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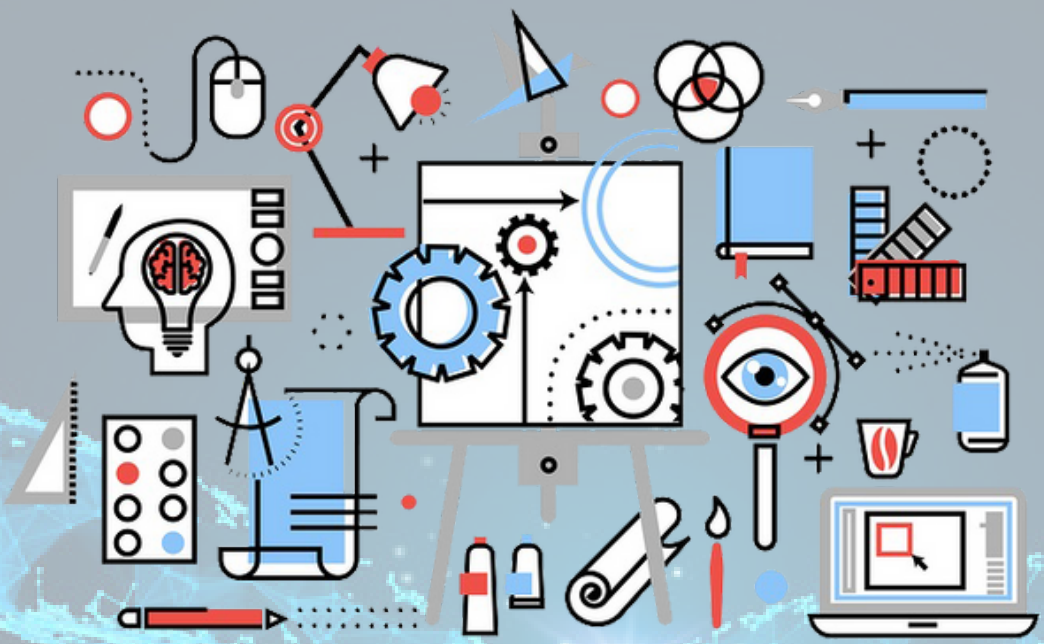

AR TUTORIAL#3

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Augmented Reality (AR) is a technology that blends digital content seamlessly with the real world. AR can be broadly categorized into two types: marker-based AR and markerless AR.

Marker-based Augmented Reality

Marker-based AR involves using specific visual markers, usually printed images or patterns, to trigger and anchor virtual content in the real world. These markers are detected and tracked by AR software to overlay digital information on top of them. Here's a step-by-step guide to implementing marker-based AR.

step 1: Choose an AR SDK(software development kit). some popular SDKs for marker-based AR.

- Vuforia: Supports iOS, Android and Unity. To use vuforia SDK visit the vuforia developer portal: https://developer.vuforia.com/
- ARToolkit: Open-source AR library that supports marker-based tracking and is compatible with multiple platforms. Offers feature like camera calibration, and OpenGL rendering. ARToolkit Documentation: https://ar.markers.ar/documentation/

- ARCore (Android) and ARKit (iOS): These SDKs provided by Google and Apple offer marker-based AR capabilities for Android and iOS devices. They are designed to work seamlessly with the native development environments of each platform.

ARCore Developer Documentation: https://developers.google.com/ar
ARKit Documentation: https://developer.apple.com/augmented-reality/

step 2:Design and Generate Markers,you can even create your custom markers.

step 3:Integrate the selected AR SDK into your development environment(we will be using Unity in our tutorial series). It involves loading and initializing the marker images and configuring the camera settings for marker detection.

Step 4: Create Virtual Content this includes 3D models, animations, videos or interactive elements, etc.

Step 5: Test and Refine.

Markerless Augmented Reality

Markerless AR, also known as location-based AR or SLAM (Simultaneous Localization and Mapping), enables virtual content to be placed in the real world without predefined markers. Instead, it uses the device's camera and sensors to detect and track the environment.

Step 1: Select an AR SDK.

ARCore (Android) and ARKit (iOS). resources are already shared for them.

Microsoft mixed reality: markerless AR using the Windows Mixed Reality platform.

Microsoft Mixed Reality Documentation: https://docs.microsoft.com/en-us/windows/mixed-reality/

Step 2:Set up the Environment

Integrate the chosen AR SDK into your development environment and set up the environment This involves enabling camera access, depth sensing (if supported), and motion tracking capabilities.

Step 3: Create Virtual Content

include 3D objects, animations, interactive elements

Step 4 : Test and refine.

Types of markers for marker-based AR

2D Markers: typically square or rectangular patterns printed on a flat surface. These markers contain a unique combination of black and white squares that help the AR software identify and track them.

Image Targets: specific images as triggers for AR content AR software analyzes the unique features and visual characteristics of the image to detect and track it. Image targets can be photographs, logos, or any other recognizable image.

3D Markers: 3D markers are physical objects designed with specific shapes and patterns These markers typically have multiple sides with unique visual features that the AR software can easily detect.

Natural Features: natural features in the environment, such as corners, edges, or distinct objects, can be used as markers. Natural feature tracking is a markerless approach that leverages computer vision algorithms and SLAM (Simultaneous Localization and Mapping) techniques.