UNIVERSITY OF AMSTERDAM
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Infrastructural Fiasco in Digital Space?: A Study of Prejudice in Everyday Use of "KindrGrindr"

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Abstract

Preceding studies on gay dating applications have primarily focused on user's everyday practice and its associated ethnical and social implications (Wu and Ward, 2018). That being said, little is known about how technical affordances, and in particular algorithmic infrastructures can break and form its consumers' habits and opinions. This project investigates Grindr, the world's largest social networking application for queer individuals with a focus on dating, so as to explore the role of algorithmic features in mediating, shaping and engaging with "biased" and "discriminative" dating choices. With particular concerns on its "toxic technocultures", that is, sexual identity issues push against diversity and multiculturalism on the techno-socio networks, this research intends to unveil Grindr's user-centred design features (such as race-based filter functions) that can not only navigate dating outcomes but prime these problematics. In doing so, this paper distinguishes two sections. The former explores both implicit and explicit representations of sexual racism on Grindr and conceptualises interpersonal bias in the practice of user-centred design. The latter deals with the power of algorithmic processing, in terms of its manipulative user guidance and intersective data cultures. Positioning itself in the realm of social-computing, this project proposes a critical and empirical insight into Human-computer Interaction (HCI) and User-experience Design (UXD) industry in the LGBTQ+ sphere and suggests appropriate methodological design schemes to work towards a more unbiased online dating culture.

Keywords: Queer human-computer interaction (HCI), dating app, algorithmic bias, User-experience Design (UXD), gay men

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Platformed Racism

The internet has become an essential space for the sex and dating lives of many gay men. Changes in mobile dating and hookup platforms, or "intimate platforms" (Hutson et al., 2018) continue to facilitate sexual encounters in the form of digitized communications. For example, since launching on 25th March 2009, Grindr has grown into global dominance in the online dating industry for LGBTQ+ customers, with about 3.8 million daily active users worldwide (Clement, 2019), and it has become increasingly common for gay men to cite Grindr as their help to meeting their first male partners (Singer et al., 2017). Such prevailing and mounting popularity of internet sex and dating amongst gay men has nurtured not only interest but also concern on the online dating culture. Previous research reviewed many issues that originate from, or are in association with the use of Grindr: its negative influence on gay men's interpersonal relationships (Wu and Ward, 2018); the increasing misinterpretation of user's intentions and constraints on their related behaviors (Blackwell et al., 2014); a higher risk for HIV acquisition or transmission (Landovitz et al., 2013); and so on. This research shifts the attention to another salient aspect of Grindr harm: bias and discrimination based on race or ethnicity in the practice of seeking potential partners.

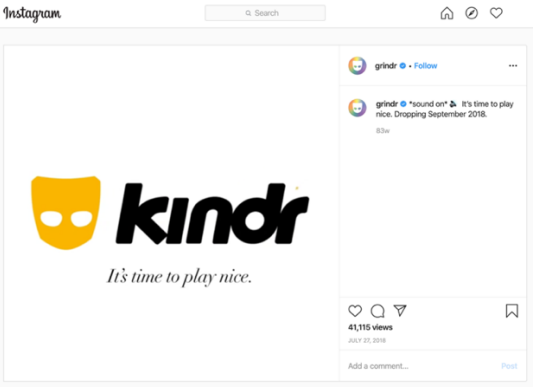
Grindr, as an online "hook-up device", can mediate and modify the dating and sexual practices by producing connectivity and constructing sociality with(in) its technical systems (Blackwell et al., 2014; Callander, 2013; Race, 2015). The central feature underneath the app: algorithms plays a vital role in articulating the aforementioned issues. For instance, some research has been published on the subject of discrimination and technical affordance and illuminated the interconnected relationships (Turizo, 2018; Wang, 2020), while others clearly pointed out that particular design features of one platform do contribute to inequality by empowering prejudicial modes of thoughts of action, such as race-based matching algorithms and searching tools during design practices (Bivens and Hoque, 2018; Hutson et al., 2018). It is believed that such racism programmed into the data infrastructure of dating apps has become the normal.

This algorithmic-mediated racial inequality can be seen in aggressive textual messages, hyper-racialized symbolic icons, and explicit filtering functions. In the summer of 2018, Sinakhone Keodara, an Asian-American Grindr user, brought such issues to the public's attention by planning a lawsuit to stop "sexual racism" on this platform. This came as a direct result of the company allowing offensive and dehumanized language to appear on users'

profiles, for example: “NOT INTERESTED IN ASIANS” or simply “NO BLACKS” (Jones, 2016). Media outlets described Grindr as a “breeding ground” that perpetuates racism against marginalized groups.

(Figure 01. Screenshot from Sinakhone’s twitter account *@frogseatmoon*)

Grindr responded to such an allegation by initiating a promotional campaign named “KindrGrindr”, the “kinder” version of Grindr (2018). Accordingly, the company takes some measures to combat racism such as prohibiting discriminative photos being published in user’s profile bio (“KindrGrindr”, 2018). In spite of this, some journalists working for LGBTQ equality use the word “scam” to portray their continued discontent with the app (Mosqueda, 2018) and question the problem of internalised homophobia (e.g. feminine gay men being considered undesirable) as well as sexual racism due to Grindr’s problematic infrastructure design.



(Figure 02. “KindrGrindr” advertisement on Instagram)

A macro-level theory of STS (Science and Technology Studies) argues that technologies by nature are neither inevitable nor neutral but can establish their products in certain contexts (Stanfill, 2014). In Grindr’s case, gay men’s dating norms and outcomes are determined by what Grindr does with its technical services, which are fundamentally made up of algorithms. However, the primitive operation of such algorithms is not simply confined to the binary resources (i.e. 0 and 1) but varies in many aspects such as classifications in alphabetical order (Totaro and Ninno, 2014; Wang, 2020). These “sets of pre-defined steps” (Kitchin, 2017) are able to steer users to process instructions/data and generate an output and

configure individual users' or user communities' social lives in this agency (Weltevrede and Jansen, 2019; Wang, 2020). However, new media scholars could remain inclined to disagree on impactful app structures by stating that the utilization of these given technical functions are not only privatized by developers but also by users themselves (Wang, 2020). A prior assumption on current racism controversy proclaims that app design tends to be geared towards engineering racial justice related to inequality (Bivens and Hoque, 2018; Hutson et al., 2018; Matamoros-Fernández, 2017).

The effect of app design and data infrastructure on racialized identities and practices has become a complex and consistently changing field of research. Currently, primary academic sources take on a socio-cultural viewpoint to emphasize the unevenness in the online dating world, such as the "toxic honorary and favorable whiteness" (Bedi, 2015; Callander et al., 2012), and look closer at the interaction between technical features and users (Race, 2015; Wang, 2020); seldom do they underscore the significant role of user-experience design (UXD). Therefore, in order to understand how Grindr actually structures its design affordances and thereby gets around unsolicited algorithmic dating outcomes for its users, this paper conducts an all-round evaluation of Grindr, regarding the polysemous "user experience". On the one hand, the term refers to Grindr resident's actual dating experiences on/related to this platform; on the other hand, it connotes how users experience this product from "physical, sensual, cognitive, emotional, and aesthetic" perspectives (Forlizzi and Battarbee, 2004).

Subsequently, this exploratory approach to research focuses more attention on the technical components of Grindr that might portray potential sexual racism and prejudiced dating goals. It aims to reflect on the interrelation of algorithms, app-specific features and socio-technical ramifications with regards to a case study of a specific piece of software. Grindr is chosen due to its sophistication in the dating apps market and popularity among gay men demographic. On that account, this project proposes the following research questions to investigate the participation of the ever-important role of user-centered design and to review the effectiveness from that design. Additionally, it hopes to draw possible blueprints that help to resist bias and discrimination in (re)designing technical systems. These central questions are:

1. *How is race discrimination or racial bias programmed into User Experience Design (UXD) on the online dating application* ***Grindr****?*
2. *How does Grindr's design discourse frame and prime sexual (dating) preference, in terms of race and ethnicity?*

This dissertation is divided as follows: the first part looks at the theoretical background of online dating norms and the implicit and explicit representations of sexual racism, discussing the main debates on algorithmic bias on dating apps, and subsequently presents several principle aspects of the complexities of Human-Computer Interaction (HCI) theories. The second part concentrates on empirical methodology such as the walkthrough methods to research UX design, demonstrating a quantitative (i.e. Python-powered sentiment analysis) and qualitative (i.e. close-reading) content analysis of user feedback, and enriches research data in the Netherlands with five semi-structured interviews. The third part displays the findings and reflections and secures them through the aforementioned inductive approach to peruse captured data, viz., the documented tweets on the topic #KindrGrindr and supplementary interviews. The final part not only concludes the primary results but also offers suggestions to this field and its future.

Literature Review

This section summarizes some previous research papers relevant to this project and reviews key theories and concepts that relate to the two themes of computer-mediated race discrimination and User-experience Design, from a socio-cultural-technical perspective. Firstly, it explores some prominent theories that attempt to explain the complicated race-related dating norms for gay men and establish the working theoretical foundation that underpins the research, that is, a false dichotomy between sexual preference and racism. Second, it discusses the relevance of algorithms and bias and discrimination surrounding the algorithms across digital platforms, with reference to (in)direct socio-cultural implications. Third, it looks at the latest Queer Human-Computer Interaction approaches within the realm of social computing and opens up the scope of human factors engineering in a more critical and dynamic view.

2.1 Dating on the Web: Sexual Preference and Sexual Racism

One heated debate within gay men's community is about "sexual racism" and the discourse of racialized attraction appears to be apparent and obvious in online settings (Callander et al., 2016). For instance, people utilise their sex and dating app profiles to describe their racialized preferences through symbolic or textual languages, such as "WHITE jump front to the line" (Callander et al., 2015; Robinson, 2015) and this contentious partner-seeking activity often ends up in two labels: preference and prejudice (Allen, 2017).

Although the research on the normalization of racial preference as a particular dating choice is prolific and many of them account for it in the name of "sexual desire" (Bedi, 2015; Thai et al., 2019) and in conjunction with "sexualization" (Robinson, 2015), hardly do they offer a clear definition in terms of dating culture. Hence, such a phenomenon is often intertwined with another term: sexual racism, since both refer to looking for potential romantic partners in relation to perceived racial identity (Callander et al., 2015). Initially, Stember (1978) defined the term as "the sexual rejection of the racial minority and the conscious attempt on the part of the majority to prevent interracial cohabitation." It is an inclination towards or, more strikingly, against specific races and often considered as being a specific form of racial prejudice. Due to the complex process of rejection, in modern dating norms, either on dating

apps or in real-life social settings, its usage frequently takes place through a disguised label of "race as just a preference" (Cunningham, 2018; Svendsen, 2013).

In most cases, sexual racism connotes racially discriminative activities and behaviors in which racial hierarchy or stereotypes are engraved and represented (Rafalow et al., 2017). Unlike other sexual bias regarding characteristics on human beings such as height or body shape, sexual racism refers to a prioritization of dating choices based on nothing but a racial favoritism to construct relationships (Bedi, 2015). Broadly speaking, it can be seen as reinforcing socio-cultural and historical importance that advocates for the aforementioned hierarchy and is embodied in non-romantic engagement besides other social engagements like employment. According to researchers (e.g. Bedi, 2015; Moholt, 2019), sexual racism is able to cut down opportunities that are beneficial to primary social goods, that is, "[…] a rational man wants whatever else he wants" (Rawl, 1999); on top of this, it also diminishes the capacity for making right and wise decisions. As a result of this, the revised chances intervene in the dating results of to-be lovers.

Scholars such as Robinson (2015) have investigated the characteristics and the nature of preference and prejudice to delineate concepts. For example, slightly differing from sexual racism, sexual preference has, somewhat surprisingly, not been linked with racial fetishism to the same extent, that is, a philosophy of objectifying ethnicity to fulfill personal wishes and expectations (Cunningham, 2018). The word "fetish" points to clear and assured attitudes, whilst preference can be both positive and negative, depending on personal thoughts and opinions on ethnicity (Anderson, 2019). From personal dating narratives, the negative fetishization is commonly replaced by positive attraction in the theme of racialized sexuality and such peculiar preferences are occasionally interpreted as a special admiration for some persons' culture, on the subject of race appreciation (Paul et al., 2010). In that specific case, individual preference could have the potential of being dangerous for the so-called racialized partner discrimination actions like the aforesaid racialized exclusion. Likewise, critiques on the difference are also deduced from the significant value of sexual freedom – an individual's right to select a partner of their choice (Callander et al., 2015). Its supporters, accordingly, operationalize a libertarian idea of choice through dating web services and raise more compelling questions on the properness of applying racism in the context of human desires.

Subsequently, no matter one's racial prejudice or preference, it is suggested for same-sex daters that cyberspace is preferred for interracial romance and thereof interracial cohabitation (Lin and Lundquist, 2013; Rafalow et al., 2017). Accordingly, qualitative studies have begun looking into such phenomena amongst LGBTQ+ communities, with specified

focus on gay men's dating norms. For example, race-based sexual stereotyping is known to happen a relatively large amount in the realm of dating advertisements and online dating app profiles (Paul et al., 2010). Also, many of them have revealed that race does matter and plays a functional role in shaping their dating beliefs and expectations (Allen, 2017; Callander et al., 2016; Jones, 2016). As a consequence, problems such as marginalization and exclusionism (Callander et al., 2012) and psychological harm (Anderson, 2019) roll into the public and amplify internalized ideas of racial classification and partiality, from actions to choices.

Up until present times, irrespective of the debate on a benign personal preference or a severe category of racism, scholars relate this dating discourse to the matter of favor or disfavor to a given racial group (Anderson, 2019) and, as a result, shines a light on the fact that racial preference can be seen as a sort of ultimate "paradox" and disclosing it in any capacity is deemed as reflecting racism, even in the domain of attraction (Thai et al., 2019). In this sense, no difference from outright discrimination can be identified (Anderson, 2019; Lin and Lundquist, 2013; Smith, 2017). In his research on personal preference as a new racism, Robinson (2015, p.317) calls to mind:

"neoliberal discourse of personal preference effaces the larger cultural assumptions that are influencing people's interpersonal and psychic racial desires, furthering an erotic new racism in this digital age."

2.2 The relevance of Algorithms in Biased Dating Actions

Presently, racial bias seems rife in online dating and attracts scholarly attention to delve into the knotty relations between pre-existing biases and their simulacra on dating apps and platforms (Mcmullan, 2019; Matamoros-Fernández, 2017). Several scientific research projects have attempted to explain a new finding that technical structures and their behind algorithms on one dating platform are never neutral. For example, the notion of "algorithmic culture" (Striphas, 2015) constructs a solid theoretical framework, which denotes a strong tie between "algorithms" and "the encompassing yet established discipline of cultural sociology" (Roberge and Seyfert, 2016). Striphas (2015) makes sense of this category culture through the observation of how human beings "delegate the work of culture, viz., the sorting, classifying and hierarchizing of people, places, objects and ideas, to data-intensive computational processes". The participation of technical agencies in such events rewrites the "logic of big data" through its associated computing activities, and thus alters "how culture has long been

practiced, experienced and understood" (Striphas, 2015). Nevertheless, the rather novel nature of this culture shares the same key value with other cultures: "it is plural, commensurable and meaningfully performative" (Roberge and Seyfert, 2016).

In the era of algorithms, a necessity appears to be possessing knowledge of this new culture since "our everyday practices are increasingly mediated through and entangled with technologies" (Willson, 2017). Recent writing illustrates how algorithms themselves can act like an interpretative key of modernity and rationality by means of their practical connotations and effective calculations (Totaro and Ninno, 2014) and offers an opportunity to pursue a deeper understanding of "the social power of algorithms" (Beer, 2017). In his analysis of *Blued,* a Chinese gay dating app, Wang (2020) conceptualizes the idea of an "algorithmic sociality" to explain how queer users are structured in the form of varied metric filters (e.g. personality tags) in order to demonstrate their representations of the self as well as dating goals and aspirations. The process, deemed "algorithmic formation", shapes a user's sexual identity to a certain extent, at least in this realm. Rather strikingly, as a technical and material representation, algorithms are instrumental to review social ordering and sorting procedures in numbers of ways: technically, computationally, mathematically, and so on (Kitchin, 2017). In reality, many empirical examinations on the critical use of algorithms are carried out by humanitarian technology scholars and many of them (e.g. Grosman and Reigeluth, 2019) focus on algorithmic normativity and bias.

A growing subfield of this research shows particular interest for the "technological mediation of sexuality and romantic relationships", especially on dating platforms and hookup apps (Albury et al., 2017; Blackwell et al., 2014; Roth, 2014; Wang, 2020). The datafication of this algorithm-mediated dating experience and subsequent actions leads to many ethical concerns and judgements. These biases could be derived from active audiences themselves (Wang, 2020), yet primarily appear to be powered by dating apps' algorithms (Mcmullan, 2019). Similar to Wang's study of *Blued* (2020), Bivens and Hoque (2018) demonstrates that Bumble breaks down its self-declared "feminist" and "gender-equality" image in its built-in data infrastructures and algorithmic logics such as the reliance of "ladies ask first" design on White Femininity stereotypes. Tinder researchers uncover a fact that a "wise use" of its collective features and collaborative filtering calculations can twist its matching systems and hence obtain preferred recommendations (Liu, 2017). Published in 2018, the project "Debiasing Desire: Addressing Bias and Discrimination on Intimate Platforms" (Hutson et al., 2018) testifies public assumptions on algorithmic bias and synthesizes its representative

implications at many aspects, viz, the search, sort and filter tools, matching by algorithm, and community policies and messaging.

This somewhat subdued connection between racial bias and algorithmic bias is appealing to scholars' eyes as well, and as a result materializes "platformed racism" (Matamoros-Fernández, 2017, p.930):

> *"a new form of racism derived from the culture of social media platforms - their design, technical affordance, business models and politics - and the specific cultures of use associated with them."*

Such ideas confront the discourse of neutrality that is commonly characterized and widely labeled by many kinds of digital platforms (Anderson, 2019; Matamoros-Fernández, 2017) and evoke a reflection at many levels: from (re)programming algorithms, to (re)constructing data structures, to (re)designing platforms (Hutson et al., 2018).

2.3 Social Computing and Queer HCI

Social Computing is an interdisciplinary research area based on computing sciences and social sciences, concerning the study of social behaviors and contexts in connection with computational systems (Schuler, 1994). It explores and evaluates the intersection and interactivities of the two factors and draws closer attention to the (re)creation of social conventions through the use of given technologies (Dryer et al., 1999; Zhou et al., 2012). Such research usually involves a collective intelligence processing of social signals and human behavior stemming from digital platforms, incorporating a series of actions such as collection, extraction, visualization and so forth (King, 2010). On the website of *Interaction Design Foundation (IDF)* organization, Erickson (2014) proclaims that "social computing has to do with digital systems that support online social interactions." An often-seen example in e-dating is that online daters rely heavily on interaction (e.g. private chat) to communicate their identities and intentions (Wu and Ward, 2018), rendering the Internet as a set-up space for transferring data (Whitty, 2011) and resulting in the establishment of cybersex analysis (Livermore et al., 2011).

Presently, two trends in this research field can be distinguished: social science-oriented social computing and application-oriented social computing (Hao et al., 2018). Social science-driven computing, by its very nature, consists of social network analysis and computational

social science, covering themes like healthcare and disease dissemination (Cachia, 2008). Similarly, the objectives in the second subfield center around a set of particular applications that integrate social computing's methodologies and technologies (Hao et al, 2018). This subbranch is manufactured through the upgraded usage of group software, social software and social media (Lugano, 2012). Recently, academia's primary focus has shifted to studying social media-based activities for three reasons: firstly, social media such as Grindr and Instagram highlights the active interactions from their user themselves; secondly, it allows users to complete the aforementioned interactions by generating and consuming the contents other than on certain media platforms (i.e. high shareability and transferability of user-generated content); thirdly, the use of social media is often executed on varying electronic devices such as mobile phones or tablets which can reflect on the rapid development of Web 2.0 (Erickson, 2014; Hao et al., 2018; King, 2010; O'Reilly, 2007).

Regarding the significance of social computing, another relevant topic can be identified and brought into discussion: Human-Computer Interaction (HCI). To HCI researchers, this new paradigm makes it available to develop and improve the existing social (media) software and deal with new emerging issues (Ji, 2010). The definition of human-computer interaction (HCI) on *IDF* is "a multidisciplinary field of study focusing on the design of computer technology and, in particular, the interaction between humans (the users) and computers". With the rise of technologies such as smartphones, its research objects have been expanded from the computer-mediated desktop world to the cellphone-led mobile world (Hussein et al., 2019). Over the last few years, HCI has encompassed and overlapped with more areas such as user-experience design (UXD) and user-interface design (UID) with regard to theories and models from computer scientists, cognitive scientists and human factors engineers (Guo, 2017). Detailed knowledge of UX and UI design will be presented in later sections. To cut to the point, it is confirmed that "HCI was the forerunner to UX design" ("What is Human-Computer Interaction (HCI)?", n.d.).

Part of HCI community has developed special interest for queer communities, as LGBTQ+ people maintain their vivid presence and active participation on tactical web media such as various dating apps and websites (Carrasco and Kerne, 2018). Starting from an investigation into dating activities and hookups (e.g. Roth, 2014) and mental and physical health concerns (e.g. Landovitz et al., 2013), other topics such as identify formation (Light, 2011) and identity management (Hardy and Lindtner, 2017) call into play an innovative thinking on HCI and Queer/Gender Studies. An increased awareness and concern within HCI sphere points directly to the problematic process of queering on electronic tools, which might

have the potential to reinforce or undermine dangerous norms (Keyes et al., 2019; Khovanskaya et al., 2018). According to Hardy and Lindtner (2017), queer can be seen as "as an umbrella term to encompass lesbian, gay, bisexual, and other non-heterosexual sexualities". Taken into account their substantial contributions to the computing community, HCI researchers and designers are working towards an inclusive and reflective design world and hence gives birth to the novel idea of Queer HCI as a strand of queer theory. At the point, Queer HCI is more theoretical. In its theory- and queering-based strand, the theory functions as an analysis of and challenges the existing structures and norms regarding sexism and other discriminations (Light, 2011; Spiel et al., 2019). It calls for a reflection on the rigid classification of humanities into static forms through troubling design and practices (Light, 2011) and sheds some light on design thinking and critiques against a toxic status quo (Khovanskaya et al., 2018). For instance, dominant HCI design approaches embrace socially conservative notions and thus leads to many social challenges such as digital (re)production of inequality (Khovanskaya et al., 2018). By promoting diversity and altering normalization strategies in technology, Queer HCI research in a sense affords a lens to deal with negative impacts and assumptions in the contemporary HCI concepts and fight against biased algorithms such as gender binarism settings (Hawkins and Burns, 2018; Spiel et al., 2019).

As mentioned previously, Queer HCI is a concept in progress. The complexity of queer(ing) theories and unsorted affiliated cultural-technical problems stigmatize its application to the modern design industries (Hardy and Lindtner, 2017). An update on this brand-new technological philosophy informs members of computing communities to bear "deconstructionism and reconstructionism" in mind (Carrasco and Kerne, 2018) and takes into consideration the trendy "liberal" idea in queer cultures to advance current design practices, in terms of designing for particular identities or intersections of identities, subverting the biased structural and foundational relationships between users and products and moving forwards "anarchic" design artefacts (Hardy, 2019; Keyes et al., 2019; Light, 2011).

Methodology

The theoretical foundation of this project is built up through a thorough analysis of a socio-cultural phenomenon – the online sexual racism, with a fruitful literature exploration of its affiliated technological representation – the algorithms, and upon an insightful conceptual consideration in a larger context – the human-computer interaction. In light of all three cornerstones, this research delves into how Grindr's functional affordance, in terms of its filtering and tagging features, user interface elements (e.g. Gaymoji) and prescribes what the users are meant and thus expected to do, and thereby collects their dating outcomes, whether racially biased or not.

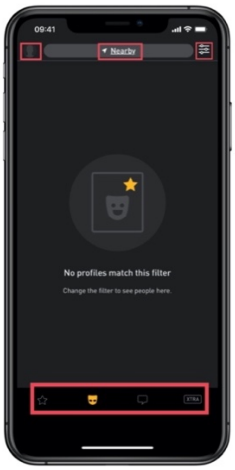
As this research is structured around human and machine factors to interpret gay men's dating behaviors, it is suggested to review Grindr's data infrastructure from both points of view. To achieve this, the case study documents functional features on Grindr's interface, captures user experiences from twitter on the topic #KindrGrindr and records five supplementary semi-structured interviews for database design. It accordingly suggests a mixed methodological attempt to operationalize content analysis, that is, a human-led close reading and a machine-based sentiment analysis of the aforementioned datafiles. In brief, this section walks through methods for software studies/interface analysis first, then shifts the direction to content analysis in the field of software studies, and lastly winds up in the discussion of informative semi-structured interviews.

3.1 The Walkthrough Method and Interface Analysis

"software studies approaches might characteristically tend to identify specific algorithms, articulate their genealogy, recognize and work with their char- acteristics, and see them as part of a larger assemblage one that is not in turn immune to the adventures of conceptual rigor." (Fuller, 2018, p.251)

Grindr's main user interface (seen in Figure 03) features seven noticeable buttons: from left to right, three menus on the top are user profile, location settings, and filter settings; four at the bottom are favorite, home, message and subscription (observed on 27 March 2020, app version 6.7.2 on iPhone OS system). This study primarily concerns two aspects of its interface/data infrastructure: user interface elements (e.g. Gaymoji) and filtering metrics that could possibly act on user experience, viz., dating outcome and using/user experience. For that reason, in

addition to statistical analysis of the performance of algorithms embedded in digital platforms, software studies in human sciences academia can rely upon the walkthrough method, which integrates cultural studies into science and technology studies (STS). Proposed by Light, Burgess, and Duguay (2016), this method provides an opportunity to build "a more detailed analysis of an app's intended purpose, embedded cultural meanings and implied ideal users and uses" (p.881) with a foundational collection of data. It helps to examine an app's interplay amongst its technical affordance, socio-cultural design discourse, and user behaviors.



(Figure 03. Grindr's main user interface)

The key value of the method is to apply empirical observation step by step and to document and annotate design features and user's activity. In detail, Light et al. (2016) recommend three procedures to maximize its value in use: "registration and entry", "everyday use", and "app suspension, closure and leaving". Following their instructions, the author signed up a new subscribed account on Grindr in Feb 2020 to go through its existing functions and save up any updates for later analysis. Henceforth, on the second stage: everyday use, the author bore "an analytical eye" (Light et al., 2016) in mind and thereof executed the app with consciousness to perceive nuances amongst the varying settings. For example, the author browsed the entire version history and took notes of every update log since then. Besides, the author clicked on the "XTRA" (extra) monthly subscription to unlock more features regarding the ways in which dating preferences are datafied. Such a payment also promised data collection by screenshotting the mentioned attributes. To avoid potential ethical breach, the entire preparation work was done carefully in consideration of "anonymity", which is also highlighted in Light et al.'s article (2016): "avoid interaction with users". In sum, before the departure and closure, the author managed to make thirty-one snapshots that cover detailed options in each sorting function and create six additions that capture several controversy Gaymoji elements.

3.2 Content Analysis in Software Studies

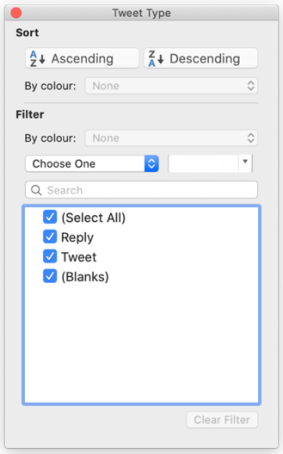
In theory, content analysis is a research technique used to analyze documents and texts and quantify the presence and meaning of certain words or concepts within such contexts (Bryman, 2012). These resources can be broadly defined as books, essays, interviews, newspaper's headlines, and so like, either in textual or pictorial forms. Generally, these materials can be in print or in digital or digitized documents. Such a tool is frequently employed in the realm of social sciences and human sciences, such as communication sciences and psychology studies, and much less seen in software (engineering) studies (DeFranco and Laplante, 2017). Since the research is concerned with how app developers design Grindr's data infrastructure through algorithms and thereby affects user experience and algorithmic dating results, it is advised to utilize this type of qualitative analysis to review users' feedback and its technical affordance (e.g. sorting menus). This research mainly relies on this technique.

3.2.1 Computational Methods: Twitter Research and Sentiment Analysis

In the field of new media research, Twitter is as a historical database/object for studying cultural and societal phenomena (Rogers, 2013; Vliegenthart, 2018). Thanks to The Library of Congress of the United States, all Tweets between 2006 and 2018 have been archived, which later helps to provoke a movement for Twitter from a well-preserved datafile to an open-access library.

Inspired by Rogers' article, this project thinks highly of Twitter's value as a contemporary archival medium and its relations to society. Therefore, concerning the exploration of Grindr's design and user experience, this study retrieved relevant tweets from twitter archive. To recap, Grindr initiated the KindrGrindr campaign to advertise its online dating environments. The author made use of the topic #KindrGrindr to locate user comments and download them with the help of Twitter API and Python (a programming language). In total, 3543 twitter threads were found online (timeline: 18 September 2018 to 31 January 2020). Data selection considered many principles such as language, completeness and types of tweets (Figure 04) and respected the moral standard of objectivity. For these reasons, the author applied the random sampling strategy and reorganized datafiles by removing irrelevant

categories (columns). After a careful selection process, 313 entries were saved for further inspection.



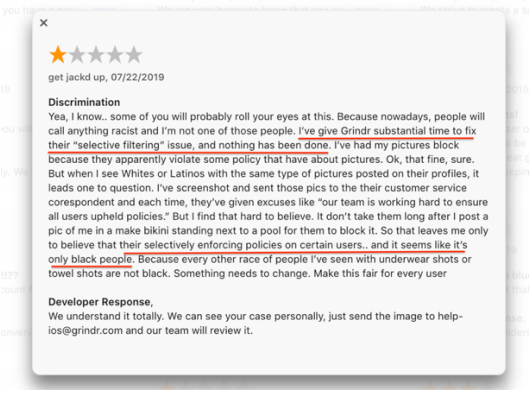
(Figure 04. An example of data selection work)

As concerns using/user experience on Grindr, this study introduces sentiment analysis to cope with quantified databases. As an automatic tool, sentiment analysis aims to extract and determine emotions from a text and returns the sentiment results in numerical scales (negative one to positive one) with computational mechanisms. Primarily, two ways to operationalize such analyses can be distinguished: the lexicon-based sentiment approach and the machine learning-based approach (Vliegenthart, 2018). For this project, the author decided on the first method and executed one of the best lexical based solutions: VADER to detect emotions. Developed by Hutto and Gilbert (2014), VADER (Valence Aware Dictionary and sEntiment Reasoner) uses a lexicon of words (supplied by predefined datasets) that can rate and assess sentiment. It is capable of performing data labelling tasks by analyzing the semantic orientation of a list of lexical features (i.e. words and phrase). In my case, there are three advantages of its application: first, VADER is an open-source, well-documented and specially-designed technology for parsing social media content; second, VADER-aided twitter research grows mature and many well-developed programming scripts become available on GitHub; and third, its methodological steps seem relatively handy and easy learning on the first attempt. Here, the complete coding scripts for tweets collection and sentiment analysis are presented in the *Appendix* section (see Appendix 7.2 and 7.3).

3.2.2 Close-reading Design Features in #KindrGrindr

Although the practical Python-based sentiment analysis might appear efficient, its efficacy and effectiveness remain doubtful for this project. As DeFranco and Laplante (2017) pointed out,

since the technical complexity of software studies involves many abundant human activities, qualitative content analysis might require precedence. To reduce mechanic errors and discover deeper meanings in the datafile, this research also implements qualitative content analysis through manual annotation (e.g. Figure 05). According to Macnamara (2005), qualitative content analysis reviews "the relationship between a text and its likely audience meaning" and features "the audience, media and contextual factors". It intends to identify the polysemy of media texts and tries to determine the very likely information associated with them. On this account, this technique asks for researchers' "reading and interpreting" actions to make sense of such texts (i.e. twitter data and Grindr screenshots in this project).



(Figure 05. An example of manual annotation of Grindrer's rating)

Due to the characteristics of time-consuming and insensitive of close reading, the author firstly carried out the aforementioned data selection work (i.e. reset random sampling in the database: tweet library) and generated 55 entities. To begin with data analysis, the author read through the 55 comments (topic: #KindrGrindr) and summed up frequently reported issues such as discriminative talks and inappropriate pictures. Afterwards, the author looked into Grindr ratings and reviews on the app market and marked up users' attitudes towards this dating environment. Along with the core concept of walkthrough methods and interface analysis, the author returned to the design features on Grindr and cross-examined user complaints, its functional affordance and everyday observation. As for the tool criticism, scholars (e.g. Herring, 2004; Macnamara, 2005) argue that this method relies heavily on subjective human reading and parsing information, which might lessen scientific reliability. Also, by nature, it usually welcomes a smaller sample of media content (e.g. 55 vs. 313 entries in this case), which appears to be unscientific and unreliable for some researchers. To balance, the combination of two methods seems to be an ideal attempt to fully understand user reports online.

3.3 Semi-structured Interview

Lacking specific evidence in relation to the research practice of using Grindr in the Netherlands, the project enriches the pre-processed dataset by carrying out five semi-structured, 25 – 35 minutes interviews with Dutch residents (i.e. self-identified racial minority gay men, age range 19 to 25) who continuously use Grindr in the Netherlands for at least 18 months. This semi-structured format is chosen due to her inspiration research on Gephi (a social networking and data visualization application): "it is effective when there is not a chance to interview people more than once and the time limits are important" (Jokubauskaite, 2018). In this study, such interviews can allow more personal spaces for users to narrate their experiences or convey their opinions that can reveal individualized attitudes towards Grindr use, regarding the discussion of racially biased activities and events. In a sense, this approach not only provides a few certain observational elements to the current analysis, but also makes some room for participants' subjective insights. In summary, two interviews were completed on-site. The rest three between March 2020 and April 2020, owning to practical constraints (the Covid-19 pandemic), were conducted and recorded in the medium of cellphones. The choice of medium (e.g. face-to-face, an Internet chat line) did not appear to affect the nature of the information gathered for this project.

The interview design aims to acquire a level of understanding user experience, primarily in terms of the satisfaction of dating outcome, app design, as well as socio-cultural reflections and technological perspectives on these features. A particular focus is placed on the dating process in relation to using the platform. Moreover, it works to fill in the gaps between theoretical findings of biased design and user attitudes towards their everyday practice. Also, it helps to narrow down the larger academic theme to a focus of the very relevant gay men feelings. As expert users, these interviewees are highly knowledgeable, and their views are important to frame the overall discussion.

During the interview, after being informed the aim of this project and the assurance of anonymity and privacy, respondents were asked to answer several open-ended questions. These questions are pre-formulated with concerns to two core topics: the socialization on Grindr and the evaluation on app design. For a detailed interview guide, please consult Appendix 7.1.

Investigating Racism and #KindrGrindr in Context

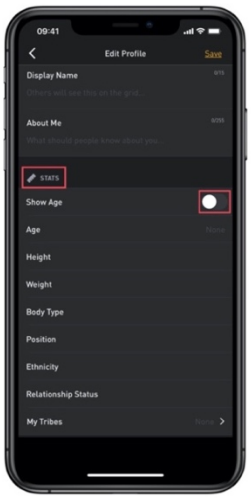
This research has been grounded in a systematic literature review and few inductive methodological approaches in order to investigate the Grindr app together with its associated disputable dating discourse. This section demonstrates more explorations of documented empirical data (i.e. #KindrGrindr tweets and interviews) and discusses them in the theoretical background from three perspectives: firstly, it reintroduces the very idea of human-computer interaction with its specific focus of user-experience design and its role in interpreting racially discriminative actions; secondly, it goes deeper in the field of UX design by characterizing the concept of affective design and concentrating on two elements: filter functions and Gaymoji that might confirm to biased dating results; thirdly, it calls attention to design ethics and draws up a few workable solutions from surveys to smooth out such salient issues.

4.1 UXD Theory: Ethical Challenges in Emerging Technologies

To open this material-semiotic data analysis, it is advisable to introduce the participation of UX design. Briefly covered in the literature review, UX design can be seen as a modern subbranch of social computing, grown out of Human-computer interaction (HCI) researches The definition of User experience design (UX) on *Wikipedia* (2020) is "the process of manipulating user behavior through usability, usefulness, and desirability provided in the integration with a product". Slightly differing from HCI researchers, UX designers tend to be practically focused rather than academically focused (Guo, 2017). Even so, both disciplines keep "human" – user experiences in mind. As for UX practitioners, the ultimate goal is not only to make a well-performed product but ought to bring positive emotions for customers by ways of device or interface interactions. By all means, UX design is considered a "human-first" action. As Guo (2017) summarizes, "one cannot design a user experience, only design for a user experience".

When users register a new account, Grindr ushers its new customers to finalize the enrollment through arrows and notifications. On its home page, one can see an avatar or a photo (e.g. headshot or body image), a screen name and a short biography called "About Me". To refine their profiles, one can disclose more personal information by filing out or opting for afforded features: STATS, EXPECTATIONS, IDENTITY, SEXUAL HEALTH, SOCIAL

LINKS. Under each name, users are allowed to display their choices in their own opinions, viz., the real data or "DO NOT SHOW". For example, the STATS unit (figure 04) accords with common gay dating forms including age, height, weight, body type (e.g. toned, average), position (e.g. top, versatile), ethnicity (e.g. Asian, black), relationship status (e.g. committed, dating), my tribes (e.g. clean-cut, daddy). In the EXPECTATION unit, there are three modules in relation to specific dating options: "I'm looking for" (e.g. chat, dates), "Meet At" (e.g. My place, Your Place), "Accept NSFW Picture" (i.e. stands for Not Suitable/Safe For Work, usually indicate explicit sexual materials or adult contents). As for the rest three units, Grindr leaves default options likewise for users' self-identification. On Grindr, with "step by step" guidance, users are encouraged to make public on their preferred personal details, which validates target-oriented dating activities. Wang (2020) regards this kind of registration process as a standardized algorithmic technique that shows the ways where technologies can translate non-calculable objects (i.e. the classification of gay men) into calculable data units, in the form of numeric numbers and non-numeric tags. Such technical mechanisms convey tight or loose socio-cultural meanings in gay men's dating world, with identified or identifiable references. The behind designing and developing processes hence seem to be relevant to reveal Grindr's design logics and reasoning systems for picking out "the best dating outcome" and strengthening racially discriminative events.



(Figure 04. A fragment of profile settings)

In a post-materialist's view, the challenge of designing such dating applications is to place the resulting experience right before the final product. For instance, Grindr developers need to be aware of gay men's dating norms to afford better technical services. The aforementioned self-datafication of gay men reflects how online dating industry quantifies and plays on same-sex dating preferences. During the interview, when the author asked, "Generally

speaking, what do you think of Grindr's design features?", four out of five interviewees showed positive emotions and the rest one held neutral attitudes (In his words: "Acceptable but ok"). To be clear, the author then asked for a rating point in Dutch grading scale (0 - 10). As a result, Grindr's design received an average score of 6.5, which showcases "amply sufficient" in the grade description table. In detail, all five active Grindr users brought up the following characteristics for the very first usage: "clear and handy instruction"; "explicit and straightforward tags"; "time-saving grid view". Particularly, interviewee Dollar and Brat (both are preferred names) mentioned that the given tags such as tribes (e.g. clean-cut, sober) allowed them to "pay less effort to determine potential dating or hookup partners based on appearance or self-defined personality". Further, when being asked to make comparisons amongst different gay dating apps like *Jack'd* and *Blued,* two interviewees used the word "simplicity and high clarity" to describe their common user experience (including registration and everyday use), while others felt "a bit reductant and obnoxious" due to a significant amount of pre-filling tasks before an actual use.

After explaining the notion of User experience design (UXD) to interviewees, the interview was moved to the second topic about socio-technological reflections on Grindr. The author made a start on questioning "Have you noticed or met any inappropriate information on Grindr in the Netherlands?" All five respondents nodded to come across racist profiles. As for personal experience, three of them (Brett, Ran and Conner) were surprised by "unexpected" nude photos or racially fetishized messages (in Dutch and English) and two (Dollar, Sino) experienced racism in the form of offensive memes and long texts. Further, the interviewer tried to associate aforesaid racially discriminative cases with Grindr's data infrastructure by open a question: "Have you ever considered that your current resulting experience took advantage of Grindr's data infrastructure?" The author later stated that previous research (Bivens and Hoque, 2018) illustrates how Bumble, a self-declared feminist app, seemingly fails to combat sexism. Interestingly, all five participants just commented that it is "an inspiring and critical way of studying racism in the online dating world" but none of them have personally thought of it. In spite of this, these five gay men agreed that Grindr's data structure and its technical affordance would, according to Sino, "definitely affect individual experience… could be technical failures and bugs or disappointed dating experience… but how Grindr functions remain puzzled to us (me)." In Brett's opinion (a six-year user, Dutch-HongKonger), on the positive side, these existing tags save gay men's much time and effort to introduce themselves in a new place; on the negative side, these pre-formulated settings seem to show how developers objectify and confirm their acknowledgment of gay men's culture. He then added,

"these features assumed a gay man's dating experience ahead, regardless of our (users) actual feelings."

When it comes to the networked topics such as designing data structure and understanding mechanic bias and human behaviors in the context of queer men's dating world, Allen (2017) appears to voice to the status quo: "sexual racism in gay online dating could be a self-perpetuating cycle, with apps encouraging its perceived social appropriateness by virtue of their very design". As a result, new questions like "is the onus on dating apps to counteract these prejudices?" (Mcmullan, 2019) seem to be necessary and crucial to confront and tackle these controversial and contested issues. From reviewing these empirical evidences, it becomes apparent that these digital dating services' data infrastructure and algorithms are able to generate or account for discriminatory activities and prejudiced dating outcomes (Albury et al., 2017; Bivens and Hoque, 2018; Wang, 2020; Weltevrede and Jansen, 2019). In other words, UX process is capable of framing and priming events like sexual racisms in the online dating industry.

4.2 UXD Practice: Grindr Interface Evaluation

As already stated, Grindr's owners hope to promote diversity and advertise equality characteristics after the latest campaign of *KindrGrindr*. From a UXD perspective, in 2017, Grindr updated new options for users who identify as transgender and gender non-conforming or choose a preferred pronoun. However, some design features are still maintained and conditioned while having the ability to attribute to potential racial inequality cases. In the following discussions, the author gives closer attention to the engagement of filtering metrics and Gaymoji in resulting "unwelcomed" user experience and biased dating outcomes.

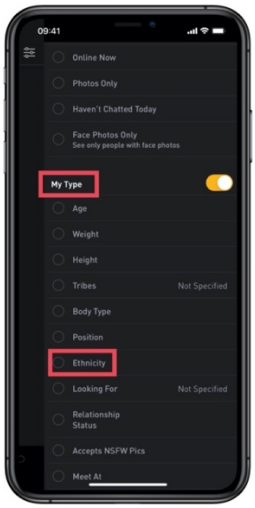
4.2.1 Filtering Metrics

	Positive Tweets	**Negative Tweets**	**Overall**
Quantity / Num.	129	99	313
Max Value	0.96	-0.01	0.96
Min Value	0.02	-0.97	-0.97
Mean Value	0.4	-0.33	0.17

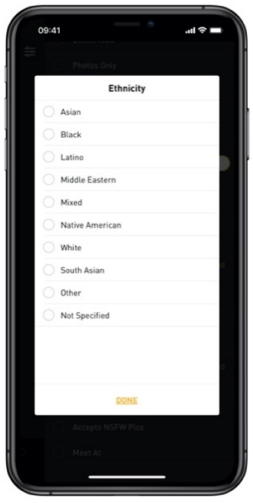
The table above is an overview of automatic sentiment analysis of #KindrGrindr tweets.

Demonstrated in the methodology part, the sentiment score range of VADER sentiment technique is negative one to positive one. Broadly speaking, 313 Twitter posts showcase a slightly positive attitude towards #KindrGrindr events, with an average score of 0.17. That said, due to the weakness of machine detecting process, for instance, it heavily counts on negation keywords "not" and "no", the author also performed a human-reading of #KindrGrindr tweets, with particular focuses on "neutral" tweets (i.e. sentiment score = 0). During the reexamination, there is a distinct pattern rising out of surface, that is, many posters stressed their uncomfortableness of Grindr's filtering systems and its negative influence on "KindrGrindr".

The user data on the registration stage has been reorganized and built into the filtering systems (see figure 05): basic filters and advanced filters (renamed as "My Type" in the membership account). In total, there are 15 subjects and each of them contains multiple data options, which promises Grindr customers to tailor their preferred dating goals by clicking on a certain filter metric and refining its given values. In such ways, user's dating outcome hence can be altered by these algorithmic functions. Although users themselves can be considered active roles in the algorithmic formations of dating results, what really appears to be a main point of conflict and issue for these posters is the present technical service of the race/ethnicity-based filter feature.



(Figure 05. An overview of filtering functions)



(Figure 06. Race-based filter settings)

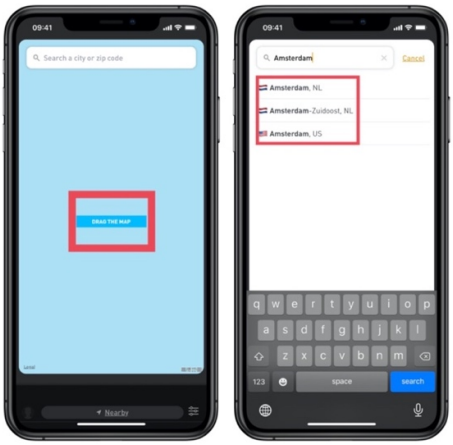
Under this subject, one can see ten prepared racial options (Figure 06) in an alphabetical order: "Asian", "Black", "Latino", "Middle Eastern", "Mixed", "Native American", "White", "South Asian", "Other", and "Not Specified". From the author's observation, the choice of "Other" and "Not Specified" seldom appears on one's profile and in the most scenarios, these two labels come along with the representations of global citizens (i.e. a globe icon or a written

pronoun). As for Grindr reviewers, many of them believed that it is a common form of excluding and rejecting gay men of color or ethnical minority and such a function makes sexual racism available. One poster wrote: "my anecdotal experience told me that I will be much likable and popular only if I switch my race from Native American to Mixed". Researchers (e.g. Anderson, 2019; Smith, 2017; Robinson, 2015) have studied that people often mix the idea of racial preference and sexual racism in partner-seeking actions and some dating results are highly linked with racial fetishism. But the ways this racially biased dating activities manifest online are still undercover. The author noticed that some Grindr users experienced erotically objectified after marking their race and left comments like "is this what you (Grindr) called inclusivity and equal treatment?". More commonly, gay users expressed their worries and disappointment regarding current Grindr-involved dates, for they found Grindr's settings inflaming racially targeted dating environments: to them, the most desirable characteristics in Grindr's love-seeking world is the "whiteness".

When it comes to UX practice, two important terms are often emphasized to designers: affective design and confirmation bias. Developed from affective computing and HCI, affective design is a design technique that devises software or their interfaces to stimulate human emotions, through human-technology interactions (de Byl, 2015). It aims to elicit certain emotional experiences and deliver affective products with inclined features via physical attributes (Preece et al., 2002). Derived from cognitive bias, confirmation bias, according to *Interaction Design Foundation (2017)*, refers to a tendency to search for, choose or interpret evidence that can support and confirm one's prior beliefs or existing values. Such theories are helpful to explain that Grindr users are not only active players but also passive audiences, whose actions and decisions are affected by afforded design features.

A minor contrary from the interview analysis is that none of five participants has indicated being strongly influenced by race-based filters. Two main reasons for this can be distinguished: morally, interviewees can more or less identify racial fetish and dating involved race; economically, they deemed the function "needless" and "extra" after a seven-day free trial and would not like to waste money on it. This finding does not mean that users are not shaped by other features. Instead, the interviewer was informed that five respondents more often applied basic filter subjects such as age, body type to "increase the efficiency of combing through undatable gays", which is in accordance with Wang's (2020) interviews with *Blued* users. When the author asked for the incentives behind, Dollar replied: "they are just… lying down there. If I have a standard in mind, why not save me some time?".

Another interesting finding is that Sino (an 18-month user, German-Chinese) admitted that he had attempted to "play some tricks to get similar, race-prioritized results". When the author showed his interest, Sino instructed on his phone how he utilized "location-based" filtering features to achieve his dating goal. The operation was rather simple and straightforward just in one step (figure 07): resetting user's current location by inputting a "favorite" area such as a white-majority neighborhood. His words then point to a brand-new issue that involves similar geosocial networking platforms. On the report of Grindr version history, the initial version only displayed 100 profile by proximity and membership version was expanded to 200 guys. From a marketing perspective, nowadays, Grindr is working towards a geo-friendly dating application by customizing user's location, which leads to broaden the existing dating pool ("Grindr", 2020). However, Sino's usage seems to make this feature conflicting. As a reflection, such decisions grant accessibility for "creative users" like Sino to accommodate algorithmic-mediated dating actions and increase the likelihood of effecting racial prejudice in dating apps.



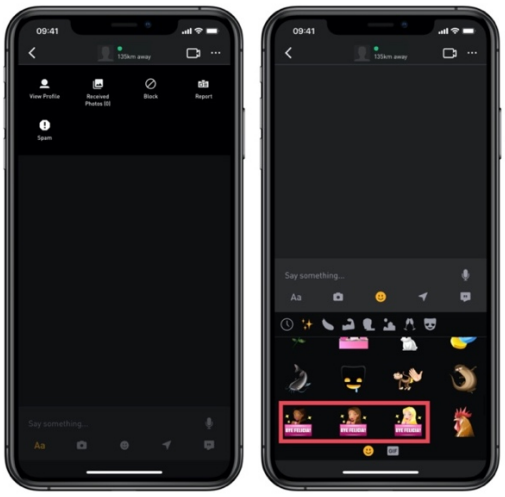
(Figure 07. An instruction of resetting locations)

4.2.2 Emoji and Gaymoji

In daily practice, another unique element of Grindr draws user's attention – Gaymoji (Figure 08). Similar to emoji, as stated on *Wikipedia* "the ideograms and smileys used in electronic messages and web pages", Gaymoji appears to function analogically as the Grindr version or gay version of Emoji. According to Grindr's update history, Grindr released a library of Gaymoji in 2017, which brought fresh symbols into the existing emoji systems.

(Figure 08. An example of Gaymoji)

For now, Grindr users are able to access Gaymoji in two ways: by downloading a Gaymoji extension from app store, users can use it in all supporting software such as iMessage; every Grindr register can utilize default Gaymoji afforded but restricted by Grindr, only for in-app use. Based on interviewees and app ratings, the latter method is favored by customers due to the simplicity and convenience. When opening a chat page, one just need to click on the smiley face and the Gaymoji instantly pops up (Figure 09). There are nine categories by far (observed on 10 May 2020, version iPhoneOS 6.9.0), representing six themes: mood, profile, body, dating plus sex, objects, and holidays. Under each category, all users can scroll up and down to choose their favorite stickers and membership users are allowed more locked options. According to Grindr, the invention of these Gaymoji collections allow a more personalized conversation through LGBTQ-themed stickers and appears to be a new and entertaining way for queer men to speak their own languages in the community. More than five hundred options are given in consideration of diversity and respect. Therefore, in its product description, Grindr states: “Get Gaymoji, the essential free keyboard for everyone in the LGBTQ community and beyond.” From the ratings and reviews, its followers describe the invention “excited and cool” and the design “adorable and vivid”. Generally, the fans appreciate the use of Gaymoji when they “fail to find the perfect emotion for every moment”. Some people even feel “addicted to it” especially when they meet a situation “when words won’t do anything good”. For example, one left the comment: “Gaymoji is really helpful for introvert people like me…no idea how to express myself with a sense of humor.”



(Figure 09. Gaymoji in a chat room)

From the point of view of this UXD research, the aforementioned interface element practice is a successful trial that fulfills the essence of affective design – it contains "anticipatory and emotional characteristics" to users (Preece et al., 2002). That said, when reanalyzing #KindrGrindr reports, the author discovered a significant amount of negative feedback. Apart from complaining a poor quality of technical support, many posters readdressed moral and ethical concerns. Tweets with very negative sentiment (below the average score -0.33) usually contain keywords such as "not much diversity", "racial exclusion", "all white skins", and "racist". Many of them claimed that "this should go for any ethnicity really". Posters who indicated being part of a self-declared racial minority (e.g. Asian-Americans, Hispanic) spoke out that they felt "miss the opportunity after using a period of time" and left the platform until "my people show up" (an example is in Figure 09, there are only three skin colors of girls "BYE FELICIA!"). To sum up, in their opinions, the flaws of Gaymoji brings about moral decline and breakdown of civilization in gay men's community. In a twitter thread, one replied: "this is not a kinder Grindr that we are expecting for such a long time".

Besides this, the author also dropped the question upon using Gaymoji for five interviewees, who are self-agreed ethnic minorities (despite the fact that Brett and Sino are multiracial). All five respondents admitted chatting with Gaymoji to a certain degree and in the most situations, they passively received Gaymoji from potential daters. The main reason why they failed to become active users was the socio-cultural norms behind these ideograms. Ran, an oversea student, said: "some are just unreadable Morse codes. I feel tired to decode its unveiled meanings." As for Sino, who grew up in German, he believed that some Gaymoji were controversial mixtures of gay people and drugs, which were "dangerous and bad choices". Similar to Sino, due to a multiracial background, Brett had a good knowledge of their implied

meanings, which allows one to recognize embedded racial inequality and biased stereotypes. Discriminative cases happened to Dollar and Conner that they both experienced racial-fetishized conversations and jokes rooted in racial bias, via varying Gaymoji. For instance. Dollar encountered a set of Gaymoji: a white muscly male, an eggplant with a ruler, a peach, a double-sized bed and the letter "M". The whole sentence connotes a social-cultural interpretation that Asian gays have biological deficiency and thereby should be seen as fitting into a submissive role by default. From their narratives, it is supposed to see that Grindr's designers take on a range of subtly encoded symbols to resemble "we-assumed" gay life, which contribute to a biased online dating sphere. Such affordance represents the infinite gaps facilitated by the spontaneity of kinder Grindr developers and the true kindness of gay men in the queer world.

In summary, the discussion above concentrates on Grindr's predominate design features, which at a physiological level can reinforce user's perceived bias. UX researchers believe that by offering communication mechanisms, and by capturing, processing and displaying traces of Internet users' online actions and interactions, digital systems are fundamental to map out one's living, working and playing style (Erickson, 2014). Deep in its architecture, the behind algorithms and their rules have the capacity to shape social and cultural formations and produce a direct and noticeable impact on individual lives (Beer, 2009; Ziewitz, 2016). From the very beginning of sign-up to everyday use, Grindr users formulate complex judgments about objects with which they interact. Their internal process navigated by material and affective experiences can directly or indirectly help to set their preferences and placate different gay men in the online dating settings. In this case, these race-based filtering services and sets of discriminative Gaymoji play a persuasive role in idealizing users' desirability, twisting possible dating outcomes and underlining racial inequality in online dating settings via app design practices, even without making "actual" contact (e.g. physical evidence of biased dating guide) with them. Such features seem to be vicious seeing as it constantly reinforces the idea of racial disparity and could lead to unjust human-to-human connections at many levels (e.g. interpersonal and intragroup). To users, Grindr's design features are not just an annoyance – it aggravates existing racial bias and amplify its associated discriminative actions.

4.3 Debias Desire: Design Responsibility and Techniques

For gay men, since so many intimate interactions start in online spheres, the design features on related intimate software or platforms – whether search and filter functions or a graphic interface element like Gaymoji are indeed influencing the possibilities of intimacy and "dateability" that are at every user's disposal. UX designers should be aware that these applications play a functional role in facilitating individual preferences and therefore their design products should stay "neutral" in the actions. As one criticized in the #KindrGrindr topic: "Dating apps like Grindr should allow users themselves to act based on their desires." With that being said, in the UX industry, companies usually "have no choice but to decide whether to include or exclude certain informational categories" for potential partner seekers (Hutson et al., 2018).

Yet, evidence from #KindrGrindr tweets and five semi-structured interviews demonstrates two specific measurable parameters that aid to determine the type of whom Grindr users can and cannot date at the first sight. In the UX design scope, they are epistemically engineered by design decisions, which are strongly tied to an anthological framework perceived by Grindr designers. In the sense, in order to counteract such systemic disadvantages, it is suggested to emphasize the participation of UX designers that they should take into consideration the need of Grindr users. When the author asked for interviews' Grindr-based dating experience, all of them admitted technological interventions that more or less reconstructed their interpersonal interactions. For example, Ran shared his story of seeing many insulting headlines like "looking for a pretty Asian pet" in the profiles after applying race-based filters. Consequentially, such headers made him leave the app for few weeks. To paraphrase in Hutson et al.'s (2018) words, this reveals "the behavior-changing power of design".

Highlighted by *Interaction Design Foundation (IDF)* organization, a core value of user experience design (UXD) is that experience as stories narrated through products "has a potential to change the way we (the developers) think and design". From an app designer's perspective, practitioners are recommended to rethink the product and acknowledge their vital position of fabricating mediated dating activities via programming algorithms and developing app infrastructures. To make Grindr kinder, users are expecting app suppliers to "proactively minimize racially discriminatory outcomes". Suggested by UX researchers (e.g. Bivens and Hoque, 2018; Hutson et al., 2018), this whole industry should take on "activist approaches" to refine products and encourage designers to reflect on their prior design values and norms regarding users' practices in the online dating space. KindrGrindr advocators believe that "recognizing unjust features is the first step". Grindr needs to pick up their responsibility and

take some concrete actions to advance pro-social outcomes. Concluded from previous user experience surveys, the key principle appears to be that UX designers should strive to cut down confirmation bias as much as possible in order to lessen racial bias on Grindr.

Racialized Grindr

The thesis has problematized the prejudiced practice of online dating using the racialized Grindr app. Through this modern dating venue, it has attempted to make sense of personal experiences from marginalized gay men. So far it has placed the current data and algorithms research in a larger discussion in the UX design industry through integrating and presenting theories from social computing realm and human sciences debates, with a special focus on human-computer interaction. This systemic literature review has first solidified the fact that race-based sexual preference is a new form of racism in online dating conditions. It has then helped to point out the fundamental role of algorithms as the minimal unit in forming meaningful relationships for every dating app customer. Most importantly, standing upon queered human-centered computing theories, it has revealed gay men's dating norms are capable of being (re)constructed in connection to an app's data infrastructure and enabled to measure the capacity of that digital environment that can exert on dating results.

Derived from this, one could preliminary assure that racism can be programmed into an app's layout and biased dating results can be dated back to that design. To testify such hypotheses, this study then carried out a mix of machine-based and human-led content analysis by researching user feedback collected through online materials (e.g. Twitter archive) and analyzing supplementary topographic interviews with five active users, with reference to documented Grindr features in the form of screen snaps. The results obtained have largely supported aforementioned theoretical foundations and the author's empirical observations on daily practice.

Initially, this research discussed the main analytical technique - User Experience Design for enquiring into Grindr. By introducing a set of pre-formulated data tags in which Grindr datafies a new register's information, on one hand, it demonstrated the app's limited onboarding process and its manipulation attempts for users, which was later confirmed by interviewees' reflection; on the other hand, it showcased the behind design thinking procedure that can manifest designer's acknowledgement of gay men's dating culture and brand their biased assumptions. Particularly, in light of app reviews, the analysis went deeper by focusing on two most controversial features on Grindr. Firstly, Grindr's race-based and location-based filtering systems that seem to afford the possibilities and feasibilities of reinforcing racialized dating can be seen. Kinder Grindr supporters responded with having noticed "a sense of exclusivity" to such racially discriminable features and admitted its unintentionally negative

influence which was explained through the theories of affective design. Such filtering systems entangled with one's dating norms influence user's opinions and therefore lead to a prejudiced dating report. Another pro-racism feature is Gaymoji. From its birth, it was assumed a role in informing users of the existence of disparities faced by racially marginalized minorities. In practice, it was validated in symbol-mediated communications, strengthening use's prior bias. In conclusion, these two special prejudiced design features not only represent existing racial bias but facilitate its associated discriminative behaviors and worsen sexual racism mediated in digital dating spaces for gay men. Such design failures do no good to social justice like race equality and forces a gay man's dating experience shifting from a subconscious to cognitive one.

On account of the discussions above, the author called on app manufactures - UX designer and their affiliated UX industry to reflect on all of three components in the user-product interaction: user, product and the context of use. Regarding *IDP*'s key principle of improving products with experience, in order to cut off the bond between this social-cultural phenomena and technical agencies, it is suggested by users that designers should take into account Grindr customers' subjective experience and synthesize them to (re)write racial-equal dating narrative. To summarise, this analysis reveals the answers to the two prevailing questions: first, racism can be programmed into Grindr's data infrastructure by configuring categorized tags and label; second, the given technical affordance on Grindr, whether functional features like sorting and filtering mechanism or graphical features like Gaymoji is involved in shaping dating preferences. The overall discussion is based on a perception of Grindr's user as a passive audience rather than an active decision maker in online partner seeking actions. According to the author's personal observation and those empirical user experiences, the study underscores the priming and framing characteristics of Grindr's design. Whether users apply such features, their visibility can make differences to users themselves with or without their awareness of them.

When researching the interaction between human and technology, it is equally important to examine how biased design products are internalized by users themselves. Grinder' case bridges the gap that traditional research pays much effort to cognitive process while neglects the socio-technological conditions. For example, the project unveiled how online settings can rewrite dating norms for gay men and affirmed that embedded algorithms are coded to retrieve and categorizes a vast number of data points in order to learn and identify patterns in human being's digital behaviors (Rolle, 2019). That said, this project has its own limitation: it has investigated user experience, the product but left the creator – the designers

alone. The complex relationship amongst design practice, developers and users requires a further justification to not only comprehend the rise and decline of racial bias in online dating app market but tackle such issues.

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Appendix

7.1 Interview Guide

<table>
<tr><td colspan="2">Introduction:
Goal of the Interview:
● Learn about LGBTQ+ user's experience on Grindr (viz. racism/racist dating experience, evaluation on design features)
● Learn about general dating application/intimate platform use regarding sociocultural and technological reflection

Recording:
● Around 25-30 minutes
● Open questions on personal background information & Grindr use
- Common, easy and casual
- Recorded, but anonymously
- Prepared/Suggestive questions
● Privacy and Anonymity: data only for academic purpose at the University of Amsterdam (UvA)
● Take notes on paper

Informed Consent:
● About general information (rules/purposes)
● Interview time and date
● Preferred/Pseudo name
● Sign-agreement (later via email)</td></tr>
<tr><td>Topic 1: Description of background information & Grindr use
Goal:
● To know interviewee's socio-cultural background information
● To know behavioural habits on</td><td>Introduction:
● To know social-cultural background
● To collect Grindr use information

Initial questions:
Would you mind introducing yourself?</td></tr>
</table>

Grindr	• Age, Gender, education, profession etc
	• Sensitive information on sexuality: self-tag/label (open/discreet gay, bi or straight but curious)
	• Cultural background: nationality (ethnicity), hometown/residence
	• Social background: how long have you been in the Netherlands?
	• Grindr use in general:
	  - How long have you been active on Grindr?
	  - How often do you check/use Grindr?
	  - When do you use Grindr most? (day or night)
	  - Habits (phubbing or on-and-off)

Topic 2: Motivations for Grindr use and Design evaluation Goal: • To understand motivations of the interviewee to use Grindr • To understand gratification of Grindr use and design features	Introduction: • To understand interviewee's reasons for Grindr use • To understand Grindr user's attitudes towards its functional affordance Initial question: *Why do you use Grindr?* • General reasons to use Grindr by Grindr tag (hook-up, looking for friends/relationship…) • Under which circumstances • Online behaviours: What do you usually do on Grindr? Type and

	frequency (random checking or chatting, etc) *What do you think of Grindr's design features?* ● General sentiment: positive or negative ● Which features do you like/dislike the most? - Some distinct labelling functions: tribes, etc. ● Have you ever paid attention to its location/race-based filtering functions? (if not subscribed users, what's your opinion on this function?) ● Have you ever noticed/met/spotted any inappropriate information on Grindr in the Netherlands? (inappropriate nude pictures, racist personal profile/bio, etc) ● Grindr norm: Have you tried to decode/interpret/translate Grindr Morse codes (symbolic or textual info)? - unreadable symbols/icons, or abbreviations • Gaymoji/Grindr Stickers: general attitudes towards its design (e.g. diversity, (im)explicitness, etc) and use (e.g. efficiency, usefulness/usability/utility, etc)

Topic 3: Technological influences and Socio-cultural consequences Goal: ● To explore possible influence on interviewee's personal online-dating choices and norms from the following perspectives: 1. Influence of personal dating preference (regarding personal socio-cultural background) 2. Influence from design features (guided vs. unguided)	Introduction: ● To understand socio-cultural factors affecting dating choice on Grindr ● To understand technical factors affecting dating choice on Grindr Initial question: *In general, would you mind describing your Grindr-based dating norms (i.e. dating preference/choice)?* **1. Socio-Cultural influence** ● Notice difference between sexual/dating preference and sexual racism (racial fetishism)? ● Word usage and associated its positive/negative feelings: *ONLY Asian, NO Asian, and Asian PLUS* **2. Technological influence** ● Dating outcome influenced by Grindr design? If yes, which feature/function has convinced your intuition? ● Feelings when on Grindr (during and after), compared to other apps or face-to-face dating? - Emotions: change or not ● Thoughts and opinions on Grindr? - Correlation between design features and sexual racism?
Rounding off	Round off interview: ● Whether have further questions or confusion to ask interviewer

	• Thanks and appreciation • End recording • (Re)emphasize anonymity

7.2 Python Scripts for Data Collection: #KindrGrindr & Twitter API

```
#Python Settings
pip install tweepy
```

```
#Preprocessing work
import tweepy
import csv
import pandas as pd
####input your credentials here (BY USING HISTORICAL API)
consumer_key = ''
consumer_secret = ''
access_token = ''
access_token_secret = ''

#Autenticate to Twitter
auth = tweepy.OAuthHandler(consumer_key, consumer_secret)
auth.set_access_token(access_token, access_token_secret)
api = tweepy.API(auth,wait_on_rate_limit=True)
```

```
#####KindrGrindr
#Open/Create a file to append data
csvFile = open('kindrgrindr.csv', 'a')
#Use csv Writer
csvWriter = csv.writer(csvFile)

for tweet in tweepy.Cursor(api.search,q="#KindrGrindr",count=100,
                           lang="en",
                           since="2018-09-01").items():
    print (tweet.created_at, tweet.text)
    csvWriter.writerow([tweet.created_at, tweet.text.encode('utf-8')])
```

7.3 Python Scripts for Sentiment Analysis

```
#NLTK settings
import pandas as pd
from nltk.sentiment import vader
import nltk
nltk.download('vader_lexicon')
```

```
#Access Datafile
datapath = 'new_KindrGrindr.csv'
data = pd.read_csv(datapath, sep="\t")
```

```
###Sentiment Analysis
def compound_sentiment(data):
    analyzer = vader.SentimentIntensityAnalyzer()
    sentiments_analysis = analyzer.polarity_scores(str(data))
    return sentiments_analysis['compound']
data['Twitter_Sentiment'] = data['Tweet'].apply(compound_sentiment)
```

```
#Export Results
#Use absolute path
data.to_csv('Grindr_file.csv',header=False, index=False)
```

ASSESSMENT FORM BA-THESIS MEDIA STUDIES
Each of the following aspects must be a pass.

Name of student:	Yifan Feng		
Student number:	11793929		
Programme:	**Media and Information**		
Title of the thesis:	**Infrastructural Fiasco in Digital Space?: A Study of Prejudice in Everyday Use of "KindrGrindr"**		
Supervisor:	**Shuaishuai Wang**	**Signature:**	
Second reader:	**Michael Stevenson**	**Signature:**	
Date:	**16 June 2020**	**Grade:**	**9**

	PASS/FAIL	**Comments**
1. Research set-up and framework • Clarity of the research question and research design (relevant elaboration of sub-questions); • Justification of the research question and set-up (points of interest: historical / theoretical / methodological framework, analytical perspectives, social relevance, working method) • Limited (critical) representation of the research field (e.g. theories, methods, research findings) • Degree of difficulty of the object/research.	Pass	An important topic and research question that highlights the intersection of identity, culture and design in dating apps. Yifan's thesis combines a strong understanding of relevant theory and excellent research skills to explore ties between Grindr's interface design, its 'algorithmic' forms of sorting users by preference, its platform governance, public user reviews and individual user experiences as these different elements relate to racial prejudice on the app. The thesis does an excellent job of justifying the research in a larger social context as well as within a clearly articulated knowledge gap. For a BA thesis, Yifan has chosen a high degree of difficulty requiring a very strong foundation theoretically and methodologically. The research questions (which are very similar, with the second being less 'closed' and thus better) don't quite cover what was actually analysed and found, and perhaps could have been reformulated in a final edit.
2. Implementation • Clear explanation of the methods used and / or the definition of the corpus; • Quality of execution of research: depth / breadth; • Clarity in the analysis of results; • Originality in application theory and / or analysis; • Conclusion and critical evaluation of the research: ties back to literature theoretical framework and relevance.	Pass	Method is clearly described and justified in relation to the question, and the quality and clarity of the analysis is excellent for this level. The mixed methods approach and analysis demonstrates that Yifan has excellent command of a wide range of analytical and research skills, even if it is a little puzzling to include automated sentiment analysis for a relatively small corpus of tweets.

3. Organisation • Logical structure of argumentation (i.e. substantiation of conclusion regarding the structure of main and sub questions); • Clear and coherent structure at thesis, chapter, section, paragraph and sentence level); • Clear organization chapters.	Pass	Also excellent, really impressive and exemplary for this level. There are a few very small issues such as a discussion of HCI in the analysis that should probably have been in the theoretical framework.
4. Professionalism • Language use: academic writing style, appropriate language use (grammar, spelling, vocabulary, terminology, style); • Application consistent / required referencing style (in text citations, bibliography); • Clear design / cover page / attachments • Relevance and effectiveness of tables / illustrations etc.; • Required length; • Evidence of independent scientific practice.	Pass	Excellent as well. Could perhaps be a little more expansive when summarizing related research, as at times the choppier 'report' academic style that derives from the social sciences conflicts with the emphasis on nuance and subtlety in the chosen research area.
5. Independency (1st reader) • Responsiveness to feedback; • Dependency on supervision; • Punctuality.	Pass	Yifan never missed a class, and was highly responsive to my feedback and comments.
6. Additional comments	Hi Yifan, Congratulations on completing your BA degree with such an remarkable achievement! I can imagine how difficult it must be for you to accomplish the thesis with this incredible outcome during this challenging corona time. For me, it has been a delight to supervise your thesis. I still remembered how you shocked me with your bold comment on Media Studies in our very first class, which happened to be my very first day of teaching in my career. I pretended to be clam and struggled to activate some interests in you on media studies, something you can personally relate to and with which you can choose as your thesis topic. Hopefully this has been a rewarding experience for you too. I wish you a happy life. Good luck with your future! Shuaishuai 21 June 2020	