



Article

Illusionary Selves: Critiquing Online Persona Construction Through AI-Mediated Interaction Design

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Abstract

Social media platforms have become central sites of identity construction, where visibility and legitimacy are shaped through algorithmic systems, aesthetic conventions, and platform economies. This paper approaches online personas through the lens of illusionary selves, understood here as online personas experienced as authentic while being shaped by sociotechnical processes, examining how they are produced through sociotechnical processes entangling design practices, generative artificial intelligence(AI), and cultural expectations. We present an AI-mediated critical design inquiry into how generative systems translate and normalize visual patterns of online self-imaging. Using a pix2pix-based model trained on 630 internet celebrity selfies, facial images are abstracted into dot-based representations and aggregated across selfie angles, foregrounding repetition and normalization. An interactive design installation links bodily orientation and numerical parameters to generative output in real time, introducing perceptual friction in self-imaging. A total of 30 participants engaged with the system in situated contexts, and their experiences were documented through observation, video recording, and a 5-point Likert questionnaire across three dimensions: perceptual friction, awareness of algorithmic mediation, and reflective responses to self-presentation. Results indicate high levels of perceptual friction (mean [M] = 4.21), strong awareness of algorithmic mediation (M = 4.29), and consistent reflective unease (M = 4.07). Through situated use, the system renders algorithmic mediation tangible and positions AI as an implicated actor in identity construction. This work contributes a conceptual framing of AI-mediated critical design, showing how generative and interactive systems operate as epistemic devices interrogating online persona construction.

Keywords: generative AI; critical design; human–computer interaction; social media; online identity; algorithmic mediation



Academic Editor: Qianling Jiang

Received: 11 April 2026

Revised: 18 May 2026

Accepted: 22 May 2026

Published: 1 June 2026

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1. Introduction

Social media platforms have become central environments for contemporary identity construction, where visibility, legitimacy, and social value are increasingly shaped through algorithmically mediated systems [1]. Within these environments, users engage in the continuous production of online personas that align with platform-specific metrics of engagement, recommendation, and circulation. Prior research has shown that such practices of self-presentation are not simply individual expressions, but are embedded within sociotechnical configurations involving interface design, algorithmic ranking, and

platform economies [2,3]. As a result, online identity emerges less as a transparent reflection of an underlying self and more as a situated performance shaped through interaction with technical infrastructures, cultural expectations, and economic incentives [4]. These dynamics are particularly pronounced within influencer cultures, where personal visibility is closely tied to social capital and economic opportunity. Influencers routinely engage in aesthetic labor, adapting their visual self-presentation to platform logics that reward recognizability, stylistic consistency, and affective appeal [5,6]. Over time, such practices give rise to recurring visual patterns, including preferred selfie angles, facial expressions, and compositional conventions. These patterns circulate through platform vernaculars and shared aesthetic repertoires, shaping how creators learn to present themselves within algorithmically curated environments [7]. While these visual conventions are often experienced as markers of authenticity, individuality, or personal branding, they simultaneously operate as mechanisms through which identities become standardized, legible, and algorithmically recognizable.

Generative artificial intelligence(AI) has introduced additional layers to these processes by enabling systems that learn from, transform, and recombine large collections of visual data [8]. Generative models encode statistical regularities across datasets, producing outputs that reflect aggregated aesthetic tendencies [9,10]. Through such processes, repeated visual practices are not only circulated socially but are computationally reinforced, shaping which forms of appearance become coherent, recognizable, or salient within algorithmically mediated environments. Importantly, these mechanisms often remain opaque to users, embedded within interactive infrastructures that foreground creativity, play, or automation while obscuring how visual norms are operationalized and normalized [11]. Within Human-Computer Interaction (HCI), critical computing and interaction design scholarship has emphasized the importance of examining how technologies shape perception, interpretation, and social meaning beyond instrumental use [12]. Prior work has framed interactive systems as epistemic devices, design constructs that support reflection, interpretation, and sense-making [13,14]. More recent perspectives further position AI systems as sociotechnical actors whose roles and effects emerge through design practices, use contexts, and cultural conditions [15,16]. Building on these approaches, we treat AI-mediated systems as sites of inquiry into how identities are computationally rendered visible and legible. Together, platform logics, aesthetic labor, and generative AI form a layered sociotechnical process: platform logics establish visibility incentives, aesthetic labor translates these incentives into repeated self-presentation practices, and generative AI further aggregates and operationalizes these practices as recognizable visual patterns. In this sense, the aesthetic normalization addressed by the installation is linked to the monetization of visibility. Repeated visual forms become valuable because they support recognizability, circulation, audience engagement, and potential economic return within platform economies. The installation therefore does not treat selfie aesthetics as purely visual preferences, but as patterns connected to the economic conditions under which visibility is produced, optimized, and rewarded.

In this paper, we conceptualize this tension through the notion of illusionary selves: online personas experienced as authentic self-expression while being shaped and normalized through sociotechnical processes. More specifically, the “illusion” does not refer to a false or deliberately deceptive identity, but to the unstable alignment between how users understand their self-presentation and how platforms, aesthetic norms, and generative systems make that self-presentation visible, repeatable, and recognizable. The concept does not describe intentionally false or deceptive identities. Rather, it highlights how users may experience their online personas as authentic even when these personas are shaped by platform-compatible visual norms, algorithmic visibility, and generative aggregation.

In this sense, illusionary selves differ from Goffman's account of self-presentation, which emphasizes situated interpersonal performance, by foregrounding the computational conditions under which such performances become visible, repeatable, and recognizable. They also differ from algorithmic identity, which often refers to system-generated categories, profiles, or predictions, because the focus here is on how users internalize and inhabit algorithmically shaped forms of self-presentation as their own. The illusion emerges through the alignment between personal self-understanding and platform-compatible visual norms. Despite extensive scholarship on influencer culture and digital self-presentation [17,18], less attention has been given to how computational systems participate in producing and stabilizing these illusionary forms of selfhood, particularly through generative processes that translate repeated visual practices into abstract, operationalized representations. From this perspective, generative and interactive processes become means of making sociotechnical patterns perceptible. In this work, we employ AI-mediated critical design to explore how illusionary selves are produced through the translation and aggregation of visual self-imaging practices. Through a generative system based on pix2pix, trained on influencer selfies, and an interactive installation that links bodily orientation and numerical parameters to generative output in real time, we introduce perceptual friction into the act of self-imaging. These design interventions render repetition, normalization, and mediation tangible, positioning AI as an implicated actor in online persona construction, not in the sense of autonomous agency, but through the system's role in selecting, aggregating, translating, and feeding back visual norms through model outputs and interaction parameters. Accordingly, this study is guided by the following research questions:

- RQ1: How are illusionary selves produced through the translation and aggregation of visual self-imaging practices?
- RQ2: How do participants experience perceptual friction when interacting with an AI-mediated self-imaging system?
- RQ3: How does the system make algorithmic mediation and aesthetic normalization perceptible through embodied interaction?

Through an account of our ongoing design inquiry, this paper contributes: (1) the concept of illusionary selves as a critical lens for understanding how online personas come to be experienced as authentic while being shaped through algorithmically mediated visual norms; (2) an AI-mediated critical design inquiry that employs generative visual translation and interactive exploration to render patterns of repetition and normalization in self-presentation perceptible; and (3) a pix2pix-based interactive system and an interactive installation that generate facial representations through a generative model and support interactive exploration, together functioning as epistemic devices for examining how identities are made visible, coherent, and legible within sociotechnical environments.

The structure of this paper is as follows. Section 2 reviews related work on influencer self-presentation, generative AI and aesthetic normalization, and critical computing and interaction design, establishing the theoretical foundation for this study. Section 3 describes the materials and methods, including the system overview, design and development process, pix2pix-based generative translation, system implementation, and participant study procedure. Section 4 presents the results of the experiential observations, integrating both qualitative interaction analysis and quantitative questionnaire findings. Section 5 discusses the findings in relation to algorithmic normalization, authenticity, and the role of AI as an implicated actor in identity construction. Section 6 outlines the limitations of the study and directions for future work. Finally, Section 7 concludes the paper by summarizing the main findings and contributions.

2. Related Work

2.1. Influencer Self-Presentation and Algorithmic Visibility

Research on influencer cultures has examined self-presentation as a practice that develops through sustained interaction with platform conditions, audience expectations, and economic incentives [19,20]. Scholars have emphasized that influencer imagery is shaped through creators' ongoing adaptations of appearance and performance in response to the conditions under which visibility is produced on social media platforms [21–23]. From this perspective, influencer self-presentation is commonly understood as a form of cultural work situated within sociotechnical environments, rather than as an isolated act of personal expression. Related research has further shown that social media platforms structure visibility through engagement metrics, recommendation systems, and ranking mechanisms that remain only partially intelligible to users [24,25]. Within such environments, influencers adapt their self-imaging practices in response to perceived platform preferences in order to sustain reach and audience attention. Beech [26] characterizes this process as aesthetic labor, highlighting how creators continually refine visual style, tone, and modes of presentation to remain recognizable within competitive attention economies. Taken together, prior studies suggest that visibility on social media emerges through ongoing processes of adjustment and alignment.

Studies have also demonstrated that these adaptive practices contribute to the emergence of shared visual conventions. Creators often experiment with framing, composition, and posting rhythms to infer how platforms distribute attention, gradually aligning their content with recognizable visual patterns [5]. Informal knowledge about effective practices circulates through tutorials, analytics tools, and peer observation, reinforcing recurring modes of appearance and presentation [27]. These adaptive processes are embedded within broader conditions of creative labor and precarity, which shape how creators sustain visibility and participation on social media platforms [28]. Over time, these processes are associated with widely replicated aesthetic tendencies, including favored selfie angles, facial expressions, lighting conditions, and compositional layouts. These recurring visual forms are commonly understood as emerging through the interplay between user practices and platform affordances. Duffy et al. [28] describe this process as the development of platform-specific modes of expression, through which particular ways of presenting the self become familiar within specific platform contexts. Within such environments, influencers engage in cycles of observation, imitation, and incremental adjustment, drawing cues from successful peers, analytics dashboards, and platform feedback mechanisms. Through these experiential and largely informal learning processes, stylistic similarities can accumulate over time, contributing to the persistence of recognizable modes of self-presentation [22]. Recent critical studies have further argued that platform visibility is shaped not only by individual self-presentation practices, but also by platform vernaculars and the political economy of aesthetic normalization [29,30]. Platform vernaculars refer to the platform-specific visual conventions, styles, and interaction norms that guide how users produce recognizable and algorithmically favorable content. At the same time, aesthetic normalization is closely tied to platform economies in which visibility, engagement, and monetization incentivize the repetition of particular visual forms and self-presentation strategies. From this perspective, online personas emerge not solely through personal expression, but through ongoing negotiation with platform-specific systems of visibility and value. While existing research has offered valuable insights into influencer self-presentation as a form of labor and platform-mediated cultural production, it has largely focused on how creators adapt to platform conditions. Comparatively less attention has been given to how repeated self-presentation practices are engaged, translated, or reconfigured at scale

beyond individual strategies. This gap points to opportunities for further examination of how visual self-presentation is shaped in relation to broader sociotechnical processes.

2.2. Generative AI and Aesthetic Normalization

Research on generative AI has examined how data-driven systems participate in shaping visual culture through processes of aggregation, abstraction, and reproduction. Generative models are typically trained on large-scale datasets, from which they learn statistical regularities that inform subsequent outputs [31,32]. Scholars have noted that such systems tend to encode dominant patterns present in their training data, translating heterogeneous visual practices into computable representations [33,34]. In this sense, generative AI systems can be understood as operating through processes of normalization, whereby certain visual features become more salient and repeatable than others. Within this context, aesthetic normalization does not necessarily imply deliberate standardization or prescriptive intent. Instead, it emerges from the cumulative effects of statistical learning, dataset composition, and model optimization. Wagner et al. [35] emphasize that data collection and curation practices shape what becomes legible to computational systems, influencing which aesthetic qualities are retained or emphasized. Zha et al. [36] further argue that representational effects in AI systems often arise from infrastructural decisions distributed across data pipelines, annotation practices, and evaluation benchmarks. Together, these accounts frame normalization as an outcome of how visual data are organized and processed at scale. At the same time, prior research has cautioned against treating generative models as neutral or objective representations of visual culture. Conditional GAN frameworks such as pix2pix are shaped by the statistical structure and distribution of their training data, and their outputs may reproduce biases, omissions, or dominant visual tendencies embedded within datasets. Moreover, correlations learned through image-to-image translation do not necessarily indicate causal relationships between visual features and social meaning. In this sense, generated outputs should be understood as operational representations of recurring visual patterns rather than objective accounts of influencer behavior or aesthetic preference. Within this study, pix2pix is therefore employed not as a predictive or explanatory model, but as a generative and interpretive design medium for making processes of aggregation and normalization perceptible. These concerns also extend to the ethical use of publicly accessible influencer selfies as training data. Although such images may be publicly visible, public accessibility does not necessarily imply unrestricted ethical use for model training or design research. In particular, facial images may retain biometric traces even after visual abstraction, raising concerns about consent, publicness, and potential re-identification risk. For this reason, the present study treats the dataset as ethically sensitive and emphasizes anonymization, abstraction, aggregation, and the avoidance of individual-level identification.

Recent work in HCI and AI studies has begun to explore how generative systems contribute to the circulation and stabilization of aesthetic norms. Research on facial analysis, image synthesis, and representation learning shows that recurring patterns of pose, lighting, facial expression, and composition are often reproduced across generated outputs, producing visual coherence [8,37] that aligns with existing cultural and aesthetic expectations, as discussed by Plate et al. [38]. In creative contexts, generative tools have been shown to amplify prevailing stylistic tendencies, making certain aesthetic forms appear more familiar or desirable through repetition and variation [27,39]. From a design perspective, these dynamics suggest that generative systems mediate how visual patterns are perceived and compared, rather than merely producing visual artifacts. As Yuan et al. [40] notes, the operational logic of AI-based image systems lies not only in generation, but in the organization and transformation of visual collections. Through aggregation and abstraction, generative

processes can foreground regularities while downplaying idiosyncratic variation. This mediating role is particularly relevant in domains such as online self-presentation, where subtle visual differences carry social and cultural meaning. Despite growing interest in the cultural and ethical implications of generative AI, much existing work has focused on system performance, risk mitigation, or governance frameworks. Comparatively less attention has been paid to how generative systems might be engaged as sites for examining aesthetic normalization itself, particularly in relation to everyday self-presentation practices and perceptual experience. This gap motivates design-oriented approaches that foreground perception and interpretation, providing a foundation for the design inquiry presented in this paper.

2.3. Critical Computing and Interaction Design Theory

Within Human-Computer Interaction (HCI), critical computing and interaction design theory have long argued that computational systems should be examined not only in terms of functionality or efficiency, but also in relation to how they shape perception, interpretation, and social meaning [41]. Dourish et al. [42] introduced critical technical practice as an approach that situates technical work within broader cultural and political contexts, treating computation itself as a site for reflection and critique. Subsequent scholarship in critical HCI has built on this foundation, emphasizing that technologies participate in the construction of norms, values, and ways of seeing, often in subtle and infrastructural ways that are difficult to observe directly [43,44]. Research-through-design and critical design approaches have further articulated how interactive systems can be used to surface and interrogate sociotechnical assumptions. These approaches treat design as a mode of inquiry that produces knowledge through making, use, and reflection. Within this tradition, reflective design practices have been proposed that deliberately introduce ambiguity and interpretive openness, encouraging engagement oriented toward sense-making [45]. Wong et al. [46] frame critical design as a speculative practice, in which designed artefacts function as prompts for questioning dominant technological imaginaries and cultural norms. Across this body of work, interaction is understood not merely as a functional exchange between user and system, but as a structured encounter through which meaning is produced.

In recent years, HCI scholars have extended critical and design-oriented perspectives to the study of AI and algorithmic systems. This body of work emphasizes the sociotechnical and situated nature of algorithmic systems, whose effects emerge through design choices, institutional settings, and everyday practices of use [47,48]. From this viewpoint, AI systems are implicated in organizing social relations and perceptual categories, even when operating as background infrastructures or mediating layers. This shift in perspective moves attention away from questions of accuracy or bias alone, toward examining how algorithmic processes shape what becomes visible, intelligible, or taken for granted [49]. Across these strands of work, a recurring concern is how interaction and experience can be mobilized to make computational mediation perceptible. Critical HCI has explored how interactive systems can create opportunities for engagement, reflection, and reinterpretation. Design, in this sense, functions as an epistemic practice that generates ways of knowing by rendering relationships, assumptions, and patterns experientially accessible [50,51]. Interactive artefacts may thus operate as epistemic devices that support inquiry by foregrounding aspects of sociotechnical systems that are otherwise obscured. For example, Lin and Long used generative AI within a speculative design exploration to imagine possible AI futures and support reflection on sociotechnical implications [52]. Building on this direction, our pix2pix-based system differs by linking image-to-image translation with embodied interaction, allowing participants to encounter aesthetic normalization through bodily orientation, real-time feedback, and perceptual friction rather than through specula-

tive artefacts alone. While prior reflective and critical design projects, including algorithmic mirrors and adversarial design, have used designed artefacts to reveal hidden algorithmic operations or provoke critical reflection, the present approach differs in two respects. First, it uses a generative model not only as an object of critique, but also as a material component in the production of the design artefact. Second, it links generative translation to embodied interaction, so that participants encounter algorithmic normalization through bodily orientation, visual feedback, and perceptual friction rather than through representation or explanation alone. In this sense, the system does not simply mirror or oppose algorithmic processes; it stages a situated encounter in which participants experience how visual norms are aggregated, transformed, and fed back through interaction. This theoretical orientation provides a foundation for the present research. By treating AI-mediated generative and interactive systems as epistemic devices that operate through interaction and perceptual experience, this work aligns with critical computing and interaction design traditions that use design to examine, rather than resolve, sociotechnical complexity. In doing so, the research positions AI as an implicated component in the construction and normalization of visual self-presentation.

3. Materials and Methods

This section describes the methodological design of the study in relation to the central problem and research questions introduced above. The central problem addressed here is how repeated visual self-imaging practices become translated, aggregated, and made perceptible through an AI-mediated interactive system, and how this process contributes to the stabilization of “illusionary selves.” Accordingly, the system components, including facial-orientation detection, fan-count parameter control, dot-based abstraction, and post-interaction questionnaire dimensions, were designed to correspond to the three research questions: the production of illusionary selves through visual translation and aggregation, participants’ experience of perceptual friction, and the perceptibility of algorithmic mediation and aesthetic normalization through embodied interaction.

3.1. System Overview

The system is a wearable interactive installation that translates bodily movement and parameter input into real-time generative visual output. It is designed to make perceptible how self-presentation is shaped through computational mediation. The system takes the form of a head-mounted device incorporating a fixed LED display, internal control components, and a portable power supply. The device measures approximately 35 cm in height and weighs 1.22 kg. It consists of a headgear structure supported by bandage-based fastening, with a screen mounted in front of the user to present generative visual feedback (Figure 1a).

To clarify the physical configuration, the prototype used two display surfaces with different orientations and purposes. The inward-facing display was positioned in front of the wearer’s eyes and provided immediate visual feedback for the person wearing the device. The outward-facing LED display presented the generated facial representation to surrounding viewers, making the otherwise private act of self-imaging publicly visible. In the study, the wearer was the primary participant who directly interacted with the system, while surrounding viewers formed part of the situated public context in which the interaction unfolded. The inward-facing display was a 6.1-inch screen positioned approximately 15 cm from the wearer’s eyes. The inward-facing display was used at close range as a feedback surface rather than as a conventional high-resolution viewing screen. Its role was to provide legible changes in orientation, density, and visual aggregation, enabling the wearer to perceive whether their bodily adjustments altered the generated

output. The outward-facing display, by contrast, externalized the generated image for others to see, thereby turning self-presentation into a shared and observable process.

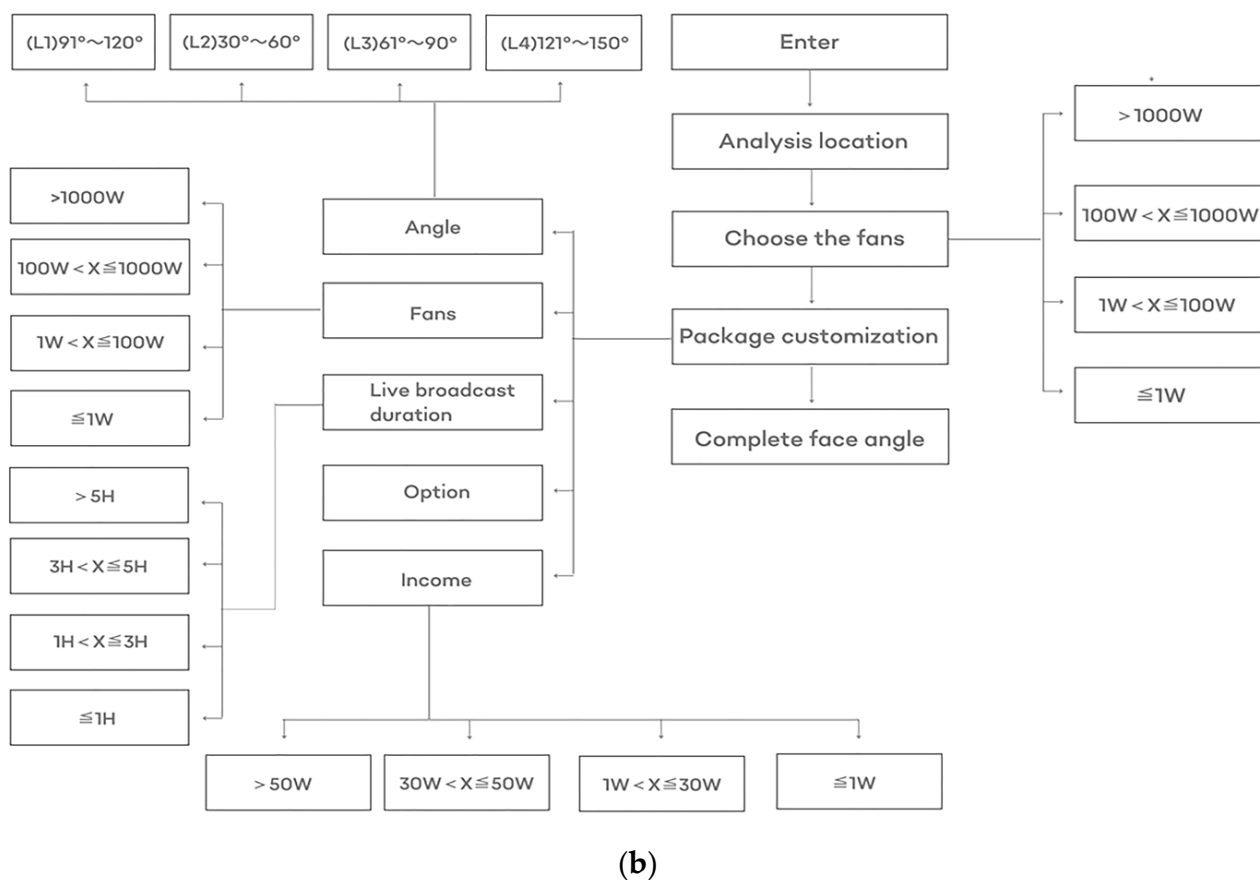
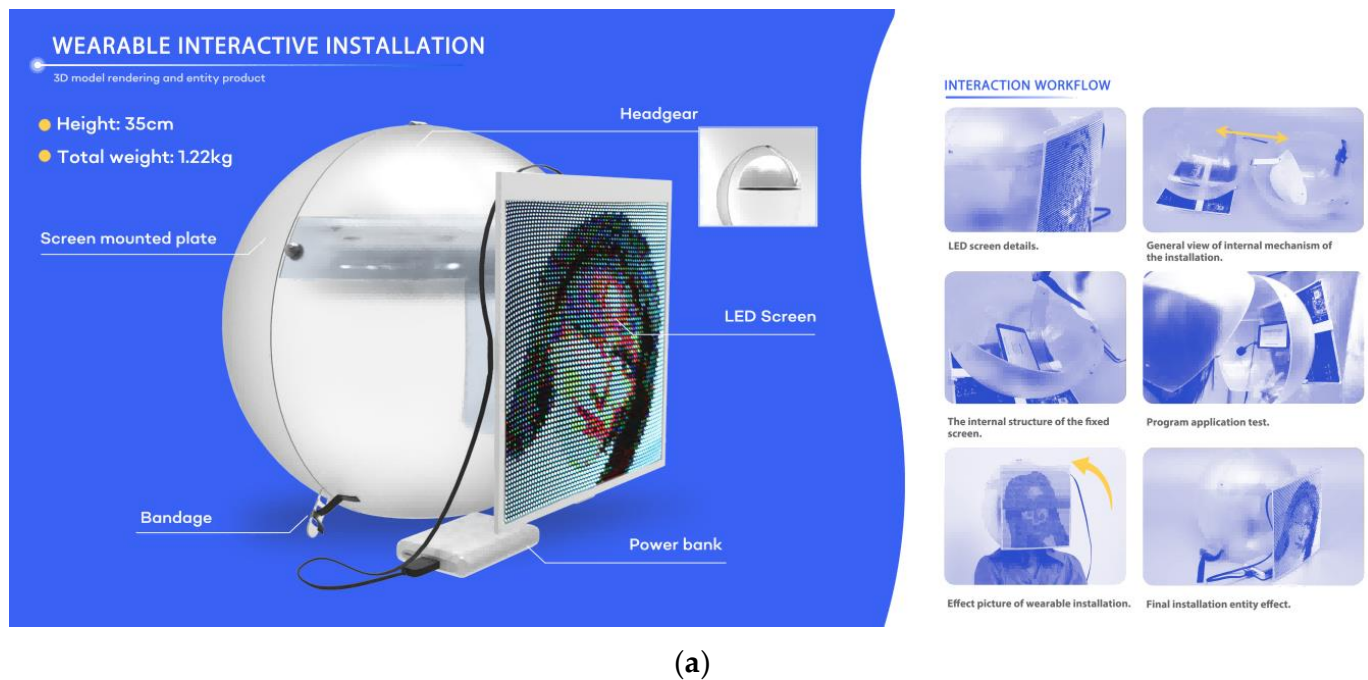


Figure 1. (a) Wearable interactive installation and physical configuration. (b) Software information flow of the interactive system.

During interaction, the system detects facial orientation in real time and maps it to changes in a dot-based facial representation displayed on the screen. As participants adjust

their head position, the visual output continuously updates, establishing a coupling between bodily posture and computational transformation. In addition to bodily interaction, the system includes a parameterized interface that allows users to select a numerical value representing “fan count”. This parameter controls the degree of visual aggregation in the generated image, with higher values producing denser and more repetitive compositions. Figure 1b further clarifies the software workflow of the system, showing how users enter the interface, select the analysis location, choose fan-count parameters, customize output settings, and complete face-angle selection. The physical configuration of the device intentionally maintains a visible and constrained interaction setup. “Visible” refers to the fact that both the device structure and the generated output remain exposed to the wearer and to surrounding viewers, rather than being hidden within a seamless or private interface. “Constrained” refers to the restricted viewing angle, limited bodily comfort, and fixed display position that require participants to actively adjust their posture in order to engage with the output. The fixed position of the screen limits viewing angle, while the weight and structure of the device introduce a degree of friction during use [53,54]. The flatness of the outward-facing screen is significant because it does not follow the curvature or mobility of the face; instead, it presents the generated image on a rigid planar surface. As a result, viewers can only perceive the output clearly from particular positions, and the wearer must negotiate this limited visibility through bodily adjustment. This design disaffordance intentionally interrupts the smoothness of ordinary selfie-taking and makes the conditions of visibility more noticeable. Together, the system creates a feedback loop in which participants adjust their posture and input in response to the generated output, while the system continuously recalculates and displays updated visual forms.

3.2. Design and Development of the System

3.2.1. Visual Abstraction Through Design Probes

This stage explored how influencer selfies could be abstracted while preserving recognizable patterns of self-presentation. Abstraction was approached as a strategy for shifting attention from individual identity to structural and perceptual regularities [55,56]. A series of visual abstraction experiments were conducted using Adobe Photoshop. Source images were derived from a fictional influencer persona constructed for design exploration. Multiple transformation techniques were applied, including color block segmentation, crystallization, distortion, oil painting, color halftone, mosaic, pointillization, and fragmentation (Figure 1). Each technique was evaluated based on its effect on facial detail, spatial continuity, and recognizability, following prior work in image abstraction and computational aesthetics [57,58]. Through iterative comparison, mosaic and color halftone were identified as the most effective techniques. These methods reduced facial detail while preserving overall compositional structure, allowing pose, angle, and spatial arrangement to remain perceptible. This outcome aligns with research on image aggregation and normalization, where discrete visual units support pattern comparison across datasets [59,60]. Based on these results, dot-based visual representation was selected as the primary abstraction strategy and used as input for subsequent computational processing.

To complement the visual exploration, sound-based design probes were conducted to examine recurring expressive patterns in influencer communication. Drawing on prior studies and observational analysis of social media content, three characteristics were identified: repetition, simplicity, and nonverbal logic [61,62]. These characteristics were translated into short, structured sound sequences and used to inform the interaction design of the system (Figure 2), reflecting prior work on patterned expression in digital media environments [63].

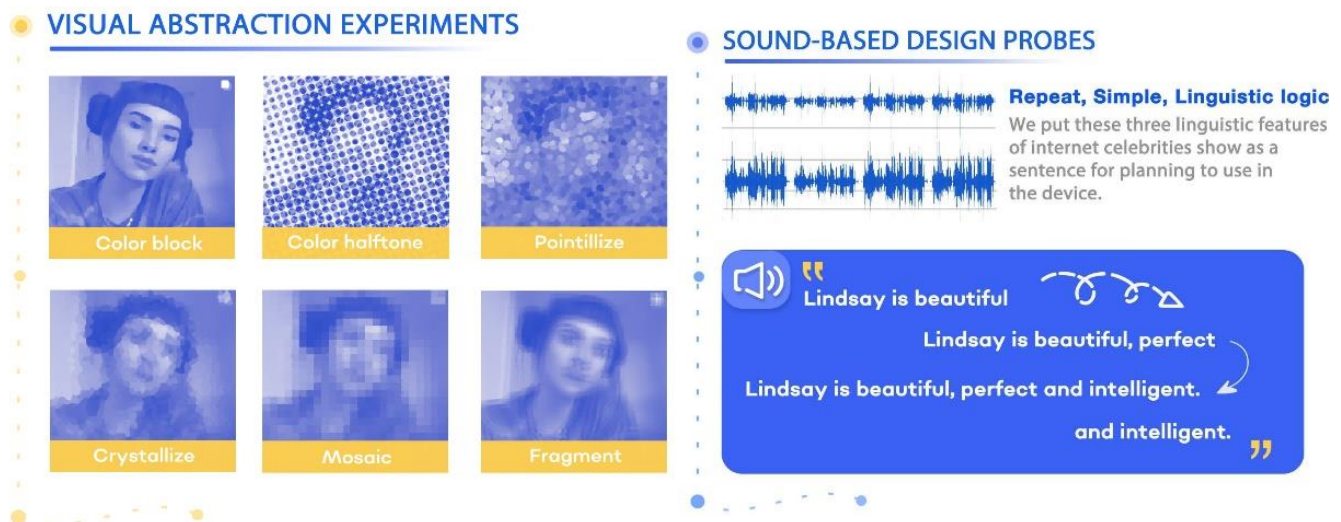


Figure 2. Design probes for the visual abstraction of influencer selfies.

3.2.2. Pix2Pix-Based Generative Translation

An initial dataset of approximately 630 influencer selfies was assembled through design-oriented sampling from publicly accessible online sources. The sampling process was conducted by two researchers following predefined inclusion and exclusion criteria. Images were included when they contained clearly visible selfie-oriented facial compositions with sufficient variation in pose and framing for subsequent abstraction and parameterization. Images with heavily occluded faces, extremely low resolution, strong facial distortion filters, or unclear orientation were excluded. To support variation within the dataset, the selected images covered different facial orientations, expressions, lighting conditions, and platform-specific presentation styles. The images were selected from publicly available content and processed in anonymized, abstracted forms that do not retain identifiable personal information. The collection and use of this dataset were approved by the Institutional Review Board of the School of Design, Hunan University (Protocol code P104015; approved on 11 December 2025). Preprocessing was conducted using custom scripts in Processing. Each image was converted into a dot-based representation by discretizing facial features into spatially distributed visual units. This transformation reduced photographic detail while preserving structural characteristics such as orientation and spatial alignment, consistent with prior work on computational abstraction and data visualization [64]. To examine patterns across similar poses, images with comparable facial orientations were grouped and composited using layering techniques in Photoshop, and then reprocessed in Processing. This step emphasized shared compositional features while attenuating individual variation, aligning with research on aggregation and comparative visual analysis [65]. To parameterize orientation, a structured image set of 45 dot-based faces was generated, representing angles ranging from approximately 45° to 150° (Figure 3). This approach reflects HCI research that treats parameter variation as a means of exploring perceptual differences [66].

The processed dataset was used to train a pix2pix image-to-image translation model. Pix2pix is a conditional generative adversarial network (conditional GAN) framework for image-to-image translation, in which an output image is generated based on a paired input image rather than from random noise alone [67]. Training was conducted using paired image sets generated from the dot-based abstractions and corresponding facial compositions. The pix2pix model was trained using standard training settings (batch size = 1, learning rate = 0.0002) for approximately 200 epochs. Because the study focused on exploratory design outcomes rather than predictive optimization, evaluation was conducted

qualitatively rather than through quantitative image-quality metrics. The research team reviewed outputs after each training cycle, focusing on the stability of facial orientation, continuity of compositional structure, and legibility of visual aggregation. Initial outputs revealed distortions in facial structure and instability in orientation, consistent with prior findings on generative image translation models [68]. Outputs showing severe structural distortion or fragmented orientation were manually traced using a graphics tablet and reintroduced into the workflow for refinement. In total, 4 out of the 45 generated outputs, approximately 8.9%, required manual tracing during the refinement process. These interventions were limited to stabilizing facial orientation and compositional continuity rather than redesigning the aesthetic style of the outputs. Approximately three iterative refinement cycles were conducted before establishing the final representative orientation set used in the interactive system. This hybrid approach aligns with research combining generative systems and human intervention for exploratory design processes [69]. Through repeated cycles of generation and refinement, a set of representative selfie orientations was established, including left-facing angles (approximately 50°, 65°, 80°, and 90°) and right-facing angles (approximately 95°, 100°, 110°, and 135°) (Figure 4). These outputs formed the basis for the subsequent interactive system.

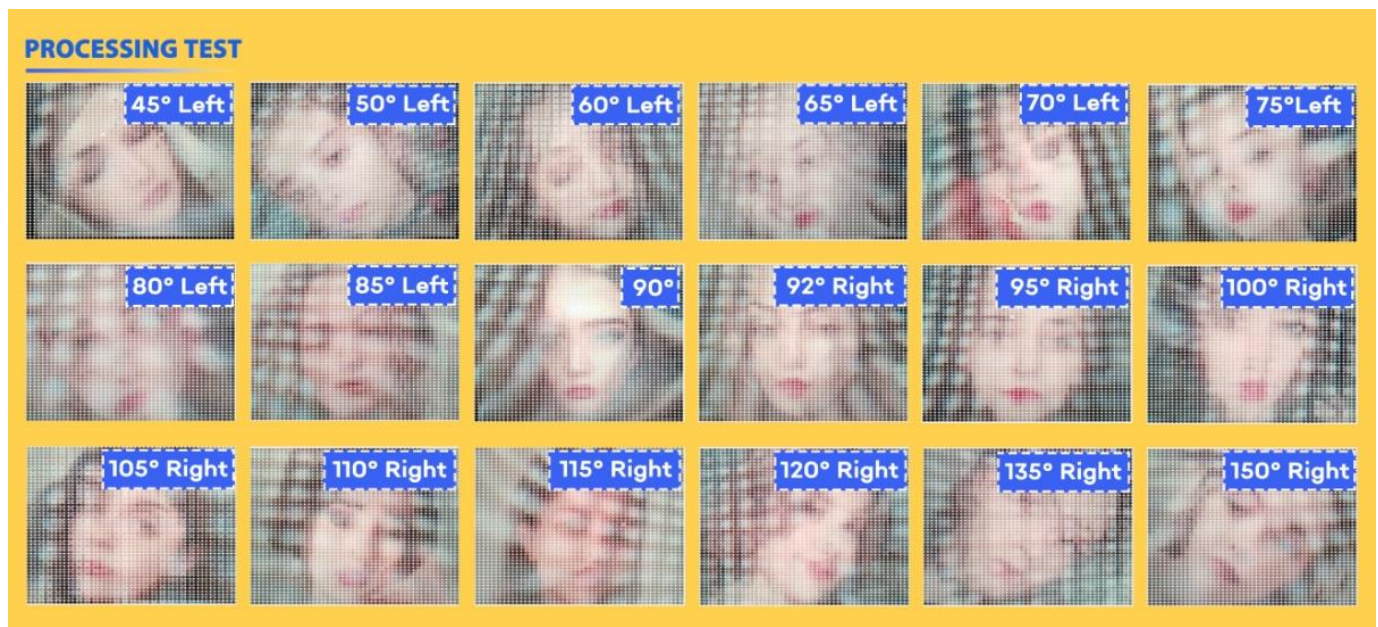


Figure 3. Parameterized dot-based facial representations across selfie orientations (45–150°).

3.3. System Implementation and Interaction Setup

Within Human–Computer Interaction, recent research has emphasized that interaction can function as a mediating encounter, through which underlying computational processes become experientially accessible [70]. Building on this perspective, the interactive system was designed to foreground how identity is shaped through algorithmic mediation by translating bodily movement and numerical choice into visible generative change. Through this coupling, the system makes perceptible how parameters that structure visibility, orientation, and aggregation operate in practice. The system integrates a sensing and control layer with a USB camera to detect facial orientation in real time (Figure 5). The implementation was developed using Processing, where custom scripts were written to capture video input, extract facial orientation parameters, and map these values to generative visual transformations. Using mathematical mappings, changes in face angle are translated into corresponding movement of the generative visual output. As users adjust their

bodily orientation, the dot-based facial representation shifts along a continuous spatial axis, linking physical posture to computational transformation. Facial orientation was approximated through real-time analysis of image input, with horizontal rotation values normalized within a defined angular range. These values were then mapped linearly to control the position and deformation of the generated visual output. A visual reference line was implemented as an overlay to guide alignment, rendering orientation perceptible as a relational variable. In this way, the system enables users to experience how subtle bodily adjustments are computationally registered and translated [71].

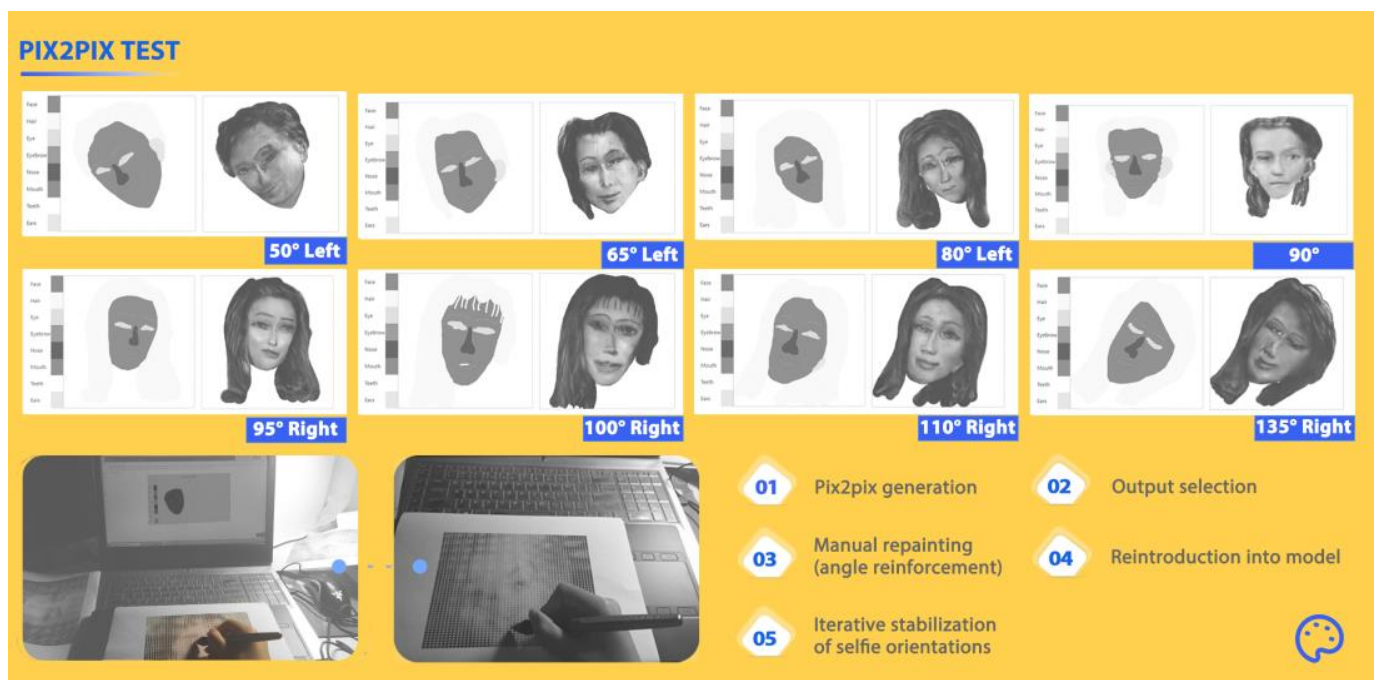


Figure 4. Parameterized selfie orientations from 50° to 135° generated through hybrid pix2pix mediation.

In addition to bodily interaction, the system incorporates a screen-based interface that structures engagement through explicit numerical input (Figure 6). Users are prompted to select a “fan count,” which functions as a parameter controlling the degree of image aggregation in the generative output. The selected value is mapped to the number of layered visual instances within the dot-based composition. Higher fan counts produce denser visual stacking, increasing repetition and reducing variation across the generated image. This mapping establishes a direct relationship between numerical input and visual aggregation. Interaction is organized through a step-by-step interface that guides users through parameter selection and orientation adjustment. This directive structure reflects constrained choice mechanisms commonly found in social media platforms and has been shown to support reflection on the influence of abstract metrics in interaction design [72]. By combining bodily orientation, numerical input, and generative visualization, the system creates a coupled interaction framework in which changes in posture and parameter values are translated into perceptible visual transformations.



Figure 5. Physical setup of the system implementation.

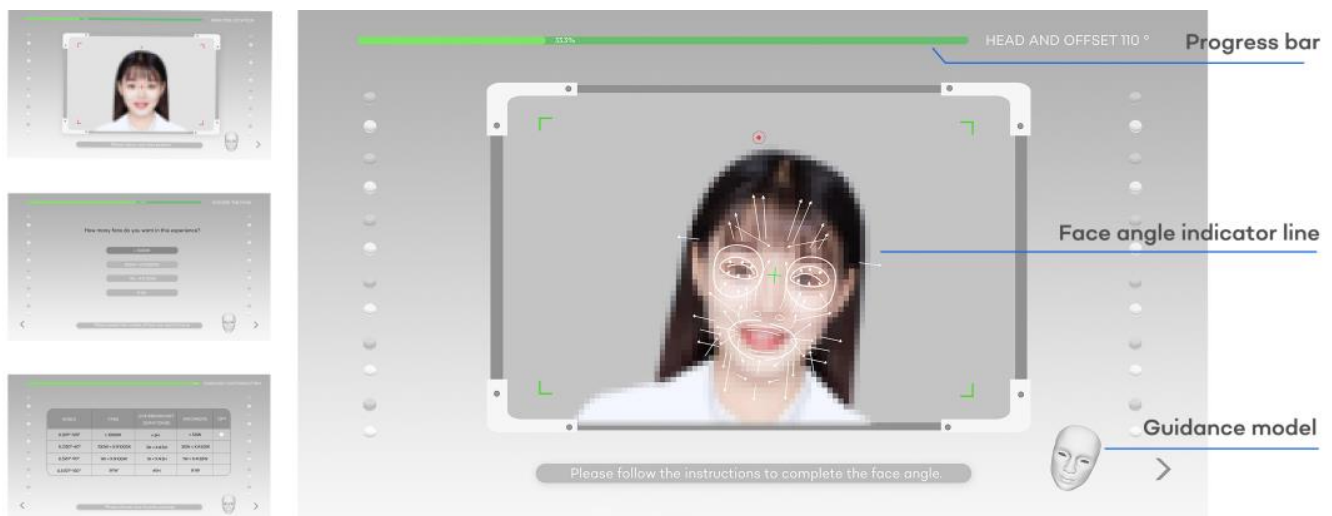


Figure 6. Interactive system interface showing parameterized control of facial orientation and image aggregation.

3.4. Participants and Procedure

A total of 30 participants (aged 18–35, $M = 26.4$, $SD = 4.1$) took part in the study. Participants had varying levels of familiarity with social media self-imaging practices, including 17 regular content creators. Detailed demographic information is provided in Table 1. The study was approved by the Institutional Review Board of the School of Design, Hunan University (Protocol code 104037; approved on 30 December 2025). All participants took part voluntarily and provided informed consent prior to participation. Participants engaged with the interactive system in situ during demonstration sessions conducted in both system testing and public presentation contexts. To clarify the procedure, the study consisted of two stages. First, participants completed a 10-min preliminary session in a controlled laboratory setting to become familiar with the device, basic operation, and safety requirements. Second, participants engaged with the system in situ in the actual installation environment for approximately 40 min. In this study, “in situ” refers to participants’ situated experience of the wearable system in the actual installation context. All participants followed the same structured interaction protocol across these stages. During interaction, participants wore the device and explored its functionality by adjusting facial orientation while observing the generative visual output in real time, as illustrated in Figure 7 and Supplementary Video S1. Participants were instructed to adjust their facial orientation across different angles, observe changes in the generated output, and explore how the system responded to bodily movement and parameter input. No participant

was asked to achieve a predefined “correct” image; instead, the task was designed to elicit exploratory interaction under consistent procedural conditions. Audio prompts accompanied the interaction, providing affective cues as participants adjusted bodily orientation and attended to the display. Interaction sessions were documented through video recordings, photographic materials, and field notes. These materials were used for subsequent analysis of interaction patterns and participant responses. Key frames extracted from video recordings were used to support later analysis of interaction trajectories. After completing the interaction, participants were asked to complete a structured questionnaire using a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). The questionnaire consisted of 15 items organized into three dimensions: perceptual friction, awareness of algorithmic mediation, and reflective responses to self-presentation. The full list of questionnaire items is provided in Appendix A.



Figure 7. Interaction sequence illustrating the participant’s engagement with the system during a demonstration session.

Table 1. Participant demographics (N = 30).

Variable	Category	N	Percentage (%)	Mean (SD)
Age (years)	Range: 18–35	-	-	26.4 (4.1)
Gender	Female	16	53.3%	-
	Male	14	46.7%	-
Social Media Use	Frequent	18	60.0%	-
	Moderate	12	40.0%	-
Content Creation Experience	Regular creators	17	56.7%	-
	Occasional creators	13	43.3%	-
Self-imaging Frequency	Daily	12	40.0%	-
	Weekly	10	33.3%	-
	Occasional	8	26.7%	-

4. Results: Experiential Observations

This section presents experiential observations derived from in situ engagements with the interactive system. To improve the transparency of the analytical process, these observations were analyzed through a thematic coding approach. The analysis was based on repeated review of video recordings, field notes, observational logs, participants' verbal comments during and after the interaction, and post-interaction questionnaire responses. Two researchers independently reviewed these materials, first identifying recurring behavioral and verbal patterns, such as hesitation, repeated posture adjustment, sustained attention to the screen, gaze shifts, uncertainty toward generated outputs, and expressions of discomfort or reflection. These initial codes were then compared, discussed, and grouped into three analytical themes: perceptual friction, awareness of algorithmic mediation, and reflective unease toward normative self-imaging. Because the qualitative analysis followed an interpretive thematic approach, inter-rater reliability was not used as a primary validity criterion. Instead, analytical consistency was enhanced through iterative comparison, discussion of disagreements, and consensus-based refinement. Patterns described as "recurring" in the following sections refer to behaviors observed across multiple participants and repeatedly documented in the video recordings, field notes, and observational logs. Table 2 presents the overall questionnaire results across all 30 participants, summarizing the three experiential dimensions used to support the thematic analysis: perceptual friction, awareness of algorithmic mediation, and reflective unease toward normative self-imaging. To assess the internal consistency of the questionnaire, Cronbach's alpha was calculated for each dimension. The reliability values were $\alpha = 0.78$ for perceptual friction, $\alpha = 0.77$ for awareness of algorithmic mediation, and $\alpha = 0.83$ for reflective unease toward normative self-imaging, indicating acceptable internal consistency. Confidence intervals for questionnaire dimensions are reported in Tables 2 and 3.

Table 2. Questionnaire results (5-point Likert scale, N = 30).

Dimension	Item	Mean	SD	95% CI	Dimension	Item	Mean	SD
Perceptual Friction	PF1	4.33	0.62	[4.10, 4.56]	Perceptual Friction	PF1	4.33	0.62
	PF2	4.27	0.66	[4.02, 4.52]		PF2	4.27	0.66
	PF3	4.10	0.72	[3.83, 4.37]		PF3	4.10	0.72
	PF4	4.13	0.70	[3.87, 4.39]		PF4	4.13	0.70
	PF5	4.20	0.68	[3.95, 4.45]		PF5	4.20	0.68
Dimension Mean Experience	-	4.21	0.48	[4.03, 4.39]	Dimension Mean Experience	-	4.21	0.48
Perceptual Friction	AM1	4.30	0.64	[4.06, 4.54]	Perceptual Friction	AM1	4.30	0.64
	AM2	4.43	0.60	[4.21, 4.65]		AM2	4.43	0.60
	AM3	4.27	0.67	[4.02, 4.52]		AM3	4.27	0.67
	AM4	4.17	0.71	[3.90, 4.44]		AM4	4.17	0.71
	AM5	4.30	0.65	[4.06, 4.54]		AM5	4.30	0.65
Dimension Mean Experience	-	4.29	0.49	[4.11, 4.47]	Dimension Mean Experience	-	4.29	0.49
Perceptual Friction	RU1	3.90	0.78	[3.61, 4.19]	Perceptual Friction	RU1	3.90	0.78
	RU2	4.20	0.70	[3.94, 4.46]		RU2	4.20	0.70
	RU3	4.13	0.73	[3.86, 4.40]		RU3	4.13	0.73
	RU4	4.07	0.75	[3.79, 4.35]		RU4	4.07	0.75
	RU5	4.07	0.74	[3.79, 4.35]		RU5	4.07	0.74
Dimension Mean Experience	-	4.07	0.57	[3.86, 4.28]	Dimension Mean Experience	-	4.07	0.57

Table 3. Descriptive comparison of questionnaire results between regular content creators and occasional creators.

Dimension	Regular Creators M ± SD [95% CI], n = 17	Occasional Creators M ± SD [95% CI], n = 13
Perceptual Friction	3.93 ± 0.37 [3.74, 4.12]	4.57 ± 0.35 [4.36, 4.78]
Awareness of Algorithmic Mediation	3.96 ± 0.32 [3.80, 4.13]	4.74 ± 0.26 [4.58, 4.90]
Reflective Unease and Norm Awareness	3.78 ± 0.56 [3.49, 4.06]	4.46 ± 0.29 [4.29, 4.64]

The observations reflect recurring patterns identified across participants, focusing on how bodily movement, attention, and evaluative judgment unfolded in relation to the system's constraints and generative responses. In the following subsections, we distinguish between directly observed behaviors, participant statements, and our interpretive claims. Observed behaviors include visible actions such as pauses, micro-adjustments, gaze shifts, and repeated attempts to stabilize or evaluate the generated image. Participant statements are presented as direct quotations using identifiers P1–P30, while interpretive claims are developed from these empirical materials and supported, where relevant, by questionnaire results. As illustrated in Figure 8, participants engaged with the system in visually prominent public locations commonly associated with social media self-imaging, where interaction involved adjusting bodily posture while attending to the generative feedback displayed on the device. In the following sections, participants are referenced using identifiers P1–P30. To address the possible role of prior content-production experience, we further compared participants with different levels of content creation experience. Based on participants' self-reported social media practices, 17 participants were identified as regular content creators, while 13 participants were identified as occasional creators. Because all participants had at least some experience with social media self-imaging, the comparison is framed as regular content creators versus non-regular/occasional creators. This grouping was used to examine whether more sustained familiarity with platform-based self-presentation shaped participants' responses to the system. To further contextualize these overall patterns, Table 3 reports descriptive comparisons between regular content creators and non-regular/occasional creators. Given the exploratory nature of the study and the modest subgroup sizes, the group comparison is reported descriptively rather than as a confirmatory group-difference test.

**Figure 8.** A participant wearing the interactive device during an in situ encounter at a visually prominent public location commonly used for social media self-imaging.

4.1. Perceptual Friction as Encounter

At the observational level, across participants, a recurring pattern of hesitation and incremental adjustment emerged during interaction. These recurring behaviors were interpreted as evidence of perceptual friction in AI-mediated self-imaging. Perceptual friction became evident when participants engaged with the system in visually prominent settings. As they oriented their heads toward familiar self-imaging angles, the LED display generated real-time pix2pix-based facial representations. Interaction unfolded as a continuous negotiation between bodily posture and mediated visual feedback, requiring sustained attention and ongoing adjustment. Participants frequently paused when the generated output did not align with their expectations of a stable or effective angle. Rather than settling into a pose, they often hesitated before making further adjustments. While observing the screen update, P28 described the image as “almost there, but never fully settling into place,” while P15 noted that “it feels like I keep adjusting, but the angle never quite locks in.” Both comments occurred when participants were adjusting between adjacent facial orientations, approximately 80–95°, while the fan-count level was set to 80. This relatively dense visual aggregation made small changes in orientation more difficult to stabilize visually. These interactions involved repeated micro-adjustments and sustained visual attention to the display. Participants occasionally held intermediate positions to compare successive outputs. For example, P3 remarked that “this one is closer, but I’m not sure if it’s right.” Together with the observed holding of intermediate positions, this statement points to an ongoing attempt to negotiate alignment with the system. Such behaviors were observed across many participants. We therefore interpret perceptual friction as a recurring interactional condition rather than an isolated occurrence. The need to continually recalibrate posture altered the rhythm of self-imaging, slowing down actions that are typically rapid and habitual. Participants’ attention oscillated between bodily orientation and screen output. This oscillation made computational mediation persistently perceptible during interaction. This pattern is also reflected in questionnaire responses, with perceptual friction reported at a high level ($M = 4.21$, $SD = 0.68$), indicating that participants frequently experienced hesitation, effort, and repeated adjustment during interaction. We acknowledge that the perceptual friction items may capture both physical and computational aspects of the interaction, including device weight, fixed display position, response delay, and the instability of generative feedback. Therefore, perceptual friction is not interpreted as a purely algorithmic effect, but as a hybrid experiential condition produced by the combined constraints of the wearable device and the AI-mediated feedback loop. Additionally, perceptual friction was not always experienced as productive or reflective. A small number of participants treated the unstable output primarily as a usability issue rather than as a meaningful interruption of self-imaging. For these participants, repeated adjustment sometimes led to impatience or disengagement rather than deeper reflection. This indicates that friction did not automatically produce critical awareness; in some cases, it remained a neutral or frustrating interactional obstacle. When comparing regular content creators and occasional creators, both groups displayed hesitation and repeated adjustment. However, regular content creators more often related this friction to their established self-imaging routines, such as their familiarity with angles that would normally “work” in social media contexts. Occasional creators also experienced friction, but they more often described it as uncertainty about how to respond to the system’s changing visual output. As shown in Table 3, occasional creators reported higher perceptual friction scores ($M = 4.57$, $SD = 0.52$) than regular content creators ($M = 3.93$, $SD = 0.62$). This suggests that participants with less routine engagement in content production may have experienced the system’s instability and bodily demands more intensely as interactional disruption, whereas regular creators

may have partially normalized such adjustment practices through their familiarity with platform-based self-imaging.

4.2. *Becoming Aware of the Algorithmic Gaze*

At the observational level, across participants, a gradual reorientation of attention was observed, indicating an emerging awareness of the system as an active mediator in self-imaging practices. This shift suggests that participants increasingly noticed the system's role in shaping the interaction. As interaction progressed, participants increasingly attended to how visual outputs responded to changes in facial orientation. The generated images functioned as a reference point that participants repeatedly consulted while adjusting posture, often shifting their gaze between bodily movement and screen feedback. Initially, participants relied on familiar self-imaging habits, such as quickly adopting preferred angles. Over time, however, unstable or ambiguous outputs prompted slower, more exploratory adjustments. Pauses became more frequent, and interaction shifted toward iterative cycles of observation and correction. While observing the screen, P14 noted that "it feels like the screen is telling me how to turn," while P16 commented that "I keep checking what the system wants to see." These comments were associated with detected facial orientations between approximately 65° and 80°, where relatively small head movements produced visible shifts in the generated output and prompted participants to repeatedly adjust their posture in response to the screen. These participant statements indicate that participants became more attentive to how the system responded visually. These responses indicate an emerging sensitivity to the system's visual logic. Through repeated interaction, participants began to orient their movements in relation to how the system rendered their appearance. For instance, P26 remarked, "I thought this would work, but I need to see it on the screen first." This statement highlights a shift from internal judgment to system-dependent evaluation. Based on these observed behaviors and participant statements, we interpret evaluative judgment as emerging through engagement with the system's outputs rather than from pre-existing criteria alone. Participants incorporated the system's feedback into their bodily actions. This process indicates that participants increasingly treated the system's feedback as a reference point for evaluating and adjusting their self-presentation. This pattern is also reflected in questionnaire responses, with awareness of algorithmic mediation reported at a high level ($M = 4.29$, $SD = 0.66$), indicating that participants actively attended to how the system guided their positioning and influenced their actions. At the same time, awareness of algorithmic mediation varied across participants. Some participants noticed that the display responded to their movements but did not explicitly describe the system as guiding, evaluating, or shaping their self-presentation. For these participants, the interaction was understood more as a technical feedback loop than as an encounter with an algorithmic gaze. This neutral response suggests that algorithmic mediation became perceptible unevenly, depending on participants' prior familiarity with platform logics and their level of engagement during the session. The comparison also showed that both regular content creators and occasional creators became attentive to the system's guidance. Although occasional creators reported higher questionnaire scores, regular content creators more explicitly connected this guidance to familiar platform logics, such as adjusting oneself for visibility, audience preference, or algorithmic evaluation. Occasional creators noticed that the system shaped their movements, but they tended to frame this guidance as a local interaction with the device rather than as part of broader platform-mediated self-presentation. As shown in Table 3, occasional creators reported higher awareness of algorithmic mediation ($M = 4.74$, $SD = 0.54$) than regular content creators ($M = 3.96$, $SD = 0.53$). This may indicate that participants less accustomed to platform-based self-imaging experienced the system's feedback as more explicitly directive

and noticeable, while regular creators may have already internalized similar forms of adjustment as part of ordinary content-production routines.

4.3. Experiencing Norms, Taste, and Unease

At the observational and verbal levels, across participants, moments of evaluative judgment and affective response emerged. These responses were interpreted as engagement with implicit norms of appearance and aesthetic preference. Participants began to assess whether generated images “looked right” or “felt off,” even when outputs appeared stable. These judgments were expressed through brief remarks, pauses, and minor adjustments. We interpret this pattern as suggesting an interplay between alignment and aesthetic evaluation. For example, P7 remarked that “this angle looks familiar, but I don’t really like it,” while P19 noted that “it feels correct, but it’s also kind of uncomfortable.” These responses occurred when the generated output became visually stable at facial orientations around 90–110° under a higher fan-count setting of 100, suggesting that discomfort was linked not only to the image content itself but also to the way repeated visual features were intensified by the system configuration. These participant statements reflect a coexistence of recognition and unease, which was also accompanied by further adjustment. The comparison between regular content creators and occasional creators was most evident in relation to norms, taste, and unease. Regular content creators explicitly related these moments to their habitual self-presentation practices, whereas occasional creators more often described them as unfamiliar or situational experiences produced by the installation. P4 observed that “normally I know exactly which angle works. . . but here I keep stopping and checking again,” while P6 stated that “I already know what looks good, but here I’m not sure anymore.” These statements indicate a disruption of established aesthetic conventions. Familiar visual configurations were often recognized quickly, but slight deviations from these patterns tended to elicit hesitation and prolonged attention. In one instance, P30 remarked that “I know this is supposed to look good, but it doesn’t really feel like me.” This statement highlights a tension between normative expectations and subjective experience. Taken together, these observed behaviors and participant statements suggest that norms and aesthetic judgments emerged through embodied interaction rather than from predefined criteria alone. Feelings of unease appeared intermittently. These intermittent responses indicate that participants did not always experience the generated images as fully familiar or personally aligned. This pattern is also reflected in questionnaire responses, with reflective unease and norm awareness reported at a moderately high level ($M = 4.07$, $SD = 0.74$), indicating that the interaction prompted participants to reflect on their habitual self-imaging practices while experiencing subtle forms of discomfort and tension. However, reflective unease was not equally strong across all participants. Some participants responded to the generated images in a more neutral or aesthetic manner, focusing on whether the output was visually pleasing, strange, or technically interesting, rather than explicitly connecting it to platform norms or identity formation. In these cases, the interaction prompted evaluation but not necessarily sustained reflection. This suggests that the system created conditions for reflection, but did not guarantee that all participants would interpret the experience critically. Overall, regular content creators appeared more likely to articulate the normative character of particular angles, poses, and visual outputs in relation to their routine self-presentation practices. Occasional creators also experienced unease, but their responses were less explicitly tied to platform norms and more often expressed as uncertainty about whether the generated image “looked right.” This pattern is also reflected in Table 3, where occasional creators reported higher reflective unease and norm awareness scores ($M = 4.46$, $SD = 0.52$) than regular content creators ($M = 3.78$, $SD = 0.76$). This may suggest that participants less accustomed to platform-oriented self-

presentation experienced the generated outputs as more unfamiliar or affectively disruptive, whereas regular creators may have recognized these norms as more routine or already embedded in their habitual practices.

5. Discussion

5.1. From Interaction Trajectories to Algorithmic Normalization

The interaction trajectories observed in this study can be understood as situated encounters with algorithmic normalization as it unfolds through bodily action, attention, and time. Participants' repeated pauses, micro-adjustments, and ongoing bodily recalibrations can be understood as central mechanisms through which normalization is enacted in practice. This understanding aligns with process-oriented accounts of interaction that emphasize how meaning and order emerge through ongoing coordination [73]. Through sustained engagement with the system's generative feedback, participants gradually oriented their bodily movements toward configurations that appeared momentarily coherent or legible on the display, even as such coherence remained provisional and open to ongoing revision. These interaction trajectories were shaped by the system's continuous yet indeterminate feedback, which prompted participants to maintain attentional focus, compare successive renderings, and incrementally recalibrate their posture over time. This mode of engagement foregrounded duration and repetition, echoing prior accounts of algorithmic mediation as operating through continuous modulation, while also resonating with research on multi-platform content creation that demonstrates how platform norms are gradually configured through repeated practices of adjustment, comparison, and prioritization [74,75]. Alignment emerged through extended sequences of bodily negotiation, as participants lingered in intermediate positions, oscillated between nearby orientations, and repeatedly returned their gaze to the display. However, these interaction trajectories should not be attributed to the generative model alone. They were shaped by the combined effects of the pix2pix-based feedback, the physical constraints of the wearable device, the dot-based visual abstraction, and the situated public installation context. Therefore, algorithmic normalization is discussed here as an interactional condition emerging from this combined setup, rather than as a direct causal effect of the model alone.

Perceptual friction sustained this mode of engagement by maintaining a state of anticipatory attention throughout interaction. As bodily movement and visual feedback became increasingly coupled, participants appeared to develop an embodied attunement to the system's responses. This attunement resonates with accounts of algorithmic power that emphasize anticipation, speculation, and affective adjustment as central dimensions of users' lived relations with algorithmic systems, even when the systems' internal logics remain opaque [76]. Anticipation operated as a mode of ongoing orientation toward system behavior, continually shaped and revised through interaction. From this perspective, algorithmic normalization can be understood as a temporal condition that structures action through continuity. As normalization unfolds through repetition and practice, it may organize how bodies move, attend, and adjust over time. This processual understanding aligns with scholarship that conceptualizes normalization as an emergent and distributed accomplishment, sustained through everyday activity and routine engagement [77]. By foregrounding these interaction trajectories, the system may help make the processual nature of algorithmic normalization experientially visible. Algorithmic standards of coherence and legibility take shape through use, remaining provisional and open to revision as interaction continues [78,79]. Interaction trajectories thus function as sites where algorithmic norms are continuously produced, stabilized, and maintained through embodied engagement. These findings suggest that normalization may operate not merely as a descriptive pattern, but as a normative force shaping how users orient themselves within platform-mediated

environments. The descriptive comparison between regular and occasional content creators further suggests that familiarity with platform-based self-imaging may shape how such normalization is experienced and interpreted. While occasional creators reported stronger perceptual friction, algorithmic awareness, and reflective unease, regular creators more often articulated these experiences in relation to familiar platform routines, suggesting that some forms of algorithmic adjustment may already have become partially normalized through repeated content-production practices.

5.2. Authenticity as a Designed and Computable Effect

The interactions observed in this study complicate claims that authenticity has become fully computable under algorithmic mediation. Participants frequently oriented their evaluative judgments toward the system's visual output, checking whether a generated image appeared to "work," "look right," or stabilize into a recognizable configuration. However, these moments of visual confirmation rarely resulted in a sense of completion. Instead, authenticity appeared to emerge as a deferred and provisional judgment, continually postponed through iterative comparison across successive outputs. This interpretation is not intended to suggest that deferred authenticity is unique to this system; rather, it extends prior studies of algorithmic filtering and recommendation systems by showing how similar forms of provisional self-evaluation may become perceptible through generative feedback, embodied adjustment, and visual abstraction. This ongoing deferral became apparent through participants' repeated pauses, hesitations, and micro-adjustments following moments of apparent visual coherence. Even when the system produced images that aligned with familiar aesthetic patterns, participants often continued to adjust their posture or linger in place, visually reassessing the output. These behaviors suggest that authenticity was not experienced as a binary state achieved through successful alignment, but as an ongoing evaluative process unfolding over time. Such dynamics resonate with accounts of authenticity as a situated and relational accomplishment [80,81]. This study does not position deferred or provisional authenticity as a phenomenon unique to the present system. Rather, it suggests that the specific configuration of generative feedback, embodied adjustment, and visual abstraction made such dynamics experientially perceptible within the interaction.

Participants' reliance on the screen shaped how evaluative authority was negotiated during interaction, revealing a sustained tension between embodied familiarity and algorithmic rendering. Participants readily recognized certain configurations as culturally legible or aesthetically familiar, drawing on prior experience with platform-mediated self-imaging practices. At the same time, they frequently expressed discomfort or uncertainty about whether these images felt acceptable or "like me." Authenticity thus took shape in the space between bodily intuition and computational visualization, where neither source alone was sufficient to settle judgment. This suspended mode of evaluation challenges interpretations of algorithmic authenticity as a straightforward outcome of classification or categorization [82]. The system generated conditions under which authenticity had to be repeatedly negotiated through interaction. The system's feedback structured attention and comparison, encouraging participants to continuously test and reassess their alignment with the generated representations. In this sense, the computability of authenticity operates less as a definitive verdict and more as an infrastructural condition that prolongs evaluation and sustains uncertainty [83,84].

Crucially, this uncertainty is shaped by culturally embedded aesthetic norms. The generative model, trained on internet celebrity selfies, incorporates visual conventions associated with visibility, desirability, and platform-specific taste. These conventions inform what appears coherent, familiar, or polished within the system's output, reflecting

broader processes through which platform aesthetics become naturalized as standards of self-presentation [85]. Participants' hesitations reveal how alignment with established aesthetic conventions gives rise to complex affective responses. Moments of visual recognition were frequently accompanied by unease, pointing to a tension between cultural legibility and personal resonance as it unfolded during interaction. Through making this tension experientially perceptible, the interaction design situates authenticity as a dynamic and negotiated effect. Authenticity takes shape through the ongoing entanglement of cultural norms, algorithmic mediation, and embodied experience, emerging through repeated judgment, comparison, and adjustment across time. In doing so, the system foregrounds how contemporary experiences of authenticity are increasingly shaped by iterative encounters with computational representations that both stabilize and unsettle the sense of self [86]. This instability challenges the assumption that authenticity can be fully stabilized through computational systems.

5.3. *AI as an Implicated Actor in Identity Construction*

The moments of hesitation, discomfort, and quiet judgment observed during interaction foreground AI as an implicated participant in identity construction, whose role emerges through situated engagement. Participants' affective responses to the generated images, visible in lingering, hesitation, and subtle bodily adjustment, indicate that the system actively shaped how appearance was evaluated in the moment. These responses draw attention to AI not only as an actor within sociotechnical processes, but also as a situated provocation deliberately staged through interaction design. Crucially, the AI system encountered in this study operates within a critical design configuration. The installation amplifies algorithmic feedback, slows down habitual rhythms of self-imaging, and makes mediation perceptible at the level of bodily experience. Such design choices operate through deliberate defamiliarization, slowing down habitual self-imaging practices in order to render algorithmic mediation experientially perceptible and open to reflection [87,88]. The unease participants experienced thus emerges at the intersection of algorithmic mediation and design intervention, shaped as much by how the system is staged as by what the model computes.

This framing complicates straightforward claims about AI agency. AI is not understood as an autonomous agent with independent intentionality, but as one component within a distributed arrangement of training data, model operations, interface constraints, design decisions, and participant interpretation. The interaction reveals agency as distributed across multiple layers, including training data, generative processes, interface constraints, bodily movement, and design decisions [89,90]. Accordingly, AI is not treated here as an autonomous agent with independent intentionality or singular causal power, but as one component within a distributed sociotechnical arrangement involving training data, model operations, interface constraints, design decisions, participant interpretation, and situated interaction [91]. Its agency is therefore understood relationally: the system does not determine participant responses on its own, but may participate in shaping the conditions under which certain visual forms become more salient, recognizable, or open to evaluation during interaction. The AI's participation in identity construction takes form relationally, through how participants orient themselves toward its outputs, interpret its responses, and adjust their actions accordingly. In this sense, AI agency emerges through ongoing coordination among human and nonhuman elements. Importantly, the affective unease observed during interaction points to how algorithmic power often operates through subtle experiential registers. Feelings of discomfort, hesitation, or quiet self-doubt suggest encounters with normative expectations that are sensed before they are articulated. This aligns with scholarship that foregrounds how algorithmic power operates through affective

modulation of attention, sensation, and self-perception within everyday interaction [92]. The system's outputs may help structure conditions under which certain appearances feel more recognizable, legitimate, or uneasy.

By situating AI within an explicitly critical interaction design, this work frames AI as a medium through which identity's normative conditions are staged and intensified. The discomfort and hesitation observed form integral elements of a designed encounter that renders algorithmic mediation experientially tangible. In doing so, the system invites reflection on how similar normative pressures operate more subtly within everyday platform environments, where algorithmic judgments are often naturalized and rendered invisible [93]. For conventional interface design, this finding suggests that reflective unease may be translated into "healthy frictions" that support user autonomy rather than merely interrupt use. For example, commercial self-imaging or recommendation systems could introduce moments of reflective delay, visible feedback about how outputs are ranked or optimized, adjustable intensity controls, or prompts that allow users to compare alternative representations before accepting a system-preferred result. Such frictions would not aim to make interaction unnecessarily difficult, but to give users greater awareness of how algorithmic feedback shapes visibility, desirability, and self-evaluation. The system thus positions AI as an implicated and contingent participant in the ongoing negotiation of online persona construction. AI participates in shaping the conditions under which identity is evaluated, felt, and adjusted. Through this lens, AI-mediated interaction design operates as an epistemic device that makes the sociotechnical production of identity perceptible, allowing users to encounter and reflect upon the normative forces that otherwise remain embedded in routine self-imaging practices.

6. Limitations and Future Work

This study has several methodological limitations. First, the experiential observations are based on a small number of participants engaging in short, exploratory sessions, which limits the breadth and depth of the empirical material. The analysis relies on selectively reported moments of interaction, without systematic coding or comprehensive coverage of all participant experiences. As a result, the findings may reflect partial interpretations and do not capture the full range of possible responses to the system. In addition, the lack of longitudinal engagement makes it difficult to assess how participants' perceptions or sense-making processes may evolve over time. The scope of the inquiry is further constrained by its focus on facial representation and selfie-oriented practices, using images of internet celebrities as a proxy for influencer aesthetics. While this enables a focused examination of aesthetic normalization within platform-mediated cultures, it limits the range of identity expressions considered. The generative model is also shaped by its training dataset and configuration, which influence the visual patterns it produces and reflect particular aesthetic regularities. Moreover, the role of generative AI in the system remains intentionally ambivalent: it may both reinforce and expose existing conventions. This ambiguity, while central to the critical design intent, limits the extent to which causal claims can be made about algorithmic influence relative to other sociotechnical factors. In particular, the absence of control conditions means that the study cannot fully separate the effects of generative feedback from physical ergonomic factors, such as device weight, fixed display position, response delay, and the unfamiliarity of the public installation setting. This limitation affects the generalizability of the findings and should be addressed in future controlled studies.

Future work may extend this inquiry in several directions. First, engaging more diverse participant groups and conducting longitudinal or repeated interactions could provide deeper insight into how perceptual friction and algorithmic awareness evolve

over time, while also strengthening methodological rigor through more systematic data collection and analysis. Future controlled laboratory studies could further separate physical ergonomic factors from generative feedback by comparing different device weights, display configurations, response delays, and feedback conditions. Second, expanding the scope of self-representation beyond facial imagery to include collective, non-facial, or non-visual identities may broaden the critical perspective on AI-mediated identity construction. Third, exploring alternative datasets, training strategies, and generative architectures, including diffusion models, could help examine how different algorithmic assumptions shape experiences of normalization, discomfort, and reflection. Together, these directions may contribute to more reflexive, situated, and accountable approaches to the design of AI-mediated identity systems.

7. Conclusions

By framing idealized online personas as illusionary selves, this study conceptualizes identity construction on social media as a sociotechnical process shaped by algorithmic visibility, design practices, AI technologies, and cultural pressures. Through an AI-mediated critical design inquiry, this work demonstrates how generative systems may participate in the construction and normalization of online self-representation. Using a pix2pix-based model trained on a dataset of internet celebrity facial images, the system translates facial representations into abstract, dot-based visual compositions. By aggregating images captured at identical selfie angles, the installation foregrounds repetition, normalization, and perceptual bias embedded in curated self-imaging practices. The interactive setup further extends this exploration by allowing participants to manipulate visual parameters in real time, revealing how subtle shifts in angle, aggregation, and abstraction reshape perceived identity. Across situated interactions with the system, including observations from 30 participants and questionnaire findings, participants encountered the generative outputs as both familiar and unsettling, alternately engaging with them as references for alignment and as sources of hesitation and doubt. These encounters point to a central tension in AI-mediated self-imaging: computational representations support the production of culturally legible and recognizable personas, while simultaneously rendering normative expectations perceptibly unstable. Identity thus emerges as an ongoing negotiation with algorithmic representations, taking shape through repeated interaction rather than fixed alignment. The participants' pauses, repeated adjustments, attention to system feedback, and ambivalent responses provide empirical grounding for understanding algorithmic mediation as something encountered through bodily negotiation rather than only inferred at a conceptual level.

This study contributes to HCI and AI design research by showing how generative and interactive systems can be used to make processes of normalization and identity construction perceptible through embodied interaction. By staging perceptual friction and instability through design, the system does not merely represent these processes but critically exposes the normative conditions through which online personas are produced and sustained. Rather than positioning AI as a neutral tool, this work foregrounds its role in reinforcing, mediating, and destabilizing standards of visibility and desirability. In doing so, the study contributes to ongoing critical discussions of AI-mediated interaction design, positioning such systems as sites for interrogating the cultural norms and power relations embedded in contemporary practices of self-presentation. Theoretically, the concept of "illusionary selves" offers a framework for examining how algorithmic authenticity is produced through the alignment between subjective self-expression and platform-compatible visual norms. From a design perspective, the findings suggest that reflective unease can be translated into "healthy frictions," such as reflective delays, visible indicators of algorithmic

ranking or optimization, adjustable intensity controls, and opportunities to compare alternative representations. Practically, these implications point toward interface designs that support user agency by making algorithmic feedback more visible, adjustable, and open to questioning, rather than allowing normalization patterns to remain hidden within seamless interaction. At the same time, the study leaves unresolved questions about how critical design can function simultaneously as a reflective practice and as an empirical research method, particularly when experiential effects are shaped by both designed constraints and participant interpretation.

Supplementary Materials: The following supporting information can be downloaded at: <https://www.mdpi.com/article/10.3390/mti10060064/s1>, Supplementary Video S1, demonstrating the interaction process, including changes in facial orientation and corresponding generative visual outputs.

Author Contributions: Conceptualization, X.L. and Y.W.; methodology, X.L. and Y.W.; validation, X.L. and Y.L.; writing—original draft preparation, X.L. and Y.W.; writing—review and editing, X.L. and Y.L.; visualization, X.L. and Y.W.; supervision, Y.L.; funding acquisition, Y.L. All authors have read and agreed to the published version of the manuscript.

Funding: This research was funded by the Key Research and Development Program of Hunan Province of China (grant number 2024JK2025).

Institutional Review Board Statement: This study was conducted in accordance with the Declaration of Helsinki and approved by the Institutional Review Board of the School of Design, Hunan University. Ethical approval was obtained for both components of the research: the collection and use of the selfie image dataset (Protocol code P104015, approved on 11 December 2025), and the participant-based installation study (Protocol code P104037, approved on 30 December 2025).

Informed Consent Statement: All participants took part voluntarily and provided informed consent prior to participation, including consent for video recording and documentation of interaction sessions. Where applicable, participants also agreed to the use of identifiable materials for research dissemination.

Data Availability Statement: The data presented in this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Acknowledgments: We thank all participants for their time, engagement, and thoughtful interactions with the system during the experiential sessions. Their contributions were essential to this study.

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

Table A1. Subjective Questionnaire Items (5-Point Likert Scale).

Dimension	Item	Statement	1	2	3	4	5
Perceptual Friction	1	I had to repeatedly adjust my posture during the interaction.	☐	☐	☐	☐	☐
	2	It was difficult to find a position that felt stable or “correct.”	☐	☐	☐	☐	☐
	3	The interaction disrupted my usual way of positioning myself for images.	☐	☐	☐	☐	☐
	4	I hesitated before deciding whether to adjust my posture further.	☐	☐	☐	☐	☐
	5	The process of aligning with the system felt slow or effortful.	☐	☐	☐	☐	☐
Algorithmic Mediation Awareness	1	I felt that the system was guiding how I should position myself.	☐	☐	☐	☐	☐
	2	I frequently checked the screen to understand how the system was responding.	☐	☐	☐	☐	☐
	3	My movements were influenced by what the system seemed to “recognize.”	☐	☐	☐	☐	☐

Table A1. Cont.

Dimension	Item	Statement	1	2	3	4	5
Algorithmic Mediation Awareness	4	I tried to adjust my posture based on what I thought the system “wanted.”	○	○	○	○	○
	5	The interaction made me aware of how my appearance was shaped by the system.	○	○	○	○	○
Reflective Unease and Norm Awareness	1	Some generated images felt familiar, but also slightly uncomfortable.	○	○	○	○	○
	2	The interaction made me reflect on how I usually present myself in images.	○	○	○	○	○
	3	I became more aware of what counts as a “good” or “correct” image.	○	○	○	○	○
	4	The experience made me question my usual habits of self-imaging.	○	○	○	○	○
	5	I noticed tensions between what looked “right” and what felt natural.	○	○	○	○	○

Note: 1 = strongly disagree, 5 = strongly agree.

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