further be used in the prosecution procedure; and (*ii*) the incident must have been observed by the security guard either at the time or on tape afterward, so the tapes can be stored and used.[28] This means that the effectiveness of the old CCTV method used to depend on someone monitoring the cameras while time-lapse recording. The problem arouses since usually there used not to be continuous supervision of the cameras by dedicated staff [29], therefore, having this knowledge, shoplifters were endorsing their risk to be captured by the belief that cameras are insufficiently monitored.[30] Another problem was the practice of shoplifters being caught deliberately so they could have access to the footage of his/her offense with detailed information about blind spots and camera

[24] Simone Vencato, Takeyoshi Imasato, 'Prevenção de perdas no varejo: Uma revisão sistemática' [2017] Revista Inteligência Competitiva, p. 188

[25] André Luis Alves de Melo, 'Poverty generates crime?' [2011] Available at: https://amp-pr.jusbrasil.com.br/noticias/2541895/artigo-pobreza-gera-crime-andre-luis-alves-de-melo-promotor-de-justica-em-mg Accessed on 7 march 2022.

[26] Associação Brasileira das Empresas de Sistemas Eletrônicos de Segurança (ABESE), 'Pesquisa Panorama 2020 e Tendências de Mercado para 2021'. Available at: https://materiais.abese.org.br/?_ga=2.232917015.806320797.1622821163-1285451092.1622821163. Accessed on 4 June 2021.

[27] Rodrigo José Firmino, Marta Kanashiro, Fernanda Bruno, Rafael Evangelista & Liliane da Costa Nascimento, 'Fear Security, and the Spread of CCTV in Brazilian Cities: Legislation, Debate, and the Market' (2013) Journal of Urban Technology, 20:3, 65-84, p. 77

[28] Martin Gill, Vicky Turbin, 'Evaluating "Realistic Evaluation": Evidence from a study of CCTV' [1999] Crime Prevention Studies, volume 10, p. 179-199

[29] Clive Norris, Mike McCahill, David Wood, 'Editorial. The Growth of CCTV: a global perspective on the international diffusion of video surveillance in publicly accessible space' [2004] Surveillance & Society, p. 110-135

[30] Nicole Lasky, Bonnie Fisher, Scott Jacques, '"Thinking thief" in the Crime Prevention Arms Race: Lessons Learned from Shoplifters' [2017] Security Journal, v.30, n. 3, p. 772-792

positioning in the store enabling them to know about this overseen method.[31] With this information, they used to share the details with other shoplifters, so they could steal merchandise without alarming the security staff. Therefore, retailers' confidence that CCTV is a good method for in-store surveillance was a fact rather than its effectiveness was demonstrated[32], since there was no concrete evidence that it used to provide a significant decrease in shoplifting.

As an alternative for the original and outdated in-store surveillance, some retailers around the world (in the US, in the UK, and Russia for instance) have been implementing Artificial Intelligence technologies in surveillance cameras to achieve more accuracy in identifying shoplifters. In this way, they work as machine learning software to identify and recognize the faces of customers while entering the stores by comparing the images with a database of "dishonest customers" compiled by the retailer.[33] When matching, the technology sends an alert for the security staff to proceed with the investigation of that customer. Some examples of such technologies are the FaceWatch software developed by a UK company assuring that this technology reduces lost revenue.[34] Another example is the north-American software Face First that instantly identifies known threats with face recognition surveillance.[35] One more example, which works similarly to the previous ones, is the Russian technology called FindFace that promises an average of 75% reduction of losses by shoplifters.[36]

The prominent outcome from these technologies opens a great opportunity for Brazilian retailers to invest in cameras with Artificial Intelligence to prevent shoplifting in their stores. This is because the autonomy of automated cameras substitutes human monitoring, reducing the necessity of security staff to analyze whether one customer's behavior is suspect or not and, also, blind spots, where shoplifters can act without being noticed, are not a problem anymore given the fact that Artificial Intelligence identifies customers' facial features as soon as they enter the store. In this way, automated decision-making decreases the direct influence of human control on catching shoplifters and consequently theoretically reduces vulnerabilities on preventing inventory shrinkage because of the weakened human errors existing in outdated methods for store surveillance.

As a pre-emptive analysis of the use of this technology in Brazil, it is necessary to emphasize that notwithstanding the beneficial aspects for retailers by using automated cameras for in-store surveillance in the Brazilian scenario, some issues need to be addressed concerning these algorithmic decisions. To substitute humans' work on identifying potential shoplifters, those technologies are designed to generate meaningful decisions that can perpetuate the existing discrimination on people's experience in stores.

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[31] James Hunter, Laura Garius, Paul Hamilton, and Azrini Wahidin, 'Who Steals from Shops, and Why? A Case Study of Prolific Shop Theft Offenders' [2018] Retail Crime: International Evidence and Prevention, p. 71-97

[32] Adrian Beck, Andrew Willis, 'Context-specific measures of CCTV effectiveness in the retail sector' [1999] Crime Prevention Studies, volume 10, pp. 251-269

[33] Letícia Miranda, 'Thousands of Stores Will Soon Use Facial Recognition, And They Won't Need Your Consent' (BuzzFeed News: 17 August 2018). Available at: https://www.buzzfeednews.com/article/leticiamiranda/retail-companies-are-testing-out-facial-recognition-at. Accessed on 6 June 2021.

[34] FaceWatch, Available at: https://www.facewatch.co.uk/facial-recognition-for-retail-sector/ . Acessed on 8 August 2021

[35] Face First, Retail Face Recognition. Available at: https://www.facefirst.com/industry/retail-face-recognition/ . Accessed on 6 June 2021.

[36] FindFace, Available at: https://ntechlab.com/solution/retail/ . Accessed on 4 June 2021

This is because technologies are programmed by humans and learn to make decisions based on training data, which reflect social inequalities.[37] By this means, the use of automated cameras for in-store surveillance in Brazil could be a challenge from a sociotechnical perspective.

2.4 The Brazilian in-store discrimination

2.4.1 Structural racism

Considering that racial discrimination is a worldwide problem, is important to remark that in Brazil this issue is still highly existent even though the amount of self-report black people represent 56,10% of the population.[38] This means that, besides the great number of black people within the population, Brazil remains one of the most unequal countries in the world.[39] More specifically, this is perceived in such a way that darker skin tones, lower household wealth, and women are more likely to experience discriminatory treatment based on their skin color, financial situation, and gender.[40] Still, the disproportional and unequal treatment of "nonwhite" people in Brazil is not independent of their status in the society,[41] in the sense that black and white populations perceive different opportunities.

This has its origins in Brazilian history, where negative impacts of inequality are highly experienced by Black Brazilians[42] since the early period of colonization. A period when Europeans, mostly Portuguese immigrants, had Africans and Indigenous as their slaves.[43] Furthermore, because of the abolition in the late stages, i.e. in the 19th century, slavery had a huge impact on the culture and development of Brazilian society. Reflections can be seen in the socio-economical structure based on income, education, and regional differentials, where white people have been experiencing the best opportunities in consequence of their preconceived better financial wealth. Yet, differences are embedded in the society since early times and still influences dividing the population where black people are more likely to be the focus of law enforcement and suspicion of criminality, in contrary to white people seen as with good financial stability.

Recent cases demonstrate the difficulty of combating the prejudice against black people in the Brazilian culture. For instance, the eve of Black Consciousness Day of 2020 was marked with an occasion where two private guards punched the face of a 40-year-old

[37] James Manyika, Jake Silberg, and Brittany Presten, 'What Do We Do About the Biases in AI?' (Harvard Business Review, 25 October 2019). Available at: https://hbr.org/2019/10/what-do-we-do-about-the-biases-in-ai . Accessed on 5 April 2021

[38] Nathália Afonso, 'Black conscience day: numbers showing racial inequality in Brazil' (Folha de São Paulo: Lupa, 20 November 2019). Available at: https://piaui.folha.uol.com.br/lupa/2019/11/20/consciencia-negra-numeros-brasil/ . Accessed on 7 March 2021

[39] Matthew L. Layton, Amy Erica Smith, 'Is it Race, Class, or Gender? The Sources of Perceived Discrimination in Brazil' [2017] Latin American politics and society, v. 59, n.1, p. 52-73

[40] Matthew L. Layton, Amy Erica Smith, 'Is it Race, Class, or Gender? The Sources of Perceived Discrimination in Brazil' [2017] Latin American politics and society, v. 59, n.1, p. 52-73

[41] Stanley R. Bailey, Mara Loveman, Jeronimo O. Muniz, 'Measures of "Race" and the analysis of racial inequality in Brazil' [2013] Social Science Research 42, p. 108

[42] Rafael Guerreiro Osório, 'Is all socioeconomic inequality among racial groups in Brazil caused by racial discrimination?' [2008] International Poverty Center, Working Paper N. 43, p.2

[43] Rafael Guerreiro Osório, 'Is all socioeconomic inequality among racial groups in Brazil caused by racial discrimination?' [2008] International Poverty Center, Working Paper N. 43, p.5

black man until his death in the surroundings of a supermarket in Porto Alegre, Brazil.[44] This case encouraged Brazilian protestors to strengthen the movement "Black Lives Matter" that has been shouted all over the world for the protection of black people from discriminatory treatment. This represents the increasing willingness to pursue the enforcement of equality by chasing responses to confront discriminatory treatment that still torments a significant part of the Brazilian population.

2.4.2 In-store discrimination

Despite the attempt of reaching equality all over the world, it is widely known that discrimination still affects black people's lives. The idea of racial profiling or 'Shopping While Black' (SWB)[45] is linked with the different treatment towards black people inside stores. This can be seen in the retail sector where black people are denied service, ignored, or even can be more surveilled than white people.[46] Also, it is a reality that some staff is trained to "shadow" black people inside stores as a precaution for shoplifting[47], making them feel more uncomfortable and outraged. The matter is, sometimes consumers' behavior may not be the main reason for approaching black people, but simply the fact that they usually draw more attention from the security staff. [48] This means that they are more likely to be "caught" in bad behavior than white people because they are over surveilled.

This is no different in Brazil. There are several cases where Black people are being incriminated erroneously for stealing products from stores, and this represents once more the discriminatory abuse in this society. For instance, a mother and her daughter were wrongly accused of shoplifting by an employee from a clothes store located in a shopping mall in Rio de Janeiro, Brazil. The staff approached the mother by accusing her of stealing a product from the store without any proof, which took the case to the Criminal Court.[49] Another example of racism occurred in the northern zone of Rio de Janeiro where an 11-year-old girl was forced to prove that she hadn't stolen any product of the establishment. This is an emblematic case because the employee declared that she aroused suspicion in the young girl because of her skin color and curly hair.[50] One more example of racial discrimination took place in a retail store in São Paulo where a black woman was a victim of racism because the security staff accused her of stealing a piece of cloth from the store.

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[44] BBC, 'Killing of black man by guards at Brazil supermarket sparks protests' (BBC News, 20 November 2020). Available at: https://www.bbc.com/news/world-latin-america-55020915. Accessed on 9 March 2021

[45] Shaun L. Gabbidon, 'Racial Profiling by Store Clerks and Security Personnel in Retail Establishments' [2003] Journal of Contemporary Criminal Justice, Vol. 19, N. 3, p. 345-364

[46] George E. Schreer, Saundra Smith and Kirsten Thomas, '"Shopping While Black": Examining Racial Discrimination in Retail Setting' [2009] Journal of Applied Social Psychology, v. 39, p. 1432-1444.

[47] Jerome D. Williams, Geraldine R. Henderson, Anne-Marie Harris, 'Consumer Racial Profiling: Bigotry Goes to Market' [2001] The New Crisis, November/December 2001, p. 22-24

[48] Dean A. Dabney, Richard C. Hollinger, Laura Dugan, 'Who actually steals? A study of covertly observed shoplifters' [2004] Justice Quarterly, Vol. 21, n. 4, p. 693-728

[49] Marques Travae, 'Black skin and suspicion: Mother and daughter accused of shoplifting in Rio mall; search proves negative' (Black Brazil Today, 15 August 2014). Availabe at: < https://blackbraziltoday.com/mother-and-daughter-accused-of-shoplifting-in-rio/> . Accessed on 9 March 2021

[50] Marques Travae, 'Suspicious of shoplifting: Shopping While Black/ 11-year old black girl' (Black Brazil Today, 17 October 2020). Available at: https://blackbraziltoday.com/suspicious-of-shoplifting-shopping-while-black-11-year-old-black-girl/ . Accessed on 9 March 2021

Even though she had a receipt proving that she had bought the product, the store staff called the police to investigate the case.[51]

Those cases illustrate the evidence of racial profiling when surveilling Brazilian stores, where black people are constantly accused of being shoplifters because of their appearance. The different treatment perceived by black people is a consequence of the prejudice in the staff decision-making. When deciding on whether who approaches or even who surveils it is usually towards black people because of their prejudicial association with criminality, which represents the discrimination entrenched in the culture. In the same way that humans' decisions involve bias, the use of Artificial Intelligence for in-store surveillance may be biased too. Therefore, arises the question of which option is apparently "less" discriminatory, while efficient, for in-store surveillance purposes.

2.5 Discriminatory decision-making

2.5.1 Human bias

There is a challenge regarding the security staffs' duty to decide whether is necessary to approach or not a particular consumer. The issue involves the existing prejudice embedded in retail culture, meaning that it is for utmost attention on which basis staff is relying on for such intervention. Importantly, the necessity of catching shoplifters cannot overcome the prevalence of justice in decision-making, contrary to the old-fashioned anti-theft practices that are used often in the retail industry that has been leading to serious allegations of consumer racial profiling.[52] One can argue that some accusations are because of human error, however, the coincidence is when the mistake is directed towards racial decisions without evidence. In fact, the association of blackness with criminality means that black people are subject to added policing.[53] Consequently, they develop negative emotions because they turn out to be victims of racial profiling[54] with unequal treatment.

Furthermore, it is important to remark that discrimination may not be easily identified. Racial inequalities can be implicit and, usually, they are manifest in subtle behaviors or interactions that are difficult for respondents to consciously control.[55] Implicit prejudice turns into a major problem since unconsciousness blinds individuals to whatever restriction or limitation they have. This is because conclusions about individuals are taken

[51] Centro de Informações sobre Empresas e Direito Humanos, 'Brasil: Mulher denuncia racismo em loja da C&A em São Paulo, empresa se desculpa e afirma não tolerar discriminação e nem preconceito' (4 November 2019). Available at: https://www.business-humanrights.org/pt/%C3%BAltimas-not%C3%ADcias/brasil-mulher-denuncia-racismo-em-loja-da-ca-em-s%C3%A3o-paulo-empresa-se-desculpa-e-afirma-n%C3%A3o-tolerar-discrimina%C3%A7%C3%A3o-e-nem-preconceito/ . Accessed on 9 March 2021

[52] George E. Schreer, Saundra Smith and Kirsten Thomas, '"Shopping While Black": Examining Racial Discrimination in a Retail Setting' [2009] Journal of Applied Social Psychology, v. 39, p. 1432-1444.

[53] Cassi Pittman, '"Shopping while Black": Black consumers' management of racial stigma and racial profiling in retail settings' [2020] Journal of Consumer Culture, Vol. 20 (1), p. 9

[54] George E. Higgens and Shaun L. Gabbidon, 'Perceptions of Consumer Racial Profiling and Negative Emotions: An Exploratory Study' [2009] Criminal Justice and Behavior, v. 36, p. 77-88

[55] Lincoln Quillian, 'Does Unconscious Racism Exist?' [2008] Social Psychology Quarterly, Vol. 71, N. 1, p. 9

in the face of uncertainty[56], thereby mining their decision-making without evidence. This applies to retail stores where human beings dressed up as security staff are responsible for making decisions whether to approach a particular customer or not. As illustrated, racial prejudice inside stores is a reality, especially on targeting individuals suspect of shoplifters because it turns impossible to separate the prejudice embedded in society from human decision-making.

The presence of bias in decision-making is a great problem and it can result in misjudgments. When a decision is influenced by institutionalized patterns of cultural value that establish some actors as inferior, this may signify misrecognition or status subordination.[57] The matter states where this discriminatory idea can find perpetuated in the decision-making generating outcomes that can be prejudicial for a particular social group. Whereby there is human subjectivity, it is possible to assume that in the process of decision-making there are irregularities, meaning that they usually carry some misjudgment particularly inclined to racially discriminate.

2.5.2 Does AI reflect or/and exacerbate human bias?

Relying on Artificial Intelligence technologies, meaningful outcomes become risky because racist beliefs reverberated in societies may be replicated and reinforced by algorithms and their features. In addition to the fact that the watchlists in which the technology is used as a comparable database are biased, the automated discrimination impacts disproportionally on vulnerable communities in the society, especially the ones in the intersection with economic and social marginalization.[58] For instance, the use of cameras with Artificial Intelligence to recognize people's faces may contribute to perpetuating pre-existent racial patterns regarding various pathways i.e. Black people can be overrepresented in many criminal databases faces.[59] This is one example that indicates that the consequence of human feeding databases with a specific pattern induces technologies to replicate undesired human bias.

Furthermore, besides humans feeding the databases of watchlists in different proportions for the varieties of skin color individuals in a society, there is the technology treating different black and white individuals because of their physical features and skin color. This represents a reduction of a person's identity to her body or physical features.[60] Also, there is evidence that social cognition relies on preconceived notions about how particular groups behave[61] in the same way that security officers tend to over surveil people based on their stereotypes. In this sense, the training data must be well controlled to avoid

[56] Hal R. Arkes and Philip E. Tetlock, 'Attributions of Implicit Prejudice, or "Would Jesse Jackson 'Fail' the Implicit Association Test?"' [2004] Psychological Inquiry, Vol. 15, N. 4, p. 257-278
[57] Nancy Fraser, 'Recognition without Ethics?' [2001] Theory, Culture & Society, Vol. 18, p. 21-42
[58] Dr. Seeta Peña Gangadharan and Dr. Jedrzej Niklas, 'Between Antidiscrimination and Data: Understanding Human Rights Discourse on Automated Discrimination in Europe' [2018] London School of Economics and Political Science, P.4
[59] Fabio Bacchini and Ludovica Lorusso, 'Race, again: how face recognition technology reinforces racial discrimination' [2019] Journal of Information, Communication and Ethics in Society, Vol. 17, No. 3, p. 326
[60] Fabio Bacchini and Ludovica Lorusso, 'Race, again: how face recognition technology reinforces racial discrimination' [2019] Journal of Information, Communication and Ethics in Society, Vol. 17, No. 3, p. 328
[61] Dean A. Dabney, Laura Dugan, Volkan Topalli, Richard C. Hollinger, 'The impact of implicit stereotyping on offender profiling: Unexpected Results from an Observational Study of Shoplifting' [2006] Criminal Justice and Behavior, Vol. 33, n. 5, P.652

misconceptions of individuals as an attempt to separate discrimination from automated decisions. However, this is an impossible task because one cannot decline humans' subjectivity in automated decision-making mechanisms since they imitate human mindsets.

In reality, the use of Artificial Intelligence technologies to identify shoplifters can be a failure from a social point of view because the intention to decrease discrimination on catching shoplifters may be a challenge for technological outcomes since they can reflect and exacerbate racial discrimination. Regarding Brazilian structural discrimination, the problem of reflecting and exacerbating human bias turns to be even wider due to the historical racial prejudice and constant intent for combating it. Thus, one may argue that there is not an overall benefit for using technologies instead of human judgment for a decision-making process where it is identified potential suspects of shoplifting.

Therefore, the use of automated decisions in substitution of security staffs' decisions for preventing shoplifters still reflects and exacerbates humans' discrimination. On one point, the problem originates from the biased watchlists that individuals elaborate. In this hypothetical case, there would probably exist an Association with retailers and police officers to elaborate a list of individuals already convinced of shoplifting or having suspicious behavior identified by the store's security staff and shared with the police.

Even with the cooperation of public authorities such as police officers which were supposed to make it more equal, there are inequalities in the lists since there is evidence that criminal databases carry more black skin color than white skin color individuals. On the other point, the problem exacerbates while technologies may still replicate discrimination because of some factors, such as the way they are designed, how they are trained, and where and to which population they are applied to.

Nevertheless, at the same time as instruments that work with Artificial Intelligence to make decisions are fed with data by humans and can generate discriminatory decisions, it is possible that the technology can be designed in a way to not reflect humans' prejudice on a large scale. For instance, affirmative actions for including minorities in the design of technologies may be a path for achieving a more equal environment.[62] Indeed, this can be a solution but there will still be missed envisaged outcomes that cannot be audited if individuals do not know what particular issue they are looking for.[63] For instance, if they do not notice that the problem starts in the biased watchlists, this can happen because it is hard to decipher where are the roots of racial discrimination in a system where individuals and technologies are working together. The problem is deeper than it is expected. Therefore, given the Brazilian scenario of structural racism and that there is no doubt that technologies reflect human bias, to which extent this technology interacts with discrimination? Is it the situation where the technology amplifies the problem of discrimination rather than decreases racial inequality?

2.6 Conclusion

[62] D.E Wittkower, 'Technology and Discrimination' [2018] Spaces for the Future: A Companion to Philosophy and Technology, p. 45

[63] Emily M Bender, Angelina McMillan-Major, Timnit Gebru, Shmargaret Shitchell, 'On the Dangers of Stochastic Parrots: Can Language Models Be Too Big?' [2021] InConference on Fairness, Accountability, and Transparency (FAccT' 21), March 3-10, 2021, Virtual Event, Canada. ACM, New York, NY, USA, p. 615

Overall, the use of CCTV as an old-fashioned way for in-store surveillance does not represent the modern world where we have technologies that can identify shoplifters on a large scale and faster than humans, such as the use of Artificial Intelligence to identify and recognize potential suspects. However, when considering Brazilian society, it is important to remark on the problems of racial inequality embedded in the population throughout the years. In this way, either with human monitoring cameras or technologies automating decisions to identify suspects of shoplifting, it will be possible to find judgmental errors leading to racial discrimination. This means that the reflection of human bias in technologies is a challenge from a socio-technical perspective. In this regard, it is important to analyze the way technologies interact with discrimination and to identify whether it exacerbates or helps discriminatory practices to determine a better solution for less discrimination for the purpose of in-store surveillance mechanisms in Brazil.

Chapter III – How technology interacts with discrimination

3.1 Introduction

After determining to which extent in-store surveillance is being conducted in Brazil and that existing technologies and human approaches are operationalizing racism, the discussion in this chapter is to establish the way Artificial Intelligence interacts with discrimination in the Brazilian scenario. The focus is to address the extent to which this technology amplifies racial inequality and the grounds that it occurs. Finally, evaluate if using Artificial Intelligence is a good opportunity to make in-store surveillance more effective in a faster way than relying on human decision-making. Therefore, in the next chapter, analyze a solution based on data protection regulations to enforce non-discriminatory practices for using Artificial Intelligence for in-store surveillance.

3.2 The inseparable relation of discrimination and technologies

The implementation of Artificial Intelligence in cameras for in-store surveillance is an important development for the retail sector. This consists of computer vision technology that is known for great accuracy because they work with face recognition algorithms based on Convolutional Neural Networks (CNN)[64] that are composed of a lot of layers. This system learns from training data how to detect and identify faces while their algorithms compare them in a database of "dishonest customers" – a watchlist compiled by retailers and police officers. This cooperation would probably be based on an Association in which retailers and police officers elaborate a list of shoplifters already convinced of shoplifting and/or with suspicious behavior identified by the store's security staff and shared with the police.

In this context, this software is of great advantage because it generates complex decisions such as detecting and identifying faces of customers in a distance that are flagged

[64] Rajeev Ranjan, Vishal M. Patel and Rama Chellappa, 'HyperFace: A Deep Multi-task Learning Framework for Face Detection, Landmark Localization, Pose Estimation, and Gender Recognition' [2016] IEEE Transactions on pattern analysis and machine intelligence, vol. XX, n. XX

as suspects of shoplifting in this watchlist. Then, the system gives a sign for the store staff so they can approach the customer to avoid his/her shoplifting.

One of the challenges of relying on technologies to automate processes is that they carry human beliefs in their outcomes. In other words, they reflect humans' prejudices in an automated way, therefore, potentially amplifying these problems. For instance, face recognition technologies are being influenced by the other-race-effect which is a phenomenon of discrimination against the ones that are not in charge of the technology.[65] This means, while technologies nowadays are being developed by white engineers, the other race – black people – are suffering from discriminatory outcomes because these technologies are being developed to work well in white people. This is explained by various factors that will be described further, but in a nutshell, they are the data on people compiled by the retailers, the infrastructure of the technology, the choice of target of where and in which population applies this particular technology and the biased data used for training the technology.

This is a problem, especially in the Brazilian society where the society is heterogeneous while composed of different people from all over the world that came to colonize this country. Not only from the beginning of the popularization, but society is constantly changing and developing different facial characteristics within the population, which makes it more and more difficult for technologies to follow up these modifications on the culture and people attributes.

Therefore, relying on algorithmic decision-making for surveillance purposes is problematic from a socio-technical point of view. The issue is stated in the fact that technologies are non-neutral[66] because they replicate the values embedded in the environment where they are inserted and that they are not able to follow some changes within a society. More specifically, relying on algorithms to identify individuals in a database of "dishonest customers", if applied in Brazilian stores, is deemed to perpetuate the structural racism existing in the society. Thus, four factors are influencing the technology which makes it inherently biased, they are the data on people compiled by the retailers, the infrastructure of the technology, the training data that is being used, and the choice of target.

3.2.1 Watchlist

The watchlists of dishonest suspects are the origin of the discrimination problem while technologies are interacting with individuals in this particular case. This is because the watchlists are the ones compiled by retailers in cooperation with police officers that contain faces of shoplifting suspects that have already been convinced of shoplifting or at least, were detected by the security staff as suspects because of his/ behavior in that store. This list must be compiled in cooperation with police authorities by demand of the second paragraph of article 4 of the LGPD.

[65] P. Jonathon Phillips, Fang Jiang, Abhijit Narvekar, Julianne Ayyad, Alice J. O'Toole, 'An Other-Race Effect for Face Recognition Algorithms' [2011] ACM Transactions on Applied Perception (TAP), v.8, n.2, p. 2

[66] Brendt Daniel Mittelstadt, Patrik Allo, Mariarosaria Taddeo, Sandra Watcher and Luciano Floridi, 'The ethics of algorithms: Mapping the debate' [2016] Big Data & Society v.3, n. 2

Given that individuals elaborate on these lists, the probability of being disproportionate regarding the variety of individuals within a society is high. Especially, when considering that people, historically, tend to be racist. Not only racists but in a database of criminals in Brazil is likely to have more black skin than white skin color individuals, whereby, statistics show the proportion for 3 individuals being arrested in Brazil, 2 of them are black skin, color individuals.[67] This demonstrates that it is right to say that the database of criminals is following this information, therefore, there are more black than white skin color individuals in those suspect lists.

This results in the creation of racially biased watchlists. While being unjustifiably investigated by security officers, black people are disproportionately included in databases of criminal suspects.[68] The consequences affect the algorithmic decision-making where the technology only recognizes as suspects individuals that are in the database of "dishonest customers", in this way, black individuals are more often found as a match for given suspects.[69] Consequently, decision-making is deemed to be discriminatory towards black individuals while technologies recognize people of color in the majority as suspects.

This means that there is no way of having non-discriminatory outcomes in automated decision-making if the source is biased. The way the watchlists of potential shoplifters are compiled is the start for envisaging the result. All the other factors discussed below in addition to the biased watchlist contribute to exacerbating discrimination in society.

3.2.2 Infrastructure

This technology is based on face recognition algorithms used to verify and identify individuals' identities by processing a video frame in which individuals' faces are visible.[70] This system learns some patterns on how to detect individuals' faces to check if they match with existing ones in a database compiled by the retailer. In this way, the software works through four steps.[71] Firstly, it detects and recognizes humans' faces – either in a crowd or alone – from customers while entering the store. Secondly, it analyses facial features' such as the dimensions of their eyes, nose, and mouth.[72] Thirdly, the algorithm converts the image of customers' faces into data, thus, becoming numbers in the application database.[73]

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[67] Cíntia Acayaba e Thiago Reis, 'Proporções de negros nas prisões cresce 14% em 15 anos, enquanto a de brancos cai 19%, mostra Anuário de Segurança Pública' (Globo.com, 19 October 2020). Available at: https://g1.globo.com/sp/sao-paulo/noticia/2020/10/19/em-15-anos-proporcao-de-negros-nas-prisoes-aumenta-14percent-ja-a-de-brancos-diminui-19percent-mostra-anuario-de-seguranca-publica.ghtml . Accessed on 26 Nov. 2021

[68] Fabio Bacchini, Ludovica Lorusso, 'Race, again: how face recognition technology reinforces racial discrimination' [2019] Journal of Information, Communication and Ethics in Society, P. 324

[69] Fabio Bacchini, Ludovica Lorusso, 'Race, again: how face recognition technology reinforces racial discrimination' [2019] Journal of Information, Communication and Ethics in Society, P. 324

[70] RecFaces, 'How Facial Recognition Works: Technology Explained in Detail' (27 October 2020), Available at: https://recfaces.com/articles/how-facial-recognition-works . Accessed on 19 Aug. 2021

[71] RecFaces, 'How Facial Recognition Works: Technology Explained in Detail' (27 October 2020), Available at: https://recfaces.com/articles/how-facial-recognition-works . Accessed on 19 Aug. 2021

[72] Patrik Kamencay, Miroslav Benco, Tomas Mizdos, Roman Radil, 'A New Method for Facial Recognition Using Convolutional Neural Network' [2017] Digital Image Processing and Computer Graphics, v. 15, n. 4, p.663

[73] RecFaces, 'How Facial Recognition Works: Technology Explained in Detail' (27 October 2020), Available at: https://recfaces.com/articles/how-facial-recognition-works . Accessed on 19 Aug. 2021

Fourthly, the system verifies whether this data matches with existing data in the database of "dishonest customers", therefore, related to a suspicious of shoplifting.

To achieve a great level of accuracy in this process, the contrast of facial traces needs to be clear and identifiable by the machine. The lack of luminosity is one problem when analyzing facial features because it is harder for the machine to identify the contrasts in the analyzed object.[74] In the same way, several researchers evidenced that face recognition technologies have difficulties in analyzing the color contrast that characterizes facial features in dark skin color individuals.[75] Indeed, a research conducted by MIT about facial recognition technologies indicated that the IBM system achieved a bad classification of accuracy on darker subjects with a rate of 22.4%, almost 7 times higher than the error rate in lighter subjects.[76] Therefore, these machines are programmed to work well only with white people's faces, which generates a great disparity between groups of people. This can also complement the well-known "Shopping While Black" movement, which describes situations where black people are more surveilled in stores than white people.

The main reason for this faulty infrastructure is probably determined by the encoded part of the technology. The other-race-effect is reflected by technologies code where mostly white engineers are dominating development sectors of face recognition algorithms, whereby producing racially-biased technologies in their construction and training.[77] In this context, codes are generated to focus on white faces while tested on white subjects and trained on data sets mostly composed of white peoples' faces.[78] Therefore, the problem of lack of accuracy in machines that recognize faces begins in the constructing codes and black skin individuals are being affected by this practice.

While not being able to accurately identify facial features dimensions in black skin individuals, machines are deemed to produce erroneous decisions related to this group, especially the ones that are introduced for in-store surveillance given the historical racial discrimination and the four factors involving the use of technologies that are being delved in this thesis. The consequences of the mentioned lack of accuracy for black people are the perpetuation of historical different treatment against them. This can lead to false positives and misidentification of individuals because of their skin color. For instance, this occurred in Rio de Janeiro when a woman of color was misidentified and arrested erroneously because the surveillance camera tagged her as a police fugitive.[79] Not only referred to black people but also black women are the most affected by discrimination through technologies since they are the minority of representation on the engineering and development of

[74] A.R. Syafeeza, M. Khalil-Hani, S.S. Liew, R. Bakhteri, 'Convolutional Neural Network for Face Recognition with Pose and Illumination Variation' [2014] International Journal of Engineering and Technology, vol. 6, n. 1

[75] Fabio Bacchini, Ludovica Lorusso, 'Race, again: how face recognition technology reinforces racial discrimination' [2019] Journal of Information, Communication and Ethics in Society, p.325

[76] Joy Buolamwini, Timnit Gebru, 'Gender Shades: Intersectional Accuracy Disparities in Commercial Gender Classification' [2018] Conference on Fairness, Accountability, and Transparency, p.10

[77] Fabio Bacchini, Ludovica Lorusso, 'Race, again: how face recognition technology reinforces racial discrimination' [2019] Journal of Information, Communication and Ethics in Society, p.325

[78] Fabio Bacchini, Ludovica Lorusso, 'Race, again: how face recognition technology reinforces racial discrimination' [2019] Journal of Information, Communication and Ethics in Society, p.325

[79] 'Sistema de reconhecimento facial da PM do RJ falha, e mulher é detida por engano' (Globo G1, 11 July 2019). Available at: https://g1.globo.com/rj/rio-de-janeiro/noticia/2019/07/11/sistema-de-reconhecimento-facial-da-pm-do-rj-falha-e-mulher-e-detida-por-engano.ghtml . Accessed on 23 June 2021

technologies.[80] Therefore, the social impact of this practice makes black women more insecure when entering environments with camera surveillance, while white people feel more secure because they know that their chance of being misidentified is very low. Thereby, this poses a threat to civil liberties for black skin individuals,[81] especially for black women.

Regardless of biased codes, when machines' assessment remains outside of the system's capability, the assistance of a human in the loop is necessary.[82] In this case, humans can work as reviewers to double-check when the machine is limited on identifying darker skin individuals is essential.[83] In this way, humans working with technologies may be a good opportunity to avoid bias instead of neglecting them when only using technologies without intervention and proper regulation.

Therefore, the application of technologies with encoded bias in the Brazilian context is risky. This means that combining the great number of darker skin individuals with the inaccuracy on identifying them is a certain way that would result in discrimination being reinforced. The problem of discrimination tends to perpetuate since machines have their own bias while not being able to identify dark skin individuals. Additionally, while the Brazilian society is composed of a large number of black people, a great number of individuals will likely be over surveilled because of the biased database and, therefore, the number of misidentifications would increase. Eventually, the consequences of disparities could be larger than relying on human decision-making.

3.2.3 Training Data

The importance of the training data is in the fact that the outputs produced by the analysis of facial features are "taught" by the training and evaluation data.[84] In the context of face recognition technologies, machines usually use training data based on a pre-existent dataset of faces developed by some institution. The Brazilian face database used in the research field is the FEI face database created by the Artificial Intelligence Laboratory of FEI in São Bernardo do Campo, São Paulo, Brazil.[85] This database consists of approximately 2800 images of 200 individuals' faces collected between June 2005 and March 2006 – they are faces of students and staff of FEI between 19 and 40 years old and they have a distinct appearance.

Besides trying to effectively cover all the distinct facial characteristics in Brazilian society, it is impossible given the constant changes and heterogeneity within this particular

[80] Joy Buolamwini, Timnit Gebru, 'Gender Shades: Intersectional Accuracy Disparities in Commercial Gender Classification' [2018] Conference on Fairness, Accountability, and Transparency, p.8
[81] Joy Buolamwini, Timnit Gebru, 'Gender Shades: Intersectional Accuracy Disparities in Commercial Gender Classification' [2018] Conference on Fairness, Accountability, and Transparency, p.2
[82] Harry Surden, 'Artificial Intelligence and the Law: An Overview' [2019] Georgia State University Law Review, v. 35, i. 4, p.1320
[83] Fabio Bacchini, Ludovica Lorusso, 'Race, again: how face recognition technology reinforces racial discrimination' [2019] Journal of Information, Communication and Ethics in Society, p. 325
[84] Morgan Klaus Scheuerman, Kandrea Wade, Caitlin Lustig, Jed R. Brubaker, 'How We've Taught Algorithms to See Identity: Constructing Race and Gender in Image Databases for Facial Analysis' [2020] Proceedings of ACM on Human-Computer Interaction, Vol. 4, CSCW1, 2
[85] Carlos Eduardo Thomaz, 'FEI Face Database'. Available at: https://fei.edu.br/~cet/facedatabase.html .Accessed on 25 August 2021

society. This means, at the same time as this technology is not able to learn how to identify faces of all demographics of the Brazilian society, the technology is deemed to outcome false decisions.

In this way, the training data is also relevant since it has a wide influence on how technologies interact with discrimination. The importance of the training data is stated in the fact that the algorithms learn to identify individuals based on the patterns they see in their learning stage.[86] For this reason, the databases must be as representative as the demographics of the population in analysis.[87] Because if not, the algorithm will be biased since the early phases where they won't learn to recognize with accuracy the characteristics of different faces.

The representativeness of different races and ethnicities is highly important, especially concerning the heterogeneous Brazilian society. This is because the facial features can vary even within a racial or ethnic category. For instance, within the group of self-declared black people, there are individuals with different skin colors such as the degree between lighter and darker black skin colors[88] and they still vary in facial characteristics. This means that the lack of unified patterns implicates the necessity of making each "sub-group" being represented in the amount of the training data.

As indicated above, there's no constancy on these different categories within the same location over time,[89] in this context, the Brazilian society has been witnessing increasingly the effects of heterogeneity throughout the years. A positive element for relying on machine learning technologies is that they are constantly learning and can improve their performance over time by analyzing more data and looking for additional patterns.[90] Thus, to improve they must be fed with training data that represent with accuracy the demographics of the population including the changes that have been emerging. In this way, while the degree of alterations in one population cannot be followed up at the same pace as technologies need to improve, they are deemed to perpetuate the lack of representativeness in the training database considering the diversified Brazilian society.

The disproportionate number of different races results in the frequent targeting of underrepresented groups of individuals in benchmark datasets.[91] This is the consequence of the other-race-effect where mostly technology's developers are white individuals, who impose their own bias while constructing and training the algorithms. The lack of representativeness in the training datasets generates algorithms more likely to provide either disparate outcomes or unfair treatment toward specific individuals or groups of

[86] Patrik Kamencay, Miroslav Benco, Tomas Mizdos, Roman Radil, 'A New Method for Facial Recognition Using Convolutional Neural Network' [2017] Digital Image Processing and Computer Graphics, v. 15, n. 4, p.668

[87] P. Jonathon Phillips, Fang Jiang, Abhijit Narvekar, Julianne Ayyad, Alice J. O'Toole, 'An Other-Race Effect for Face Recognition Algorithms' [2011] ACM Transactions on Applied Perception (TAP), v.8, n.2, p. 2

[88] Joy Buolamwini, Timnit Gebru, 'Gender Shades: Intersectional Accuracy Disparities in Commercial Gender Classification' [2018] Conference on Fairness, Accountability, and Transparency, p.4

[89] Joy Buolamwini, Timnit Gebru, 'Gender Shades: Intersectional Accuracy Disparities in Commercial Gender Classification' [2018] Conference on Fairness, Accountability, and Transparency, p.4

[90] 'What is Machine Learning? 3 Things You Need to Know' (MathWorks, Machine Learning). Available at: https://www.mathworks.com/discovery/machine-learning.html. Accessed on 24 June 2021

[91] Joy Buolamwini, Timnit Gebru, 'Gender Shades: Intersectional Accuracy Disparities in Commercial Gender Classification' [2018] Conference on Fairness, Accountability, and Transparency, p.2

customers while dark skin tones are more likely to be the focus of law enforcement.[92] While not including characteristics of black skin individuals in their datasets, the technology will be inherently biased, and this is also what influences the technologies infrastructure of not being accurate when detecting black individuals' faces.

Running tests for racially biased errors would be a positive insight to avoid inequality issues when technologies are recognizing faces. On the contrary, the reality of face recognition technologies being applied for surveillance purposes is that major companies are not running this kind of test.[93] Whilst the importance of these tests, it makes it even more apparent that companies are not giving the given importance to avoid racial bias when using technologies. Certainly, it does not mean that technologies are discriminating solely because companies are not running tests. Instead, it is the combination of lack of accuracy and the lack of representativeness of black people in the training datasets that do generate discriminatory outcomes. Therefore, in this context, not running tests makes surveillance methods less reliable and compliable with racial bias.

3.2.4 Choice of Target

Yet, the lack of accuracy and the lack of representativeness are not the only factors influencing technologies on generating discriminatory outcomes. The choice of target is an important factor that influences the perpetuation of racial inequality while targeting a certain group of people in a determined location. This means that it matters the conditions in which these technologies are to be used, in the sense that these machines are programmed to recognize faces only within the population they reach. In other words, unfairness also arises depending on the circumstances that the data is being collected or sampled.[94]

It is widely known that Brazilian police officers tend to target black people as their focus for law enforcement, thereby relating them to criminality.[95] This is evidenced while people of color are more likely to be unjustified investigated, stopped, or incorrectly found a match for a given suspect.[96]Accordingly, the same occurs when security staff is looking for potential suspects inside stores. They are inclined to focus on black skin individuals as potential suspects for shoplifting. This reflects on tagging black individuals in the database of "dishonest customers" while choosing them as their target.

Another aspect influencing discriminatory outcomes is the location where cameras with Artificial Intelligence for in-store surveillance are to be used. It is revealed that retail stores in the surroundings of poor neighborhoods are most likely to be crime scenes. This is related to poverty and the low income of people living in Brazilian *favelas*, meaning that poverty usually motivates individuals of stealing products while not being able to purchase

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[92] Nicol Turner Lee, 'Detecting racial bias in algorithms and machine learning' [2018] Journal of Information, Communication and Ethics in Society, Vol. 16, No. 3, p.256

[93] Clare Garvie, Alvaro Bedoya, Jonathan Frankle, 'The Perpetual Line-up: Unregulated Police Face Recognition in America' (George Town Center on Privacy & Technology, 18 October 2016). Available at: https://www.perpetuallineup.org/ .Accessed on 7 July 2021

[94] Joshua R. Loftus, Chris Russell, Matt J. Kusner, and Ricardo Silva, 'Casual Reasoning for Algorithmic Fairness' [2018] arXiv:1805.05859v, p. 9

[95] 'Black Brazilians protest against racism and police violence' (BBC News, 14 May 2021) Available at: https://www.bbc.com/news/world-latin-america-57112382 Accessed on 7 July 2021.

[96] Fabio Bacchini, Ludovica Lorusso, 'Race, again: how face recognition technology reinforces racial discrimination' [2019] Journal of Information, Communication and Ethics in Society, p. 324

them. Due to the Brazilian historical context, social and racial discrimination are interconnected while a great part of poor individuals living in *favelas* – poor neighborhoods – are people of color and are victims of the police investigation.[97] Therefore, the application of face recognition technologies on stores located in the surroundings of poor neighborhoods outcomes deliberately mostly black individuals as potential suspects of shoplifting. Which makes it, even more, an environment of discrimination, where the proportion of suspects between white and black people is unequal.

Furthermore, it is usual that poor people try to shoplift in big supermarkets where they assume there's less chance of being caught and, they believe is an easy way to bring food for home. One situation occurred in Salvador where a pair of men of color stole meat from a supermarket. Instead of calling the police, the security staff punished them on their own by calling other criminals that killed both men.[98] Besides this atrocity, retailers from this kind of retail store probably are to apply the use of Artificial Intelligence for identifying potential shoplifters before they act. By this means, the already existent empowerment and violence towards poor and black people will perpetuate while machines are targeting them. Therefore, the act to choose particular locations for using technologies makes it more susceptible to marginalize even more the victims of racial and social discrimination.

Thus, choosing targets is already a practice of law enforcement authorities in Brazil. The use of technologies, instead of avoiding discriminatory bias, just reflect inequalities and automate discrimination between individuals. This occurs not only when deciding which stores and which location using this technology because, as demonstrated, structural racism is also already entrenched in an individual's decisions, therefore, it is hard to separate discrimination from the choice of target if the watchlist is already leading to discriminatory decisions.

3.3 Socio-technical aspects of amplified discrimination in Brazil

Nonetheless, technologies are inherently discriminatory, the way they interact with discrimination is susceptible to amplifying racial inequalities in Brazilian society. Firstly, while the watchlists of "dishonest customers" are racially biased, it is impossible to separate discrimination from the use of technologies that use them as databases. The problem goes even further because, secondly, there's evidence that face recognition technologies are less accurate when detecting black individuals' faces. Thirdly, because datasets are mostly not representative enough of the heterogeneous characteristics of the Brazilian population. This means that these technologies are disproportionately programmed to detect white individuals' faces and therefore work better with them, while there is a great chance of misidentification with black individuals. Fourthly, the grounds that retailers choose targets while compiling the database of "dishonest customers" is undoubtedly entrenched with their discriminatory instinct. Also, these technologies are to be used in stores located in poor neighborhoods which are mostly composed of black people.

[97] Kyra Moon, 'Police Violence in Brazil' [2009] Human Rights and Human welfare, p. 116-131

[98] Bruno Luz, 'Murdered for four trays of meat: The uncle and nephew killed in Brazil for shoplifting' (El País: Organized crime, 11 May 2021). Available at: https://english.elpais.com/usa/2021-05-11/murdered-for-four-trays-of-meat-the-uncle-and-nephew-killed-in-brazil-for-shoplifting.html . Accessed on 9 July 2021

By this means technologies exacerbate discrimination by automating this process and generating situations where at first glance black people wouldn't receive different treatment. This is because technologies are reducing their identity to their physical appearance and their facial characteristics.[99] For instance, being misidentified is a problem more related to technologies because it entails automated decision-making that was disproportionately trained in addition to the encoded problem of bias, which makes it even more problematic and susceptible to generating discriminatory outcomes. The effects of black people being misidentified as potential shoplifters are several. It begins with their victimization by experiencing unfairness while entering stores, impacts on them feeling outraged while developing psychological problems and, therefore, increasing disparities between them and white skin individuals.

The problem of automating discrimination in Brazil is of utmost attention regarding the historical prejudice and its relationship with racial and social segregation in this particular society. The social effects go further than perpetuating discrimination, in the sense that automated bias amplifies this undesirable problem. Some researchers defend the idea that algorithms can perform equally for blacks and whites by using different sensitivity settings for each group.[100] However, this is impractical and still discriminates against them by giving them different opportunities for how they interact with the technology.[101] Thus, this does not solve the problem, instead, just expands it.

Furthermore, a social implication derived from the use of artificial intelligence for in-store surveillance is the way black individuals experience their routine activities within society. The power asymmetry imposed by society influences different experiences between black and white individuals. In the sense that white individuals tend to exploit better their advantaged position, while members of racially disadvantaged groups will perform worse as they would in absence of the technology.[102] For instance, when entering inside stores that use cameras for in-store surveillance, white individuals feel safer and more confident, while black individuals will be more afraid of being misidentified, hence having a shopping experience with more tension and unpleasantness. Therefore, this limits their civil liberties while indirectly compromising their sense of freedom of movement.

These enumerated issues have an impact on the balance where on one side there's the effectivity of in-store surveillance in retailers' point of view and on the other side there are racial disparities being perceived from black individuals. Certainly, looking from an overview of structural racism in Brazilian society there is no point in suppressing black individuals' civil liberties such as equal rights of treatment even more since they already perceive prejudice throughout their life experiences. In this sense, the insertion of Artificial Intelligence for in-store surveillance for identifying suspects of shoplifting in Brazil is not

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[99] Fabio Bacchini, Ludovica Lorusso, 'Race, again: how face recognition technology reinforces racial discrimination' [2019] Journal of Information, Communication and Ethics in Society, p. 328

[100] Tom Simonite, 'The Best Algorithms Struggle to Recognize Black Faces Equally: US government tests find even top-performing facial recognition systems misidentify blacks at rates five to 10 times higher than do whites' (Wired – Business, 22 July 2019). Available at: https://www.wired.com/story/best-algorithms-struggle-recognize-black-faces-equally/ . Accessed on 6 July 2021.

[101] Tom Simonite, 'The Best Algorithms Struggle to Recognize Black Faces Equally: US government tests find even top-performing facial recognition systems misidentify blacks at rates five to 10 times higher than do whites' (Wired – Business, 22 July 2019). Available at: https://www.wired.com/story/best-algorithms-struggle-recognize-black-faces-equally/ . Accessed on 6 July 2021.

[102] Fabio Bacchini, Ludovica Lorusso, 'Race, again: how face recognition technology reinforces racial discrimination' [2019] Journal of Information, Communication and Ethics in Society, p. 328

as effective as it is expected to be, because in the balance it is deemed to worsen black individuals' experience while amplifying discrimination.

3.4 Conclusion

All in all, regarding the Brazilian society, it is demonstrated how the four factors (i.e., watchlists, infrastructure, training data, and choice of target) influence the interaction between Artificial Intelligence for in-store surveillance and discrimination. The effects of the use of this technology perpetuate and amplify undesired discrimination towards black skin individuals. The effectiveness of the algorithmic in-store surveillance is compromised by threats posed on the civil liberties of marginalized groups of individuals. Finally, using automated decision-making instead of relying on human decision-making might not be a good alternative for in-store surveillance in Brazilian society.

Therefore, this practice is compromised by the fact that discrimination is a problem that needs to be eradicated rather than amplified. In a scenario that the implementation of Artificial Intelligence to automate processes is a reality, companies need to address these issues in such a way to minimize the risks of providing a scenario with more discrimination than nowadays. In this way, the next chapter will present a potential tool to enforce non-discriminatory actions while using Artificial Intelligence for in-store surveillance in Brazil.

Chapter IV – Report on the Impact of Personal Data Protection as a tool to enforce non-discrimination

4.1 Introduction

Although the use of Artificial Intelligence to recognize shoplifters inside stores is a practice that has the potential to perpetuate and amplify discrimination in Brazilian society, is important to consider that the use of technologies in daily tasks tends to stay and be a reality for the following years. This means that instead of the abolishment of such technology, there are tools in existing regulations such as the data protection ones that help the development of technologies at the same time as protecting individuals from the threats to their civil liberties and freedoms. Therefore, this chapter aims to analyze the potential of a data protection impact assessment as a potential tool to enforce non-discrimination while using Artificial Intelligence for in-store surveillance in Brazilian retail stores.

4.2 The role of Data Protection regulations

The main purpose of the technology at hand is to analyze individuals' faces while they are entering the stores and compare them with a database of "dishonest customers" which means that, when there is a match, the machine identifies this person as a potential shoplifter and the security guard comes to prevent this person to enter the store. This system is used to identify shoplifters faster than humans and on a large scale, therefore, for this system to function properly, it requires a technology that works with Artificial Intelligence.

As explained in the previous chapters, the use of Artificial Intelligence in cameras for in-store surveillance with the purpose to identify potential shoplifters is a threat to Brazilians' rights because it reflects and even amplifies racial discrimination for a couple of factors. This entails more than a threat for an individual itself but harms groups of individuals that have been receiving different treatment because of structural racism throughout the years. Consequently, this does not involve specific issues of compliance with a certain law (i.e data protection law), instead, entails violations of civil liberties and fundamental rights of an already marginalized group of individuals.103 Therefore, while generating undesired outcomes, the use of technologies by the private sector becomes an interesting object for being regulated.

The scenario in the Brazilian legal system is incipient. There is no proper regulation for Artificial Intelligence technologies within the Brazilian landscape, instead, the Brazilian Data Protection Regulation, hereinafter LGPD (Law number 13.709/2018)104is legislation, similar to the GDPR, that can be applied in these cases of algorithmic decision making. This is because data protection laws regulate situations regarding personal data and the most relevant uses of algorithmic decision-making involve personal data. In this context, the LGPD provides instruments to mitigate and avoid high-risk situations, when considering automated decision-making, for individuals' rights such as the Report on the Impact of Personal Data Protection105, hereinafter RIPD.

The remedies provided by the data protection laws are concerning unequal treatment at an individual level – they do not directly regulate machine learning decision-making towards groups of individuals.106 Nevertheless, as an enhancement of individual protection,107 these types of regulations provide tools that must be elaborated ex-ante of the processing of individual's data for mitigating the risks of marginalized groups from being discriminated against. For instance, the elaboration of an RIPD would be a good tool to enforce fairness, accountability, and transparency in cases where technologies pose high risks for individuals' rights. As a legal requirement, this report must be addressed when certain activities threats individuals' civil liberty and their fundamental rights, therefore, a good possibility to prevent discriminatory outcomes while prior assessing the risks108 posed by the face recognition algorithms in this case.

Importantly, the Brazilian legislation does not determine the requirements for the elaboration of the RIPD because it is a task for the National Authority of Data Protection (ANPD).109 However, by the time this research was done, the competent Authority hadn't released the provisions of how to elaborate an RIPD yet. In the meanwhile, some institutions (i.e. Idec – Instituto de Defesa do Consumidor, and InternetLab) developed

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[103] Diego Carvalho Machado, Laura Schertel Mendes, 'Tecnologias de perfilamento e dados agregados de geolocalização no combate à Covid-19 no Brasil: Uma análise dos riscos individuais e coletivos à luz da LGPD' [2020] Revista Brasileira de Direitos Fundamentais & Justiça, p. 130

[104] "Lei Geral de Proteção de Dados". Available at: http://www.planalto.gov.br/ccivil_03/_ato2015-2018/2018/lei/l13709.htm Accessed on 13 July 2021

[105] LGPD, Article 5, XVII

[106] Linnet Taylor, Luciano Floridi, Bart van der Sloot, 'Group Privacy: New Challenges of Data Technologies' [2016] Philosophical Studies Series, Springer, Vol. 126, Conclusion.

[107] Linnet Taylor, Luciano Floridi, Bart van der Sloot, 'Group Privacy: New Challenges of Data Technologies' [2016] Philosophical Studies Series, Springer, Vol. 126, p. 235

[108] Determined as sensitive personal data under article 5, II of the LGPD, while using customers' faces is a biometric data.

[109] LGPD, Article 55-J, XIII

their guidelines of good practices when using face recognition technologies to encourage the private sector to take measures to avoid and mitigate risks for the individual rights', in especial, the risk of amplifying discrimination.

4.3 Seeking fairness

The main challenge about this technology is the injustice when being applied in retail stores in Brazil, meaning that, while this technology compares faces in a database of "dishonest customers", this technology is deemed to discriminate against black individuals as explained in the previous chapters.

Accordingly, the way this system function brings up some questions about fairness regarding technology decision-making, where the result of a decision disproportionately impacts different groups of people while they are entering the stores. This is because face recognition technologies are biased by some factors (i.e., infrastructure, training data, and choice of target), besides the fact that the basis for using this technology is already unfair since the watchlist is racially biased. Therefore, this results in unfairness while using this technology.

In addition to racially biased databases of "dishonest customers", the problem entails not only different results but different rates of false negatives and false positives considering different sensitive attributes (i.e. whites and blacks). This is the case of disparate mistreatment where misclassification rates are differing between individuals with different values of that sensitive attribute.[110] Thus, it is also unfair to consider a situation of using a technology that results in rates of errors with different responses in cases of distinct skin colors. In this way, given these problems, it is important to seek fairness while applying the use of technologies in a society that is already embedded with racial discrimination.

The debate on algorithmic fairness includes a technical and political challenge.[111] On one hand, it is impossible to separate the political aspect from the idea of fairness in algorithmic decision making, this means that it is inherent that algorithms will carry political ideals in their working process. This is because of the four factors mentioned above and the inherently human influences on all the steps of developing this specific technology and its functioning. On the other hand, the technical challenges of having biased algorithmic decision-making include the temptation of developing a system that does not generate envisaged decisions, which is impossible[112] because of the same problem that humans influence technology development.

The importance of seeking fairness while applying this technology in the Brazilian landscape is the attempt to use less harmful technologies while considering citizens' freedoms and guarantees. While demonstrating through the report potential risks for individuals' rights and how it affects data subjects socially, the risk assessment seems to be a good instrument that suggests fairness between retailers and individuals. Moreover, demonstrating that retailers are indeed taking into consideration individuals' freedoms and

[110] Muhammad Bilal Zafar, Isabel Valera, Manuel Gomez Rodrigues, Krishna P. Gummadi, 'Fairness Beyond Disparate Treatment & Disparate Impact: Learning Classification without Disparate Mistreatment' [2017] International World Wide Web Conference Committee

[111] Pak-Hang Wong, 'Democratizing Algorithmic Fairness' [2019] Philosophy & Technology, 33 p. 229

[112] Pak-Hang Wong, 'Democratizing Algorithmic Fairness' [2019] Philosophy & Technology, 33 p. 229

guarantees at the same time as they value the use of face recognition for automating processes, is a good start for avoiding perpetuating disparities in society. For this reason, it is important to elaborate a risk assessment where retailers demonstrate the parameters on which they are relying to use face recognition for in-store surveillance.

In this context, the RIPD is a good instrument for retailers to enforce the elaboration of an accountable and transparent process of decision-making when applying their technology inside stores. This is because, as stated by the law, this report must contain, at least, the description of the collected data, the methodology used to collect them to guarantee their security, and also the measures being applied to mitigate the potential risks.[113] This includes not only the use of the technology *per se* but also assessing to which extent retailers are elaborating the watchlists of potential suspects. Considering the elaboration of a report with at minimum these three aspects will be provided a better sense of fairness while using technology for in-store surveillance.

Furthermore, the LGPD does not address specifically the principle of fairness, instead, there is a bundle of principles from which fairness in the processing of data can be derived. In special, grouping the principle of transparency[114] and accountability[115] is a good link to seek fairness while elaborating the risk assessment for certain processing of data. Notwithstanding, the regulation addresses precisely the principle of non-discrimination which states a general prohibition of illicit or abusive discrimination while data processing.[116]

Importantly, considering what article 6, IX of the LGPD means, the Brazilian legislation does not have a general prohibition of automated decisions, it does prohibit discriminatory behavior that leads to illicit or abusive discrimination, therefore, tacitly allows discriminatory conduct that does not lead to such results and leaves to the data protection authorities "ANPD" address it in a specialized manner.[117] In this context, while discrimination may take place lawfully, the risk assessment provided by the Brazilian data protection regulation is a good remedy for mitigating the risk of unfairness and racial discrimination from an *ex-ante* approach while this assignment is a demand of the authority that will supervise it.

This is important because the elaboration of an RIPD will encourage retailers to comply with accountability by recognizing the social impacts of their processing activities and how they are compiling the databases of potential suspects, and also will be held responsible in respect of violations to individual and collective rights and freedoms that they took the risks.[118] This is because the elaboration of an RIPD detects previously envisaged outcomes in the processing data, meanwhile, it is required that retailers justify and explain whether they decide to proceed with the processing and with the measures they are taking. This means that, assessing risks before society experiences undesired effects that emerge from technologies is important to provide better enforcement for mitigating risks of amplifying racial discrimination.

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[113] LGPD, article 38, single paragraph

[114] LGPD, article 6, VI

[115] LGPD, article 6, X

[116] LGPD, article 6, IX

[117] Marcela Mattiuzzo, 'Let the algorithm decide: is human dignity at stake?' [2021] Revista Brasileira de Políticas Públicas, Brasília, v.11, n.1, p. 357

[118] Michael Butterworth, 'The ICO and artificial intelligence: The role of fairness in the GDPR framework' [2018] Computer Law & Security Review 34, p. 267

4.4 The RIPD (Relatório de Impacto de Proteção de Dados)

While the requirements for the elaboration of an RIPD are not determined yet by the competent Authority, this research will use as an example the guidelines for good practices for using face recognition technologies in the private sector developed by the Idec (*Instituto de Defesa do Consumidor*) and InternetLab.[119] This framework proposes some parameters considered essential while elaborating an RIPD. In this case, an analysis of the proportionality and necessity must be done to identify if the principles of the LGPD are being followed. Furthermore, demonstrate accountability with the public by assessing the potential risks for individuals' rights and establishing the lawful basis on which the data processing is being taken. Then, provide information about the measures taken for mitigating racial discrimination while using face recognition technologies in-store.

Following these steps, the risk assessment becomes a tool where retailers expose their systems' weaknesses by transparently engaging with the analysis of potential risks for customers' fundamental freedoms and guarantees, also informing the data subjects the extent to which the algorithms are reaching decisions. Not only by exposing how the algorithms are deciding, but how individuals end up on the watchlist of potential suspects. The transparency must be involving all the steps used by retailers in their searching for potential suspects inside their stores.

Moreover, provides a system where the responsibility of the risks lay on the company that is controlling and processing the biometric data of their customers, thus, determining an accountable system. A risk assessment is an instrument for mapping the use and processing of individual data to work as a governance tool. Therefore, it suggests that retailers are seeking to use a fair system while exposing their potential errors and risks of discrimination including the potential bias in their watchlists and the rates of false positives and false negatives across racial groups.

Importantly, it is already known that the LGPD is largely influenced by the European General Data Protection Regulation (GDPR), for this reason, the framework for the elaboration of the RIPD here proposed is a combination of the literature about the Brazilian with the European data protection laws. Therefore, the proposed framework for the RIPD should contain the following:

4.4.1 Necessity and Proportionality Assessment

Within the necessity and proportionality analysis, this stage involves three phases where the data is being processed. The analysis must be done in the (*i*) parameters in which the database of suspects of shoplifting is being compiled; (*ii*) training and testing model phase; and in the (*iii*) Artificial Intelligence application phase.[120] It is essential that retailers, in these phases, reveal the purpose of the processing, the lawfulness of the processing and that this processing follows the minimization principle. Thus, demonstrating the necessity

[119] Bárbara Simão, Nathalie Fragoso, Enrico Roberto, 'Reconhecimento Facial e o Setor Privado: Guia para a adoção de boas práticas.' [2020] InternetLab/IDEC

[120] Yordanka Ivanova, 'The Data Protection Impact Assessment as a Tool to Enforce Non-discriminatory AI' [2020] Annual Privacy Forum, Springer, Cham, p.3

of the processing through their reasoning and balancing it with the proportionality of the risks this technology can provoke for the society.

Overall, the purpose of the processing relies upon the fact that retailers aim to combat the shrinkage of their inventory by using Artificial Intelligence technology to compare individuals' faces while they are entering the stores by matching them with the ones in the compiled watchlists. Importantly, this technology uses biometric data for their functioning, this means that to recognize faces, the technology collects face features that are biometric data, which are categorized as sensitive data under the LGPD.121 In this context, they have special treatment as personal data, and their collection, processing, and treatment are specifically regulated under Section II of the LGPD.

The collection of biometric data by the private sector is restricted and established under article 11 of the LGPD where it determines specifically that the data subject must consent in a specific and emphasized manner to the processing of their data for it to be lawful. Anyways, imposing risks for data subjects without their consent is prima facie unfair.122 Also, the collection of biometric data must observe the principle of necessity under article 6, III, which limits the collection of data to be the minimum required for accomplishing the desired process. In this way, these two requirements must be followed in all the stages below, either in the phase in which the database is being compiled, the training model phase, or in the application phase. Despite collecting data with an individual's consent and elaborating a necessity and proportionality balance, it is only worth it to transparently treat an individual's data, meaning that it's not a sufficient mechanism for non-discrimination.

***(i)* Compiling the watchlist**

This is the most important phase where the necessity and proportionality assessment must be meticulous because this phase is the basis for all the functioning of the whole technological system here discussed. Meaning that without a database of "dishonest customers" there is no point in applying face recognition technologies for identifying potential shoplifters because the system won't find any suspect without a list of them.

This database is compiled considering the images of faces of individuals that have already been the target of suspicious behavior inside stores and/or individuals who have already been convinced of shoplifting. The cooperation of retailers with police authorities would be based on meetings to decide which individuals had suspicious behavior and are a strong candidate to be on the watchlist and also people that have already been convinced of the crime of stealing123 merchandise.

Despite that the elaboration of these watchlists is with police officers' cooperation, the subjectivity in humans' decisions may influence the outcome while deciding whose face must compose the list or not because there's already evidence of discriminatory abuses even in criminal watchlists.

The faces already recorded and stored by CCTV cameras are to be used by retailers to compose the lists that are called watchlists of "dishonest customers", but only when the police officers confirm that a certain individual was found with suspicious behavior. It is evident that these lists must contain a lot of errors and mistakes, for example, the fact that they found an individual acting suspiciously and that this person has committed a crime of

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[121] LGPD, article 5, II

[122] Pak-Hang Wong, 'Democratizing Algorithmic Fairness' [2019] Philosophy & Technology, 33 p. 231

[123] Brazilian Criminal Code, article 155, *caput*.

stealing merchandise previously, it does not mean that he/she will shoplift in that store at that time. And here we can find those cases where the "other-race-effect" affects human decision-making, meaning that the security staff's decision can be influenced by the racial discrimination in his/her beliefs. That's why the Brazilian legislation does not permit only private actors to compile watchlists. However, even with the cooperation of police officers, the lists tend to be biased because the criminal databases are mostly inclined to have dark skin color individuals.

In this respect, it is hard to have a database of potential suspects of shoplifting that is free from human discrimination. For this reason, the proportionality and necessity assessment while compiling this list is important, in a way that retailers are committed, at least, for trying to process individuals' data observing the necessity and proportionality of doing it so. When deciding who must be in this list needs to be well-grounded and analyzed under the penalty of contaminating the whole use of technologies for identifying shoplifters. For instance, retailers must try to be impartial and professional when suspecting from someone by not letting them be influenced by the customer's skin color, their gender, or even how they are dressed. Also, police officers must be aware and in control when judging whether an individual definitely has suspicious behavior when elaborating these watchlists.

By making a good assessment on this phase with the cooperation of police officers, the basis for identifying potential shoplifters won't' be as biased and will be able to give a better start (with less discrimination) for retailers to use technologies in the retail sector for catching shoplifters.

(ii) Training and Testing model phase

As demonstrated in the previous chapters, the training model is also a sensitive phase where technologies are deemed to discriminate because of the racial discrimination embedded in society. Therefore, it is important to address an analysis of the necessity and proportionality of the training data that is being used since the purpose of the processing is for training and testing the technology before applying it for real use. In the sense that, the report must ensure that the variety of characteristics within Brazilian society is being considered in the database of training data to avoid discriminating against individuals by misrepresenting some characteristics in this phase.

Accordingly, the processing of data in the training and testing phase must be collected lawfully as a requirement of the data protection law. Scientific research is a good legal base in this phase given the fact that this information is being used with the purpose to train and prepare the technology for its real use in a private manner. The LGPD confers this possibility under article 11, II, c, where it permits the collection of data without subjects' consent in cases of scientific research by research organizations. Despite this article limiting the processing without consent for research organizations, private companies that are using data for their technologies' development can be considered research organizations in the sense that they are applying the amount of data for research to train their system. This occurs similarly to the GDPR that under Recital 159 includes in scientific research the technological development, applied and privately funded research.

Moreover, to analyze the extent of the necessity for this processing, the LGPD also provides safeguards for the data subjects, while having their biometric data being collected, under article 11, II, c that includes anonymization for achieving the research purpose.

Article 6, III, of the LGPD, also determines that the collection of data must obey the principle of the minimum required to achieve the purpose aimed. Therefore, while using as legal basis the collection of data for scientific research, the private actor must not abuse this permission and only collect the necessary data to train the technology.

(*iii*) AI application phase

The application of Artificial Intelligence for in-store surveillance in retail markets needs to follow the legal ground requirement for lawful processing under the LGPD. While collecting sensitive data – customers' face features – article 11, I, requires consent from the data subject. Considering that customers must give explicit consent for the data collection, all the customers that are giving the permission must be warned of the possibility of discrimination that the system can generate.

The purpose of AI application, in this case, is to identify potential shoplifters and reduce inventory shrinkage, in the sense that the suitability of the system as a measure should be assessed based on the predictive accuracy and efficacy of the model and the fact this measure is the less restrictive to achieve the objective of identifying potential shoplifters. For this reason, the report is a good instrument to demonstrate the accuracy and efficacy of using this technology for identifying shoplifters because it is a tool to describe the elements that comply with the necessity of using this technology before the proportionality of the risks that emerge from them.124 Also, by exposing the reasons why the technology is accurate and effective, the report must contain explanations of why this measure is less restrictive to individual's rights while identifying potential shoplifters.

Therefore, the analysis must demonstrate that the goal is legitimate and necessary for the practice of identifying potential shoplifters to justify the discriminatory outcomes emerged by the decision-making. Furthermore, to explain whether the restriction is minimized and proportionate to the legitimate objectives, it is needed that the report entails a balance between the benefits and the adverse impacts emerging from the technology. In this way, no restriction should be tolerable for individuals' rights that permits discrimination between toward black skin color individuals. Hence, this content should be reinforced in the report as an instrument utilized to avoid the tolerance of discriminatory outcomes.

4.4.2 Risk Assessment

After justifying the processing of sensitive data while using this technology, the most important stage of the RIPD is to elaborate a risk assessment to identify *ex-ante* the risks that the use of this technology generates to society. Issues of discrimination are addressed under article 6, IX of the LGPD which determines that the data processing must follow the principle of non-discrimination. Therefore, each part of the process must be assessed to identify the risks for potential discrimination. Hence, as general requirements for

[124] Yordanka Ivanova, 'The Data Protection Impact Assessment as a Tool to Enforce Non-discriminatory AI' [2020] Annual Privacy Forum, Springer, Cham, p.5

elaborating a data protection risk assessment, it must identify in the origin the sources of risks and the impact on individuals' rights or fundamental guarantees.[125]

When identifying the sources of risks, the assessment must be directed to the watchlists, to the infrastructure, to the choice of target, and the training data of the AI at hand. The problem begins in the biased watchlist, then, on the infrastructure of the AI that is determined by the fact that the coding part carries the discrimination embedded in the culture of code developers. The biased choice of target consists of where and in which population the technology is being applied. The risks on the training data are explained by the fact that the database of training data does not compose the total variety of characteristics within Brazilian society.

Moreover, the report must contain the expected impact on an individual's rights or fundamental guarantees. In this respect, the Brazilian Federal Constitution is already clear stating that any discrimination that attempts individuals' rights and liberties are punishable by law and that racism is an unbailable crime126. In addition, the Constitution under article 3, IV, ensures the well-being of everyone regardless of origin, race, gender, color, age, or any other form of discrimination. Therefore, any interference on fundamental guarantees and liberties occasioned by different treatment towards a certain group of individuals is a prohibited practice in the Brazilian legal framework. In this sense, if the technology at hand is deemed to have a negative impact on individuals' fundamental guarantees, it is necessary to describe, explain and justify this intervention and the potential social impacts.

In addition, the report must address not only the discriminatory practices but also the interference with other fundamental rights and liberties, non-material harms such as psychological distress and annoyance for being misidentified, and the side effects of societal and ethical values beyond the affected individuals.127

In this regard, all the sources of risks must be addressed concretely in a way that the discriminatory outcomes should be considered high risk. This is because different treatment towards certain groups of individuals cannot be tolerated in a democratic society.[128] Furthermore, when identifying and assessing this risk and in a position where not able to reduce to acceptable levels, the mitigation measures must be implemented for the processing of data to continue.

4.4.3 Prevention and Mitigation Measures

The adoption of prevention and mitigating measures are important to ensure that the data processing follows the principles and controllers' obligations[129] under the LGPD. Not only, but this is the stage where retailers predict the possibility of risks while they establish

[125] Dariusz Kloza, Niels Van Dijk, Simone Casiraghi, Sergi Vazquez Maymir, Sara Roda, Alessia Tanas, Ioulia Konstantinou [2019] Towards a method for data protection impact assessment: Making sense of GDPR requirements', p. 2-7

[126] Brazilian Federal Constitution, Article 5, XLII. Available at: http://www.planalto.gov.br/ccivil_03/constituicao/constituicao.htm Accessed on 11 August 2021

[127] Yordanka Ivanova, 'The Data Protection Impact Assessment as a Tool to Enforce Non-discriminatory AI' [2020] Annual Privacy Forum, Springer, Cham, p.8

[128] Alessandro Mantelero, 'AI and Big Data: A blueprint for a human rights, social and ethical impact assessment' [2018] Computer Law & Security Review

[129] Yordanka Ivanova, 'The Data Protection Impact Assessment as a Tool to Enforce Non-discriminatory AI' [2020] Annual Privacy Forum, Springer, Cham, p. 9

some measures that they believe are capable of preventing them from happening.[130] Taking effective measures also avoids the risk of discrimination from materializing, meaning that they can in fact reduce the probability of risks or the impact on protected groups. This phase is essential while elaborating a risk assessment report, and must be considered in two areas: in the watchlist of potential shoplifters and the use of Artificial Intelligence *per se*.

***(i)* In the watchlist of potential shoplifters:**

The adoption of prevention and mitigation measures here involves impartiality and professionalism when compiling lists with only individuals that have already committed a crime i.e. convinced of shoplifting, or, at least, is a real suspect of shoplifting frequently by having evidence of their suspicious behavior. Here, the human subjectivity must be the minimum as possible, so the results won't carry the influence of humans' discriminatory beliefs. The watchlist must be compiled in the purest way under penalty of discriminating individuals unfairly from the beginning. That's why the LGPD (second paragraph of article 4) only permits the elaboration of watchlists with the cooperation of public authorities, avoiding arbitrary decisions coming from retailers.

***(ii)* In the use of Artificial Intelligence:**

Some of the good practices recommended by researchers and supervisory authorities to address the risk of discrimination at different stages of the AI process, in this case, are as follows[131]:

In the *design and programming* stage, the controller must have attention because in this stage the purposes and the means of the processing are defined. Decisions made in this stage impact the efficacy of the system and on the outcomes generated by the decision-making process. For this reason, the technology at hand must comply with approved certification schemes or standards for unbiased and accountable AI since the "design" moment. To avoid a biased infrastructure of the AI, it is important to guarantee the diversity of developers' teams, this means not having only white men developing the technologies' code.[132] Also, it is highly important to train developers to detect and identify bias to avoid developing technologies that generate envisaged outcomes. In addition, the controller must take measures to equalize treatment between different groups of individuals to achieve fairness towards diverse groups of individuals through computational measures. In this way, avoiding bias when programming means that it is important to use only variables that are appropriate when classifying certain individuals. Furthermore, it is important to ensure the interpretability and explainability of the AI system to combat the lack of algorithmic transparency when using AI.

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[130] Maria Cecília de Oliveira Gomes, 'Relatórios de Impacto à proteção de dados: Uma breve análise da sua definição e papel na LGPD' [2019] Revista do Advogado, São Paulo, n. 133, p.10

[131] Yordanka Ivanova, 'The Data Protection Impact Assessment as a Tool to Enforce Non-discriminatory AI' [2020] Annual Privacy Forum, Springer, Cham, p. 9

[132] Nicol Turner Lee, Paul Resnick and Genie Barton, 'Algorithmic bias detection and mitigation: Best practices and policies to reduce consumer harms' (22 May 2019) Brookings, Available at: https://www.brookings.edu/research/algorithmic-bias-detection-and-mitigation-best-practices-and-policies-to-reduce-consumer-harms/ . Accessed on 17 September 2021

Regarding the stage of training the AI, the system must be trained considering the diversity of characteristics within Brazilian society to achieve better results. This means while being trained with almost all of the characteristics that compose the Brazilian population, problems such as differences in rates, misidentifications, and errors will decrease and affect less marginalized groups (i.e. black people). In this respect, controllers must ensure quality on the training stage by adding all the protected characteristics, even the sensitive ones (when justified in its collection) to ensure that the technology becomes discrimination-aware.[133] Therefore, to ensure an unbiased training dataset is important to guarantee an accurate and representative dataset, in a sense that it must be up-to-date with the changes that the Brazilian society has been experiencing.

The *testing and validation* stage is the moment where the technology is tested to assess its validity and reliability under its expected functioning. The testing must be done in different scenarios for false positives and false negatives, where bias can be detected through several methods to show that groups or individuals are treated differently. Likewise, it is important to assess whether human or automated decision-making generates overall greater accuracy and minimizes bias.[134] Another possibility is to allow an independent third party to audit the AI to open the black box and ensure full transparency by detecting whether there is bias in the coding.[135]

Finally, the *application stage* is where the controller disposes the technology and applies it to the personal data of end-users. Is at this moment that retailers demonstrate that they are following good practices while applying the technology for genuinely using it. Importantly, the controller must update the RIPD while the results of testing are changing, considering that it concerns a machine learning technology that is constantly "learning". Moreover, ensuring transparency is important while providing data subjects the necessary information about how the processing of their data is being taken, also the envisaged consequences they can experience. The principle of transparency is determined under article 6, VI of the LGPD and must be considered in every processing of data, in particular, on automated decision-making processes. This is because automation of processes can affect individuals' rights, therefore, data subjects must be informed on which grounds they can influence these decisions.

Furthermore, it is important to train retailers on how to use the AI system and what are the risks that they may encounter.[136] In this way, ensure that they are using the AI only for the purposes and the context for which it has been designed, so the people involved are aware of how it works and the problems it may generate. Hence, data controllers must guarantee respect for data subjects' rights (17 – 22 of the LGPD) giving them access to their "profiles", informing them how their characteristics are being treated by the machine, and explaining how the decisions are being reached. Another measure is to establish procedures to enable data subjects to request human intervention and appeal to solely

[133] Indre Žliobaite, 'Measuring discrimination in algorithmic decision making' [2017] Data Mining and Knowledge Discovery, v. 31, n. 4, p. 1064

[134] Yordanka Ivanova, 'The Data Protection Impact Assessment as a Tool to Enforce Non-discriminatory AI' [2020] Annual Privacy Forum, Springer, Cham, p. 13

[135] Yordanka Ivanova, 'The Data Protection Impact Assessment as a Tool to Enforce Non-discriminatory AI' [2020] Annual Privacy Forum, Springer, Cham, p. 13

[136] Yordanka Ivanova, 'The Data Protection Impact Assessment as a Tool to Enforce Non-discriminatory AI' [2020] Annual Privacy Forum, Springer, Cham, p. 15

automated decisions.[137] If it still results in data subjects being affected by discrimination, data controllers must provide remedies for them by granting similar advantages to individuals in different "categories".

Taking these advised measures for elaborating an RIPD is a good basis for enforcing the use of the technology in a way to avoid high-risk situations for data subjects' fundamental guarantees and liberties. When elaborating this report for in-store surveillance in Brazil, retailers must address the problem of amplifying racial discrimination and adopt all the necessary measures to mitigate this risk. In this way, the RIPD will be a useful instrument to enforce non-discrimination while using AI for in-store surveillance because the report will indicate the discrimination embedded in the infrastructure, choice of target, and training database. Therefore, being aware of the problems and presenting measures to avoid them are good starting points to enforce good use of technologies.

4.5 Retailers' point of view Vs. transparency and individuals' rights point of view

The elaboration of a data protection report to assess the risks of discrimination while using face recognition technologies may not be the ideal instrument for preventing black people from discriminatory abuses. This means, there is a challenge between what is the reality for retailers and what makes sense for individuals for preserving their fundamental guarantees and liberties. On one hand, the RIPD is an instrument that establishes controllers' duty of care and holds them accountable to avoid racial discrimination while designing and using face recognition systems.[138] On the other hand, what touches upon customers entering stores is that the risk assessment is a mere document that addresses all the details about the technology and provides customers a remote idea of being protected against discrimination.

Regarding retailers' point of view, the best way of using this RIPD in a beneficial manner is to move away from their liability when certain customers perceive that they are receiving different treatment in the store, therefore, is an instrument to protect retailers against lawsuits of racial discrimination. This is because the use of technologies of face recognition is deemed to discriminate, thus, with this knowledge, retailers adopt measures and develop strategies to mitigate the risk of discrimination towards black people while using their technology. However, the efficiency of this report on the mitigation of harming minorities is just theoretical and non-efficient given this does not change the technical structures of the technology (i.e. infrastructure, choice of target, training data). The problem of discriminatory abuse on the outcome from face recognition technologies must be assessed on the design of the technology.[139] The attempt to address the problem of discrimination with a risk assessment is not as efficient as eliminating it in the encoded part, using diversity models in the database of training data, and avoiding choosing targets.

Besides retailers wanting customers to fear stealing products during their experience in the store, the use of this technology can harm even more people from minority groups

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[137] Yordanka Ivanova, 'The Data Protection Impact Assessment as a Tool to Enforce Non-discriminatory AI' [2020] Annual Privacy Forum, Springer, Cham, p. 16

[138] Yordanka Ivanova, 'The Data Protection Impact Assessment as a Tool to Enforce Non-discriminatory AI' [2020] Annual Privacy Forum, Springer, Cham, p. 17

[139] Morgan Klaus Scheuerman, Jacob M. Paul, Jed R. Brubaker, 'How Computers See Gender: An Evaluation of Gender Classification in Commercial Facial Analysis and Image Labeling Services' [2019] Proceedings of the ACM on Human-Computer Interaction, V.3, CSCW, p. 27

such as black people. In this way, the challenge of looking from customers' point of view is that a report does not effectively move away from the chance of black people suffering abusive discrimination while they are entering their store. This is because, for customers, this is a mere document that describes how the data processing works and how data subjects can seek their rights. The reality is, customers, do not have access to such documents previously while entering the stores, therefore, they are not able to consent in a detailed and extensive way. Moreover, the transparency within the RIPD is limited because medium individuals do not have complete access to how the technology codes work given the complexity of the machine learning technology. Therefore, the idea of transparency for retailers and individuals is different and contaminates de efficiency of using an RIPD as a tool to enforce non-discrimination while using face recognition for in-store surveillance in Brazil.

4.6 Conclusion

Finally, Data Protection Laws have an important role meanwhile the use of Artificial Intelligence is not yet regulated. This is because face recognition analysis is based on individuals' data which makes it, more specifically, sensitive data under the LGPD. The Brazilian data protection law gives special protection to sensitive data in a way that it does not permit any processing that leads to abusive discrimination. A remedy provided by this specific law, the RIPD, is a good instrument that tackles risks of discrimination while using AI for in-store surveillance and provides potential measures to mitigate them by following all the steps mentioned before. However, the conclusion is that this instrument is not sufficient to enforce non-discrimination while using face recognition technology in this situation because the bias must be addressed and corrected in the design of the technology. There's no way of having non-discriminatory outcomes without assessing the biased watchlist of "dishonest customers". This risk assessment addresses the potential problems and the measures that must be taken, although it is not something that corrects technology bias in their designing stage. Therefore, the RIPD is not a good instrument to enforce non-discrimination, instead, it just clarifies and demonstrates the potential problems of having discriminatory outcomes.

Chapter V - Conclusion

Given the extension of shoplifting issues for retailers, especially in Brazil, this thesis is a pre-emptive analysis for applying artificial intelligence technologies that recognize and identify faces that are marked in a database of "dishonest customers" as a mechanism to potentially combat the inventory shrinkage by shoplifters in the Brazilian scenario. This is because the use of technologies is shaping the environments and they can bring a lot of benefits when automating some processes, however, this can also threaten individuals' liberties and guarantees.

The four factors that are inherent in technologies that recognize individuals are the ones that make it unjust to apply the technology in this society. Firstly, the biased database of "dishonest customers", which means that even with police officers' cooperation, the

watchlists are deemed to be biased against black skin color individuals because human decision making is already envisaged. Secondly, the infrastructure is deemed to be biased because of who is developing the software, meaning that the technology carries developers' preconceived judgment. Thirdly, the training data is deemed to be discriminatory since most databases used for training technologies are biased against black people. In this respect, while the training database is not as representative as it should be for all the different skin colors in a society, it is deemed to discriminate against the ones who are not well represented. In this case, technologies are mostly trained with white male pictures. Fourthly, the choice of the target also influences the discriminatory outcomes regarding face recognition technologies. This means that technologies are mostly applied in stores where there are big chances of having thieves around. In Brazil, these stores are mostly located in poor neighborhoods that are inhabited by black people. Consequently, the chances of in-store surveillance cameras targeting black skin individuals are higher than targeting white skin individuals.

Therefore, the discrimination while using this system for identifying potential shoplifters in Brazilian stores drives to a discussion of different points of view, they are the retailers' benefits and individuals' rights. This means, on one hand, there is the temptation of preventing shoplifters inside retail stores as an important measure to decrease the loss of products from retailers' point of view. On the other hand, there are some issues regarding the use of this technology from the individuals' rights point of view that need to be considered before applying this technology in the market. This implies that there must be a balance between retailers' needs and individuals' rights. This is because the application of technologies within a society impacts a lot from a political and ethical point of view including the extent of justice on the method for using a particular technology, especially in Brazilian society.

In the absence of regulation particularly for technologies that recognize faces, the LGPD (*Lei Geral de Proteção de Dados*) is legislation that regulates the use of personal data in any activity. For this reason, bringing this legislation for the case at hand is a good opportunity to enclose all the matters related to face recognition technologies and the way they function. Anyways, this technology processes personal data (individual faces) and, not only, but uses a program to identify a potential shoplifter in a database compiled by retailers to prevent this person from entering the store. That's why data protection legislation is a good way to help shape these activities with technologies.

The LGPD brings remedies to combat issues of abusive processing, especially in the case where the technology is giving different treatment to different individuals. This means, in the case of cameras for in-store surveillance that are mistreating black individuals, the LGPD provides instruments that are capable of, when applied by the retailer, preventing the enhancement of discriminatory abuses in society. The RIPD (*Relatório de Impacto a Proteção de Dados*) is a type of risk management to give retailers an overview of what and to which extent their technology and the database that they compile can interfere in individuals' rights and guarantees. With the elaboration of this instrument, the retailer will be awarded a bigger picture of how this system is working and how it threatens individuals' rights, therefore, it is a good way to start idealizing measures to prevent discrimination.

As it is seen, this instrument works better in theory than in reality because it does not prevent discrimination, but it is just a document in which retailers believe they are protected from holding liable for illegalities in the outcomes of the technologies they are applying in the society. Analyzing the RIPD in the case at hand is a good instrument to give information

for retailers about the extent of the damage they can cause by applying cameras for in-store surveillance in strategic stores in Brazil. However, it does not signify that the use of this particular system will turn to be non-discriminatory only because of the elaboration of an RIPD. Therefore, this is not a good instrument to enforce non-discrimination in retail stores in Brazil.

Considering this pre-emptive analysis, it is concluded that, besides the need of retailers for combating inventory shrinkage by shoplifters, the use of this technology is harmful in a society where racial discrimination is still alive everywhere. Even with tools provided by data protection laws, which regulate how technologies are functioning with individuals, it is not enough to prevent discriminatory abuses coming from artificial intelligence for identifying shoplifters. Therefore, this technology that is being used in the US, in the UK, and Russia must not come to this side of the continent, because in these mentioned countries there are already discriminatory abuses being observed, thus, applying it to a country where the structural racism is so entrenched within the population probably will cause harms hardly able to be fixed. Not even regulating technologies would be enough since it can be an obstacle for developing new technologies and at the same time insufficient as a method for preventing inventory shrinkage by the action of shoplifters. In this way, it is evident that the use of technologies does not always make more benefits than harms individuals, in this context, it is necessary a pre-emptive analysis before applying technologies in society to deconstruct the false feeling that automating processes is always beneficial.

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