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Editorial

Symmetry/Asymmetry in Computer-Aided Industrial Design

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In the ever-evolving landscape of industrial design, the interplay between symmetry and asymmetry serves as both a philosophical cornerstone and a practical compass. This Special Issue of *Symmetry*, titled "Symmetry/Asymmetry in Computer-Aided Industrial Design," brings together cutting-edge research that interrogates these dual forces—not merely as visual attributes but as systemic principles shaping user experience, design cognition, decision-making, and technological integration.

Symmetry, long celebrated for its harmony, balance, and intuitive appeal, continues to underpin successful design across products, interfaces, and services [1–3]. However, in an age defined by personalization, complexity, and dynamic user contexts, rigid symmetry can sometimes obscure nuance or stifle innovation. Conversely, asymmetry—often perceived as disruptive or chaotic—emerges here not as a flaw but as a fertile ground for addressing real-world mismatches, particularly those between designer intent and user need, between system output and human perception, and between functional requirements and emotional resonance.

The contributions featured in this Special Issue exemplify this duality with remarkable depth and diversity. From failure touchpoint reconfiguration aimed at enhancing product–service symmetry [4] to data-driven methodologies aligning sustainable refrigerator design with consumer preferences [5], each paper navigates the tension between order and variation. Several works tackle information asymmetries directly: one investigates the alignment gap between agile prototyping platforms and designer requirements [6], while another proposes fine-grained recognition of implicit user intentions in human–machine collaboration [7]. Complementing these, studies on the hybrid evaluation of HMI layout design in service robots [8] and cognitive load assessments in airtight cabins via a one-dimensional convolutional neural network [9] demonstrate how computational methods can reconcile aesthetic symmetry with functional and perceptual demands. Notably, multiple papers explore affective dimensions: furniture forms shaped by multi-dimensional emotional responses [10], biomimetic packaging aligned with affective semantics [11], AI-augmented Kansei engineering for vehicle morphology [12], and the reinterpretation of symmetrical traditional patterns in home textiles through user perception [13]. Together, they reveal a field increasingly attuned to human nature within human-centred designs.

This Special Issue also reaffirms that symmetry and asymmetry are not binary opposites but complementary strategies. Strategic asymmetry can drive innovation where symmetry risks homogeneity; conversely, intentional symmetry can restore clarity in complex systems. The challenge—and opportunity—for designers and researchers lies in discerning when to embrace each, guided by empirical data, user empathy, and computational insight.

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and human factors—ultimately advancing a more responsive, equitable, and meaningful design practice for the future.

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