

ting

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Abstract

Amidst the hyperconnectivity of the digital age, Gen Z paradoxically reports unprecedented levels of loneliness and anxiety in forming meaningful human connections. Traditional dating apps and social platforms often reinforce superficiality and emotional detachment. *Ting* proposes an alternative, a hybrid wearable-app ecosystem designed to restore the intimacy of real-world encounters. Worn near the vagus nerve — a central regulator of emotional safety — the device vibrates subtly upon proximity to emotionally compatible users, as determined by physiological signals (heart rate, temperature, posture) and contextual data processed by an adaptive AI. *Ting* doesn't gamify attraction or mediate via images; instead, it whispers through the body, initiating connection through emotion and sensation. The device fosters presence over performance, with no swipes or feeds, transforming the body into a relational interface. It proposes a new grammar of encounter based on intuition, embodiment, and emotional resonance. In doing so, *Ting* offers a product and a paradigm shift in how we relate, reconnecting technology with its most humane potential.

1. Context & Foundations

a. Problem Statement

Despite being the most digitally connected generation in history, Generation Z faces an alarming rise in loneliness, social anxiety, and difficulty forming meaningful connections. Raised in an environment of constant online presence, these individuals navigate relationships through screens, algorithms, and curated personas — yet often fail to experience authentic human closeness.

Studies from *Cigna*¹ and *McKinsey*² confirm this paradox, 79% of Gen Z respondents report frequent feelings of loneliness, and 58% claim their social needs remain unmet. This is not simply a technological issue, but an emotional and behavioral crisis. The ease of swiping and liking has replaced the challenge of real-life engagement, leaving behind a generation unsure of how to begin or maintain a face-to-face conversation.

The psychological cost of such disconnection is high: increased anxiety, poor emotional regulation, and a growing sense of inadequacy. Social apps promise connection but often deliver performance, comparison, and overload.

It is within this complex emotional and social landscape that *Ting* emerges — not as yet another app, but as a new social language that bridges the gap between body and technology, presence and emotion. Our project responds to the urgent need for tools that are not only technically efficient but also emotionally intelligent and physiologically aligned with how people feel.

b. Literature Review

Multiple sources point to Gen Z as the most emotionally vulnerable age group. *Cigna's* report identifies this generation as the loneliest, and *McKinsey* corroborates that over half experience unmet social needs. According to Brazilian psychologist *Jamile Teles*³, digital dependency exacerbates this condition by amplifying anxiety and encouraging toxic comparison:

"(...) Technology, instead of being a tool of support, has become a source of stress and anxiety due to social approval pressure and constant exposure to judgment(...)"

These dynamics result in reduced self-esteem, distorted self-image, and a decline in basic social skills such as empathy and active listening. As

¹ Cigna, 2020. Available at:

<https://newsroom.thecignagroup.com/loneliness-epidemic-persists-post-pandemic-look>

² McKinsey & Company, 2023. Addressing the mental health challenges of Generation Z. Available at: <https://www.mckinsey.com/industries/healthcare/our-insights/addressing-the-unprecedented-behavioral-health-challenges-facing-generation-z/pt-BR>

³ Portal Unit (2024, October 8). Geração Z e ansiedade: o desafio dos jovens no mercado de trabalho. Unit.br. At: <https://portal.unit.br/blog/noticias/geracao-z-e-a-ansiedade-o-desafio-dos-jovens-no-mercado-de-trabalho/>

social encounters are increasingly filtered through digital interfaces, the capacity to sustain real-life conversation or emotional presence diminishes, fueling a cycle of social withdrawal.

Social connections play a central role in human health and well-being. The work of *Baumeister and Leary* (1995)⁴ emphasizes the psychological necessity of belonging, while *Holt-Lunstad et al.* (2010)⁵ demonstrate that strong social relationships can reduce mortality risk and improve overall quality of life. These findings affirm that emotional well-being is tightly linked to interpersonal relationships, especially those built through non-verbal cues such as touch, facial expression, and shared presence.

Our project is grounded in the *Polyvagal Theory*⁶, developed by neuroscientist Stephen Porges, which outlines how the vagus nerve regulates emotional states and social engagement through physiological feedback loops. The theory posits that the body's detection of safety through subtle physical cues (such as vibrations or gentle touch) can activate the ventral vagal complex, enhancing openness to social interaction and reducing defensive responses like anxiety and avoidance.

This concept is central to *Ting's* proposal; instead of relying on visual judgment or digital performance, our wearable uses the body as the starting point for connection. Positioned in the upper spine, the ting device aligns with the vagus nerve, translating proximity and emotional compatibility into a subtle vibration, fostering real-world connection through embodied feedback.

c. Main Goals & Research Questions

This project stems from a pressing paradox: how did the most digitally connected generation in history become the loneliest? Our primary goal was to investigate how emerging technologies could support Gen Z in forming emotionally meaningful and safe face-to-face connections. Rather than reinforcing performative digital habits, we sought to reimagine technology as a bridge between physiology and presence.

We aimed to answer the following research questions:

1. What are the social and emotional barriers Gen Z faces when building new in-person connections?

⁴ Baumeister, R. F., & Leary, M. R. (1995). The Need to Belong. *Psychological Bulletin*, 117(3), 497–529. DOI: [10.1037/0033-2909.117.3.497](https://doi.org/10.1037/0033-2909.117.3.497).

⁵ Holt-Lunstad, J., & Smith, T. B. (2012). Social Relationships and Mortality. DOI: [10.1111/j.1751-9004.2011.00406.x](https://doi.org/10.1111/j.1751-9004.2011.00406.x)

⁶ Theory by Stephen Porges (1995) explaining how the autonomic nervous system supports safety and social behavior through the vagus nerve. DOI: [10.1111/j.1469-8986.1995.tb01213.x](https://doi.org/10.1111/j.1469-8986.1995.tb01213.x)

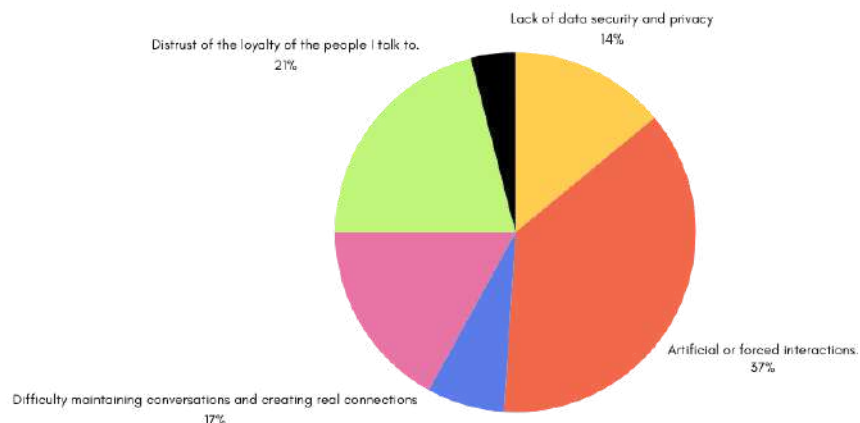
2. How can emotional AI, embedded into the body, assist in fostering low-pressure, authentic encounters?
3. Can a wearable device, guided by Polyvagal Theory and user-specific physiological data, enable a more intuitive and embodied social experience?

These questions led us to develop *Ting* — a speculative, yet deeply grounded tool for reawakening the social body.

d. User Research

To ensure the project's alignment with real user needs, we conducted a quantitative and qualitative survey with 93 participants. Most were aged between 18 and 25, and 83% identified as students or student-workers. A significant majority reported experiencing social anxiety, particularly when initiating in-person interactions. While they often default to digital platforms for comfort, there was clear interest in deeper, value-driven, real-world connections.

What makes you give up on friendship or dating apps?



Participants expressed frustration with the superficiality and emotional fatigue caused by current dating and social apps. They voiced a desire for quieter, non-judgmental ways to meet compatible people, especially ones that didn't rely on photos, messages, or forced small talk. These insights helped us define three key user personas:

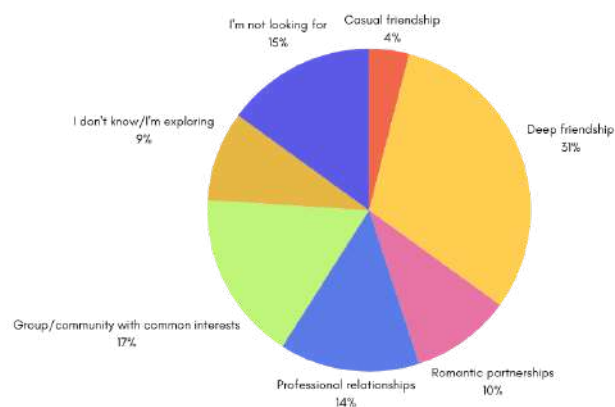
- Introverted young adults seeking non-verbal social cues
- Users balancing emotional vulnerability with self-protection
- People who crave genuine connection but need time and subtlety to build it

If there was a way to help with socialization, what would be most helpful?



Based on participants' preferences, the pie chart displays the types of connections people are currently seeking. Options include friendships, romantic relationships, professional ties, and interest-based groups. These choices reflect the priorities of different personas, such as introverted young adults in search of deeper bonds or individuals who favor quiet, meaningful interaction. The data aligns with *Ting's* strategy of offering a private, body-centered way to foster connection that suits these nuanced social needs.

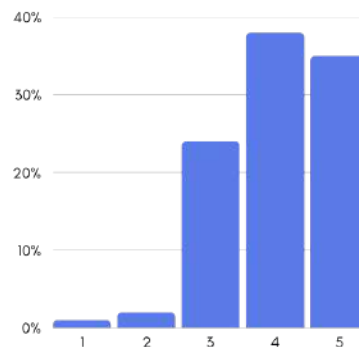
What kind of connection are you most looking for these days?



The bar chart offers a clear perspective on how significantly relationships affect participants' lives, rated on a scale from 1 to 5. The concentration of responses at the higher end suggests that interpersonal

connections play a key role in daily decision-making, emotional well-being, and personal growth. For personas balancing professional and personal goals or those who experience anxiety in traditional social contexts, this highlights the importance of a more subtle, pressure-free approach—precisely the kind of experience Ting is designed to provide.

On a scale of 1 to 5 (1 - no influence at all, and 5 - totally influence) how much do relationships impact your life?



This research validated *Ting's* core strategy: offering a silent, sensory way to initiate connection grounded in emotional resonance rather than digital performance.

e. Benchmarking

Ting was conceived in dialogue with a range of existing tools that attempt to facilitate embodied connection, yet they fall short of promoting it. Products like *Bond Touch*⁷ and *Neosensory Buzz*⁸ use vibration to simulate presence between people at a distance, but they assume pre-existing relationships and do not address the needs of spontaneous, real-world social initiation. *Replika AI*⁹ and *Limitless Pendant*¹⁰ represent advances in affective computing, but remain trapped within screen-based, productivity-driven paradigms.

Traditional dating apps like Tinder, Hinge, and *Bumble BFF*¹¹ rely heavily on swipe-based gamification, curated profiles, and visual-first

⁷ Bond Touch is a wearable that transmits touch between people at a distance through vibration. Official website: <https://www.bond-touch.com/>

⁸ A wearable wristband that translates sound or other inputs into vibrations to support sensory substitution and accessibility. Official site: <https://neosensory.com/buzz/>

⁹ Replika is an AI-based chatbot designed to simulate an emotional companion. Official website: <https://replika.com/>

¹⁰ A wearable pendant that records conversations, summarizes meetings, and acts as a personal AI assistant focused on productivity. Official site: <https://www.limitless.ai>

¹¹ A feature of the Bumble app focused on building friendships rather than romantic relationships, still based on profile swiping. Official site: <https://bumble.com/bff>

impressions. They reinforce performance anxiety, social fatigue, and an overemphasis on appearance — the very dynamics *Ting* was designed to escape. While Life360¹² offers real-time geolocation that inspired our spatial interaction model, it focuses on safety within existing groups, not creating new connections.

Ting disrupts this landscape by eliminating the visual interface and introducing a fully embodied method of interaction. By grounding connection in physiological resonance and emotional states — not bios or pictures — *ting* initiates encounters based on compatibility the user feels, not judges. This design is informed by *Polyvagal Theory*¹³, neurodesign principles, and a belief that true presence starts within the body.

f. Theoretical & Technological Feasibility

This project draws on emerging interdisciplinary knowledge in neurophysiology, *affective computing*¹⁴, and interaction design. The core theoretical foundation is Polyvagal Theory, proposed by neuroscientist Stephen Porges (1994–2011), which explains how the vagus nerve regulates social engagement, emotional safety, and the body's readiness to connect.

This theory emphasizes that our nervous system constantly scans the environment for cues of safety. When such cues are detected — including soft vocal tones, eye contact, or gentle vibrations — the ventral vagal complex is activated, enabling us to socially engage in a calm and open state. In contrast, cues of threat activate defense responses (fight, flight, or freeze).

Ting uses this mechanism intentionally: it is worn precisely on the upper spine, near the vagus nerve, to activate this social system subtly through vibration. Scientific studies^{15 16} also confirm that physical signals, like heart rate variability and temperature, are strong indicators of emotional states.

¹² A location-sharing app designed for families and small groups, offering real-time GPS tracking, alerts, and safety features. Official site: <https://www.life360.com>

¹³ Theory by Stephen Porges (1995) explaining how the autonomic nervous system supports safety and social behavior through the vagus nerve. DOI: [10.1111/j.1469-8986.1995.tb01213.x](https://doi.org/10.1111/j.1469-8986.1995.tb01213.x)

¹⁴ Rosalind Picard, *Affective Computing*, MIT Press, 1997. Available at: <https://mitpress.mit.edu/9780262661157/affective-computing/>

¹⁵ Holt-Lunstad, J., & Smith, T. B. (2012). Social Relationships and Mortality. DOI: [10.1111/j.1751-9004.2011.00406.x](https://doi.org/10.1111/j.1751-9004.2011.00406.x)

¹⁶ Portal Unit (2024, October 8). Geração Z e ansiedade: o desafio dos jovens no mercado de trabalho. Unit.br. At: <https://portal.unit.br/blog/noticias/geracao-z-e-a-ansiedade-o-desafio-dos-jovens-no-mercado-de-trabalho/>

On the technological side, *Ting* leverages photoplethysmography (PPG)¹⁷ for heart rate, thermal sensors for skin temperature, and IMU (Inertial Measurement Unit)¹⁸ components (accelerometer and gyroscope) to assess posture and tension. These inputs feed a local AI model that builds an emotional profile unique to each user, refined weekly via user feedback.

Bluetooth Low Energy (BLE) technology with a 10m range ensures discreet but reliable detection of nearby users. Importantly, all data are anonymized and stored only locally, reinforcing privacy and emotional security.

Together, these technological and theoretical bases ensure that *Ting* is not only speculative but realistically grounded in emerging neuroresponsive interaction design.

2. Solution Proposal

a. Product Design

Ting is a hybrid system composed of two elements: a wearable device positioned at the top of the spine (on the vagus nerve), and a complementary mobile app. The wearable acts as a real-time emotional radar, while the app functions as a private affective log, not a social feed.

The goal is to move beyond screen-based attraction models and instead support in-the-body, in-the-moment social alignment. *Ting* helps users identify emotionally compatible people nearby, not through bios or messages, but through internal resonance measured via physiology.

It's not a replacement for conversation. It's an invitation to connection, one that begins not with a swipe, but with a vibration.

b. How it Works

Once a user creates their account, they complete a brief emotional and social profile questionnaire to train their personal AI. This serves as the foundation for future calibration. From there, the wearable collects biometric and behavioral data in real time, such as heart rate variability

¹⁷ Photoplethysmography (PPG) is a non-invasive optical technique used to measure blood volume changes in peripheral tissues by detecting variations in light absorption. For a comprehensive review of PPG principles and applications, see: Allen, J. (2007). Photoplethysmography and its application in clinical physiological measurement. *Physiological Measurement*, 28(3), R1-R39. <https://doi.org/10.1088/0967-3334/28/3/R01>

¹⁸ IMU (Inertial Measurement Unit): A small motion sensor that uses accelerometers and gyroscopes to track body orientation and movement. Commonly used in posture-monitoring wearables to detect spinal alignment and slouching. Source: <https://www.analog.com/media/en/news-marketing-collateral/solutions-bulletins-brochures/mems-imu-brochure.pdf>

(anxiety or excitement), skin temperature (emotional activation), and posture (openness vs. withdrawal).

When another *Ting* user is within a ~10m range, the device evaluates compatibility by comparing AI-generated affective maps. If a match is detected, both users' devices vibrate gently. The vibration is discreet — subtle enough not to demand action, but strong enough to spark curiosity and physiological openness.

After this initial signal, a pop-up appears in the app, inviting the user to decide whether to meet the matched person. If the invitation is accepted, the app seamlessly opens a map — inspired by tools like Life360 — showing the approximate live location of the other user, allowing them to meet spontaneously and safely in the real world.

c. Interaction Design

The interaction model is intentionally minimalist. *Ting* avoids screens, messages, and feeds, favoring haptic language and quiet feedback. The app is used only to:

- Review emotional “highlight” moments;
- Adjust personal preferences and boundary settings;
- View a map-style history of meaningful encounters.

Ting's design has a minimal UI, ambient presence, and private, reflective feedback loops. The wearable is small and integrates with the user's back posture, similar to the Xiaomi HiPee Smart Posture Corrector¹⁹.

Instead of designing for social attention, *Ting* is designed for social attunement.

d. Visual Identity

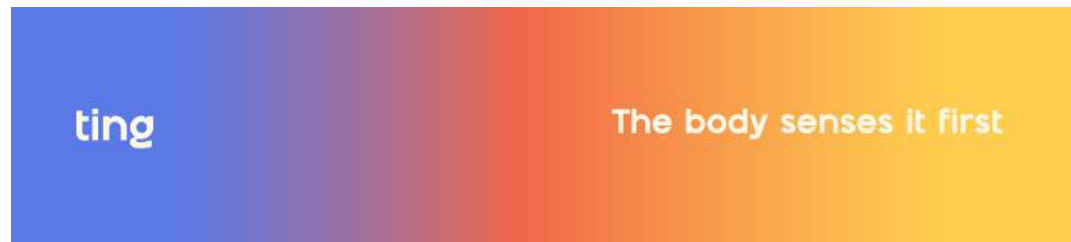
The name *Ting* itself suggests that initial moment — that soft vibration, the almost imperceptible cue that something meaningful is near. It's a sound, a touch, a feeling. It doesn't explain. It signals.

The brand's color gradient moves from deep blue to warm yellow, passing through lilac, coral, and soft orange. This isn't decorative — it's effective. The colors are inspired by emotional thermography and the emotional coding structure of *Ekman's Atlas of Emotions*²⁰. Blue evokes regulation and calm; orange and red suggest emotional activation; yellow

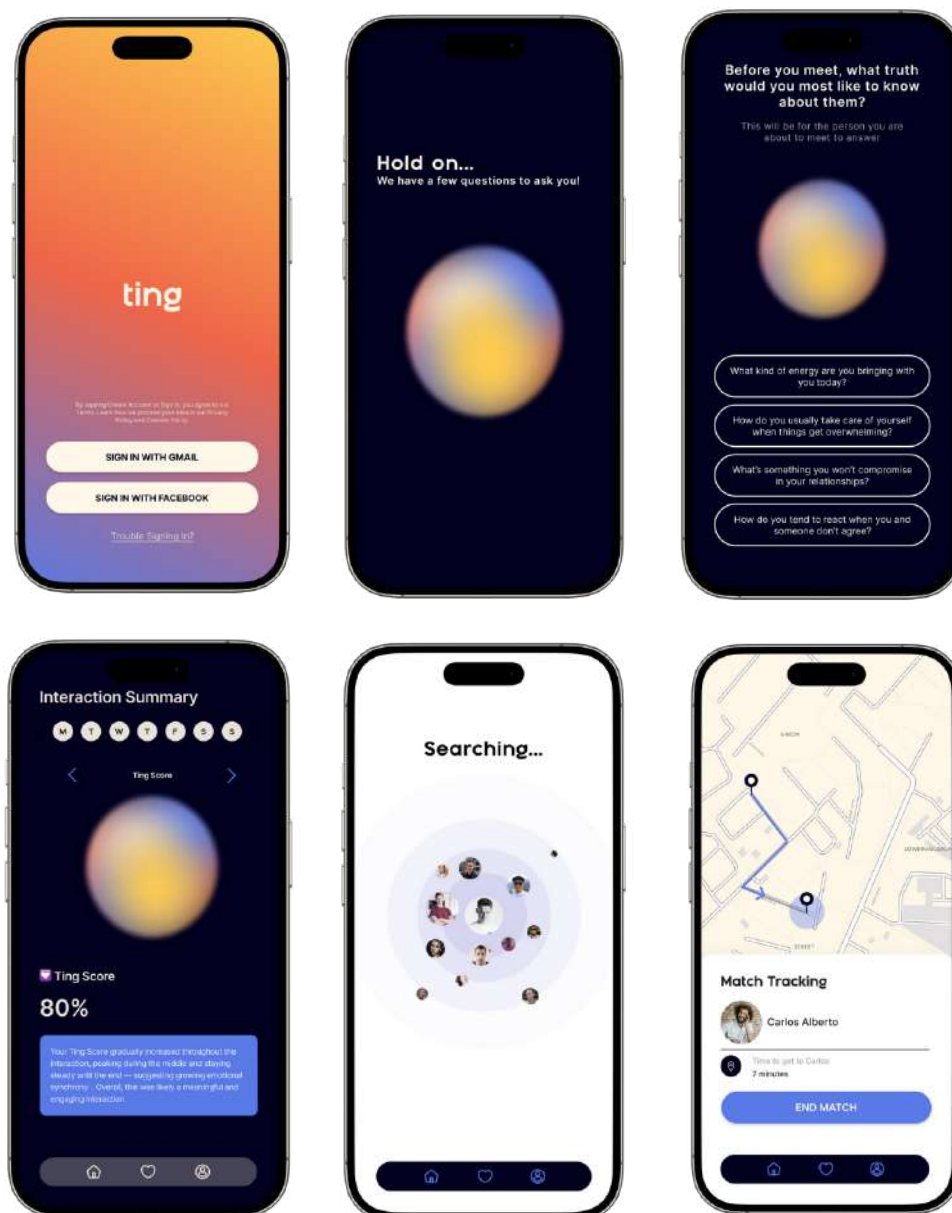
¹⁹ Xiaomi HiPee Smart Posture Corrector: Wearable device that uses motion sensors and vibration alerts to help users maintain proper posture. Source: https://www.xiaomiyoupin.com/detail?gid=136560&source=duomai_99361425_3.duomai.99361425.1603390065874

²⁰ The Atlas of Emotions was developed by psychologist Paul Ekman, with the support of the Dalai Lama, to map human emotions. Visit: <https://atlasofemotions.org/>

signals openness and curiosity. Together, they reflect the full spectrum of what the body might feel when real connection is near.



e. UI & UX Design



Ting's UX and UI were designed to be intuitive, discreet, and emotionally aligned with the product's purpose. Unlike traditional dating apps that rely on images, swipes, and performance, *Ting* avoids overstimulation and visual overload. The interface prioritizes calm interaction, using a soft color palette inspired by affective states and minimal visual elements to guide the user through onboarding and weekly reflections.

The app's main function is not to foster digital engagement, but to support real-world emotional connections. After account creation, the user completes an initial personality questionnaire that calibrates the device's emotional AI. From there, the interface acts as a reflective journal and match history, offering weekly prompts to refine emotional accuracy. The design follows the principle of "low input, high resonance," creating a user experience that is subtle, responsive, and aligned with the embodied nature of the *Ting* wearable.

3. User Testing & Feedback

To explore how people would respond to *Ting*, we conducted a small informal testing session with a few participants between 18 and 25 years old — a group that reflects our primary audience. Instead of rigorous methodology, we focus on observing general impressions: how the idea landed, how intuitive the interface felt, and what emotional reactions the experience evoked.

The test included a walkthrough of the onboarding flow, where users created a profile and answered the initial questionnaire, and a quick simulation of a match event using a gentle vibration. Feedback was overwhelmingly positive. People found the experience fluid and intuitive, especially appreciating the absence of swipes, photos, or flashy buttons. The minimalist layout and colors were mentioned as calming and distinct from traditional apps.

Even though the wearable was only simulated, most participants found the idea compelling, describing it as "different," "natural," and "more human." They liked that *Ting* doesn't push for instant responses, but instead suggests reflection and presence. A few noted that in real life, the meaning behind the vibration should be made very clear to avoid confusion.

Although the test was small and exploratory, it gave us a strong sense of direction. People understood the concept and felt intrigued. The main takeaway? *Ting* doesn't feel like "just another app" — it feels like something people would like to try. That tells us we're on the right path, while also pointing to small adjustments we'll need to refine in the next design phase.

4. Conclusion

Ting emerges as a timely and necessary response to one of the most pressing yet often overlooked crises of our time: the erosion of genuine human connection in an age of digital excess. Rather than proposing yet another platform of visual curation or gamified socialization, *Ting* repositions the body and emotion as the true interface. It translates physiological signals into a subtle, affective language that fosters real-world, real-time encounters grounded in intuition, not image.

Its impact lies in this reeducation of relational habits: instead of swiping through endless profiles, users feel the presence of compatibility through the body itself. By subtly activating the social nervous system, *Ting* creates an embodied state of openness and safety — the preconditions for meaningful connection. In doing so, it offers an alternative to the overstimulating, often performative logic of mainstream social apps, carving space for something quieter, slower, and more human.

Naturally, challenges remain. Emotional technologies are still emerging, with ethical, technical, and physiological complexities yet to be fully addressed, such as variability in biometric responses and ensuring privacy of sensitive emotional data. The wearable format also assumes mutual adoption, which could limit large-scale applicability. Yet these are not roadblocks, but design opportunities.

The future of *Ting* lies in expanding the conversation: refining the reading of emotional states, partnering with mental health professionals, and extending its application to contexts like therapy or neurodiverse socialization support. Ultimately, it doesn't just detect potential connections — it creates the emotional conditions for them to happen. In a world saturated by visual noise and fragmented attention, *Ting* whispers — and perhaps that's what we've been missing all along.

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