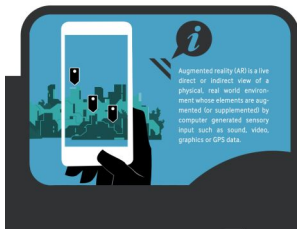
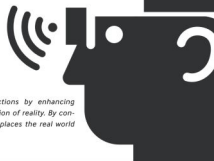


# WHAT IS

## AUGMENTED REALITY TECHNOLOGY?



Augmented reality (AR) is the direct or indirect view of a physical, real world environment whose elements are augmented or supplemented by computer generated sensory input such as sound, video, graphics or GPS data.



The technology functions by enhancing one's current perception of reality. By contrast, virtual reality replaces the real world with a simulated one.

With the help of advanced AR technology (e.g. adding computer vision and object recognition) the information about the surrounding real world of the user becomes interactive and digitally manipulable. This information can be virtual or real.

### HARDWARE

**Hardware components for augmented reality are:**  
**PROCESSOR, DISPLAY, SENSORS AND INPUT DEVICES.** Modern mobile computing devices like smartphones and tablet computers contain these elements which often include a camera and MEMS sensors such as accelerometer, GPS, and solid state compass, making them suitable AR platforms.

### DISPLAY

Various technologies are used in Augmented Reality rendering including optical projection systems, monitors, hand-held devices, and display systems worn on the human body.

### HEAD-MOUNTED DISPLAY (HMD)

It is a display device paired to the forehead such as a harness or helmet. HMDs place images of both the physical world and virtual objects over the user's field of view.

### HUD (HEAD-UP DISPLAY)

Near eye augmented reality devices can be used as portable head-up displays as they can show data, information, and images while the user views the real world. Many definitions of augmented reality define it as overlaying the information. This is basically what a head-up display does.

### CONTACT LENSES

Contact lenses that display AR imaging are in development. These Bionic contact lenses might contain the elements for display embedded into the lens including integrated circuitry, LEDs and an antenna for wireless communication.

### HANDHELD

Handheld displays use a small display that fits in a user's hand. All handheld AR solutions to date opt for video see-through. Initially handheld AR used field of views.

### TRACKING

Modern mobile augmented reality systems use one or more of the following tracking technologies: digital cameras and/or other optical sensors, accelerometers, GPS, gyroscopes, solid state compasses, RFID and wireless sensors.

### INPUT DEVICES

Techniques include speech recognition systems that translate a user's spoken words into computer instructions and gesture recognition systems that can interpret a user's body movements by visual detection or from sensors embedded in a peripheral device such as a wand, stylus, pointer, glove or other body wear.

### COMPUTER

The computer analyzes the sensed visual and other data to synthesize and position augmentations.

### SOFTWARE AND ALGORITHMS

A key measure of AR systems is how realistically they integrate augmentations with the real world. The software must derive real world coordinates, independent from the camera images. That process is called image registration which uses different methods of computer vision.

### AUGMENTED REALITY MARKUP LANGUAGE (ARML)

It is a data standard developed within the Open Geospatial Consortium which consists of an XML grammar to describe the location and appearance of virtual objects in the scene, as well as ECMAScript bindings to allow dynamic access to properties of virtual objects.

### AR DEVELOPMENT SDK

To enable rapid development of Augmented Reality Application, some software development kits (SDK) have emerged. A few SDK such as CloudRdAR leverage cloud computing for performance improvement. Some of the well known AR SDKs are offered by [Vuforia](#), [ARToolKit](#), [Cascades](#), [Crafter](#), [MobiStreet AR](#), [Wikitude](#), [Blippar Layer](#), etc.

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