Rethinking Safe Mobility: The Case of Safetipin in India

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How do we make sense of the promises of digital technologies for safe mobility? Drawing on a case analysis of Safetipin, a mobile app that has garnered much praise in India, this paper examines the assumptions and promises of technologies designed for safe mobility. The contribution of this paper is twofold. First, we draw on feminist criticisms of safety technologies, defined broadly, to identify the main issues in their framing and efficacy. Second, we build upon initial interviews with users and makers of Safetipin to examine how the app addresses, or fails to address, the criticisms received by other safety technologies. We conclude by foregrounding key questions that ICTD designers can consider when designing for safe mobility in India and beyond.

CCS Concepts: • **Human-centered computing → HCI theory, concepts and models**.

Additional Key Words and Phrases: Safety, Mobility Justice, Gender, Design, ICTD, Feminist HCI

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1 INTRODUCTION

Around the world, women, along with other marginalized groups, experience violence and abuse in their homes and on the streets. India is no exception. To promote safety in cities, the government and technology companies have created tools such as tracking apps, reporting apps, and alarm systems [Dimond et al. 2013; Times 2014; Wu 2016]. One application called Safetipin, in particular, has garnered much praise [Safetipin 2022a]. Safetipin was created by a group of women's rights advocates in India following the aftermath of the horrific Nirbhaya rape case in 2012. Safetipin serves as a digital extension of safety audits, a tool commonly used to assess safety metrics in the built environment [Jagori 2017; METRAC 2022]. The app allows users to share data about a location's infrastructure by rating the following nine factors: amount of lighting, openness of space, visibility to others, number of people around, presence of security, condition of walk paths, availability of public transit, presence of women and children, and feeling of safety [Safetipin 2022b]. This crowdsourced data is used to calculate safety scores for various locations and routes. A user can then review these safety scores to make safe mobility decisions. The Safetipin app also allows the user to share their location with others. Additionally, according to the app's website, the crowdsourced data is shared with the local government to

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improve city infrastructure such as lighting and walk paths. Through these practices, Safetipin seeks to help its users safely navigate the urban environment.

While other safety technologies, such as panic buttons, have been heavily criticized for furthering patriarchal norms, Safetipin has received broad appreciation. The app has won several awards [Gupta 2019; Womanity 2022] and has been included in a variety of 'best safety apps' lists [Daily 2021; Gupta 2016]. However, similar safe walking apps in the US, such as SketchFactor, have been denounced for propagating racist stereotypes, amongst other critiques [Dewey 2014]. Given the appreciation for Safetipin, it is essential to examine whether and how the app withstands the criticisms that have been raised against other safety tools. Is it successfully addressing those criticisms? Or, does it bring about the same issues under a new guise?

2 METHODS

This study unfolds in two stages. First, we review a range of safety technologies and their criticisms. This review draws upon research by feminist scholars, urban planners, and sociologists, especially qualitative and critical studies on safety in cities. Through this process, we examine the inadequacies of how such technologies frame the issue of safety and shortcomings in their efficacy. Our summary of this research culminates in the identification of four broad themes that are subsequently used to study Safetipin. Our goal here is not to be exhaustive. Rather, we aim to explore why safety technologies have failed in the past and whether or how Safetipin is different.

Next, we examine Safetipin through a close reading of the app. We review its conception, features, and framing through its website and media coverage. We further draw upon a preliminary study of six interviews with designers, users, and non-users of Safetipin. Specifically, we interviewed one member of the Safetipin team to learn about the app's motivations, aspirations, and known limitations, along with five women in India to further understand Safetipin's strengths and shortcomings. Participants were recruited via email, Safetipin's Instagram page and personal contacts. The interviews were approved by the Georgia Institute of Technology Institutional Review Board.

3 TECHNOLOGIES FOR SAFE MOBILITY AND THEIR CRITICISMS

Initiatives and technologies created to promote safety have been criticized for making gendered assumptions about safety. In this section, we summarize these critiques under four themes that serve as the basis of our analysis of Safetipin.

Panic buttons and alarms are among the most common safety tools. They are designed to enable users to quickly call for help in the case of an attack [Wu 2016] [Gupta 2016]. However, these tools may be impractical as they may be tucked into handbags or pockets when needed. These tools are also futile if not supported by robust social and police infrastructures [Karusala and Kumar 2017]. Calls for help can yield unequal outcomes for different populations, as marginalized women are more likely to be questioned for their presence in public spaces [Khan 2021]. Moreover, panic buttons and alert systems ultimately work to reify gendered safety norms. These tools place the burden of safety on the victim, expecting them to be vigilant at all times [Sterling 2013].

Anti-rape wearable technologies, such as teethed condoms [Axe 2022] or rape proof bras [Graham 2013], have also been designed to prevent assault. However, these tools are built on the false assumptions that sexual assault incidents follow singular behavioral patterns and that a perpetrator's actions can be effectively predicted [Sterling 2013]. These technologies are largely ineffective in cases of domestic violence that represent a large percentage of sexual violence cases [Dhawan 2020], especially against women from marginalized castes [Ackerson and Subramanian 2008]. They also propagate sexist stereotypes by portraying women's bodies as fragile and in need of protection [Bivens and Hasinoff 2018].

Reporting apps are designed to document incidents of sexual violence and assault [Ahmed et al. 2014; Dimond et al. 2013; Young 2014]. These apps may be helpful in building awareness about the frequency of harassment incidents, but are less effective in preventing violence proactively. Moreover, victims may be deterred from reporting because of the stigma surrounding sexual assault [Ali et al. 2015; Henne et al. 2021]. In addition, some forms of harassment, such as stalking, remain unreported as they are not legally considered crimes according to local laws. Reporting tools that present the number of reported crimes in an area can cultivate fear of spaces and justify the need to control women's movement [Ahmed et al. 2014]. The reported numbers of harassment cases are also devoid of contextual and embodied specificity. As such, reporting apps reinforce the fear of assault and present it as a vague but looming threat.

CCTV cameras and other surveillance practices have also been deployed in efforts to curb sexual assault. In India, surveillance tools have been promoted by politicians in response to widespread violence in cities [Khan 2021]. For instance, in 2021 the state government of Madhya Pradesh proposed a program that requires every woman stepping out of her home to register with the local police station so that the police can track her for her protection [Wire 2021]. Feminist scholars, however, have argued that surveillance practices do little to prevent assault, as evidenced by the lack of significant change in crime rate in the wake of their use [Pankaj 2022]. Additionally, these tools build upon the 'masculinist logic of protection', denying women decision-making agency [Young 2003] and advance the false assumption that most perpetrators are unknown to the victim [Bivens and Hasinoff 2018]. These tools have also been criticized for over-policing marginalized communities [Khan 2021]. Further, surveillance technologies facilitate cyberstalking, enabling abusive partners to easily track their victims [Henry and Powell 2016; Mason and Magnet 2012]. Such surveillance practices can ultimately make women feel more unsafe as they are made "hypervisible in exchange for security". This hypervisibility manifests as a digital extension of the voyeuristic male gaze [Rathi and Tandon 2019].

Urban design strategies that focus on changing physical infrastructure, such as lighting, have also been used to advance safety [Krause 2021]. Such interventions are based on the assumption that crime is opportunistic. In other words, they assume that specific spatial qualities are more conducive to criminal activity and improving infrastructure can reduce chances of sexual assault [Koskela and Pain 2000]. This assumption disregards underlying sociocultural factors that give rise to crime. Moreover, such strategies tend to favor urban forms that enable surveillance and policing, undervaluing the effectiveness of social connection [Krause 2021]. Not all sexual assault cases occur at night, and bright lights in the dark may instead create fear by allowing victims to be seen by potential attackers [Koskela and Pain 2000]. Ultimately, infrastructural changes do little to reduce crime or fear in urban environments [Kern 2020].

Strategies to reduce assault often disregard systems of oppression, such as gender, age, ability, race, and class. For example, some reporting mechanisms may force gender and sexual minorities to "come out" in order to report anti-LGBTQ+ hate crimes [Kidd and Witten 2007]. Even though some technology companies refer to studies that address social positioning, their final products often portray a universal safety narrative to attract a wider user base [Shelby 2021]. What the above safety measures all share in common is the aim to offer one-size-fits-all solutions. In doing so, they fail to do justice to the varied needs and experiences of safety [Sterling 2013; Vanolo 2016].

In this paper, we center women's experiences of safety, especially given Safetipin's focus on women. We would like to emphasize, however, that sexual assault and violence is a serious concern across the gender spectrum and sexual identities. Indeed, part of our argument in this paper is that both perception and experience of safety are intersectional.

In summary, we observe four major themes surrounding criticisms of safety technologies: (1) they project the fear of assault onto the urban environment; (2) they put the responsibility of being safe on women; (3) they enable surveillance and control; and (4) they disregard intersectionality (they fail to account for the influence of age, gender, ability, class, caste, race, and religion on safety). Together, these factors exacerbate the challenges of safe mobility.

4 FINDINGS

In this section, we discuss if or how Safetipin addresses the four key criticisms summarized above.

4.1 Projecting Fear Onto the Urban Environment

> "You fear that it is unsafe outside... you are told that you are not supposed to go outside,... We sort of assume because we are kids... that this is how society works... Then if you want to break out of that..., it is very difficult because we are conditioned in a manner that the fear stays." – Participant 3 (P3)

Women commonly report fearing strangers, especially at night and in public spaces [Sur 2012]. Everyday experiences of abuse, such as catcalling [Kern 2020], together with narratives ranging from media coverage of sexual violence to warnings from loved ones all contribute to this fear [Phadke et al. 2011]. Women are advised to limit their movement [Bhattacharyya 2015; Parikh 2018; Viswanath and Mehrotra 2007] and take preventative measures such as not going out at night, being chaperoned by men, or wearing clothes and accessories that portray marital status [Phadke 2005].

'Fear' is justified as a means of protection that controls women by restricting their use of public spaces. This fear results in lost opportunities for women and girls [Kern 2020]. For example, girls from a low-income neighborhood in India may be deterred from attending school if the route to school is considered unsafe [Jagori 2010].

Safetipin aims to assuage these fears by informing women of 'safe' and 'unsafe' routes. However, in doing so, Safetipin advances the fear of 'unsafe' spaces, limiting women's mobility to 'safe' spaces. 'Unsafe' spaces, then, draw fewer women, further lowering the areas' safety scores. Even as women walk on paths marked 'safe', the less-than-perfect rating continues to frame assault as an ever-present possibility [Hall 2004].

Another way Safetipin aims to mitigate fear is by partnering with the Indian government to improve public infrastructure. For example, Safetipin's website reports the reduction of nearly five thousand dark spots across New Delhi [Safetipin 2019]. However, fear cannot simply be 'designed out' through such improvements. Instead, it needs to be addressed alongside social, legal, and economic infrastructures [Kern 2020; Koskela and Pain 2000]. Moreover, public officials in charge of making pragmatic use of the safety data may not take a progressive stance on women's safety [Singh 2020]. Instead, they may misuse safety data to advance sexist practices such as banning 'provocative' clothing [Bhattacharyya 2015; Kashyap 2011; of India 2011].

Finally, Safetipin's attempts to reduce fear do not come without a cost, a cost that is often framed as a choice:

> "...if they have an option, they can choose the safest route. It may be long, but it would be safer for them... she has a tool to make that decision, to make that choice consciously." – Safetipin team member

This quote illustrates how Safetipin normalizes the "hidden cost of fear" [Kern 2020]. For example, in this case, it is assumed that women should 'choose' to spend more time and energy on commuting in order to stay safe.

4.2 Placing Responsibility on Women

> "A woman came to me and said– 'why are you wearing shorts? That is so cheap'...the idea that a woman should cover herself to be safe is more of a problem than the actual threat" – Participant 5 (P5)

The expectation to behave in a respectable manner negatively affects women in India and beyond. The idea of 'respectability' dictates that 'good' women act decently [Bhattacharyya 2015; Parikh 2018] and have a purpose to be outside of their homes [Phadke 2005]. 'Respectability' is often operationalized through cultural narratives as a way to prevent sexual assault. For instance, in the aftermath of a gang rape case of a young woman in 2020, an Indian politician stated "These [sexual assault] incidents will stop only by good values, not by law or force. It is the responsibility of

parents to teach their young daughters how to live and behave in a cultural environment" (translated from [Singh 2020]). A woman behaving in a 'disreputable manner' is often considered to be 'inviting' potential assault [Asokan and MacSwan 2014]. As a result, the theme of respectability dictates a woman's mobility patterns [for Good 2022; Phadke 2005], prohibiting them even from working late at night [Sur 2014].

On the surface, it may seem that Safetipin shifts such narratives by bringing awareness to issues of safety and empowering women to make informed mobility decisions. However, the same routes that are labeled as 'safe' have the potential to become yet another ideal for women to adhere to. 'Respectable' women may be expected to limit their movement to 'safe' spaces, and their presence in 'unsafe' areas may be considered a transgression. With the use of Safetipin, adherence to safety scores then becomes the new respectable behavior that will keep women safe. Not unlike panic buttons and other safety apps discussed before, this approach too puts the burden of safety on women and ultimately does little to address the root causes of violence.

4.3 Enabling Surveillance and Cyber Control

> "I have to call my mom and be like yea, I am getting into the cab, just look after it and she calls me another 5 times again when I am in the cab. So yes, it is frustrating. Like there is no freedom. There is no independent freedom. You need someone." – Participant 1 (P1)

It is common for women to be chaperoned or surveilled for their safety [Soni 2016]. This practice is becoming increasingly prevalent through technological mediation, such as location tracking. Surveilling women's movements 'for their safety' serves as a means to control women, constraining the bounds of where they are allowed to be [Krishnan 2015].

Women express feeling constrained by their family members' constant watch over them. At the same time, however, they express the need to be in contact with someone they trust when they are in public [Blom et al. 2010; Satchell and Foth 2011]. Due to the fear of assault in public spaces, they accept the compromise of freedom for alleged safety. Safetipin internalizes this compromise by allowing one to share their location with others. However, such a feature positions women as weak and dependent and requires them to surrender control of their bodies. This feature can also be abused to stalk or control women's movement and exacerbate domestic violence [Dimond et al. 2011]. It may appear that using this feature is a choice that women make, as suggested by Safetipin in our interviews. However, the ingrained fear of assault, the respectability narratives, and the social and familial structures strongly influences this 'choice'.

4.4 Disregarding the Intersectional Nature of Safe Mobility

Both experiences and perceptions of safety and mobility are intersectional. They are entangled with systems of oppression such as gender, ability, age, race, caste, and religion [Cresswell 2008; Phadke 2005; Twamley and Sidharth 2019]. For example, in India, caste-based violence against women is a recurring phenomenon [Narula 1999]. Additionally, amidst religious divisions in India, violence against women of minority religions has also escalated [Schultz 2019]. In other words, one's experience of 'safety' is inextricably linked with dominant structures of power [Cresswell 2008].

The feelings of safety and freedom for one community can come at the cost of other marginalized groups. Rape prevention discourse has often condoned the image of marginalized men (e.g., Black, Muslim, poor, or of a different caste) as a potential threat. Many approaches to promote women's safety thus attempt to create barriers between lower-income or lower-caste men and upper-class women. Limiting women to spaces and neighborhoods based on

shared caste or religion has been used as a means to ensure their safety [Thapan et al. 2014]. In doing so, it reinforces the unjust image of the dangerous, unknown, lower-class man [Annavarapu 2021; Parikh 2018].

Safetipin attempts to be inclusive of diverse safety experiences by providing alternate modes of technological access. For example, they set up safety centers to address the needs of people who may not have access to a mobile phone [Viswanath and Basu 2015]. This diverse data is used to aggregate safety risks in the form of a universal 'safety score'. Additionally, Safetipin claims that the safety factors included in their audit survey are 'objective'.

> " It [variance in experiences] doesn't get like that [lost], because the parameters are rated objectively, it's only the feeling...which is subjective. It gets aggregated, everything adds up. And it's not just you doing audits. There are multiple people doing audits in the same place." – Safetipin team member

Safetipin, however, in their attempt to calculate an objective measure of safety, reduces the diversity and specificity of safety experiences. They disregard the importance of the data setting [Loukissas 2019] in which each data point is created: Who created the data? Whose safety was calculated? In whose company? Under what circumstances?

Seemingly 'objective' depictions of safety could still be based on prejudiced conceptions of who is dangerous [Datta 2021]. As such, the app can act as a means to reify unjust assumptions that neighborhoods of lower socioeconomic status and minority religions are unsafe. Such unfounded suggestions risk further reinforcing fear of and stigma against marginalized groups while disregarding the presence of violence at home by known perpetrators.

5 ADVANCING SAFETY, CHALLENGING PATRIARCHY

The inadequacies and failures of safety tools exemplify how difficult it is to break free from dominant patriarchal norms that seep into the design of emerging technologies and reinforce long-standing injustices. While it may be said that Safetipin has initiated conversations around an important issue, its impact and efficacy remain unclear.

"But we cannot risk women's lives just to challenge the patriarchy!" is a common reprise. We wonder, however, if the space of possibility is limited to the binary choice stated above. Are our only options either to risk lives to challenge patriarchy or to save lives by advancing patriarchal norms? Alternatively, how can we, as ICTD designers, do both: design for women's safety while challenging patriarchy? Below we present some questions that could serve as starting points for designers, advocates, and policymakers to reflect on as we tackle this challenge:

The design and uses of urban environments are deeply intertwined with the larger economic, political, and cultural conditions [Kern 2020; Koskela and Pain 2000]. Can we design technologies that embrace the complex nature of safety and grapple with all of the above to meaningfully promote women's safety with care and nuance? Relatedly, it is essential that technologies are complemented with systemic changes in infrastructure, law, and education. We must be critical of any discriminatory views institutions may hold about the position of women in society. In such cases, how can designers find strategic ways to challenge those in power while also working with them to promote safety?

How can we design for safety without further marginalizing vulnerable communities across social dimensions of gender, caste, class, religion, and more? How can we design safe mobility approaches that do not depend on limiting women's movement and promote patriarchal methods of controlling women? How can we design tools, initiatives, and policies that push the boundaries of what is expected of women instead?

As we have seen, historically, a variety of discriminatory methods have been employed in the name of keeping women safe. However, to advance safety in a meaningful manner, we need not only be aware of the discriminatory nature of these approaches but also actively protest them. Nuanced and critical examination of safety technologies and their narratives marks a vital first step in this process.

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