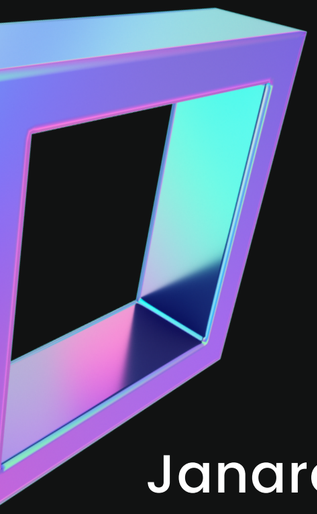
3-D DIGITAL OUTFIT USING AUGMENTED REALITY

Using Unreal and AR Core



By
Janardhan Piyush Sarthak Tanmay

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Problem Statement

MANY FASHION INDUSTRIES HAS MOVED TOWARDS SEMI OR COMPLETE ONLINE MODE DURING THE PANDEMIC,

BUT FINANCIALS REFLECT PEOPLE ARE STILL TO ACCEPT THE TRANSITION(EX: BIRLA'S FASHION LINE UP)

MANY USERS ARE NOT YET COMFORTABLE PURCHASING OUTFITS ONLINE BECAUSE OF VARIOUS REASONS

ONE OF THE MAJOR REASONS BEING USERS UNABLE TO UNDERSTAND THE "FIT OR SHAPE" OF THE APPAREL

Objective/ Proposed Solution

HELPING USERUNDERSTAND VARIOUS
DETAILS NOT CAPTURED IN A 2D PHOTO

DISPLAYING “OUTFITS” IN “3D” FORMAT
USING AR

BUILDING UP CONFIDENCE IN USER TO
MAKE A DECISION

04 WHAT IS AUGMENTED REALITY

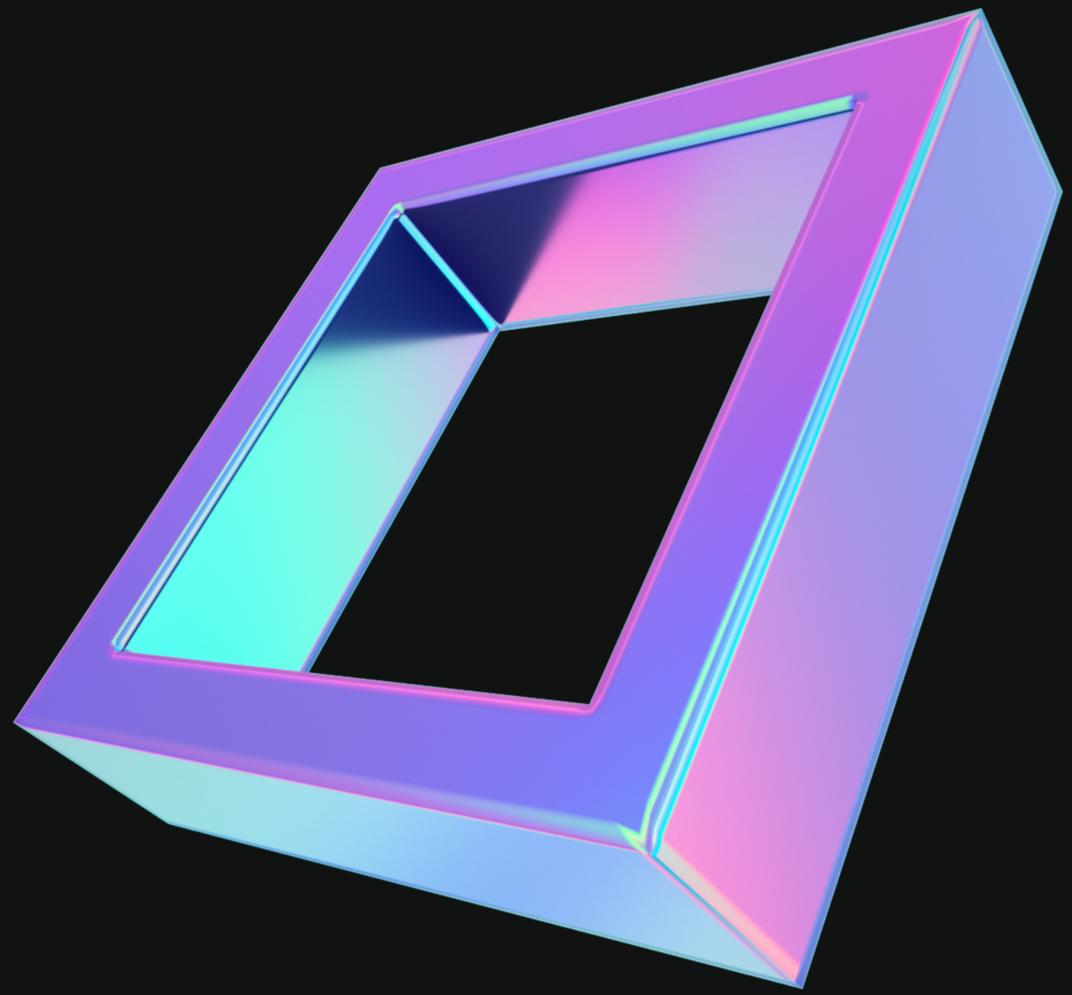
AUGMENTED REALITY(AR) IS A FIELD OF COMPUTER RESEARCH THAT DEALS WITH THE COMBINATION OF THE REAL-WORLD AND VIRTUAL OBJECTS.

Architecture Breakdown

- UNREAL ENGINE (UE_4.26)
- AR CORE
- FewOtherAndroid SDKs(For Packaging)

What is Unreal Engine 4?

SIMULATION OR REAL-TIME DESIGN: IN FACT NASA, MCLAREN, AND MICROSOFT AIRSIM (OPEN SOURCE, HOSTED ON GITHUB) UTILIZE UNREAL ENGINE 4



UE4 Tools and Editors Used

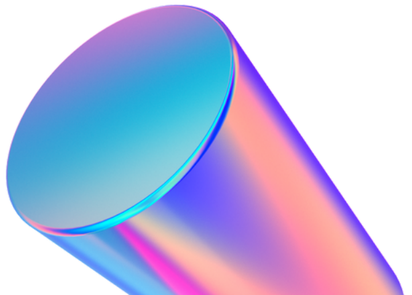
Level Editor
Material Editor
Blueprint Editor
UMG UI Editor
Sound Cue Editor
Physics Asset Tool Editor
Static Mesh Editor
Media Player Editor
Behavior Tree Editor*

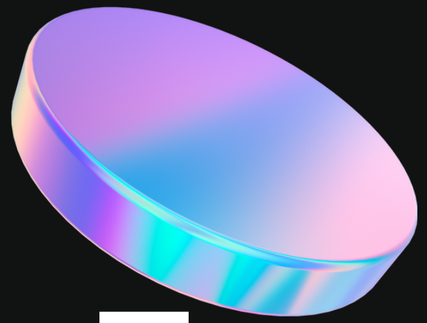
08

UNREAL'S BLUEPRINT VISUAL SCRIPTING SYSTEM

Instead of writing lines of code by a traditional programmer, Blueprint provides a way of scripting those some lines of code in a visual manner by connecting a series of nodes that have some functionality attached to them in order to create the same functionality that was traditionally only available to programmers

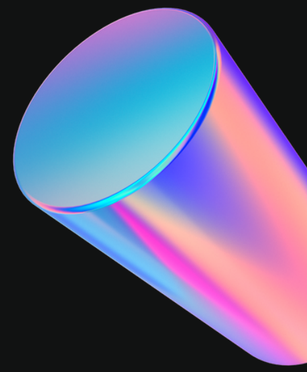
In many ways Blueprint works identically to writing code, the only difference is Blueprint allows scripting in a more visual way by connecting nodes instead of writing lines of code

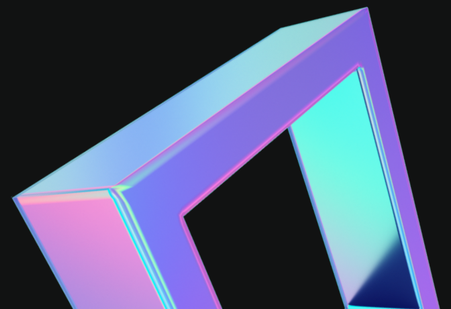


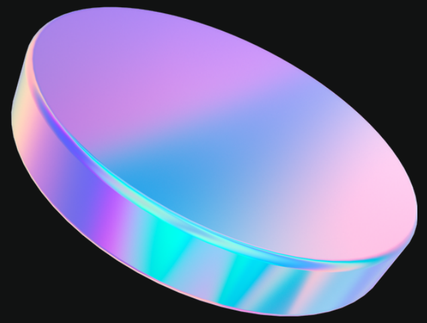


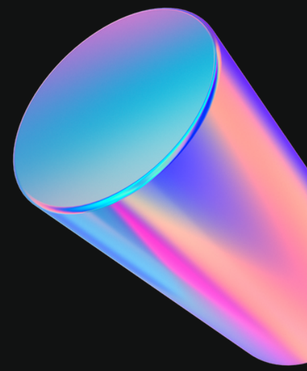
Types of Blueprints Used

- Blueprint Class
- Data-Only Blueprint
- Level Blueprint
- Blueprint Interface
- Blueprint Utility (a.k.a. Blutility)



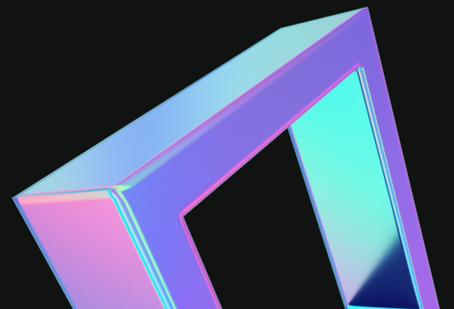




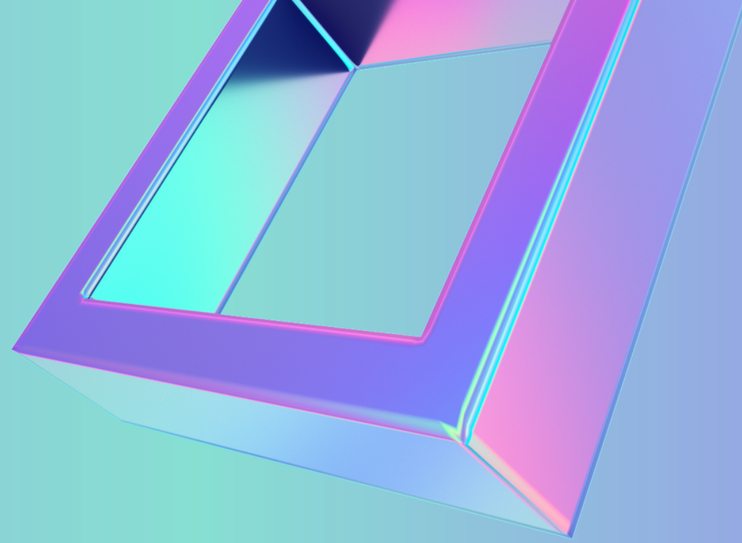


Blueprint Anatomy (Functionalities)

- Components Window
- Construction Script
- Event Graph
- Functions
- Variables



A perfect mix: C++ and Blueprints



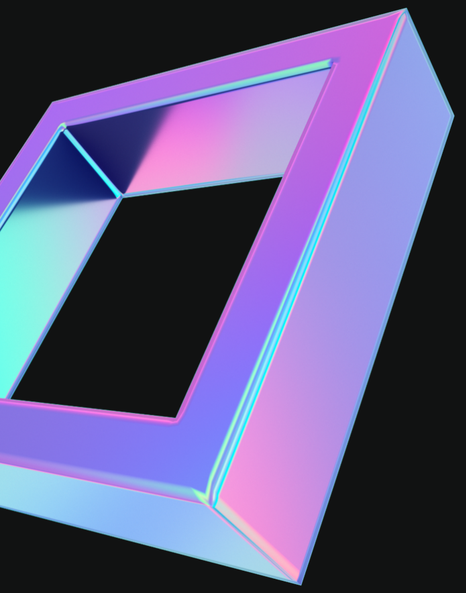
SUITABLE FOR LOGIC

C++ Classes
Blueprint Classes
Custom Systems (e.g UE4 Materials Editor, Sequencer Tracks, and Behavior Trees)

SUITABLE FOR DATA

C++ Classes
Blueprint Classes
For Data you have more options than C++ and Blueprints: Config Files, Data Assets Placed, Instances,(e.g. Save Games)

IN THE REAL WORLD, A MID TO LARGE-SCALE PROJECT USES A BALANCED DOSE OF EACH. IN FACT, C++ AND BLUEPRINTS ARE TIGHTLY COUPLED IN UNREAL ENGINE 4.

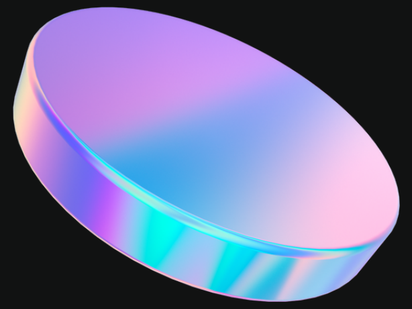


What is AR Core

PowerfulAR API for Android

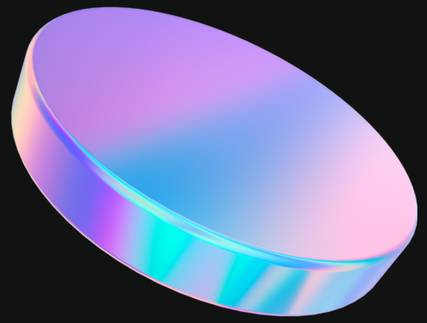
ARCore is a platform, developed by Google, for building augmented reality apps on Android.

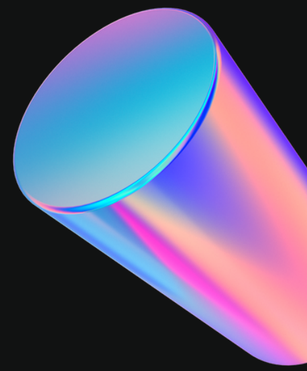
ARCore use concurrent odometry and mapping (COM) technology to understand where the phone is relative to the world around it.



Application of AR Core

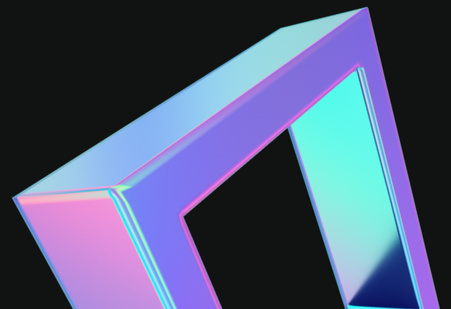
- Motion Tracking
- Environmental Understanding
- Light Estimation
- Seeing the Size/Shape of Objects in the Real World





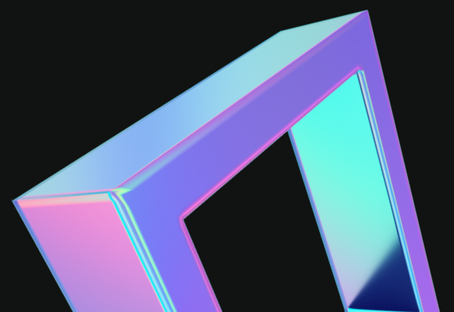
Advantages of AR Core

- No Special Hardware Needed
- Usable with Unity and Unreal
- Incredibly Active Github
- No Associated Simulator Sickness



Limitations of AR Core

- No Texture Surfaces
- Reflective Surfaces
- Limited to Certain Android Models



Completion Status

DONE

Image Tracking(AR Core + UE)

3D mannequin models for Apparels(Blender + Daz3D)

IN PROGRESS

TextureDesign(Substance Painter)

Rigging of Mannequin(Blender + Daz3D)

PENDING

Platform Detection(AR Core + UE)

Apparel Designing(Blender)

Completion Status

Image Tracking

Completion Status

3D mannequin models for Apparels

Final Mannequin not decided

Tentative Mannequin final LOD depends on compatibility

HCI Principles

- Reduce Memory Load

  Implemented By Simple and minimalist UI

- Reversal Of Action Or Error

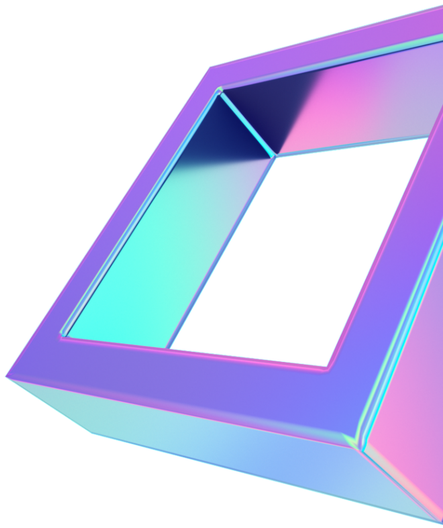
  Implemented By Undo or "Go-Back" Feature

- Naturalness

  Naturalness in UI can be bought by higher LOD in Models

Literature Survey

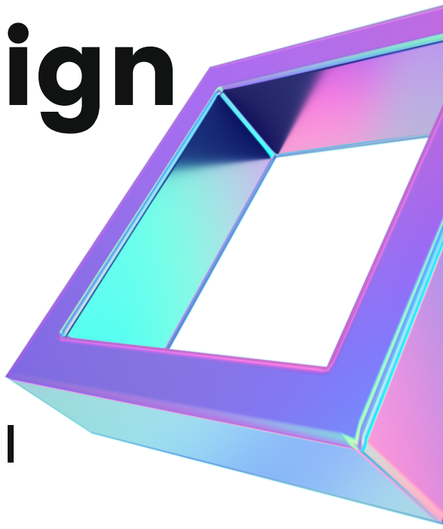
21 AR &AR in Fashion Industry



Fashion Merchandising: An Augmented Reality:
https://academicworks.cuny.edu/cgi/viewcontent.cgi?article=4195&context=gc_etds

THE INFLUENCE OF AUGMENTED REALITY (AR)
https://archives.palarch.nl/index.php/jae/article/download/6100/5990

22 Documentation about game design and development in general



The Art of Game Design: A Book of Lenses 2nd Edition by Jesse Schell

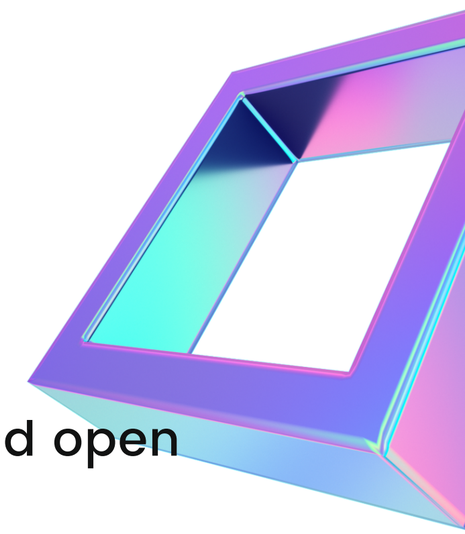
Level Up! The Guide to Great Video Game Design by Scott Rogers

How Games Move US: Emotion by Design by Katherine Isbister - https://mitpress.mit.edu/books/how-games-move-us

Amnesia Fortnight (2012, 2014, 2017) by Double Fine in conjunction with Humble Bundle - https://www.doublefine.com/fortnight

Blender 3D: Noob to Pro a featured book on Wikibooks and shared effort by numerous artists, authors, and editors in order to get familiarized with 3D content creation using free and open-source tool Blender 3D

23 Resources about hardcore game development (technical)



Game Engine Architecture, Third Edition by Jason Gregory https://www.gameenginebook.com/

The Nature of Code: Simulating Natural Systems with Processing free and open sourcebook by Daniel Shiffman https://natureofcode.com/

Handmade Hero series by Casey Muratori https://handmadehero.org/

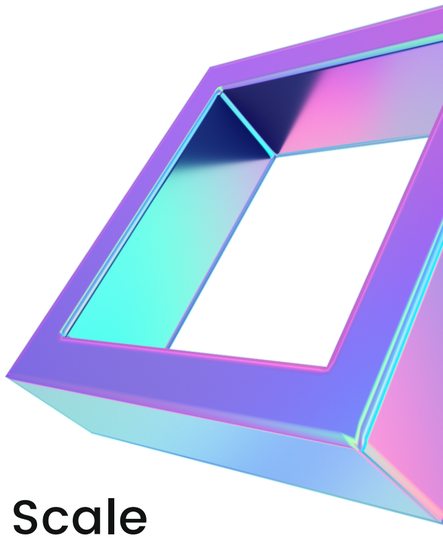
ThinMatrix - https://www.youtube.com/user/ThinMatrix

Thebennybox - https://www.youtube.com/user/thebennybox

edX Computer Graphics Course from The University of California, San Diego - https://www.edx.org/course/computer-graphics

Math for Game Developers by Jorge Rodriguez - https://www.youtube.com/playlist?list=PLW3Zl3wyJwWOpdhYedlD-yCB7WQoHf-My

24 AR Core References



Google Developers. "Introducing ARCore: Augmented Reality at Android Scale (GDD Europe '17)." Youtube, 5Sept. 2017, https://www.youtube.com/watch?v=rFbcOGuDMPk.

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THANK YOU