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EXPLORING TYPOLOGIES OF MODERN INTERACTIVE INSTALATTION

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This paper categorizes modern interactive installations through sensory engagement, examining visual, auditory, touch, smell and taste, and multi-sensory interactions. As technology advances, AI, real-time processing, and adaptive feedback will further shape interactive experiences. This study provides a structured framework for understanding sensory-driven interactivity in design and media.

Key words: *installation, technological foundations, sensory experience, sensor-based interactions.*

INTRODUCTION

The modern interactive installations engage viewers directly, creating dynamic, immersive experiences. With advances in digital technology, AI, and sensor-based interaction, they have evolved into complex, multifaceted art forms. This study aims to develop a typology of modern interactive installations, considering technological foundations, interaction types, audience engagement models, spatial contexts, and sensory experiences.

PURPOSE

The purpose of this paper is to establish a comprehensive typological framework for modern interactive installations through the lens of sensory engagement. By categorizing installations based on different sensory modalities—visual, auditory, smell, taste, and multi-sensory experiences—this study seeks to analyze how each sensory approach shapes interaction and influences technological foundations. This sensory-driven typology provides a structured means of understanding the relationship between perception, user participation, and technological implementation in interactive installations.

RESULTS AND DISCUSSION

Sensory engagement plays a pivotal role in shaping the interactive experience, influencing both emotional responses and cognitive perceptions. To be specific, visionary and auditory senses often dominate digital interactions, providing rich visual and sonic landscapes. However, haptic feedback, olfactory engagement, and even taste-based interactions add depth to interactive experiences, creating new opportunities for user involvement. The integration of multiple senses fosters more immersive, engaging, and memorable installations, expanding the creative possibilities for artists and designers.

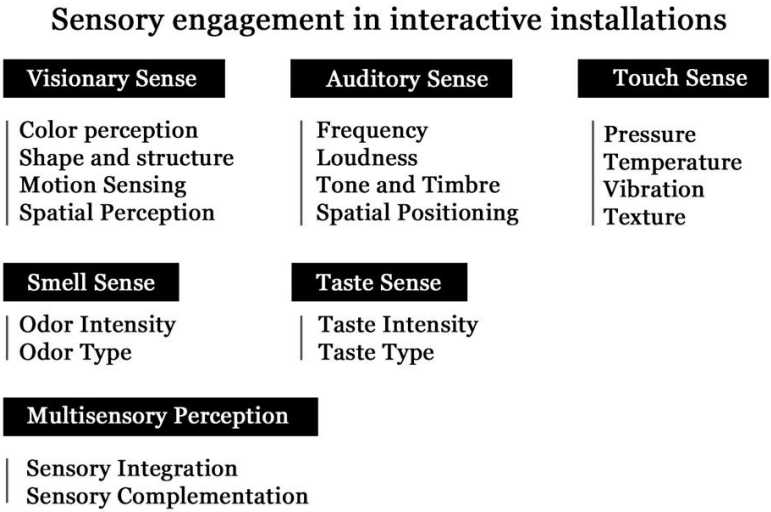

Fig. 1. Sensory modalities in interactive installations

Visionary Sense. Vision plays a fundamental role in interactive installations, as it is often the primary mode of engagement. Visual elements such as color perception, shape, motion sensing, and spatial perception contribute to how users experience and interact with digital art. Advanced projection mapping, augmented reality (AR), and virtual reality (VR) technologies enhance visual engagement by immersing users in digitally augmented spaces [1]. Interactive installations such as TeamLab's Borderless use high-resolution projection and real-time tracking to create environments that dynamically respond to user movement, blurring the boundaries between physical and digital space [2].

Auditory Sense. Sound is another crucial dimension of sensory engagement, influencing emotional and cognitive responses in interactive installations. Auditory elements, including frequency, loudness, tone, and spatial positioning, enhance immersion and guide user interaction. Binaural audio, spatialized soundscapes, and generative music algorithms are commonly used techniques.

Touch Sense. Tactile interactions, including pressure, temperature, vibration, and texture, add an embodied dimension to interactive installations. Haptic feedback and tangible interfaces enable users to physically engage with digital content, deepening their sense of presence. Technologies such as force-sensitive resistors, electroactive polymers, and vibrotactile actuators facilitate these interactions. In Tangible Media Group's work at MIT, shape-changing displays allow users to manipulate digital objects with their hands, transforming virtual engagement into a kinetic experience [3]. The integration of haptics fosters new modes of expression, enhancing the affective dimension of interactivity.

Smell and Taste Sense. Although less common than vision, sound, and touch, olfactory and gustatory interactions are gaining traction in experimental interactive installations. Smell-based interactions involve odor intensity and type, with diffusion systems releasing scents in response to user input.

Multisensory Perception**.** Interactive installations increasingly integrate multiple sensory modalities to create holistic experiences. Sensory integration and complementation enhance immersion by synchronizing visual, auditory, haptic, olfactory, and gustatory inputs. Studies in human perception highlight the role of cross-modal interactions in shaping user experience [4]. Multisensory installations like Random International's Rain Room leverage combined visual, auditory, and tactile stimuli to simulate standing amidst digitally controlled rainfall, evoking an intuitive and embodied response.

CONCLUSIONS

This study examined modern interactive installations through sensory engagement, showing how various sensory modalities shape user experience and technological foundations. Vision and sound remain dominant due to their cognitive impact and tech development. However, growing interest in haptic, olfactory, and taste-based interactions opens new paths for deeper immersion. Multisensory integration fosters dynamic, participatory environments. Future research should explore cross-sensory effects, AI, and adaptive feedback to enhance interactivity and provide practical insights for creators in interactive media.

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ДОСЛІДЖЕННЯ ТИПОЛОГІЙ СУЧАСНИХ ІНТЕРАКТИВНИХ ІНСТАЛЯЦІЙ

Стаття присвячена дослідженню сучасних інтерактивних інсталяцій через призму сенсорного сприйняття, аналізуючи роль візуальних, аудіальних, тактильних, нюхових і смакових взаємодій у формуванні користувацького досвіду. Багатосенсорна інтеграція поглиблює взаємодію, відкриваючи нові творчі перспективи. Висновки підкреслюють значення технологічного прогресу, зокрема штучного інтелекту та адаптивних технологій, у подальшому розвитку інтерактивних мистецьких практик.

Ключові слова: *інтерактивні інсталяції, сенсорний досвід, технологічні основи, взаємодія.*