AUGMENTED REALITY CONCEPTS

AR vs. virtual reality vs. mixed reality vs. extended reality

In the recent growth of types of virtual realities, it can be challenging to keep up because of their subtle differences. The types of digital realities are:

- **Augmented reality (AR)—** designed to add digital elements over real-world views with limited interaction.
- **Virtual reality (VR)—** immersive experiences helping to isolate users from the real world, usually via a headset device and headphones designed for such activities.
- **Mixed reality (MR)—** combining AR and VR elements so that digital objects can interact with the real world, means businesses can design elements anchored within a real environment.
- **Extended reality (XR)—** covering all types of technologies that enhance our senses, including the three types previously mentioned.

Types of Augmented Reality

In deciding which type of AR technology you'll need for your business, you'll first have to determine what kind of AR to use. There are two types of augmented reality: marker-based and marker-less. Choosing one of these types of AR will determine how you'll be able to display your images and information.

Marker-based AR is created using image recognition to identify objects already programmed into your AR device or application. When placing objects in view as points of reference, they can help your AR device determine the position and orientation of the camera. This is generally achieved by switching your camera to grayscale and detecting a marker to compare that marker with all the others in its information bank. Once your device finds a match, it uses that data to mathematically determine the pose and place the AR image in the right spot.

Marker-less AR is more complex as there's no point in which your device will focus on. Because of this, your device must recognise items as they appear in view. Using a recognition algorithm, the device will look for colours, patterns, and similar features to determine what that object is and then, using time, accelerometer, GPS, and compass information, it will orient itself and use a camera to overlay an image of whatever you'd like within your real-world surroundings.

Devices And Components Of AR

Kinect AR Camera:
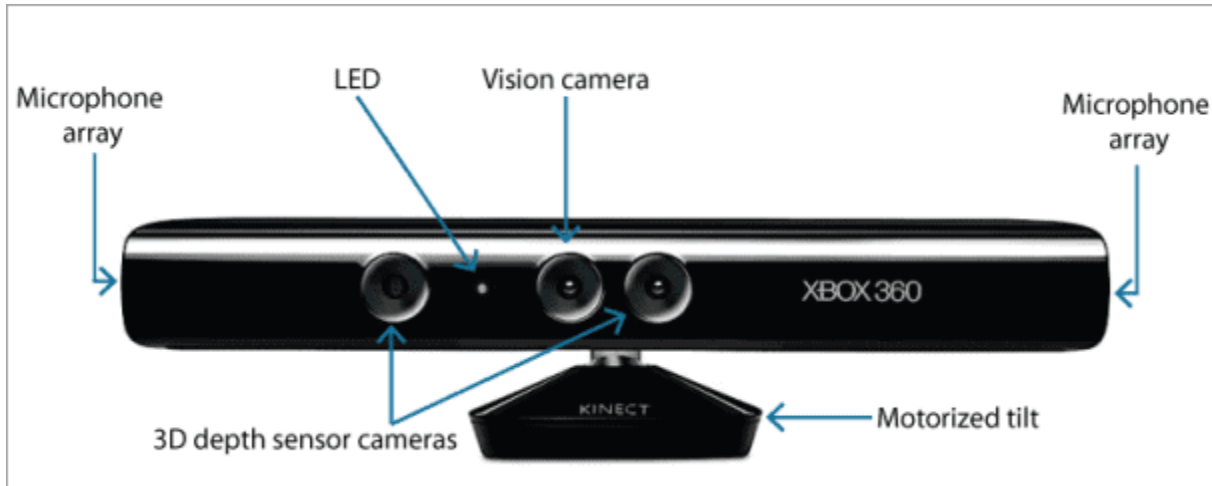
Cameras and sensors: This includes AR cameras or other cameras, for instance, on smartphones, take 3D images of real-world objects to send them for processing. Sensors collect data about the user's interaction with the app and virtual objects and send them for processing.

Processing devices: AR smartphones, computers, and special devices use graphics, GPUs, CPUs, flash memory, RAM, Bluetooth, WiFi, GPS, etc to process the 3D images and sensor signals. They may measure speed, angle, orientation, direction, etc.

Projector: AR projection involves projecting generated simulations on AR headset lenses or other surfaces for viewing. This employs a miniature projector.

Reflectors: Reflectors such as mirrors are used on AR devices to help human eyes to view virtual images. An array of small curved mirrors or double-sided mirrors can be used to reflect light to the AR camera and the user's eye, mostly to properly align the image.

Mobile devices: Modern smartphones are very applicable for AR because they contain integrated GPS, sensors, cameras, accelerometers, gyroscopes, digital compasses, displays, and GPU/CPUs. Further, AR apps can be installed on mobile devices for mobile AR experiences.