Beyond Screen: Display as Cognitive Interface

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In the past, displays merely served as tools for presenting information. However, with the advent of AI capable of sensing not only human language but also nonverbal signals such as facial expressions, gaze, and gestures in real time—and interpreting user intentions, emotions, and context—displays are evolving into cognitive interfaces. This shift signifies that displays are moving beyond simple visual output devices to become interactive windows for human-AI communication. Thus, discussing the evolution of displays in the age of AI fundamentally means exploring how modes of communication between humans and AI are transforming. This transformation unfolds along two key trajectories.

The first is the evolution of input modalities. Previously, buttons and touchscreens represented machine-centered interfaces where users issued one-way commands based on predefined rules. Now, AI recognizes user behavior through sensor-based detection of gaze and gestures and understands intentions, thoughts, and emotions using technologies such as Electromyography(EMG) and Brain-Computer-Interface(BCI). As a result, input modalities are evolving into human-centered interfaces that enable interactive communication between humans and machines.

The second trajectory is the evolution of spatial structures. The physical forms of displays have advanced to enhance immersion within the boundaries of rectangular screens and are now evolving to transform flexibly according to user intent, as seen in foldable and stretchable displays. From the perspective of visual depth, driven by the human desire to experience the fusion of real and virtual spaces, displays are expanding beyond two-dimensional boundaries into mixed-reality spaces through AR, VR, 3D, and transparent displays.

These technological advancements must progress within ethical and sustainable boundaries, including privacy protection, energy efficiency, and the use of eco-friendly materials and manufacturing processes. These are essential conditions for displays to continue evolving responsibly into the future.

This presentation will explore how displays should evolve in the age of AI and the technological requirements necessary to enable this evolution.