



Augmented reality

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Augmented reality, also known as AR, is the addition of artificial visual, auditory, or other sensory information to the physical world, so that it appears to be part of the actual environment. AR additions to the environment are called *augmentations* or *annotations*.

Augmentations are usually [computer-generated graphics](#) or sounds that are three-dimensionally (3-D)*registered* with the real world. 3-D registration keeps the augmentation matched to the physical environment in real time, even as the user moves around.

People can experience AR through various display technologies. For example, special eyewear overlays information on top of the user's perception of the physical environment. [Smartphones](#) and tablets can act as devices through which the user can see a live image of the real world with augmentations added to it. Projectors can display imagery directly on top of real-world objects to give the appearance of different materials or moving parts. Additional display hardware is needed when other sensory information, such as sound or touch sensation, is part of an augmentation.

AR systems consist of several components. A *tracking component* determines the user's position and orientation within the physical environment. A *rendering component* creates the augmentation. A *registration component* and a *spatial world model* match up and align the augmentation with the physical environment.

In 1968, the American computer scientist Ivan Sutherland demonstrated the first AR system. It consisted of a head-mounted display suspended from the ceiling that allowed the wearer to see a virtual image superimposed on the room around them. Researchers at the [Boeing Company](#) coined the term "augmented reality" in the early 1990's, while describing a display used for aircraft assembly. Today, many smartphone apps use AR. AR is increasingly used in medical and industrial fields, and also has applications in architecture, tourism, education, entertainment, sports, and personal information management.

Contributor

- Tobias Höllerer, Ph.D., Professor, Computer Science Department, University of California, Santa Barbara.

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