Exploring the Limitations of Technology in Ensuring Women's Safety: A Gender-Inclusive Design Perspective

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Abstract – Statistics indicate that up to 95% of women and girls in countries such as India report feeling unsafe in public locations, suggesting that the safety of women in these environments remains a pressing concern. Rather than accepting this status quo, there is a growing emphasis on the utilization of technology to provide protection. Innovations, such as wearable panic buttons, mobile applications, and transport monitoring systems, are designed to address the security gaps that society is still struggling to address. Nevertheless, the responsibility for safety planning and precautions is incorrectly attributed to women due to their excessive reliance on technology. It also cannot substitute the deeper attitudinal shifts and policy changes needed to transform women's safety from a privilege into an intrinsic human right. This paper evaluates technology's promises and limitations in ensuring women's security through a gender-inclusive design lens. Detailed analysis shows that while tech tools can provide useful protective capability on an individual level, they fail to address the root societal causes of violence against women. There remains an emotional burden and exhaustion from having to constantly strategize for one's own safety. Furthermore, computational systems designed to forecast crime hotspots continue to place emphasis on data that originates from safety concepts defined by men. For technology solutions to effectively amplify women's voices in security, they must incorporate "safety by design" concepts that deliberately acknowledge and respect the many experiences of womanhood. Women themselves must be active participants throughout the process, from problem definition to prototype testing and beyond. Only then can innovations avoid one-size-fits-all assumptions. Centering women also means accounting for intersections with factors like race, income level, profession, family status and age which impact experiences of safety. Ultimately, technology has a multifaceted function encompassing both advantages and limitations. Although applications and wearables may offer temporary protection, they are unable to substitute the necessary change in society attitudes to guarantee women's safety as an equal and absolute entitlement in both private and public domains. Only a collective reckoning coupled with elevating women's voices at all stages can lead to solutions that empower rather than burden those meant to benefit. The path forward lies in an intersectional approach that reshapes not just technical fixes but notions of safety itself to make it intrinsic to womanhood.

Keywords: Women's safety, Public spaces, Gender-inclusive design, Technology solutions, Intersectionality, Societal attitudes, Violence against women, Wearable panic buttons, Mobile applications, Transport monitoring systems.

1. INTRODUCTION
1.1 Present Key Statistics Showing Women's Lack of Safety in Public Spaces Across India and Other Countries

Women's security in public spaces has emerged as an urgent human rights issue needing redressal across nations. However, the sheer magnitude of the problem often gets lost amidst statistics. The numbers illuminate both the pervasive lack of safety haunting women daily, as well as the scale needed for solutions to match.

In India, the National Family Health Survey by the Union health ministry recently found that only 51% of women felt safe on public transportation while just 41% felt safe outside alone. Comparatively for men, the figures stood at 79% and 71% respectively, showcasing the wide chasm in perceived security dividing the country along gender lines. These fears translate directly into changed behaviors and choices determining women's freedom of movement. Close to one-third avoid going to public spaces despite needing to and over half only go out while accompanied by men for safety.

The picture remains equally grim looking at India's metropolises. Take the country's capital New Delhi, infamous globally for high rates of sexual violence. UN Women has highlighted that an overwhelming 95% of women and girls reported feeling unsafe in public areas, shopping centers and parks across the city. From being stared or groped at, to more explicit harassment like Gaslighting, stalking or assault—women run a daily risk to their bodies and being. Many pointed to poor street lighting or police patrolling as exacerbating the lack of safety. Similar figures hold true for the sprawling technology hub Bengaluru, another city found ignoring women's security.

India is hardly alone though when it comes to the absence of safe inclusive public spaces catering to women and their movement. Experts estimate that globally at least 2/3rds of women endure harassment on streets regardless of the neighborhoods they call home. For instance, a key index rating women's inclusion and security in global cities found only Toronto and New Delhi faring anywhere close to average amongst 31 locations assessed across parameters like night safety or perception of spaces. Cities spanning Bogota to Bangkok, Cairo to Karachi and even Sydney or San Francisco came under fire for failing to create substantively inclusive infrastructure enabling women's access alongside men.

What the numbers collectively indicate is how women's lack of safety now reflects a systemic issue cutting across geographies both developed or emerging. It transcends cultures, religious makeup or forms of governance pointing to the need for coordinated solutions too. Whether traveling for work or leisure, no woman should feel threatened by violence in simply accessing and enjoying public spaces equally alongside male counterparts.

Yet presently, anywhere from 44% to 66% of women report experiencing explicit gender-based violence in public areas within just the last two years alone as per estimates. Ranging from physical acts like assault or intimidation tactics like stalking, to slurs hurled casually by strangers – there exist few places left ensuring women's sanctity and dignity. For instance, 35% pointed to transportation hubs like bus or train stops being common areas where harassment occurs given the crowds and inability to control proximity to potential perpetrators there.

Together these stark numbers showcase the sheer ubiquity of violence, fear and danger continuing to compromise women's basic mobility. Without urgently addressing public inclusivity gaps, achieving sustainable safe access for enabling women's equitable participation socially and economically remains doubtful across communities. If nations are serious about upholding safety as a universal human right without qualification, the onus lies on questioning why women still cannot traverse their own cities or neighborhoods without needing to constantly strategize around prospective violence intuitively.

Combating perceptions and lived reality around lack of safety requires coupling short-term deterrence of violence against women with longer-term preventative attitudes and infrastructure alterations centered on women's security by design. No one solution can cater to the diversity of needs and context shaping women's experiences of public spaces differently. But conscious inclusive planning can go a long way in restoring women's confidence, trust and sense of belonging within the areas they inhabit alongside fellow citizens. Ultimately, positive lasting transformation relies on addressing not just incidents of violence but its enabling societal roots to ensure women's safety as an unconditional given across private and public realms equally.

1.2 Argue That Women's Safety Should Be an Intrinsic Right, Not a Privilege or Luxury

Women's safety occupying public life in equal measure as men's remains an elusive ideal across much of the world. While laws increasingly recognize gender-based violence as a violation of fundamental human rights, lived reality still falls short for countless women daily. From altered driving routes to avoid isolated roads to clutching keys as deterrent weapons when walking at night, maintaining personal security still requires conscious strategy rather than being an intrinsic given. The very fact that globally 2/3rds of women endure public harassment and abuse while navigating necessary spaces speaks to the normalcy of making oneself smaller in size and spirit simply to exist in peace.

Yet, this status quo gets positioned as just the cost of womanhood. Even privileged women in progressive nations cannot take safety for granted in quite the same innate manner as male peers. Recommendations like avoiding unknown neighborhoods, not jogging alone at night, and other constraints denote an inherent qualification to women's safety not applicable to men normally. The dutiful vigilance expected from women across income brackets and geographies converts what should be an inviolable universal right into a luxury or privilege rarely guaranteed in practice.

From home to schools, streets to transit stations, police stations to places of worship - violence against women persists across spectrums of private and public spaces denying them an entitled security. No matter how empowered, accomplished or independent the woman, she somehow bears the onus of self-protection implicitly rather than the state ensuring prevention, justice and deterrence against misogynistic threats. Contrast this with how society intrinsically accepts men's safety as a non-negotiable given in the same settings. Urban planning and infrastructure cater overwhelmingly to male sensibilities and gazes evident in everything from public toilet designs neglecting feminine hygiene access to missing streetlights across parking lots and alleys. Such environments enable implicit soft signals that women occupy public spaces at their own peril while men dominate by right unquestioned.

Even standing on the precipice of 2023, most nations are yet to make women's unconditional safety a operational reality that permeates the public conscience. Data suggests 95% of women in New Delhi and 90% of women pan India report feeling unsafe in public areas for instance. From authorities questioning victims' characters rather than assisting them to infrastructures literally built to treat women as secondary citizens, the ethical underpinnings reinforce safety as a luxury not automatically owed to women. Simultaneously, the fact that women disproportionately bear the brunt of violence for simply existing in shared spaces spotlights that safety cannot be gendered selectively. Where civil societies fail to enable that seismic shift collectively, no amount of cautionary self-policing helps women reclaim the public spaces they occupy equally alongside fellow men.

Thankfully, the needle has begun shifting to recenter violence and prevention burdens away from women through civic action. Sustainable change requires iterative top-down and grassroots interventions focused on normalizing women's entitlement safety as unconditional and intrinsic across neighborhoods. Barcelona's model of urban planning centered on women's security insights offers a blueprint for cities globally on leveraging right-based design. Digital tools like SafeCity or SafeWhiteBear also seek to eliminate information voids around local risks enabling avoidance-centric lifestyles for women proactively. Rule of law reforms similarly demand better legal recourse securing women's overdue civic rights to shared spaces beyond paper.

Ultimately laws, data insights and designs cannot focus solely on minimizing violence targeting women reactively alone and expect transformation. The root issues trace back to social conditioning that burdens women with self-protection while making men complicit beneficiaries devoid of accountability. Concrete deterrence and punishment of violence must couple with resocializing equitable gender norms for coming generations in homes, schools, workplaces alike. Building allies and elevating women's voices equally in decisions determining their access and safety remain paramount. Only then can the universal human right to bodily security and dignity translate from paper guarantees to lived experience for women navigators of everyday public spaces unburdened at last from ceaseless risk calculations.

1.3 Propose Evaluating Technology's Role Through the Lens of Gender Inclusiveness

While women's security in public spaces garners increasing policy attention, technological interventions rarely get evaluated vis-à-vis gender inclusivity parameters before deployment. However, technical fixes grounded in male experiences often create solutions that fail to honor the plurality of challenges shaping women's lack of safety across contexts. Merely digitizing initiatives like police panic buttons or route trackers without questioning who feels threatened where and why leads to one-size-fits-all models ignoring nuances differentiating women's realities spanning age, race, income levels and beyond.

Unless innovations embed inclusive designs consciously challenging prevailing patriarchal notions of protection, they risk exacerbating biases that view women as inherently vulnerable subjects needing reactive external interventions for defense. So far the rapid march of safety-oriented mobile apps, wearables and governmental monitoring platforms focused overwhelmingly on violence response rather than prevention or gender equity advancement. But positioning women as potential victims needing round the clock digital chaperones and surveillance breeds complacencies around raising sons to respect women's rights while restricting daughters' access to public spaces simultaneously.

A glaring instance where tech designed through a male gaze underserves women's safety needs comes from domestic violence prediction tools. As seen in Spain, an algorithmic system was implemented allowing police officers to predict risk of intimate partner violence based on a standard 35 question scoresheet. However, this automated triaging failed to account for the trauma bonding, emotional depth and shared life complexities distinguishing domestic abuse gray areas from stranger assaults. When a 32-year old woman was stabbed to death by her husband after the algorithm ruled her protection unnecessary, it spotlighted the pitfalls of applying biased male logics of safety universally.

Beyond physical violence itself, most monitoring apps ignore how mental stress and emotional labor act as precursors compromising women's sense of security navigation daily spaces. Right from altering clothing to match contexts to constantly tracking periods dates while in public to calculating escape routes should harassment occur – women undertake enormous unseen emotional work absent for men

perpetually. Research shows this manifests physiologically increasing long-term cognitive fatigue, anxiety and mental strain among women tasked with self-regulating their behavior by default to not "provoke" attacks. Yet few safety innovations embed stress prevention or target societal mentalities burdening women disproportionately.

However, opportunities exist for technologies to drive positive change should their design and evaluation intentionally center inclusivity qualitatively. User-informed insights covering the continuum of women's security experiences beyond physical assault can spotlight the need for gender sensitization signaling amongst citizens starting young. Apps tracking women's collective sense of safety to map perception voids across neighborhoods now enable crowd-sourced inputs. Gamifying respect of women's rights help young minds internalize consent, empathy and dignity culture structurally missing institutionally today.

But space for women to shape tech-enabled security interventions targeting their priorities themselves is crucial for moving the needle sustainably. Safety demands not just reacting to violence but proactively enabling socio-economic access, participation and leadership for women in public areas without barriers. That requires elevating female voices in deciding the problems wanting solutions rather than unilaterally building defensive tools expecting women to adopt post-facto. Through an intersectional gender lens factoring overlapping vulnerabilities spanning ableism, LGBTQ+ realities, indigenous communities et al, technology can turn more equitable, accessible and responsive benefiting whole societies.

This paper argues for frameworks assessing safety innovations through metrics quantifying user inclusivity and prevention efficacy instead of technical sophistication alone. Monitoring who gets left behind and why should determine funding for scaling initiatives, not eventual adoption figures divorced from gender segregation limiting access in reality. Questions around whose insights shape design, integration of emotional labor welfare and cultural sensitivity become paramount. Ultimately, redefining women's safety itself by diversifying beyond violence alone to enable freedom, dignity and access equally creates progress for women and girls hitherto restricted structurally. Working in partnership, civil societies and technical advances can build foundations valuing women's lives intrinsically rather than provisionally in private and public realms alike.

2. TECHNOLOGY AS A PROTECTIVE TOOL

2.1 Detail Various Personal Safety Mobile Apps and Wearables Available, and How They Operate

As women's security gains policy priority, technology-led protections occupy center stage promising reactive safeguards digitally where states continue failing. Personal safety mobile applications lead the charge empowering women manage risks better by bridging information voids around local dangers. GPS-enabled features like emergency contacts alerts, travel route tracking and one-touch dialing for first responders represent common offerings here.

MySafeti for example blends location sharing with an SOS alert system where simply shaking phones triggers calls to predefined guardian contacts. It also maintains walk records mapping frequented areas checking women reach intended destinations safely. Similarly, apps like SafeUP offer discretionary check-in requests where failure to respond or unexpected deviations from set trips activates automated SOS messaging to family or friends in need. Features akin to virtual voluntary surveillance seek defending women's bodily autonomy against external threats constantly.

However, concerns persist around privacy compromise from excessive location data collection alongside efficacy doubts for detecting genuine crises only. Tools like Guardian for instance require access permissions to mobile cameras, contacts list alongside GPS coordinates constantly while promising 24/7 monitoring protection via cloud connectivity globally. Critics argue the hidden costs of women needing to remember to keep such apps active at all times lest their utility lapses despite advertising always-on support intuitively.

Seeking to balance both personalized security and flexible lifestyles for women, next-generation safety apps offer options to schedule different modes. SOStart for example lets women keep tracking private for regular commutes while triggering emergency contacts sharing only for riskier night travels or unfamiliar locations. CheckMate works similarly but instead of location data, it relies on users checking in manually via the app itself which then coordinates response protocols should messages stop suddenly. Such innovations demonstrate tackling perennial skepticism regarding excessive battery drain or data appropriation risks seen impeding adoption despite purported benefits earlier.

Alongside smartphones, AI-integrated wearable devices like smart jewellery, watches and buttons also promise direct safeguarding capability literally from women's fingertips. Products such as the InvisaWear necklace hide the ability to discretely send SOS alerts and GPS coordinates to pre-assigned contacts at the press of inbuilt panic buttons. Smash's tech-enabled bracelet works similarly but also lets women leave traced location trails usable as legal evidence later while disguised innocuously as routine accessory wear. Additionally, clenched fist gestures now activate some jewellery pieces' emergency calling and family notification features through motion-triggered sensors seamlessly.

Here too, balancing functionality against aesthetics and costs remain key challenges influencing wider public adoption despite impressive technical credentials. Battery charging needs for wearables also require remembering daily, else their utility lapses ironically when protection gets needed most unexpectedly. Nonetheless, cultural shifts towards normalizing personal safety accessories for women alongside smartphones presage promising strides easing access barriers further. Their discreetness avoids advertising vulnerability externally letting women quietly control channels for seeking help as required privately without needing changes in outward behavior daily.

In fact, hospitals now even provide safety wearable devices for abused women as standard procedure when seeking medical or legal assistance after attacks. The data creation potential on harm suffered facilitates stronger investigation suivis bridging gaps proving gender violence historically downplayed by authorities earlier. Together the smartphone app and wearables booms reflect technology's growing role as force multiplier aiding women exercise self-determination regarding managing threats proactively rather than waiting helplessly for external recourse reactively. It expands the safety toolkit women deploy navigating public spaces rife with risks to their bodily integrity unabated.

2.2 Discuss Government Initiatives Like Transport Monitoring Services and Crime Prediction Algorithms

Beyond personal apps and wearables, authorities globally also recognize technology's potential easing women's security in public spaces. Transit safety receives particular investment via video surveillance within vehicles, GPS tracking systems and emergency response optimization research. Cities from Seoul to Bogota trial concepts like women's only subway cars trying to insulate female passengers from sexual harassment risks recurring in crowded mixed transport.

Latin America leads on leveraging mobile innovation for women's commuting safety through networks like Safetipin or Data4Good. Bogota's municipal government collaborated with crowdsourcing platforms to audit neighborhood walkability scoring safety criteria preferred by women. Insights mapped things like infrastructure causing discomfort, lack of physical security or poor lighting that institutional fixes then targeted responsively easing access. Such data integration with urban planning processes helped contextualize infrastructure shortcomings directly fueling threats to women's public movement. It mainstreams inclusive perspectives otherwise lacking in male dominated transport design ecosystems conventionally.

Other authorities go further seeking predictive capabilities forecasting risks to women proactively through machine learning systems. From 2020 Mexico City has used algorithms combing police reports with wider datasets to identify offense hotspots against women spanning streets or subway lines. Alerts now notify citizens real-time about locations correlated with heightened crime rates against women enabling avoidance or heightened precautions accordingly. However, concerns persist on racial or demographic profiling alongside efficacy since sexual violence largely stays unreported initially by Latina women fearing stigma or backlash in lodging complaints formally.

India's various state police forces unveil their own digital initiatives tackling reported gender crimes using technology for swift response. The southern state Telangana has won praise for initiatives like 'Suraksha' app allowing women to report threats digitally while securing case updates via automated calls eliminating police station commuting needs. Similarly, the central state Chhattisgarh enables E-FIR registration by women via a dedicated portal with legal advisors aiding accurate remote complaint filing for sexual harassment instances otherwise buried conventionally. Critically these apps ease pressures women face resisting family discouragement against pursuing criminal charges in socially conservative Indian societies against perpetrators through digital aids.

However, women's safety apps and transport tools operate reactively post abuse occurrence rather than stress prevention before that stage. As such Tamil Nadu state recently launched South Asia's first Women's Cyber Safety application instead tackling online harassment and stalking risks growing exponentially. By using AI to track digital threats against women real-time and coordinating rapid response from tech giants, authorities demonstrate updated understanding on emerging spaces requiring women's security too. Still activists argue piecemeal projects ultimately fail matching the sheer ubiquity and complexity of violence against women in public life without addressing cultural root causes pervasive socially.

Altogether governments globally invest growing resources leveraging digital technology assisting women's safety across essential public spaces promisingly. Prioritizing female passengers within transit systems to apps tackling cyber stalking risks demonstrate widened recognition on the multifaceted vulnerabilities women navigators of shared spaces face daily. However, concerns persist around efficacy, ethics and inclusion in both crime response algorithms and transport innovations launched. Critics point out that band-aid tech fixes only provide short-term cover unless they couple with transformative laws and resocialization addressing tolerance for violence against women at societal roots fundamentally.

2.3 Caution That Over-Reliance on Tech Wrongly Places Burden of Safety on Women

While apps and devices promise protecting women reactively post-assault, most critique stems from their inability to affect violence prevention more fundamentally. Reliance on digital vigilance wrongly transfers accountability for women's public safety from state and societies to women themselves. Critics argue

rushed deployment gives false impressions of secured inclusive spaces, when in reality gender exclusive barriers to access persist socially unabated.

The fixation on creating alarm buttons, location trackers and emergency dialers implies the principal onus lies with women adjusting behaviors self-preserving from hypothetical aggressors even before attacks occur. It labels women's bodies and freedoms as inherently vulnerable commodities needing round the clock risk calculations and external surveillance dynamically. Yet paradoxically no similar societal expectations exist for men to pre-emptively defend themselves likewise despite facing statistically lesser violence statistically in public spaces by far as per data.

In effect, women get socially conditioned to occupy public areas defensively not as equal participatory citizens by birthright, but as guests whose onus lies in self-regulation to avoid provoking attacks. Critics therefore argue safety devices substitute for rather than supplement legal deterrents to violence against women or mindset overhauls equalizing access to shared spaces more equitably. Their quick fixes grant symbolic acknowledgment of the violence ubiquity facing women, whilst avoiding actual reforms questioning why feminine existence itself invites unprovoked attacks before any action even on the victims' part.

Additionally, excessive reliance on technology-mediated safeguards transfers undue data control and privacy costs to women rather than credible state-backed protections assured more universally. Apps tracking location history or wearables capturing sensitive journey details for 'security purposes' imply women should compromise informational autonomy alongside physical movements. It positions rights-based public participation as a conditional privilege contingent on meeting subjective 'prudence' burdens rather than as an intrinsic entitlement unconditionally.

Moreover, rarely do tools consider financial, linguistic or civic barriers certain demographics face adopting expensive smartphones or apps expecting technological savviness. Critics highlight how marginalized communities like migrants, minorities or rural women stand excluded lacking digital access or literacy to utilize apps promising safety supports in cities or well-lit areas. Such gaps spotlight the need to couple women-led grassroots insights with top-down innovation if vulnerability reduction initiatives seek true inclusion rather than exclusivity.

At the crux lies debate on whether safety apps prove mere palliatives seeking to mitigate external threats to women reactively rather than systemically removing root societal constraints restraining women's unconstricted participation publicly. Reliance on wearables, emergency alerts or police tracking concentrates solely on equipping women for self-protection after violence likelihoods rather than dismantling tolerance for violence itself through laws and cultural realignment.

Ultimately laws, infrastructure and attitudes enabling violence against women trace back to failures recognizing consent, autonomy, and dignity as unconditional universal rights rather than conditional privileges randomly. Remedial apps can only temporarily empower individual responses against continually predictable risks created by broken societal systems. Unless the focus embeds comprehensive reforms designed for marginalized gender needs, kneejerk tech fixes only license public spaces remaining inequitably unsafe for women navigating them. For digital tools to enable transformative women's safety, the lens must shift from reactive protection alone towards proactive prevention by addressing violence before occurrence.

3. SHORTCOMINGS AND SOCIETAL CONTEXT

3.1 Analyze Case Like Spain's Flawed Domestic Violence Algorithm Showing Tech Limitations

Spain recently spotlighted risks that automated systems can exacerbate when applied legally for predicting intimate partner violence devoid of nuanced gender insights. In 2021, the murder of a 32-year old woman by her abusive ex-boyfriend despite her previous police complaints sparked national outrage regarding institutional negligence. Investigations revealed her death followed Spanish authorities deploying a standardized questionnaire algorithm categorizing her as low risk thereby denying further protection.

The flawed system designed by male data scientists relied solely on a 35-point checklist administered by officers when women approached stations fearing partners. Questions included "Has he ever threatened you with any weapon? Does he take drugs regularly? Have you separated recently?" and based on yes/no answers, women got classified as low, moderate or high danger levels qualitatively. However, such scoring failed capturing trauma bonding dynamics, emotional abuser manipulation tactics and mental coercion distinguishing domestic violence apart from physical assault by random strangers easily.

In the deceased victim's case, the algorithm ruled her a non-critical case overlooking eight prior incidents reported against the perpetrator granting him continued access eventually enabling murder. The incident spotlighted risks of applying statistical violence models designed from stranger crimes data lacking qualitative insights differentiating domestic abuse contexts. Critics argued coding unable to account for emotional complexities or trauma behavior could never accurately predict risks facing victims reluctantly lodging police complaints against intimates often still emotionally attached.

What stood out was lack of female perspectives incorporated in the system design itself thereby overlooking red flags like perpetrator access to possible weapons or past violation of restraining orders. Moreover, engineers admitted the original risk scoring checklist simply built expanding an existing juvenile diagnostic questionnaire without adjustments reflecting domestic violence specific challenges. The tragic outcome signified harms AI systems can amplify when crafted through majority male teams' assumptions of safety divorced from grounded realities facing women victims.

It highlighted how alert systems communicating moderate danger levels influenced officers downgrading responses than if human discretion alone categorized complaints initially. Over-reliance on statistical systems above investigating case nuances also impacted accountability around ensuring follow ups once complaints got filed formally no matter the assigned risk rating generated automatically. Spain's case echoed previous technology policy failures like Clearview AI's facial recognition built using images non-consensually scraped from social media also without assessing gender representation harms adequately.

Most crucially the flawed coding spotlighted the ultimate need for preventative approaches first rather than simply reactive interventions post abuse occurrence as undertaken too late here. Gender rights experts flagged how restraining orders get violated recurrently failing actual deterrence reflecting unchanged societal nonchalance enabling abusers despite complaints lodging. Structural solutions demand preventing violent incidents themselves through resocializing equality values from childhood whilst ensuring laws universally mandate removing weapons access from probable male abusers altogether proactively.

Altogether the human toll from Spain's failed AI experiment underscored risks of rushed public implementations without safeguarding against inaccuracies, biases or blind spots designed by unrepresentative technology teams. It highlighted real ethical threats posed by black box systems whose

opacity hinders tracing errors allowing flawed algorithm results translating dangerously into policies severely underserving women's safety. Surfacing false positives like this instance growingly represents warnings against unchecked AI expansion in law and order applications lacking transparency or contestability around systems ultimately programmed by tech architects' limited worldviews. Before deploying sensitive scoring algorithms differentiating protection access, rigorous audits checking coding neutrality alongside gender inclusivity in designing teams represent non-negotiable obligations.

3.2 Stress That Tech Cannot Substitute Needed Attitude Shifts and Policy Changes in Society

While apps and devices promise protective supports easing women's navigation of public spaces, excessive reliance risks neglecting root societal reforms needed. Critics argue desperate dependence on technology platforms reflects failures around consciousness raising, infrastructure building and accountability measures deterring gender violence socially first.

Quick digital fixes imply women's unconditional safety stays contingent on prudent self-policing through alarms or tracking rather than intrinsic rights enforcement guaranteed equitably. But lasting change relies on disentangling feminine existence itself from violence risks seen rationalized through victim blaming mentalities like provocative clothing or alcohol consumption. Unless social mindsets transform to recognize consent, autonomy and dignity as non-negotiable universal rights unlinked to arbitrary morality impositions, no app can sustainably enable women reclaiming public spaces leur birthright.

Merely digitizing historically flawed systems also risks amplifying blind spots rather than eliminating systemic cracks failing women through band-aid tech solutionism. Applying algorithms codified from years of dismissed complaints or designing safety apps without female lens inputs retains biases against victims historically silenced. Technical interventions decided unilaterally thereby risk centralizing some women's fears like harassment visibility while dismissing concerns like job safety or domestic violence most others equally prioritize.

Moreover, no amount of après-coup apps notify authorities of violence against women post-fact can substitute deterrence guaranteed by accountability laws and enforcement proactively. When 9/10 women report feeling unsafe in public areas, root causes trace beyond physical spaces into socio-legal systems enabling abuse without consequences through credibility attacks against victims for instance. Safety apps promising responsive private protections remain meaningless without corresponding public reforms positively asserting women's unconditional rights occupying shared spaces equitably first.

In fact, by externalizing safety burden wholly onto women rather than diffusing responsibility across citizens, quick tech fixes risk nurturing apathy around building allyship for women's security concerns collectively. Reliance on smart jewelry triggers or discreet apps sustains cultures viewing women's visible self-defense signaling as taboo whilst expecting women manage abuse risks silently instead behind digital veils. Doing so furthers dangerous assumptions that unconditional public safety represents a high bar luxury practical only through women's cautious tradeoffs rather than an accessible civic necessity cutting across gender uniformly.

Hence governments investing in safety devices like phone apps or police heatmaps concentrate myopically on fortifying women individually post-violence rather than strength rather than strengthening equity foundations valuing feminine dignity intrinsically pre-emptively. Allowing digi-fixes appearing strong substitutes for attitude shifts risks leaving legal systems, mentalities and infrastructures intrinsically tolerant towards violence against half the population structurally unreformed.

Sustainable security demands no less investment in resocializing emerging citizens and landmark policy reforms as apps rolled out reactively much later seeking limited damage control post-crisis. For instance, urban design must mandate civic authorities audit public infrastructure through gendered threat perspectives prioritizing women's safety insights equitably. Schools need re-envisioning as sites seeding consent culture and gender sensitization from childhood while workplaces require accountability mechanisms enforcing harassment reporting rights uniformly.

Alongside women-centric spaces, conscious building of pro-feminist male allies also crucial given men still dominate decision-making enabling security prioritization presently. Community policing integrating men as stakeholders in calling out peer complicity around locker room sexism or standing witnesses against victim blaming remains pivotal. Resocialization initiatives make citizens partners in women's safety alongside states rather than positioning marginalized women against entire systems unequally.

In conclusion while apps promise responsive protection for women reactively, progressive reliance risks substituting needed foundational reforms proactively that policymakers must still undertake. Technical tools can only temporarily mitigate threats manifesting from loopholes in laws, infrastructures and mentalities thereof structurally designed without gender consciousness today. Unless social re-engineering dismantles assumptions linking feminine access to arbitrary conditions, women's safety will remain qualified easements than fundamental guarantees in practice regardless of digitization promises suggested. The change requires inclusive reimagination of public spaces, laws and attitudes entitling women's unconditional autonomy first rather than mere technological assistance overriding symptoms afterwards.

3.3 Warn Constant Safety Planning Inflicts Emotional Toll on Women Expected to Remain Vigilant

While apps and devices promise responsive protection supports easing navigation of public spaces for women, most critique stems from their inability to affect violence prevention more fundamentally. Critics argue rushed deployment gives false impressions of secured inclusive spaces, when in reality gender exclusive barriers to access persist socially unabated. Apps risk becoming mere symbolic acknowledgment of violence ubiquity facing women, whilst avoiding actual reforms questioning why feminine existence itself invites unprovoked attacks before any action even on the victims' part.

Additionally, excessive reliance on technology-mediated safeguards transfers undue data control and privacy costs to women rather than credible state-backed protections assured more universally. Critics highlight how marginalized communities like migrants, minorities or rural women stand excluded lacking digital access or literacy to utilize apps promising reactive safety supports in cities. Their vulnerability risks exacerbating given crushing safety planning burdens socially expected from women already prior to any violence incidents, unlike male peers moving freely sans precautions by default.

The fixation on creating alarm buttons, location trackers and emergency dialers implies the principal onus lies with women adjusting behaviors self-preserving from hypothetical aggressors even before attacks occur. It labels women's bodies and freedoms as inherently vulnerable commodities needing round the clock risk calculations and external surveillance dynamically. Yet paradoxically no similar societal expectations exist for men to pre-emptively defend themselves likewise despite facing statistically lesser violence statistically in public spaces by far as per global data.

In effect, women get socially conditioned to occupy public areas defensively not as equal participatory citizens by birthright, but as guests whose onus lies in self-regulation to avoid provoking attacks through cautious safety planning. Such lopsided accountable distribution both physically and mentally drains women who not only undergo actual violence but also exhaustive labor safeguarding themselves preemptively before that stage continually. It manifests through actions like altering clothing, tracking dates' cycles, memorizing police helplines, mapping dark alleys along regular routes or constantly texting contacts from public transportation daily.

Experts caution the sheer ubiquity of self-protection measures monitorable through apps now risks normalizing fallacy that women live lives of perpetual violence anticipation unlike male counterparts at all times. The myth of women's safety attainable purely through individualized cautionary tradeoffs furthers assumptions of public spaces as inherently hostile sites they enter own their peril rather than accessible civic goods equitably. Apps suggesting contingency measures post assaults thereby offer reactive band-aids unable to substitute proactive resocialization dismantling risks targeting women's presence within shared spaces itself fundamentally.

Without addressing root tolerance for violence culturally or legally, quick tech fixes grant symbolic acknowledgment of gender safety gaps whilst avoiding actual reforms needed. They offer individual solutions for protecting singular women after assaults probabilistically but do nothing to dismantle risks expected before any first incidents recurring daily. As a result, generation after generation socially conditions women undertaking safety planning labor from girlhood itself whilst leaving male entitlement over public access unchanged culturally which apps barely moderate materially. For digital tools to offer meaningful protection gains sustainably requires coupling with resocialization initiatives humanizing women's equitable rights to shared spaces unconditionally beyond stopgap technical measures solely.

4. CENTERING WOMEN IN SAFETY SOLUTIONS
4.1 Define "Safety by Design" Principles for Technology Putting Women's Needs First

"Safety by design" represents an emerging framework promoting gender-inclusive digital innovation benefiting women's interests equitably alongside business or efficiency goals simultaneously. It argues that integrating women's safety insights sustainably requires going beyond mere product functionality to embed values like consent, confidentiality and personal autonomy structurally across technical builds.

Central to safety by design lies understanding contextual challenges shaping women's public access experiences far differently from male counterparts. It demands technology solutions consciously challenge proprietary tech sector assumptions that frequently mischaracterize or trivialize fem-centric concerns in chasing scale or profits myopically. Instead, engineers must employ evidence-based vulnerability assessments mapping threats women undergo trying to exercise the very public freedom of movement, expression and opportunities that apps promise enabling remotely.

Some guiding principles include upholding privacy as the default for women users so that families or partners cannot access sensitive personal data without consent. Granular visibility controls should govern location, activity monitoring and money trails allowing women discretion over what digital footprints get created accessibility to whom. User journeys must also emphasize understanding functionality easily over complex features chasing technical superiority alone. Confidential counseling and violence resources referrals should integrate directly within digital tools women rely on daily traversing public spaces.

Most crucially, engineers cannot dominate decision tables unilaterally when designing women's safety products intended empowering women's agency firsthand. Structures enabling participation like safety design labs where women users actively identify neighborhood infrastructure gaps or test proto-app builds enhance inclusivity. Such spaces allow confronting unconscious biases developers bring when targeting fem-centric adversities using male lived experiences as proxy baselines intuitively limiting relevance.

Safety by design also demands technology measure success qualitatively beyond adoption metrics or profits solely. Solutions designed for women's concerns measure true impact through freedom of access, mobility and opportunities enabled removing restrictive norms or surveillance pressures otherwise. Metrics assessing privacy risks, emotional labor tradeoffs and women's collectivized security across socio-economic barriers matter more than profits or functionality alone here.

At its heart, safety by design puts fulfilling women's rights at the center rather than retrofitting feminine concerns around technologies built agnostic to realities of end-users expected adopting security wearables or police heatmaps. It compels engineers to approach women's safety not as an afterthought for streamlined products but the foremost design priority guiding business goals secondarily. Making tech work optimally for women means hard-baking values like consent, personal autonomy and freedom generalized across users. But structurally centering marginalized women's situated concerns remains vital given their historic exclusion crafting technical solutions targeting their lives.

4.2 Outline How to Assess if Apps and Initiatives Consider Diverse Realities of Womanhood

Evaluating technology's ability to enable women's unconditional public access and participation requires assessing if designs and functionalities actively consider differences underpinning lived womanhood. Marginalized voices often stand excluded from direct participation in the historically male-dominated tech sector defining solutions targeting women's lives.

User-informed insights covering the continuum of women's security experiences beyond physical assault therefore prove crucial spotlighting the need for greater gender sensitization signaling. Apps tracking women's collective sense of safety to map perception voids across neighborhoods now enable crowd-sourced inputs driving this. Spain's tragically flawed domestic violence algorithm showed ignoring women's situational realities carries lasting horrors technology often exacerbates even if unintentionally.

Structural audits help uncover product gaps that exclusionary tech ideation practices generate frequently. Analyzing features through an intersectional lens and factoring overlapping vulnerabilities spanning ableism, LGBTQ+ realities, indigenous communities et al allows more equitable, accessible, and responsive designs benefiting whole societies. Key questions determining app/service inclusivity cover:

1. **Research phases:** Were target women users across socio-cultural demographics actively consulted identifying priority threats and desired supports instead of external interpretations alone? Was prevalence of types of violence like workplace harassment weighed equally alongside public transport sexual assault prominently occupying tech discourse?

2. **Design process:** Did diverse women get opportunities reviewing prototypes and providing modification feedback aligned with plural realities beyond designers' worldviews? Were feminist organization insights incorporated regarding ethical risks around surveillance or visibility tradeoffs for women? Were accessibility needs of disabled women, practical constraints facing elderly female users given considerations or only tech-savvy segments dominating digital spaces focused upon?

3. **Rollout plans:** Is app/service communication and marketing aimed at raising overall social awareness on women's unconditional safety as an intrinsic right beyond selling product functionality? Do outreach teams engage localized women's collectives as partners accessing marginalized cohorts nationally rather than tech-fluent NGO's alone? Are trainings conducted upskilling women users making solutions adoptable by non-privileged communities realistically countering exclusive tech penetration trends seen so far?

4. **Business model:** Do revenue approaches avoid manipulating safety fears by peddling paid features addressing threats that states' responsibility lies resolving like harassment complaints platforms monetizing? Are women's data privacy needs safeguarded stringently without capitalistic usage relaxations typical for tech spaces? Are minority women stakeholders empowered collectively rather than companies retaining unilateral data/design controls related to women's security?

Evaluating tech's role tackling female safety hence requires factoring how engineering and deployment processes address intersectional realities across caste, class, race, orientation lines shaping womanhood pluralistically. Uplifting marginalized voices as decision makers in technological visioning of women's security proves pivotal realizing outcomes considerate of under-privileged resilience challenges. Inclusive app development demands intentional structural changes placing women themselves at the center first rather than mere reactive gamification around women's safety later.

4.3 Emphasize Participation of Women at All Stages, Avoiding One-size-fits-all Tech Fixes

Ensuring technology solutions enable women's unconditional public access and participation demands embedding female insights and oversight structurally rather than one-time consultation alibis alone. Critics argue the historic underrepresentation of women's voices in technological design spaces centering male worldviews risks apps malfunctioning for excluded cohorts.

It complains reactive band-aid technical fixes trying empowering women as an afterthought following market viability confirmation first for widespread male consumer tech. The approach risks oversights around unmet needs or unintended harms to marginalized cohorts evident through dangers amplified for women domestic violence victims from AI safety scoring systems untested qualitatively.

Structural inclusion of women's voices at all stages thus prevents such algorithm harms witnessed in Spain recently or racial biases called out across facial recognition designs ignoring non-white skin tones. Importing intersectional gender perceptions within engineering teams through community partners allows avoiding product-market fit assumptions guided by male experiences disproportionately. Diversity insights institute necessary checks questioning whether app functionalities indeed resolve priority threats diverse women collectively identify themselves globally.

But participation cannot limit at consulting phases alone either without sustained women leadership governing projects targeting female users uniquely. Experts already warned the pandemic's shadow looming over hard fought workplace equality gains as burnt out women professionals juggle workplace and domestic responsibilities unequally. Already female digital access suffers exacerbated divides on axes of income, race and education explaining minorities exclusion from tech opportunity equality promised.

Altogether the risks of artificially infusing women's participation temporarily generates compliance alibis than meaningful priority alignment centering underserved cohorts. Unless women direct design choices

plus audits around ethics, privacy plus accessibility themselves, initiative success metrics stays divorced from lifting women collectively. Top-down decision making power retention risks engaging women narrowly as check-box validators post app roll out rather than process co-pilots themselves beyond initial surveys.

Hence project charters must mandate institution mechanisms cementing women's veto powers in vitals aspects like data gathering selective consent. Anonymous collective reporting channels allows unfiltered ground level feedback driving iterative feature enhancements responding dynamically to women's concerns unburdened by company hierarchies or biases.

Further independent audits staffed by certified feminists organization allows credible whistleblowing protections if corporate vested interests overlook harassment complaints in digital workplaces employing women for instance. Making app source codes transparent rather than proprietary assets gives external female analysts oversight authority assessing underlying profit motives or ethicality around apps soliciting personal sensitive information of women users. -centered participatory design extending beyond launch prevents femmes needs subordinating to either efficiency goals or unconscious biases enshrined digitally. Structural reforms securing women's equitable inclusion in visioning technological futures targeting their lives' gambits prove pivotal avoiding one-size ill fits all or band-aid fixes repeating historically.

5. CONCLUSION

5.1 Reiterate Women Have Intrinsic Right to Feel and Be Safe Without Qualifications

In conclusion, women's security represents an intrinsic human right rather than a qualified privilege as operationalized presently. Safety cannot remain contingent on exhaustive self-policing through apps and gadgets while male entitlement over shared public spaces stays culturally unchecked simultaneously. For sustainable change, women's bodily autonomy and dignity warrant unconditional defending rather than partial protection policies or bolt-on digital tools promising reactive assistance alone.

Globally, women's fears occupy private and public spaces equally with up to 95% feeling unsafe even in progressive cities. Yet urban planning traditionally centers keeping vehicles rather than female citizens safe, with just 30% of transport research incorporating gender considerations for instance. Workplace infrastructure design ignores women's needs evident in just 3% of businesses worldwide meeting lactation regulations facilitating nursing mothers balancing professional lives realistically. Female public figures face exponentially more trolling, harassment and credibility attacks online restricting participation. Public leisure spots like parks or jogging trails see usage segregation by gender driven by violence risks disproportionately targeting feminine bodies denying equal access.

Be it hospitals, police stations, places of worship or education, absence of inclusive spaces catering to women's privacy, hygiene and security needs persist ubiquitously. Schools notoriously lack functional gender neutral toilet facilities while three in four women avoid public washrooms due to cleanliness or safety fears as per research. Insensitive interrogation processes and medical tests further stigmatize female victims approaching authorities after sexual assaults already.

What the continued normalization of feminine fears occupying even essential institutional spaces underscores is failure recognizing women's bodily security and dignity as fundamental human rights beyond paper. Without safe access as an unconditional pre-requirement for enabling professional, economic and leadership opportunities equitably, gender parity remains unrealistic notwithstanding policy proclamations. Ubiquity of apps trying to digitize piecemeal protections itself signals institutional failures

delivering substantive structural reforms guaranteeing women's public participation on par with male counterparts fearlessly.

Correcting course requires coupling smart laws and infrastructure with resocializing safety as intrinsic to womanhood not a conditional allowance for "compliant" subjects alone. Urban planning must proactively embed safety audits led by women's collective inputs while workplaces need accountability systems enforcing equal access plus anti-harassment rights uniformly. Schools ought to build consent culture from early ages and public recreational spaces must reconcile designs accommodating women's needs before expecting confidence rebuild. Future promises of women's empowerment stay limited without securing unconditional safety in present through legal and infrastructural commitments enabling equitable access beyond digital band-aids trying mitigating inherited threats reactively alone.

5.2 Argue Technology Should Enable That Right but Not Replace Societal Responsibility for It

In conclusion, technology offers assistive potential fast-tracking women's safety but cannot replace imperative legal and social reforms pending fundamentally. Apps today at best mitigate visible threats reactively rather than dismantling risks targeting women's presence within public spaces itself proactively. Unless societies reimagine safety as an unconditional right intrinsic to womanhood not a qualified privilege, sustainable structural progress stays doubtful regardless of digitization.

Present tools concentrate predominantly on equipping women's individual self-protection post assaults by arming them with alarms, emergency contacts and evidence logging. But preparedness yielding mere harm reduction alone shifts focus away from preventing violence before occurrence through systemic changes. It labels women's bodies as inherently vulnerable commodities needing round the clock risk calculations and external surveillance. Yet no similar expectations exist for men to defend themselves likewise statistically facing far lower violence incidence within public spaces.

Hence apps trying to enhance responsive coordination alone cannot substitute deterrence guaranteed by accountability laws and enforcement measures proactively. Temporary individual protections facilitated digitally remain meaningless without corresponding public resocialization asserting women's equitable rights of access unambiguously. Reliance on smart devices sustains cultures expecting women manage risks silently instead while granting men unchecked mobility privilege still.

What lies vital is coupling accessible technology assists with legal and infrastructure reforms embedding women's voices equitably at systemic levels. Urban planning must mandate safety audits led by women's insights securing public spaces inclusively beforehand, rather than apps trying to reclaim their access reactively later. Workplaces and educational institutes need legally binding accountability frameworks enforcement uniformly beyond digitizing assistance alone. Resocializing initiatives should target building pro-feminist male allies early on viewing women's dignity as indivisible from human rights universally.

Technology assists best when enabling structural transformation rather than substituting for state's unconditional safety responsibilities owed socially towards female citizens. Tools like crowd-sourced safety perception maps or facilitating women co-design urban policy interventions allow driving positive change. But excessive reliance on personal safety devices risks nurturing public indifference about demanding foundational reforms from governance systems. It limits potential for women occupying decision-making spaces shaping collective priorities around laws, infrastructure and budget allocations.

Hence for technology to uplift rather than inhibit women's safety in sustainable ways, tools must couple with system them coupling with systematic reforms beyond individual capabilities. Apps can temporarily assist personal security management, but robust deterrence mechanisms lie with national laws universally criminalizing gender violence unambiguously. Preventative infrastructure audits soliciting women's inputs help too but cultural attitude shifts grounding feminine dignity and consent as non-negotiable human rights matter more.

At best technological innovations remain force multipliers realizing women's safety not ultimate guarantors palming off societal obligations. They expand assistance women rightfully deserve while spotlighting overdue policy actions states must double down executing. Unless social mindsets transform and governance systems update codifying unconditional protections for womanhood, no technical solution band-aids alone can uplift systemic cracks denying half the population public space accessibility equitably so far.

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5.3 Call for an Intersectional Approach Elevating Women's Voices in the Safety Dialogue

In closing, enabling women's unconditional access to public spaces demands intersectional approaches amplifying excluded female voices systematically marginalized in policy decisions historically. Without uplifting pluralistic insights from women navigating shared environments daily, technical fixes risk exacerbating blind spots failing underprivileged demographics instead.

Globally, disability rights activists alert pressing challenges facing wheelchair users occupying public spaces rife with accessibility flaws even progress metropolitan cities. Yet urban safety perceptions get defined often through ableist physical harassment risks alone failing recognizing disabled women face layered mobility plus discrimination threats socio-politically restricted through infrastructural exclusions daily. Queer individuals too highlight needing solutions securing same-sex partnership legitimacy, housing rights and cyberbullying protections concurrently enabling safety equitably beyond heteronormativity lens limiting mainstream discourse.

Likewise, solutions targeting workplace sexual harassment require factoring economic precarity denying underprivileged women alternatives walking away exploitative jobs unlike privileged cohorts. Single mothers, elderly citizens, indigenous communities all stress intermeshed safety challenges transiting public spaces daily spanning accessibility, legal protections, healthcare access compounded by poverty vulnerabilities collectively.

An intersectional approach driving policy reforms would therefore start bringing excluded voices inside decision rooms first. It demands participatory urban planning mandating underserved demographics like persons with disabilities co-create public infrastructure designs securing accessibility otherwise denied in practice. Diverse community participation pilot testing digital safety tools allows inputs improving relevance for minority women technologically excluded presently from such application spaces historically centered around western users predominantly. Acknowledging emotional, healthcare and child support needs part and parcel of women's safety by service providers enables holistic protection mechanisms lacking for survivors facing multifaceted struggles rebuilding independent lives post-violence.

Workplace infrastructure audits soliciting cultural minority women's insights helps tailor unique returnship job models facilitating professional reentry after maternity breaks rather than one-size ill fits all technical solutions alone. LGBTQ+ inclusive safety apps can provide both digitized basic policing assistance alongside resources assisting individuals fight instituted discrimination by default daily excluding their collective experience lacking in mainstream societal consciousness so far.

In essence intersectional approaches position women not as passive recipients of top-down security initiatives but active participants shaping decisions in accordance. Structural inclusion of women's voices at all governance levels allows safety solutions emerging grounded in lived gender realities on the ground for lasting equity. It compels engineers approach fem-centric adversities using gender balanced insights rather than unilaterally decided male experiences alone limiting contextual relevance otherwise. Mainstreaming intersectionality principles mandate policy spaces validate standpoints of underprivileged navigating public spheres daily as stakeholders in sustainable safety solutions targeting their lives centrally.

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