Machines do not decide hate speech: Machine learning, power, and the intersectional approach

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Abstract: The advent of social media has increased digital content—and, with it, hate speech. Advancements in machine learning help detect online hate speech at scale, but scale is only one part of the problem related to moderating it. Machines do not decide what comprises hate speech, which is part of a societal norm. Power relations establish such norms and, thus, determine who can say what comprises hate speech. Without considering this data-generation process, a fair automated hate speech detection system cannot be built. This chapter first examines the relationship between power, hate speech, and machine learning. Then, it examines how the intersectional lens—focusing on power dynamics between and within social groups—helps identify bias in the data sets used to build automated hate speech detection systems.

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Machines Do Not Decide Hate Speech

Machine learning, power, and the intersectional approach[1]

1 Introduction

The advent of social media platforms—such as Twitter, Facebook, and YouTube—has increased digital content. Alongside this change, *hate speech*—defined as highly negative and often violent speech that targets historically disadvantaged groups (Walker, 1994; Jacobs & Potter, 1998; see also Sponholz in this volume) – has also increased. In response, social media platforms have leveraged machine learning to scale up their efforts to detect and moderate users' content (Gitari et al., 2015; Agrawal & Awekar, 2018; Watanabe et al., 2018; Koushik et al., 2019; see also Ahmad in this volume). Developing a system that relies less on human inspection and validation is desirable for these firms because this system's efficiency gains would allow them to grow further and increase profits.

Unfortunately, scale is only part of the problem related to hate speech detection and moderation. Marginalized groups and individuals (e.g., ethnic and racial minorities, women, lesbian, gay, bisexual, transgender, and queer

1 I thank Thomas R. Davidson, Renata Barreto, two anonymous reviewers, and the editors of this volume for their constructive comments on an earlier draft of this chapter.

[LGBTQ] people, immigrants, and people with disabilities) are major targets of hate speech, which is one reason why many social media platforms cite potential harm against marginalized people as the main reason to target hate speech (Twitter, 2021; Facebook, 2021; YouTube, 2021). A difficulty arises, however, in that these historically disadvantaged groups' speech is more likely than others' to be labeled as *hate speech* (Sap et al., 2019). Ideally, advancements in machine learning should have solved this problem by developing efficient, fair automated hate speech detection systems. For instance, the probability of labeling speech as *hate speech* should not depend on whether the speaker is a member of a marginalized group. Unfortunately, however, many scholars have found that these systems are vulnerable to racial, gender, and intersectional biases (Waseem & Hovy, 2016; Waseem, 2016; Tatman, 2017; Waseem et al., 2017; Davidson et al., 2019; Davidson & Bhattacharya, 2020; Kim et al., 2020; Zhou et al., 2021). So, why does this paradox persist despite so many technological innovations?

A closer inspection reveals that this vulnerability is not ironic. The meaning of *hate speech* changes over time and across places (Walker, 1994; Gelber, 2002; Bleich, 2011; see also Litvinenko in this volume) because shifts in power relations determine who can say what comprises hate speech (Binns et al., 2017; Geva et al., 2019; Al Kuwatly et al., 2020). If hate speech is a social construct, so is hate speech annotation. Automated hate speech detection relies on human-annotated data, and it faces a challenge in that hate speech annotation concerns deciding whether particular speech violates social norms. However, most norms have boundaries that can vary, depending on context. For instance, White people's use of the "n-word" to describe Black people is likely a racial slur, but the same word used among African Americans is unlikely to be offensive. These subtleties should be acknowledged in building an automated hate speech detection system. Otherwise, hate speech algorithms will be more likely to label African Americans' speech as offensive than White peoples' (see Sap et al., 2019). This "label bias" (Hinnefeld et al., 2018; Jiang & Nachum, 2020), defined as the misannotation of training data, is a fundamental challenge in building a fair artificial intelligence system. Practitioners and scholars define *machine learning performance* based on its prediction accuracy, but if the ground truth that an algorithm predicts is invalid, whether its prediction is effective becomes a secondary question.

Without considering this data-generation process, a fair and automated hate speech detection system cannot be built. Focusing on the data-generation process

requires thinking about power because certain individuals and groups set boundaries around hate speech, and these norms influence hate speech annotation. In this vein, this chapter first discusses how power, hate speech, and automated hate speech detection systems are deeply interconnected. It then examines how the intersectional lens (i.e., a focus on power dynamics between and within social groups) helps identify bias in the data sets used to build automated hate speech detection systems. The chapter enriches the discussion of the obstacles to building a fair automated hate speech detection system and how to overcome them.

2 Bias in machine learning and hate speech detection

Bias in a machine learning application is usually defined as a residual category of fairness (for a review of the various definitions of *fairness* in machine learning applications, see: Gajane & Pechenizkiy, 2017; Corbett-Davies & Goel, 2018; Mitchell et al., 2021). A machine learning model is biased if it performs unevenly across subgroups, based on their protected features, such as race, ethnicity, and sexual orientation. Because a model's uneven performance can be defined in many ways, many definitions of *fairness* exist. For instance, if one's definition is *demographic parity* (Dwork et al., 2012; Feldman et al., 2015), in the ideal world, a predictive model should demonstrate an equally positive rate across demographic groups. Another influential metric is *equality of opportunity*. Under this definition, a machine learning model is *fair*, in a binary classification case, if its predicted outcome has equal true positive rates across demographic groups when $y = 1$ and equal false-positive rates when $y = 0$ (Hardt et al., 2016, pp. 1–2). From this conceptual perspective, a bias exists in an automated hate speech detection system if a certain racial group's speech is labeled *hate speech* more often than others'.

These mathematical definitions are convenient tools to assess how predicted outcomes may influence the welfare (allocation harms) and representation (representational harms) of a particular group compared to other groups' (Crawford, 2017; Barocas et al., 2020). Nevertheless, these "outcome-focused" indicators are limited because they do not inform researchers of how these outcomes were generated.

The concern regarding the data-generation process is particularly critical to understanding the elements missing from the current discussion on bias and fairness in machine learning. In empirical social science research, if an outcome

is biased racially (e.g., racial disparity in income and poverty), an attribute of race influenced the outcome (Holland, 1986; Greiner & Rubin, 2011; Sen & Wasow, 2016). For example, Bertrand and Mullainathan (2004) measured racial discrimination in the labor market by sending fictitious resumes in which job applicants' names varied. The field-experiment results indicated that candidates with White-sounding names (e.g., Emily and Greg) received more callbacks for interviews than Black-sounding names (e.g., Lakisha and Jamal). In this example, researchers were interested in estimating the effect of name attributes on resumes that may cause people to perceive a job applicant's race differently. In contrast, if machine learning applications' outcomes are biased racially, their models perform poorly for one racial group compared to others. Unlike in the earlier social science example, in this case, the machine learning literature does not focus on what caused the disparity in model performance across demographic groups that could exacerbate existing socioeconomic inequities (Kasy & Abebe, 2020).

To understand bias in machine learning applications and its origins, scholars and practitioners must understand that machine learning applications are embedded in society (Martin, 2019). Machine learning models depend on data for their performance, and a particular algorithm may outperform others, depending on the characteristics of the data sets it uses and the tasks it performs. Humans are involved in both generating training data and defining these tasks, and these decisions are susceptible to long-standing explicit and implicit human biases. Therefore, bias in machine learning applications, including automated hate-detection systems, encompasses a wide spectrum of societal and historical biases (Garg et al., 2018; Jo & Gebru, 2020). No panacea can solve this problem, and only a careful investigation of underlying causes can yield promising solutions.

Unfortunately, most solutions that have been presented focus on fixing the most immediate issue. For example, IBM released the "Diversity in Faces" data set in 2019 in response to criticisms of bias in the commercial use of computer vision algorithms because these algorithms discriminate against Black women (Buolamwini & Gebru, 2018). This effort is laudable, but an exclusive focus on training data sets insufficiently addressed the bias issue fully because representation bias is only one element among a broad set of societal and historical biases (Mehrabi et al., 2021). The more fundamental issue is not that training data sets lack sufficient amounts of Black women's faces but, rather, why this practice was accepted and not questioned in the first place. The main concern in this regard is power—not

the extent of observations related to different racial groups. Therefore, the larger social environment that defines what kinds of training data and labeling processes are acceptable must be investigated. This investigation is particularly necessary when training data are generated through normative judgments, which are highly susceptible to bias (see Bocian et al., 2020, for a recent review on this subject in social psychology).

Measurement is an issue related to this label bias, and it is also fundamental to making automated hate speech systems fair. *Objective ground truth* in hate speech data sets is difficult to define. If the goal of building a predictive model is differentiating between cats and dogs, a consensus could easily be reached on essential features that help make sound predictions (Deng et al., 2009). However, hate speech is part of a societal norm. What comprises hate speech varies across groups and over time, and its definition has become a contested political issue (Walker, 1994; Gelber, 2002; Bleich, 2011). Power relations establish such norms and, thus, determine who can say what comprises hate speech. Political stakes are involved in deciding that some speech is acceptable and other speech is not. If my group's speech is labeled hate speech and other groups' is not, the odds of my speech eliciting a political and legal toll are higher than others'. In a hierarchical society, power relations are unequal, and these relations determine who shapes rules and norms (Lukes, 1974). Therefore, a subordinate group's speech is more likely to be labeled *hate speech* than a dominant group's (Maass, 1999; Collins, 2002; Campbell-Kibler, 2009).

In the machine learning literature, researchers have circumvented this measurement problem by assuming either that well-defined ground truth exists or that the best approximation is available through social consensus (Dwork et al., 2012, p. 214). This assumption is convenient for building a compact theory, but it presents an important obstacle to be acknowledged in practice. To acknowledge the relationship between power, normative judgments, and hate speech labeling, researchers should recognize how the definition of *hate speech* is established socially. If ground truth is generated through an unequal social process, then making predictive models' performance similar across demographic groups is insufficient to make an automated hate speech detection system fair (Blodgett et al., 2020).

In principle, fairness in hate speech detection systems can be accomplished by promoting greater transparency and inclusion in building such detection systems.

2.1 Transparency

Researchers should acknowledge that hate speech is a contested concept and that some individuals and groups have more power to define *hate speech* than others. They should also provide a position statement in their research that describes why they define *hate speech* in a particular way within the context of their research background. For instance, researchers can construct *hate speech* as a categorical or continuous variable, or as a single-dimensional or multi-dimensional concept. They should explain why their definition is more appropriate to their research than other definitions. Model cards—a documentation tool for fair machine learning—helpfully illustrate this approach (Mitchell et al., 2019).

2.2 Inclusion

Furthermore, researchers should include people most likely to be harmed from automating hate speech detection in the development process so that they can provide critical feedback on data-collection and -annotation procedures (Frey et al., 2020; Halfaker & Geiger, 2020; Katell et al., 2020; Patton et al., 2020). This participatory approach is essential from ethical and scientific perspectives. These individuals possess deep knowledge of what speech targets them and what part of their speech practices could be mislabeled as *hate speech*.

Practicing these principles requires considering power in two steps: first, how does the dominant group define *societal norms* (between-group power relations), and second, how do these societal norms marginalize particular segments of subordinate groups (within-group power relations)? Clarifying these points helps identify which of researchers' assumptions should be transparent and which members of marginalized groups should be invited as research partners. In the next section, I discuss how the intersectional approach helps raise this type of awareness.

3 Why use an intersectional approach?

The intersectional approach helps explain what shapes people's perception of hate speech and how this bias is baked into data sets used to train hate speech

detection algorithms. This approach to hate speech differs from the approach that focuses on hate speech analysis at the content level, according to which *hate speech* can be intersubjectively defined based on certain characteristics (for a discussion of distinctions between these approaches, see, e.g., Sellars, 2016, pp. 14–18). It also differs from a similar approach that focuses on social identity theory (Tajfel, 1970; Tajfel & Turner, 1979; Brown et al., 1980; Perreault & Bourhis, 1999). According to the social identity approach, people are easily motivated to define group boundaries, favor their in-group, and denigrate their out-group; as a result, annotators are more likely to label speech by their out-group's members more negatively than speech by their in-group's members (Binns et al., 2017; Geva et al., 2019; Al Kuwatly et al., 2020). The solution to reducing label bias in this context is to recruit members of different groups as annotators (e.g., White and Black people, men and women). Then, when aggregated, the biases of annotators from different backgrounds would cancel each other out.

However, this approach raises another question: How should we define *diversity*? The above approach works only if the members of a particular group have strongly homogeneous opinions on hate speech. In practice, homogeneity means that if a researcher is investigating racial bias, then they should assume that other forms of bias—such as gender bias—do not exist. This assumption is unwarranted if different axes of discrimination (e.g., race, class, and gender) intersect and make a segment of a subordinate group more marginalized than other segments.

For instance, Cohen (1999) demonstrated how the intersection of race and sexuality explains African American communities' unwillingness to mobilize against the acquired immunodeficiency syndrome (AIDS) epidemic despite these communities' long history of involvement in racial justice movements. Racial elites (e.g., Black pastors) intentionally avoided including the AIDS epidemic in their political agendas because they did not want their groups' moral reputations tainted by the stigma attached to Black LGBTQ communities and their presumed relationship with the AIDS epidemic.

Although Cohen's research does not speak to hate speech analysis directly, its main insight—marginalization within a marginalized group—is relevant. Suppose a hate speech data set contains a significant volume of hate speech that targets members of the Black LGBTQ community in the United States and researchers recruit racially diverse annotators to build an automated hate speech detection system. Such an initiative fails to consider the gender dimension of the potential

bias issues within a racially marginalized group. Consequently, such an automated hate speech detection system remains vulnerable to societal and historical biases because hate speech targeting Black LGBTQ communities is highly likely not to be labeled *hate speech*. Even Black annotators might avoid labeling such attacks as *hate speech* because their community leaders had not addressed this problem publicly. These annotators might not recognize how problematic this form of speech can be.

In this case, the key to understanding the data-generation process is to think about power relations in the contexts of between- and within-group power relations (Crenshaw, 1990; Blodgett et al., 2020; Kasy & Abebe, 2020). A dominant group creates prevailing societal norms that condone certain sexual relations but not others. These norms define which thoughts, speech, and behaviors are acceptable within subordinate communities if they want to maintain their (moral) reputations in society at large. Depending on how this boundary is constructed and reproduced, some aspects of marginalization may be acknowledged more publicly than others.

4 Concluding remarks

Making fair automated hate speech detection systems requires a deeper understanding of who decides what comprises hate speech. Machine learning algorithms are powerful tools for detecting hate speech at scale, but an oversight remains. These models are trained with labeled data that are susceptible to historical and societal biases—a particularly acute problem in hate speech analysis because labeling hate speech means deciding what speech violates social norms. But who decides what comprises hate speech? If practitioners and scholars do not understand how people perceive hate speech, some groups' speech will be more protected than others.

To tackle this problem, I propose two principles. First, the transparency principle emphasizes acknowledging *hate speech* as a contested concept and understanding that some people have more power over its definition than others. Providing a position statement that describes why one *hate speech* definition is preferred over others is important to increase the transparency of the model-building process. Second, the inclusion principle underscores that including people who are most likely to be

harmed by hate speech in the creation of automated hate speech detection is crucial so that they can influence data-collection and -annotation procedures (Frey et al., 2020; Halfaker & Geiger, 2020; Katell et al., 2020; Patton et al., 2020). This participatory approach not only improves hate speech detection systems' accuracy but also makes the whole model-building process more democratic.

In practice, taking an intersectional approach (i.e., focusing on power dynamics between and within social groups) is essential to understanding how people's perceptions of hate speech influence their data annotation. For practical and research purposes, assuming that only one form of bias (e.g., racial bias) exists, while other forms (e.g., gender bias) do not exist, might be convenient. However, in reality, these various bias axes intersect, causing one segment of a historically disadvantaged group to suffer from marginalization more than other group members. For this reason, understanding hate speech requires understanding marginalization in both between- and within-group contexts (Kim et al., 2020).

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