The Only Resource You Will Need For Learning Extended Reality

Extended Reality Roadmap

- Extended Reality is a vast domain of immersive and spatial computing and can get really hard to find the best resources for learning Extended Reality. This repository compiles the best possible resources on XR out there, this is a very detailed and comprehensive roadmap with loads of amazing resources to learn from.

- It contains the best resources to learn Augmented Reality, Virtual Reality and Mixed Reality from scratch along with all the necessary tools such as Blender, Unity Engine, Vuforia, Spark AR, Lens Studio, AR Core and AR Foundation.

- This roadmap is designed in such a way that anyone who doesn't have any experience with developing softwares can start developing Augmented Reality, Virtual Reality and Mixed Reality applications without any extra hassle.

- The roadmap will help you get started with Extended Reality development by following a level based approach and it's recommended to everyone to go through the prerequisite content before hopping onto learning to develop XR Applications.

- It covers all the essential tools that a developer uses to develop their augmented reality experiences and launch them on PlayStore, AppStore, Instagram, Snapchat, etc.

Prerequisites

Topic	Resources
Fundamentals of Programming with C#	C# Fundamentals for Beginners, Learn C# in One Day and Learn It Well by Jamie Chan (Book), Learn C# From Microsoft
Fundamentals of Unity Engine	Unity 2022 Beginners Course, Unity Essentials by Unity Learn, Basics of Unity Engine

Topic	Resources
C# For Unity Engine	Beginner Friendly C# for Unity, Intermediate C# for Unity, Learning C# by Developing Games with Unity 2021 by Harrison Ferrone (Optional Book)

If you're new to C# and Unity, we highly recommend going through the prerequisites first. These resources cover all the necessary components related to C# scripting in Unity and will help you get up to speed quickly. By mastering these fundamentals, you'll have a solid foundation to build on as you explore more advanced topics in Unity development. So take your time and enjoy the learning process!

Now that we have completed the prerequisites, it's time to dive into the exciting world of Augmented Reality, Virtual Reality, and Mixed Reality. You can start learning the fundamental concepts of these technologies in-depth, and explore the endless possibilities they offer. It's an exciting journey, and we hope you enjoy every step of it!

Level One: Fundamentals of Extended Reality and Best Practices

Topic	Resources
Fundamentals of Extended Reality	Fundamentals of Extended Reality, Introduction to AR/VR/MR/XR: Technologies, Applications and Issues
Fundamentals of Mixed Reality	What is Mixed Reality, What are Holograms, Types of Mixed Reality Applications
Designing XR Applications	XR Design Process, Design Thinking Ethics and Guidelines, UX Design Principles for Augmented Reality, Designing VR Applications
Best Practices for Developing & Designing XR Applications	Designing AR Applications by Google'18, Things to know while creating XR Applications, AR Best Practices, Designing AR Applications by Google'19

MANDATORY: XR Development Pipeline

For anyone learning to develop and deploy Augmented Reality applications, it's highly recommended to follow a proper pipeline. This helps ensure a smooth and efficient development process, and improves the overall quality of the final product. It's a good idea to use this pipeline as a guide whenever working on XR projects, as it can save you time and help you avoid potential issues down the line.

Topic	Resources
Extended Reality Development Pipeline	XR Development Pipeline, XR Development Pipeline Structure

Level Two: Developing Markerbased Augmented Reality Applications with Vuforia Engine

Topic	Resources
Introduction to Markerbased Augmented Reality	Markerbased AR in Depth, Theory and Applications of Markerbased Augmented Reality (Optional but really beneficial)
Introduction to Vuforia Engine	Fundamentals of Vuforia Engine, Getting Started with Vuforia
Multiple Image Tracking	Multi Image Tracking with Vuforia, Vuforia Simultaneous Tracking
Vuforia Virtual Buttons	Theory & Implementation Virtual Buttons, Best Practices, Configuration and Implementation of Virtual Buttons

If you're looking to develop Augmented Reality (AR) applications using Vuforia and Unity Engine, it's important to start with the basics and follow best practices. Developing AR apps using Vuforia and Unity with a proper development pipeline can help you gain a solid foundation and understanding of the tools involved. This will make it easier to transition to more advanced Markerless AR development in the future and help you create better AR experiences overall.

Level Three: Developing Markerless Augmented Reality Applications with AR Foundation

Topic	Resources
Introduction to AR Foundation and AR Core	Getting Started with AR Foundation and AR Core (Documentation) , More About AR Foundation (Documentation)
Core Concepts of AR Core	Fundamentals of ARCore
UX Design Principles of ARCore	User Experience Design Guidelines for Augmented Reality
Setup AR Foundation and AR Core	Setup AR Foundation and AR Core for Markerless Augmented Reality Development with Unity Engine

To ensure a smooth build process for AR Core applications in Unity Engine, it is recommended to use the IL2CPP scripting backend instead of Mono. Additionally, make sure to enable ARM64 support for supporting 64Bit Architecture for your target platform. This will help avoid any potential errors during the build process.

Topic	Resources

Topic	Resources
Plane Tracking in AR Foundation	Configuring Plane Detection and Tracking (Video), AR Plane Manager (Documentation)
Ray Casting & Place Objects in AR	Object Placement with Raycasting (Video), AR Raycast Manager (Documentation)
Multiple Object Placement	Multiple Object Placement with Raycasting (Video), AR Raycast Manager (Documentation)
Augmented Faces and Face Tracking	Introduction to Augmented Faces (Documentation), Tracking Faces with AR Foundation (Article), AR Face Tracking (Documentation)
Image Tracking	Image Tracking with AR Foundation (Video), Augmented Images (Documentation), AR Tracked Image Manager (Documentation)
Light Estimation	Introduction to Light Estimation (Article), Integrating Light Estimation with AR Foundation (Documentation), Implementation of Light Estimation (Code)
Realtime Occlusion	What is Occlusion? Why Does it Matter?, AR Occlusion Manager,Integrate Realtime Environment Occlusion with AR Foundation, Integrate Human Occlusion with AR Foundation (Only Works on iPhone's with ARKit)
AR Anchors	Fundamentals of Anchors, AR Anchor Manager, AR Anchor Manager, Implement Local AR Anchors, Persistant Cloud AR Anchors, Implement Cloud AR Anchors,

A great way to learn about tools and mechanisms is to build micro-projects yourself. It's recommended for everyone to try this approach as it offers a hands-on learning experience. By working on small projects, you can gain a better understanding of how these tools and mechanisms work and improve your skills.

Level Four: Build with Lightship ARDK

Topic	Resources
Integrate Lightship ARDK with Unity	Getting Started with Lightship ARDK, Install Lightship ARDK
Deploy ARDK Applications to Android/iOS	Build ARDK for Android Systems, Install Lightship ARDK