

CREATE WEB-BASED AR

BUILDING AUGMENTED
EXPERIENCES WITHOUT
CODE USING GEENEE



SCAN HERE



FOR ENGAGING
AUGMENTED REALITY
EXPERIENCE

TS. UMMU HANI YUSOF & DIANA JAIS

CREATE WEB-BASED AR

**BUILDING AUGMENTED
EXPERIENCES WITHOUT
CODE USING GEENE**



TS. UMMU HANI YUSOF & DIANA JAIS

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PREFACE



Have you ever wanted to create something using Augmented Reality (AR) but felt it was too hard or needed coding skills? Don't worry you're not alone. That's exactly why I wrote this book. In this ebook, you'll learn how to create Web-based AR (WebAR) experiences using Geenee, a fun and easy tool that doesn't need any coding. You'll learn step by step how to build your own interactive AR project like an eBook that comes to life with videos, sounds, 3D models, and more.

Whether you're a student, teacher, content creator, or just someone who's curious about AR, this book is made for you. You don't need to be an expert. You just need to be willing to explore, try new things, and have fun while learning.

This book also use in Diploma in Games Art Technology. The related course and learning outcomes as follow;

COURSE NAME : DGA40213 EXTENDED REALITY DEVELOPMENT

Extended Reality Development provides encapsulates Augmented Reality (AR), Virtual Reality (VR), Mixed Reality (MR), and everything in between. Although AR and VR offer a wide range of revolutionary experiences, the same underlying technologies are powering XR. Students will describe types of extended reality and construct content game using extended reality. Student also will perform project using extended reality technology related to industry fields.

COURSE LEARNING OUTCOME

CLO1 : describe types of extended reality development and its usage in the industry (C3 , PLO 1)

CLO2 : construct contents for Extended Reality using suitable software (P3 , PLO 2)

CLO3 : perform project using extended reality technology related to industry fields (P4 , PLO 2)

**“HOPE THIS GUIDE GIVES YOU THE
CONFIDENCE TO START CREATING WITH
AR AND BRINGS YOUR IDEAS TO LIFE IN
EXCITING
NEW WAYS”**

TS. UMMU HANI YUSOF
Writer





E-BOOK GUIDE

This e-Book has been enhanced with **Augmented Reality (AR)** content. To enjoy the full experience, a few simple steps should be followed.

What You Need

- A smartphone or tablet with internet connection
- A web browser (e.g., Chrome or Safari)
- A camera-enabled device
- This eBook (on screen)

How to View AR Content

- Look for the AR icon on pages throughout the eBook.
- These icons show that AR content has been embedded.
- A QR code or marker image will be found near the icon.
- This image or code is used to activate the AR experience.
- Use your smartphone or tablet to scan the QR code.
- The link will open automatically in your web browser.
- Allow camera access when prompted.
- The AR experience will not work without it.
- Point your camera at the marker image on the page.
- The AR content (such as a 3D model or animation) will appear on your screen.
- Interact with the content if buttons or sounds are included.

Tips for Best Experience

- Make sure the page or screen is well-lit.
- Keep the marker image in full view of the camera.
- Hold the device steady while scanning.
- Use landscape mode if the model is too large.

Troubleshooting

- If nothing appears, try refreshing the browser.
- Make sure camera permission is enabled.
- Scan the marker from a proper distance (30–50 cm).

SCAN HERE



FOR ENGAGING
AUGMENTED REALITY
EXPERIENCE



INTRODUCTION TO AUGMENTED REALITY



▶ WHAT IS AUGMENTED REALITY?

Augmented Reality (AR) is a technology that integrates digital elements such as images, animations, audio, and interactive data into the real world in real time through mobile devices or head-mounted displays. It allows users to see and interact with virtual objects as if they were part of their physical environment.

Common uses of AR are seen in apps where filters are applied to faces, furniture is previewed in rooms, or virtual creatures are captured during gameplay.

According to Li et al. (2025) and Zuo et al. (2025), AR significantly enhances student motivation, engagement, and comprehension of abstract concepts. Geroimenko (2020), in *Augmented Reality in Education* (Springer), describes AR as a transformative educational technology that bridges the gap between theory and hands-on application.





TYPES OF AUGMENTED REALITY

Augmented Reality (AR) technologies are categorized based on how virtual content is triggered and displayed. These technologies are used in different ways depending on the device, purpose, and user experience intended. Each type is described below:

MARKER-BASED AR

Marker-Based Augmented Reality (AR), also known as image recognition AR, is activated when a camera scans a specific visual marker—typically an image, icon, or QR code. Once the system detects and recognizes the marker, it instantly overlays digital content such as 3D models, animations, or videos onto the real-world view in real time.

This type of AR is widely used in educational and promotional settings due to its simplicity and reliability. Common applications include interactive flashcards, AR-enabled posters, museum exhibits, and printed materials such as textbooks and eBooks. By enriching static images with dynamic content, marker-based AR enhances user engagement and makes information more visually compelling.

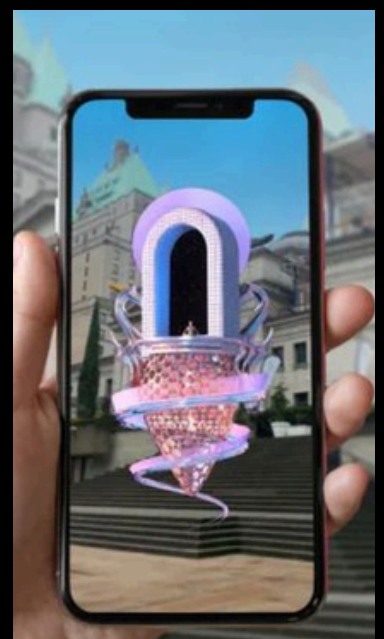
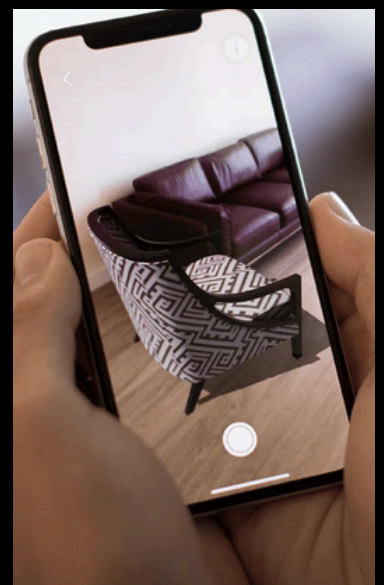




MARKERLESS AR

Markerless AR, also known as marker-free AR, overlays digital content onto the physical world without the need for predefined markers. Zuo et al. (2025) highlight its growing role in geography and outdoor history lessons, encouraging exploratory and kinesthetic learning. Markerless AR is described as ideal for mobile STEM activities because it frees students from screen-bound interaction.

One of the key advantages of markerless AR is its flexibility. It provides a seamless and immersive experience by integrating digital elements into the user's real-world surroundings. Since it doesn't rely on fixed markers, it can be used in various indoor and outdoor environments, depending on the capabilities of the device's sensors. However, markerless AR also presents some challenges. Its accuracy depends heavily on the quality of sensors, which can be affected by environmental conditions like poor lighting or uneven surfaces. Prolonged use may drain device batteries quickly, and the collection of location and sensor data raises concerns about user privacy and data protection.

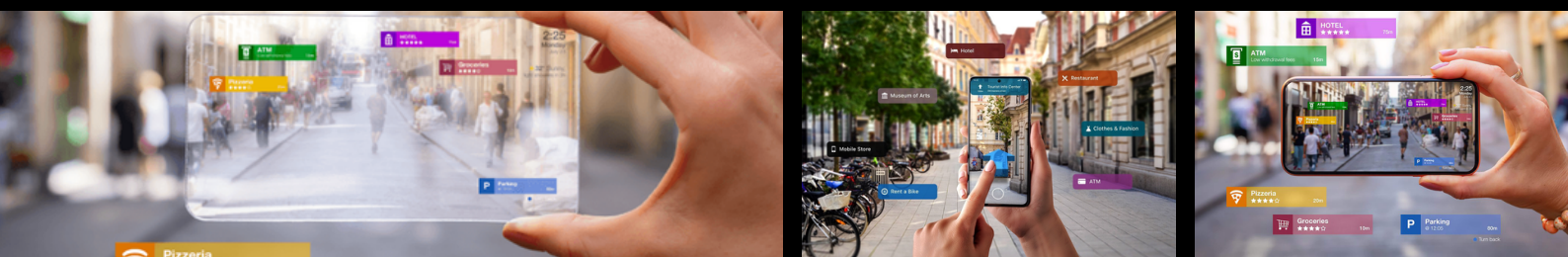




LOCATION-BASED AR / GEO AR

Location-based Augmented Reality (AR), also referred to as markerless AR or SLAM-based AR (Simultaneous Localization and Mapping), overlays digital content onto the physical world without requiring predefined markers. Instead, it uses the device's GPS, camera, and motion sensors to determine the user's position and orientation in real time. Popular applications like Pokémon Go use this technology to place virtual characters in real-world settings, while AR-enhanced tourism guides create interactive experiences at historical sites and landmarks.

One of the main advantages of location-based AR is its ability to provide immersive and context-aware experiences by integrating digital content directly into the user's physical environment. This makes it highly versatile, as it can be used both indoors and outdoors depending on the capabilities of the device's sensors. However, its effectiveness depends heavily on the accuracy of the sensors, which can be influenced by environmental conditions such as poor lighting or weak GPS signals. Additionally, continuous use of sensors and cameras can lead to increased battery consumption.





PROJECTION-BASED AR

Projection-Based Augmented Reality (AR) involves projecting digital visuals directly onto physical surfaces using projectors or lasers, allowing users to interact through touch, gestures, or movement. Unlike traditional AR, which requires handheld or wearable devices, projection-based AR delivers immersive interactions without personal screens (Nee & Ong, 2023).

This form of AR works by using projectors to display content onto surfaces such as tables, floors, or walls. Sensors, including infrared and depth cameras, track user movements and gestures, enabling the system to detect and respond in real time. As users engage with the projected elements, the digital content adjusts dynamically, offering a seamless and highly interactive experience (Geroimenko, 2020).

Projection-based AR is increasingly used in interactive museum installations, allowing visitors to trigger responses by touching or moving around exhibits. Virtual keyboards projected onto desks enable typing without physical hardware. AR Sandboxes, developed for education, use depth-sensing and projection to simulate topography in real time, helping students explore concepts in geography and earth sciences (Wang, Ryoo, & Winkelmann, 2023).

The advantages of projection-based AR include hands-free operation, intuitive interactions, and support for collaborative experiences. It can be applied in diverse settings, particularly in education, public spaces, and exhibitions. However, its limitations include the need for controlled lighting, flat reflective surfaces, and complex setup involving projector alignment and sensor calibration (Nee & Ong, 2023).



AR PLATFORM

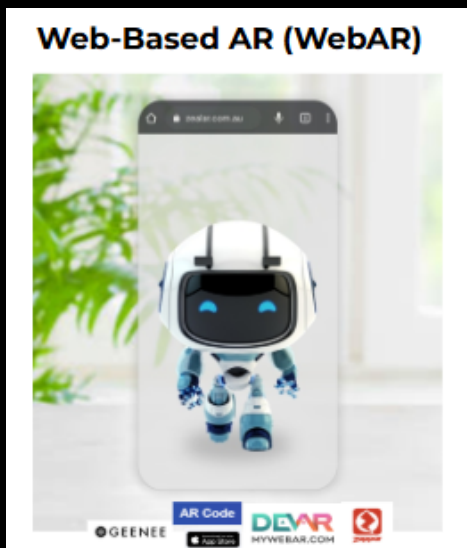
Augmented Reality (AR) can be experienced through different platforms. These platforms are usually divided into two main types: Web-Based AR and Application-Based AR. Both are used to display AR content, but they work in different ways and serve different needs.

WEB-BASED AR

- Runs in a web browser (Chrome, Safari, Firefox, etc.)
- No app installation needed; instant access via a URL
- Best for Quick AR experiences, marketing campaigns, product previews

APPLICATION-BASED AR

- Requires users to download and install an app.
- Needs storage space and installation process
- Best for Gaming, industrial applications, complex AR projects





AR ENGINES AND DEVICES

Augmented Reality (AR) can be experienced through various types of devices. These devices are used to display digital content in the real world. Depending on the technology, different levels of interaction and realism can be achieved. AR devices are generally grouped into three main categories, such as Mobile devices, Smart glasses/headsets, Projection systems

Augmented Reality Engines

[Web-Based, No Programming Required]

[Web-Based, Programming Required]

[Not WebAR, Programming Required]



AR IN EDUCATION



A growing body of evidence from recent academic journals and books indicates that Augmented Reality (AR) has a significant positive impact on various aspects of learning. In terms of student motivation and engagement, Li et al. (2025) reported a notable increase in student interest when AR is integrated into learning activities. Additionally, a Routledge publication (2020) highlighted how AR helps reduce accessibility gaps and supports inclusive education.

AR also enhances the visualization of abstract concepts, making it easier for students to grasp complex ideas. A meta-analysis by Zhang et al. (2022) on AR in K–12 education revealed a large effect size in improving conceptual understanding. This is further supported by case studies, such as the use of marker-based AR in science education (Chaipidech et al., 2024). For example, students in science classes can explore 3D models of human organs to better understand anatomy, while in history lessons, they can immerse themselves in reconstructed historical environments. AR also enables students to conduct virtual experiments without the need for physical tools, making science education safer and more accessible.

In the development of 21st-century skills, the book *Cross Reality (XR) and Immersive Learning Environments* by Wang et al. (2024) states that AR and XR foster collaboration, critical thinking, and creativity, especially in STEM-based projects. By engaging multiple senses and encouraging active participation, AR supports more effective knowledge retention. Overall, this technology transforms traditional classrooms into dynamic, interactive learning spaces that promote curiosity, deeper understanding, and learner autonomy.





STEP BY STEP AR EBOOK DEVELOPMENT



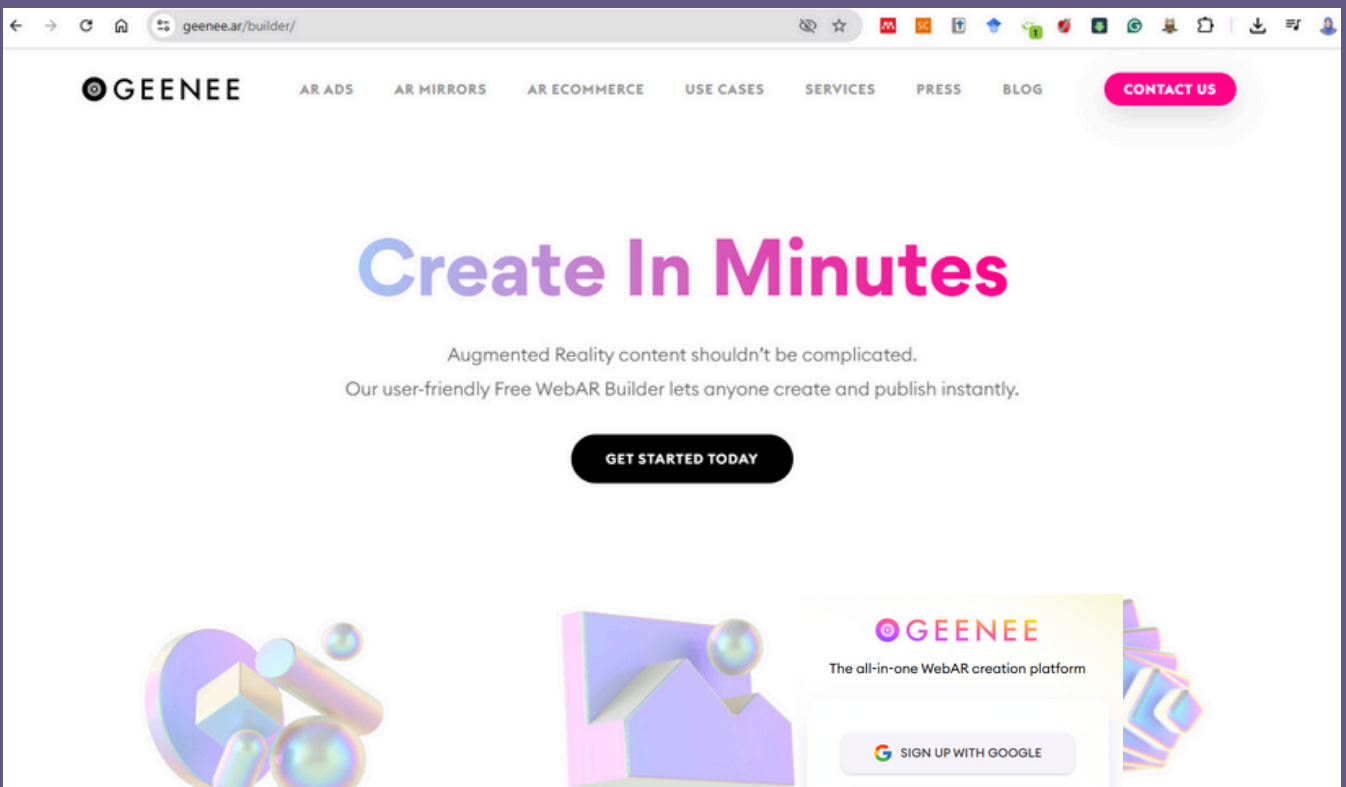
1 Prepare Your Assets

Before using Geenee, prepare the materials you want to include in your AR eBook:

- Images or pages from your eBook (JPG or PNG)
- 3D models (GLB or GLTF format)
- Videos (MP4)
- Audio (MP3 for voiceovers or sound effects)
- Any URLs you want to link (e.g. websites, YouTube, Google Forms)

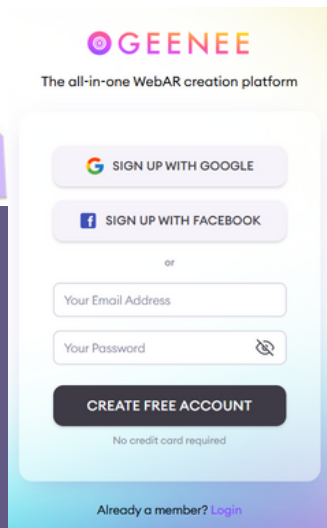
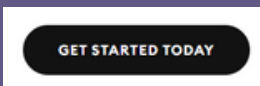
2 Log In to Geenee Studio

Visit <https://geenee.ar/builder/>



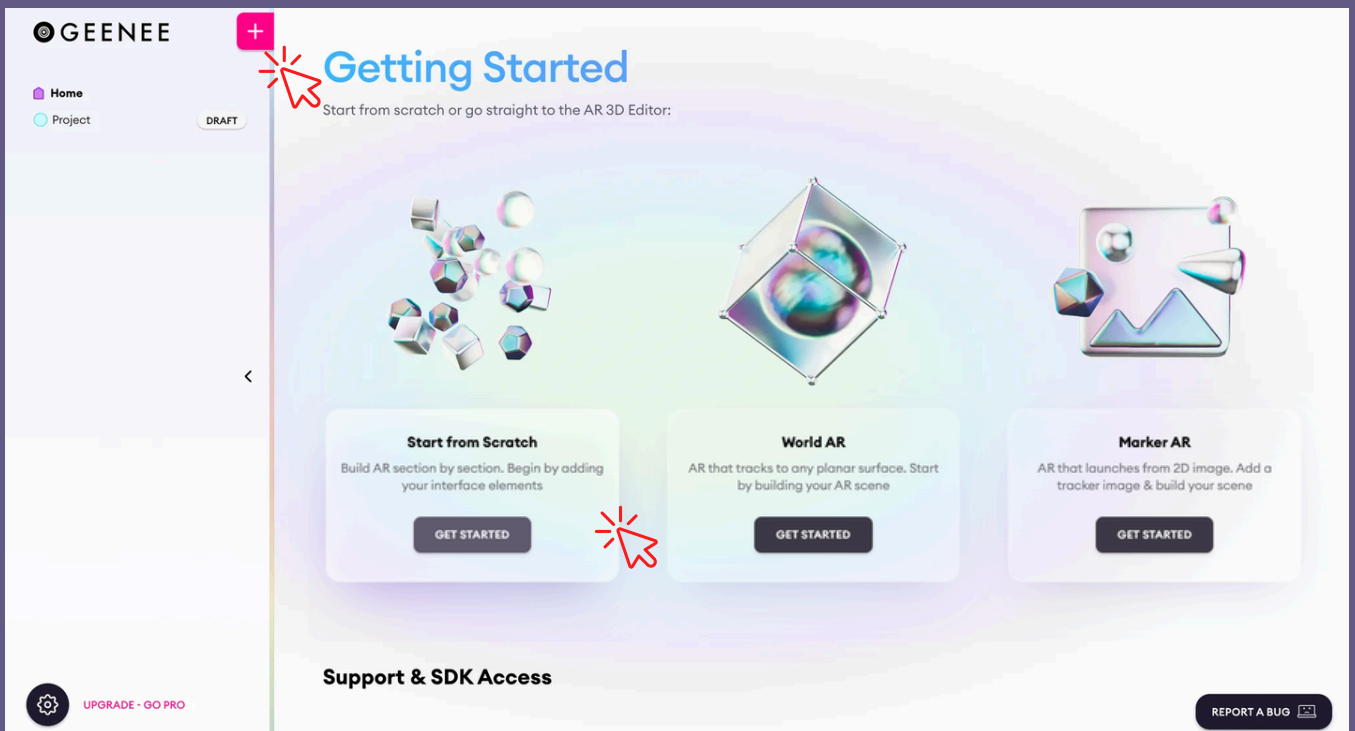
3 Click Get Started Today

4. Sign up with Google

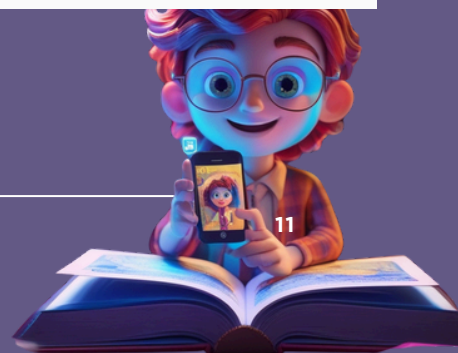
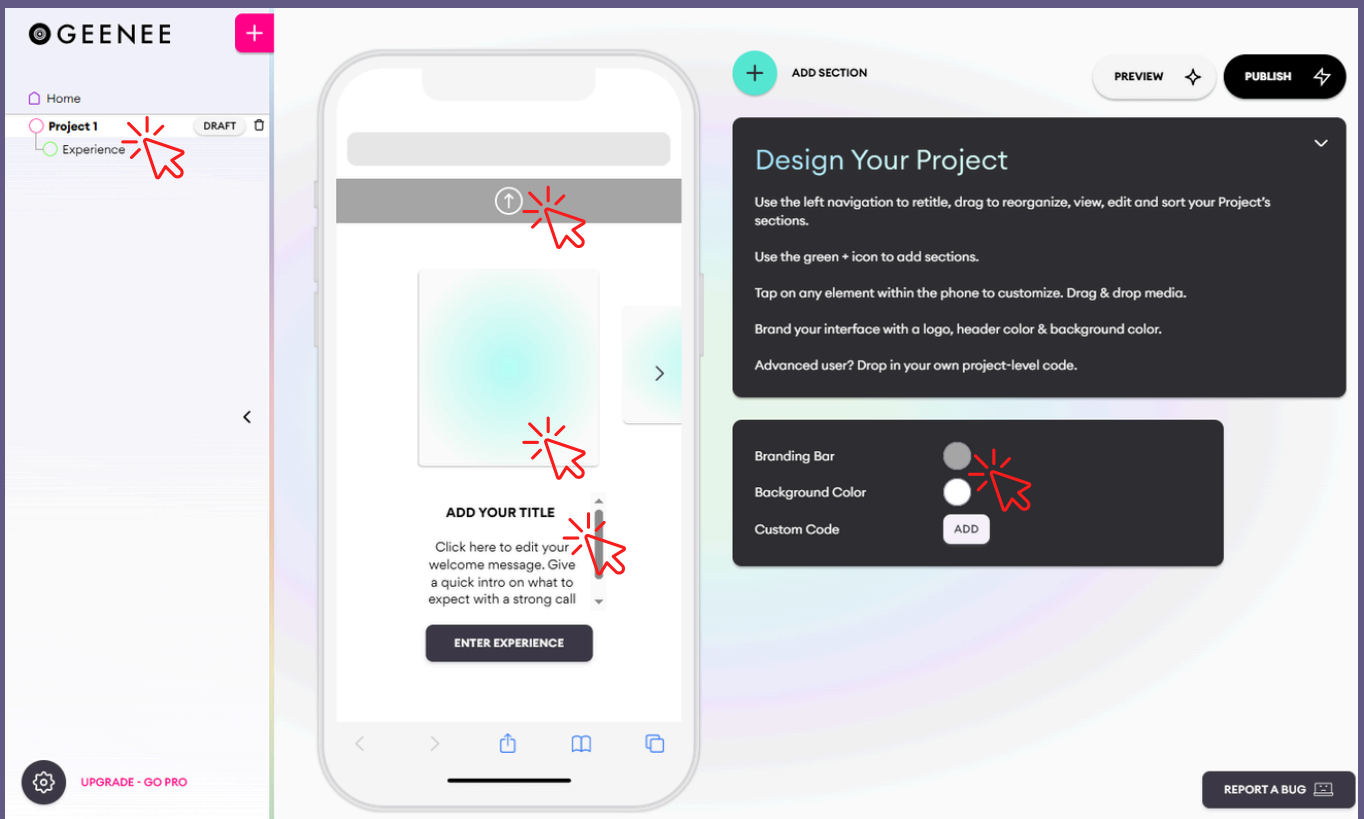




1 Click button to start or choose Start from Scratch



2 Rename and Design your interface.



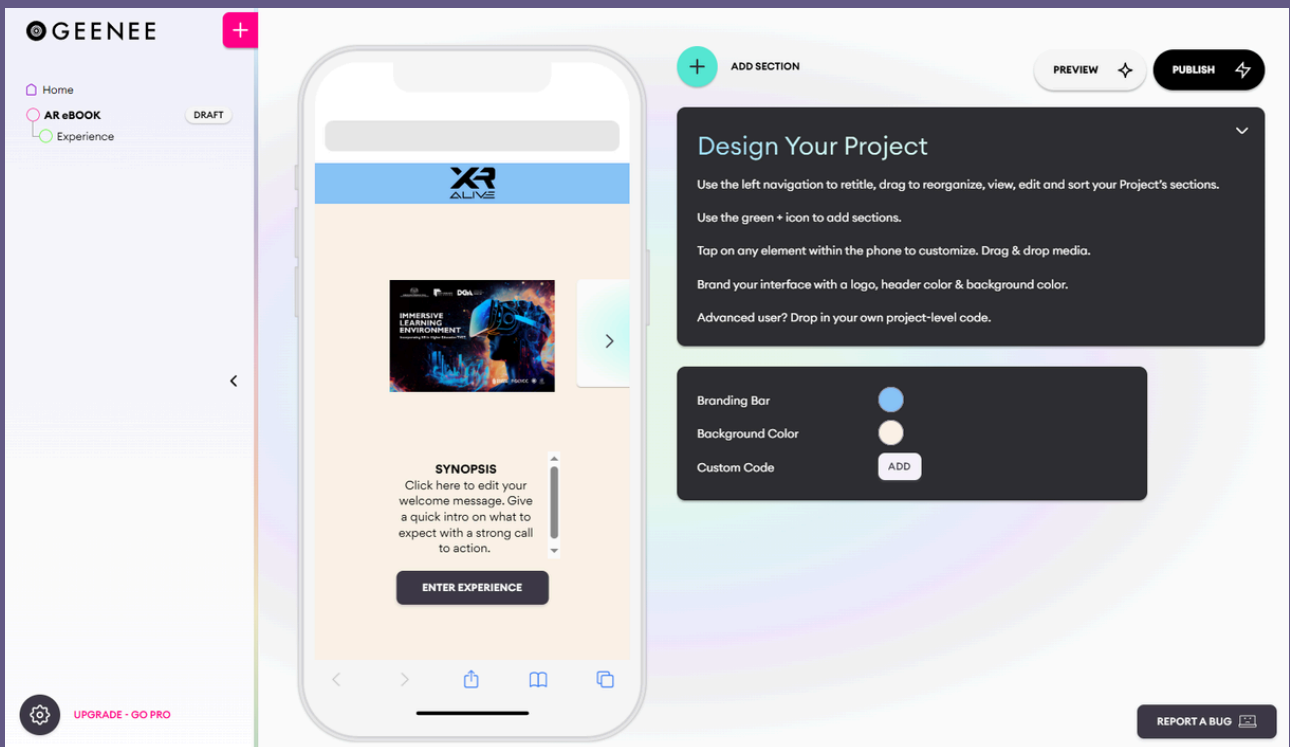


2 NAME YOUR PROJECT

Rename Project 1 to your own project name (e.g. "AR eBook")

Customize this page by:

- i. Change color of your Branding Bar and Background.
- ii. Add Logo on your Branding Bar.
- iii. Add Cover Image.
- iv. Add a title and add Welcome Message, Quick Intro or Synopsis of your project.





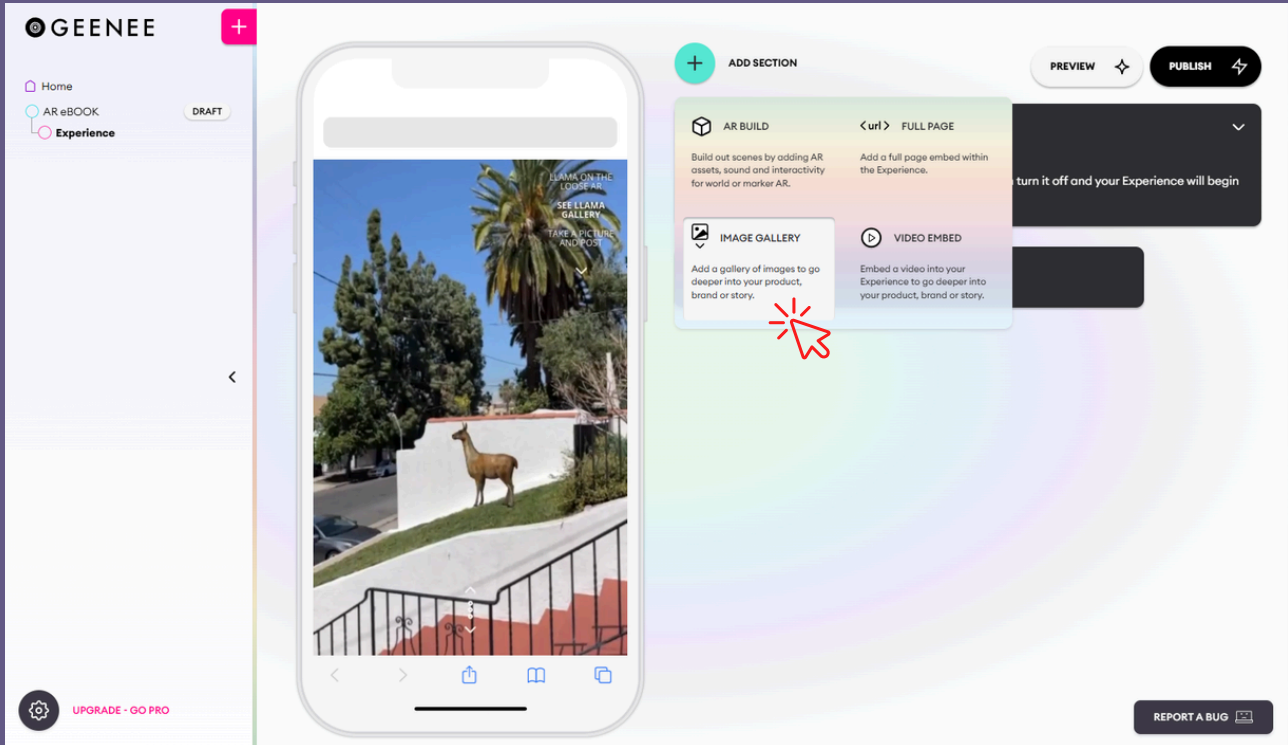
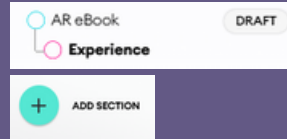
ADD EXPERIENCE: IMAGE

3 ADD IMAGE GALLERY

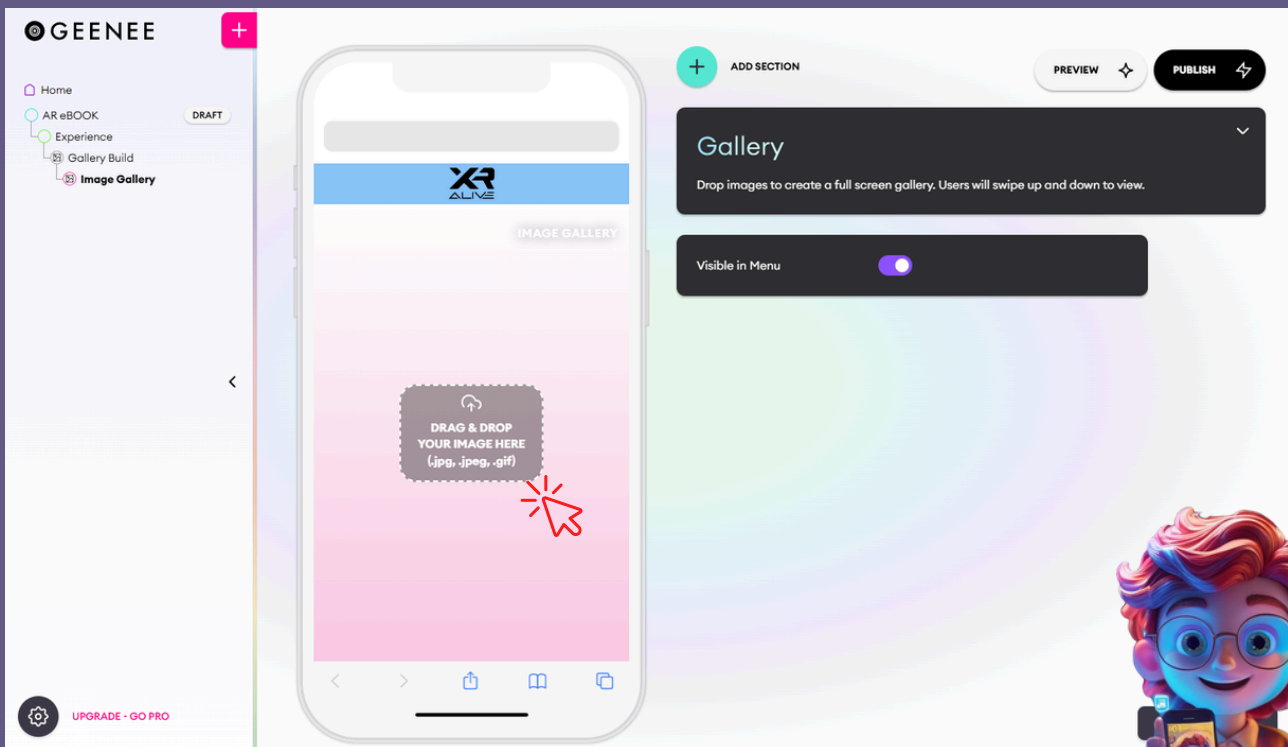
Click Experience Layer. The text become bold.

Click + Add SECTION > Click IMAGE GALLERY

Add a gallery of images to go deeper into your product brand or story.

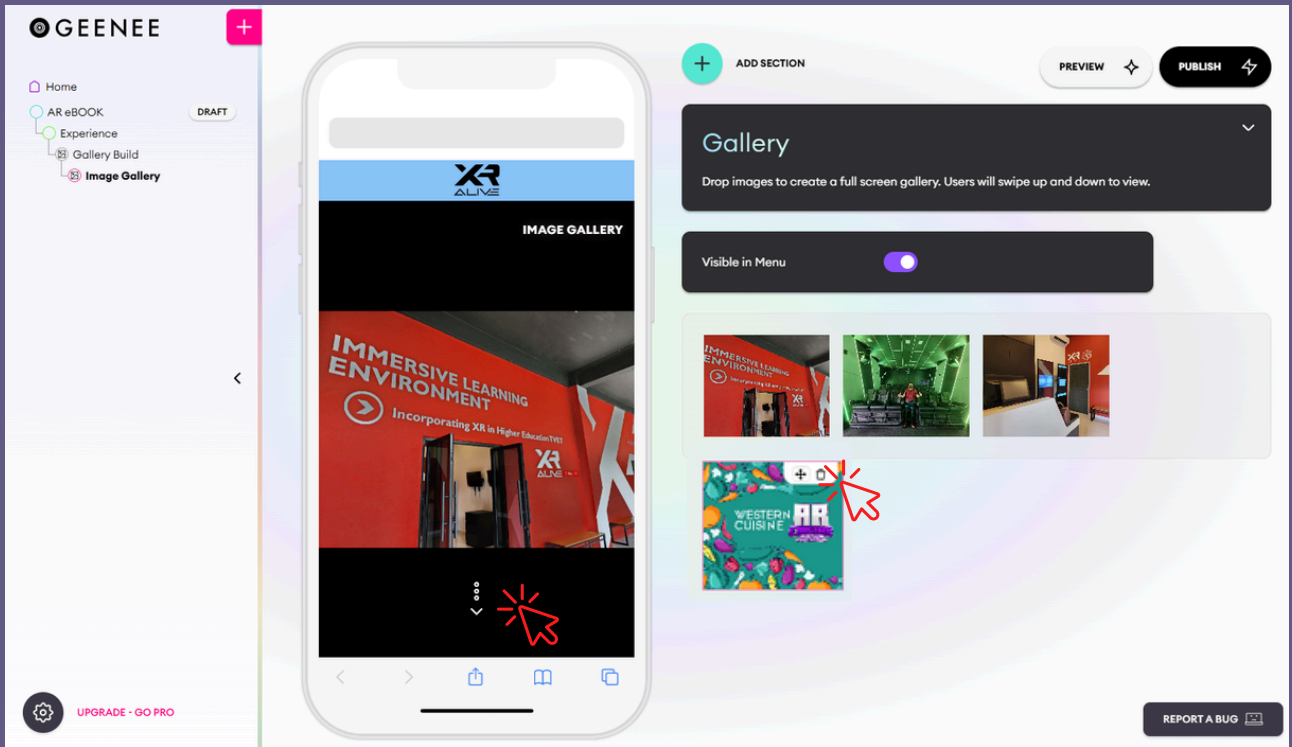


Drop images one by one to create a full screen gallery. Rename 'Image Gallery' to other name. It will appear on screen.





Delete or rearrange images using icon at the top right.



Use this arrow to swipe up and down to view image gallery.



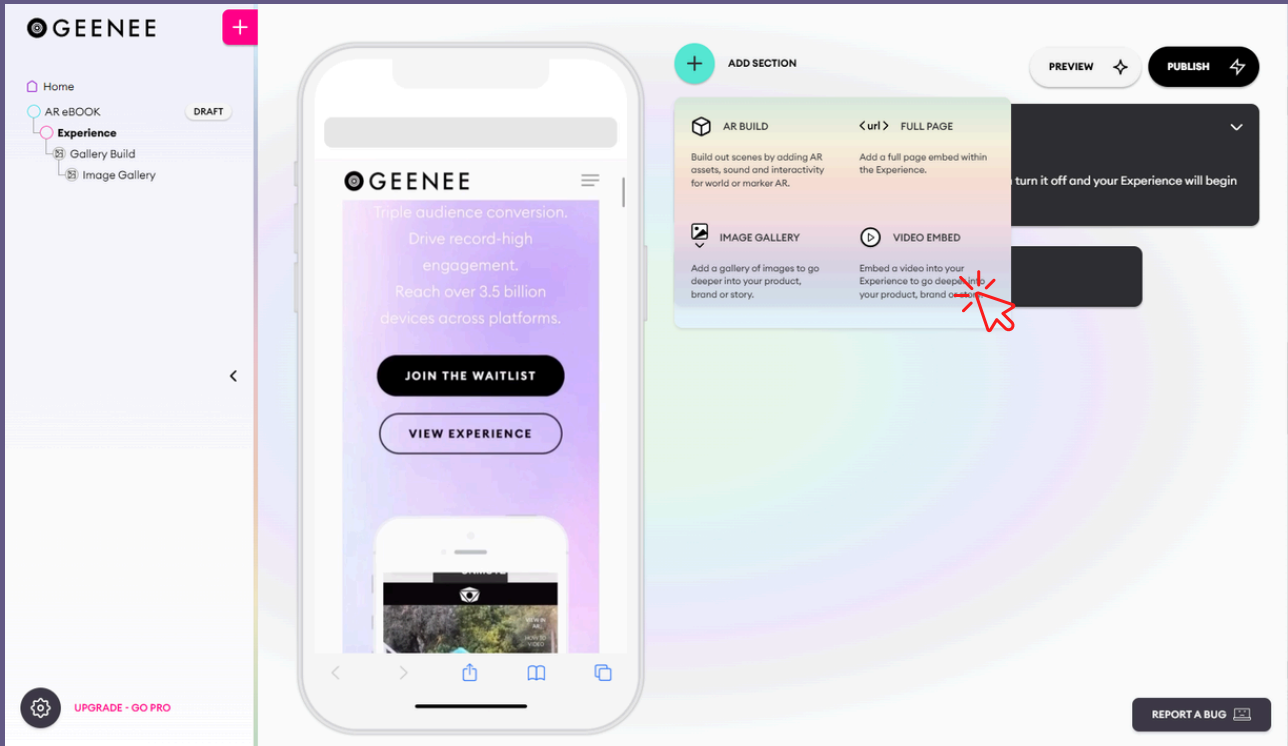
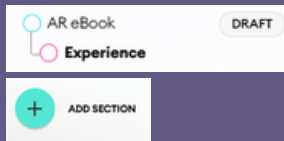


ADD EXPERIENCE : URL

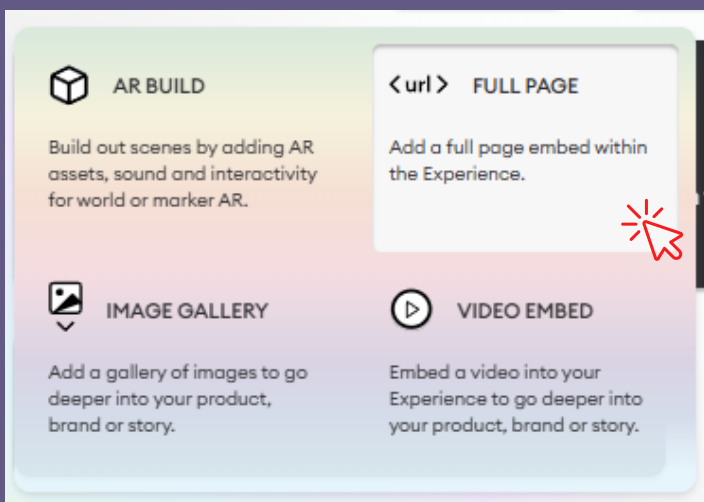
4 ADD URL

Click Experience Layer.

Click + Add SECTION > Click URL FULL PAGE

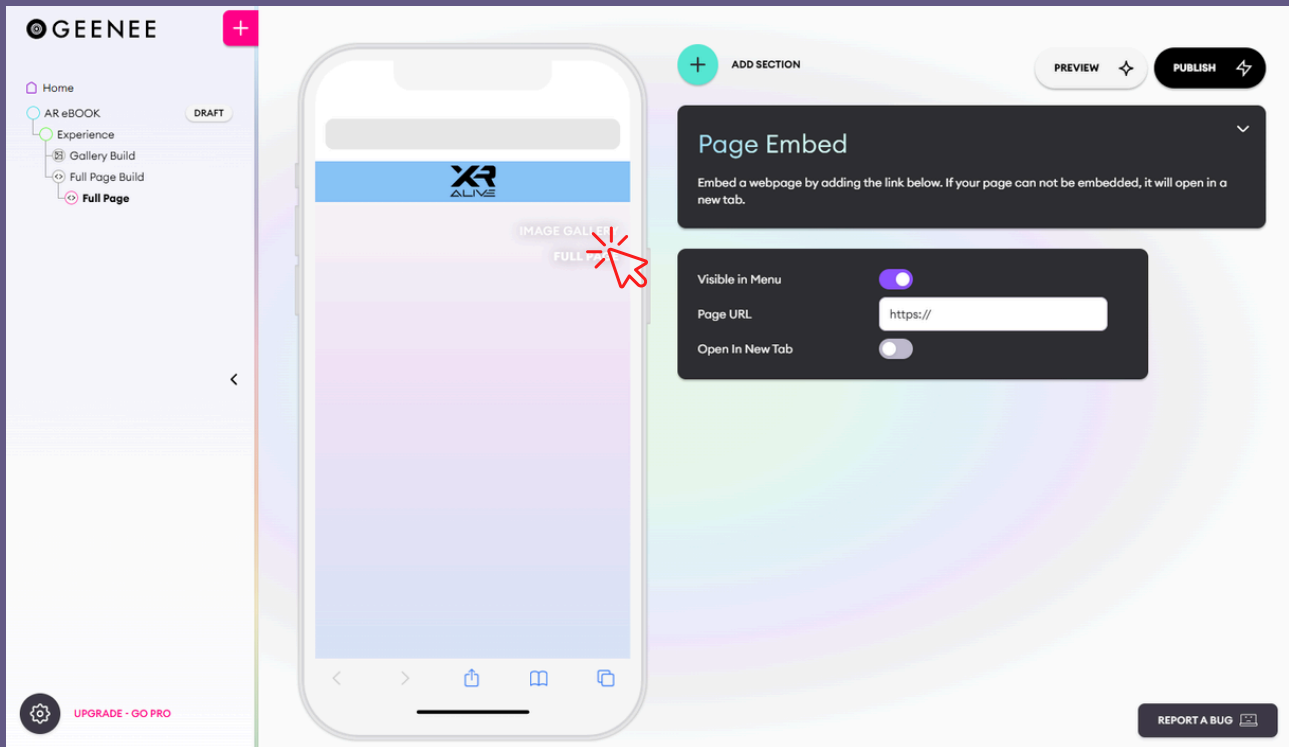


Add a full page embed within the Experience. You can add websites or any URL you need.

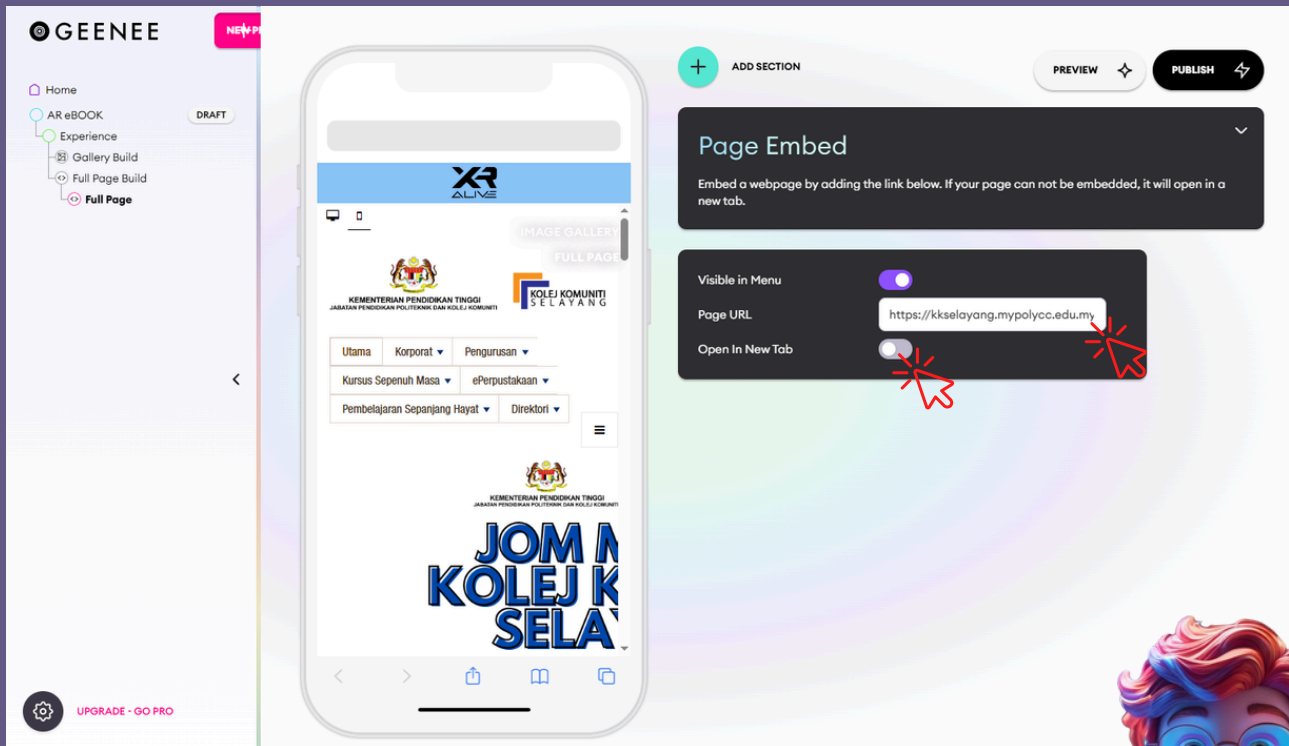




Add a full page embeded within the Experience. Rename 'Full Page' to other name. It will appear on screen.



Embed a webpage by adding the link or set Open in New Tab. Enable 'Open in New Tab' if you want users to tap the screen first before the content appears.



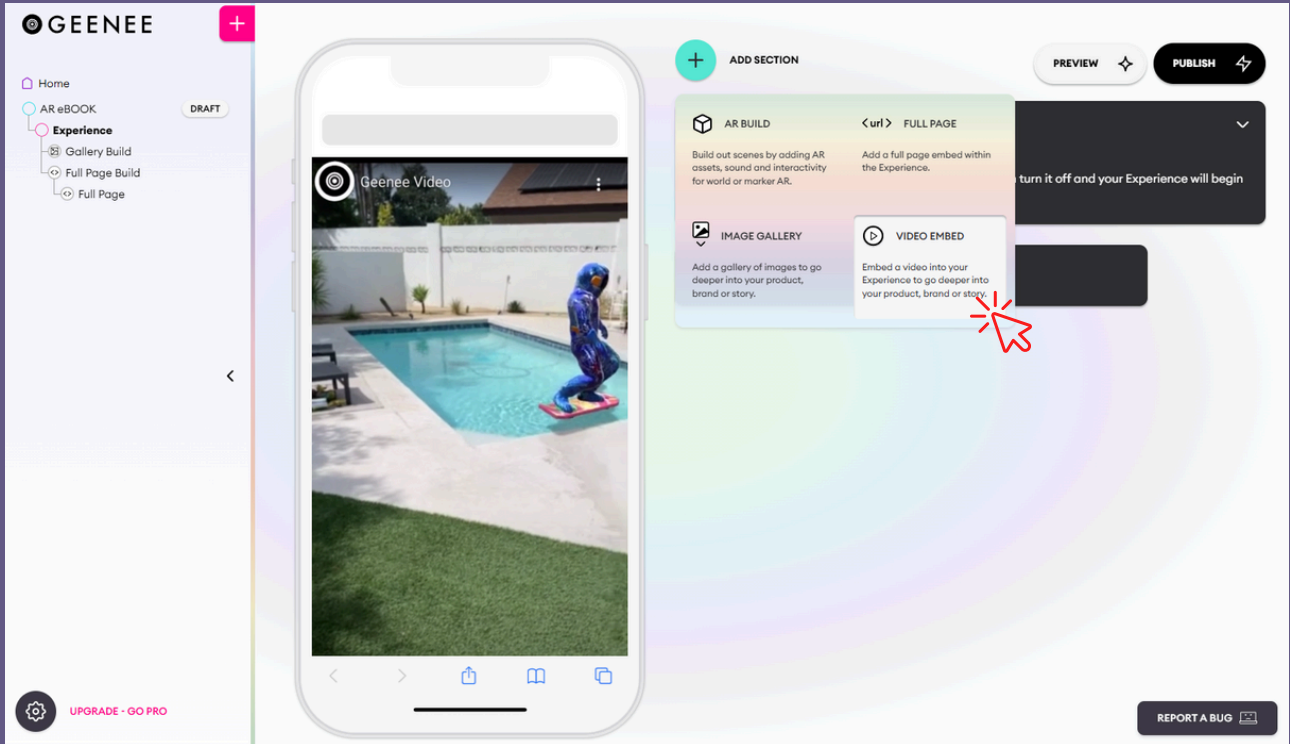
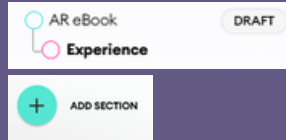


ADD EXPERIENCE : VIDEO

5 ADD VIDEO

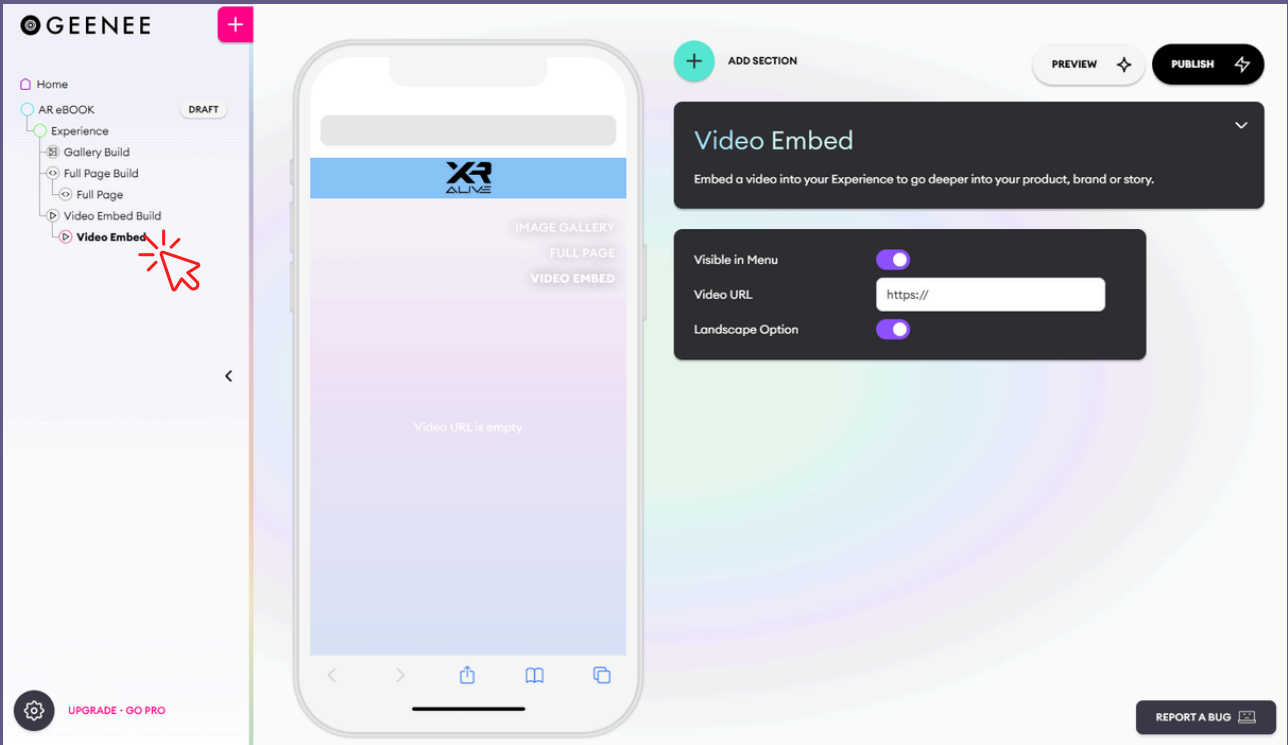
Click Experience Layer.

Click + Add SECTION > Click VIDEO EMBED

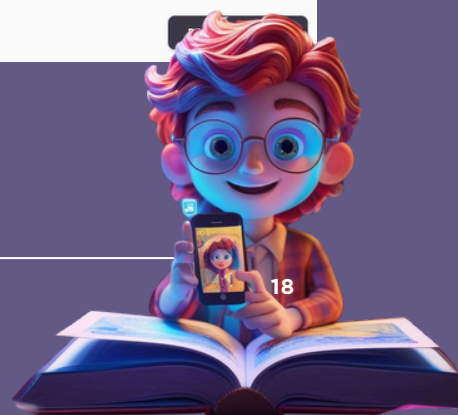
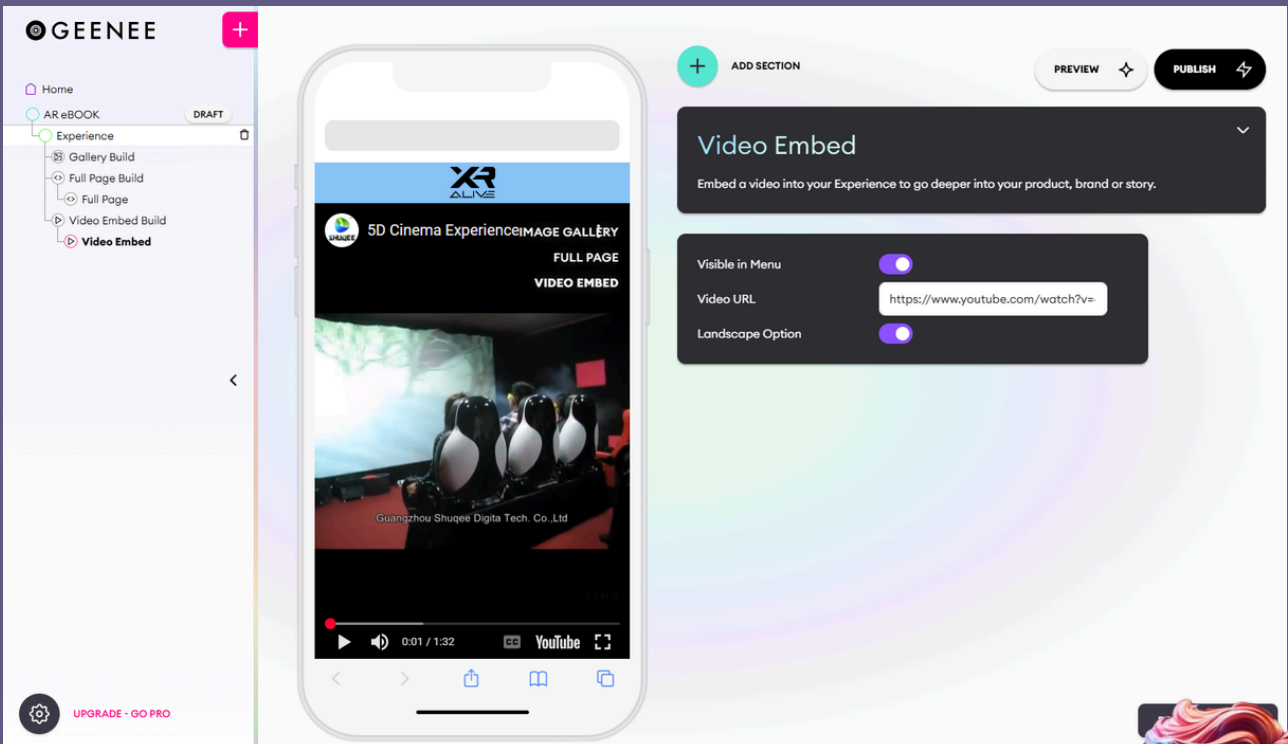




Embed a video into your Experience to go deeper into your product, brand or story. Rename 'Video Embedd' to other name. It will appear on screen.



Embed a video into your Experience to go deeper into your product, brand or story.



ADD EXPERIENCE : AR

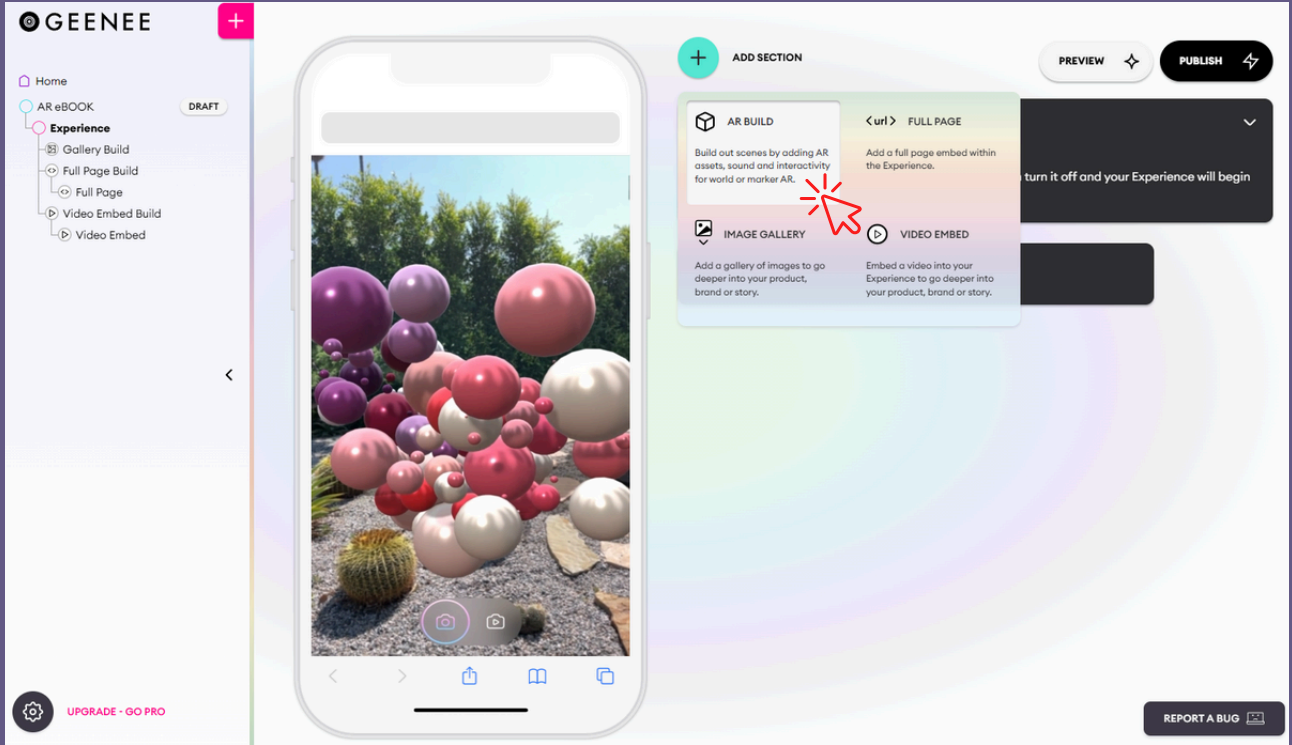


6 AR BUILD

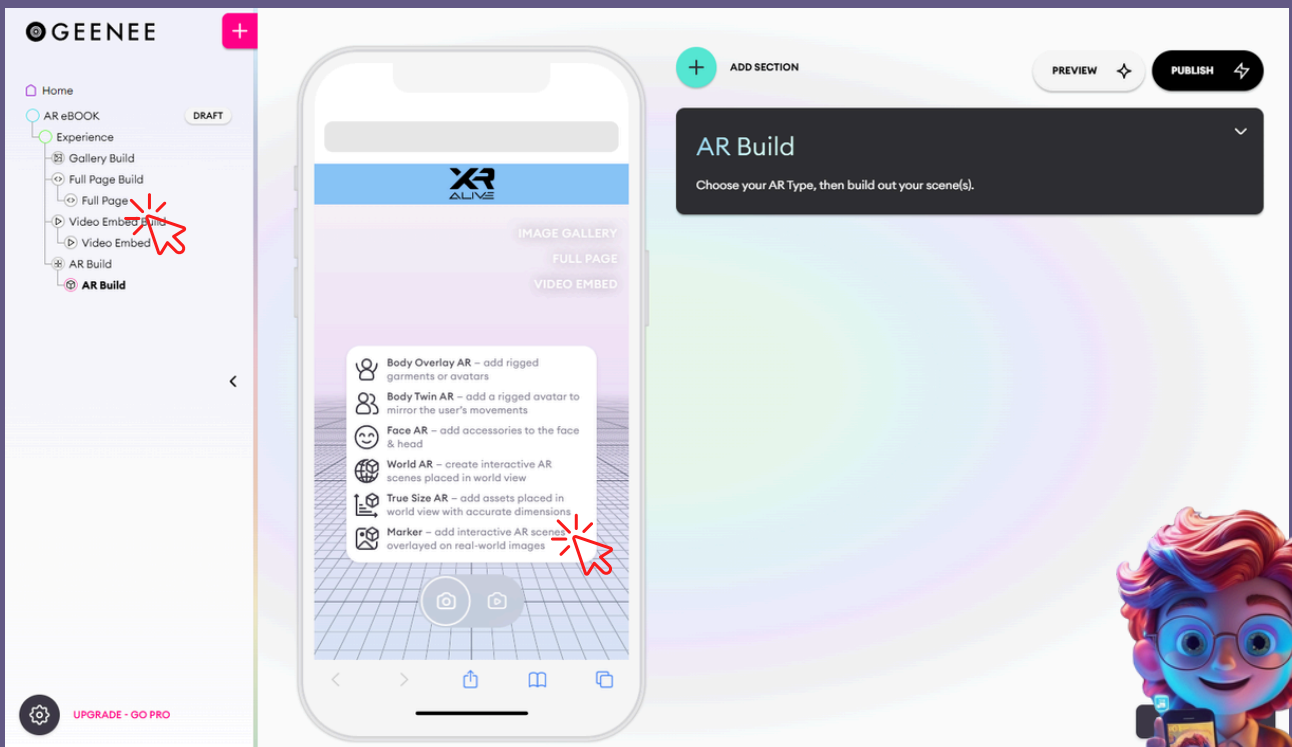
Click Experience.

Click + Add SECTION > Click AR BUILD

Build out scenes by adding AR assets, sound and interactivity for world or marker AR



Choose your AR Type, then build up your scene. Rename Layer AR Build. You can choose Marker, True Size AR or World AR. Marker is Marker-Based AR, True Size and World AR is Markerless AR.





EXPERIENCE : WORLD AR

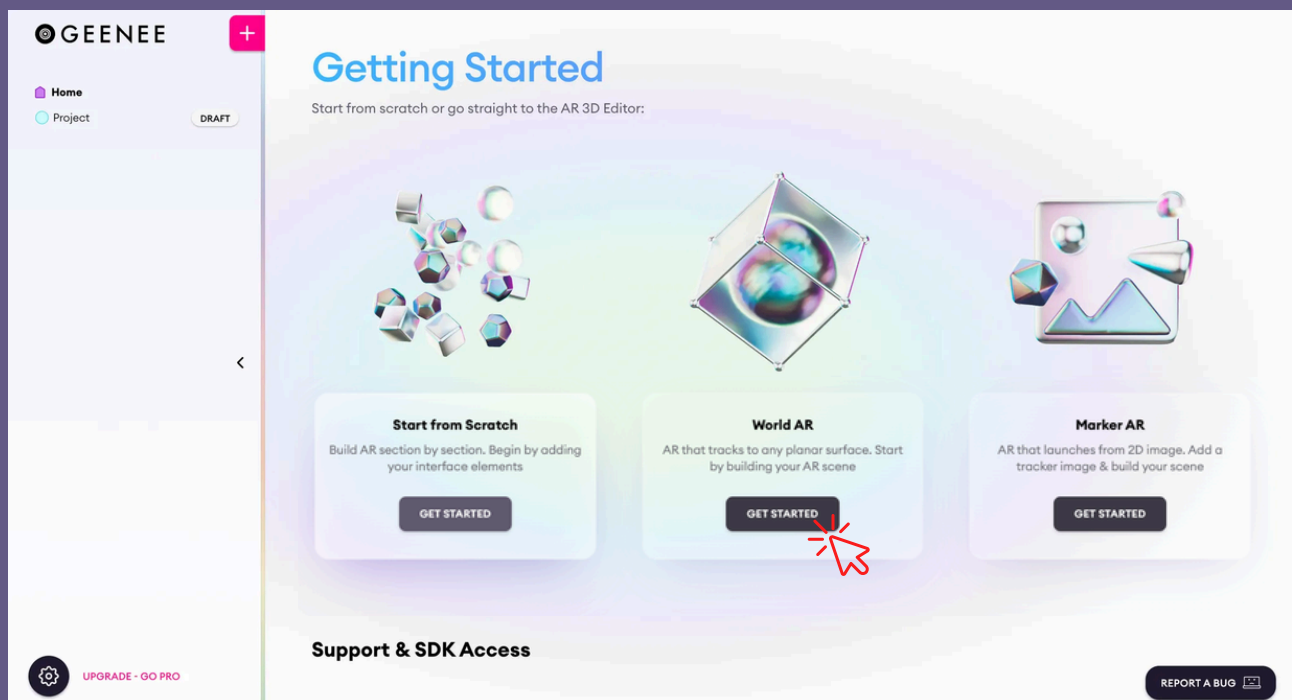
AR (Augmented Reality) development can be done easily using Geenee WebAR, a platform where AR experiences are created and shared without any coding.

Through Geenee, digital content such as 3D models, images, audio, or videos can be placed in the real world. These AR scenes are accessed directly through a web browser, so no apps are needed to be downloaded.

WORLD AR

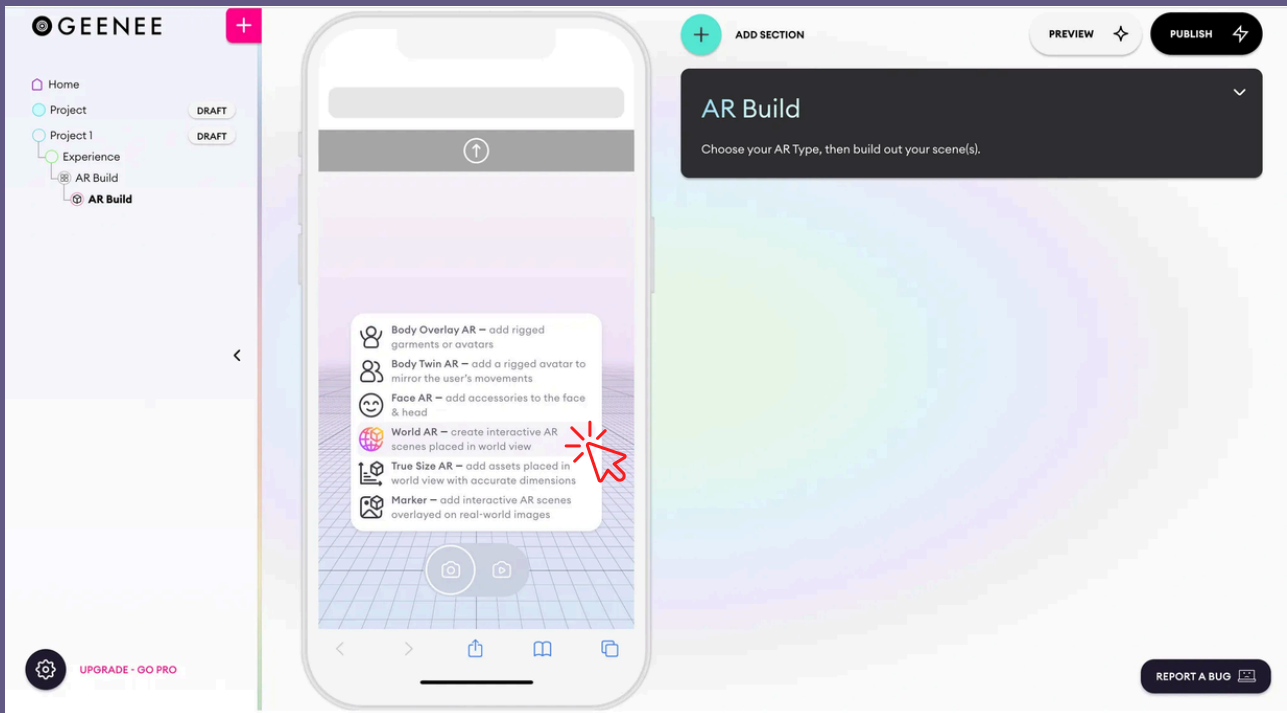
1 START

Go straight to the World AR 3D Editor from the Getting Started (Home) page.





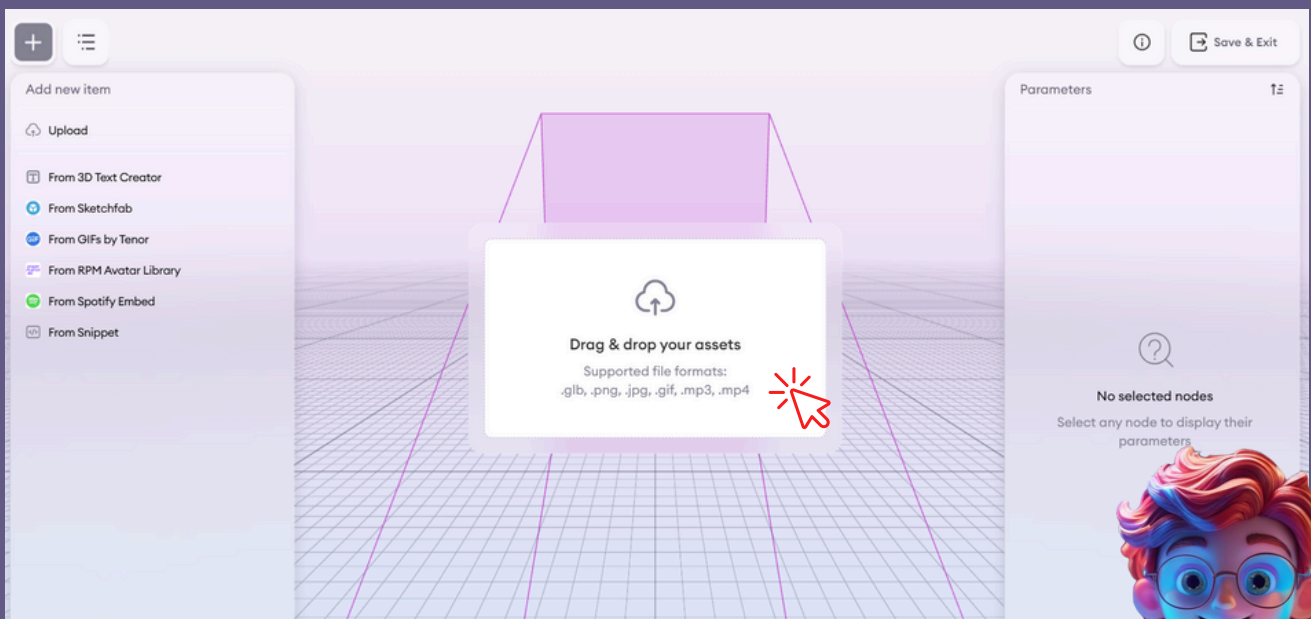
OR New Project → Add Section → AR Build → World AR



2 START

Roll over the phone's content and tap to go full screen to add your own assets. Once in the 3D editor, you can drop in your assets or use the + button to upload.

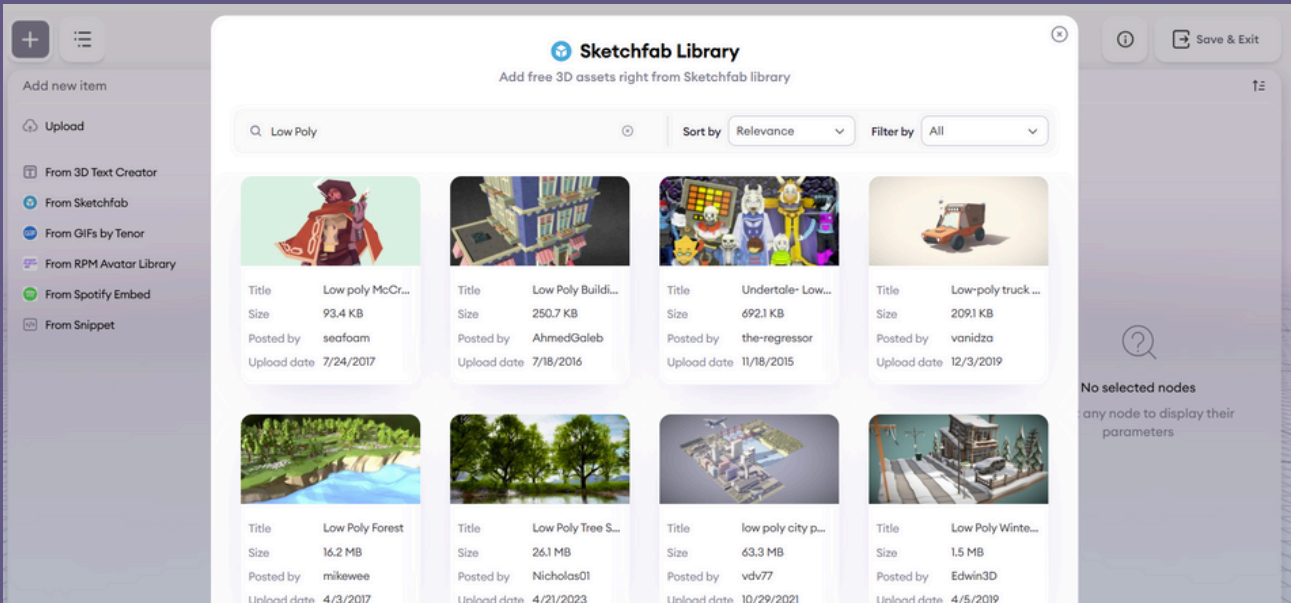
Supported file formats: .glb, .png, .jpg, .gif, .mp3, .mp4



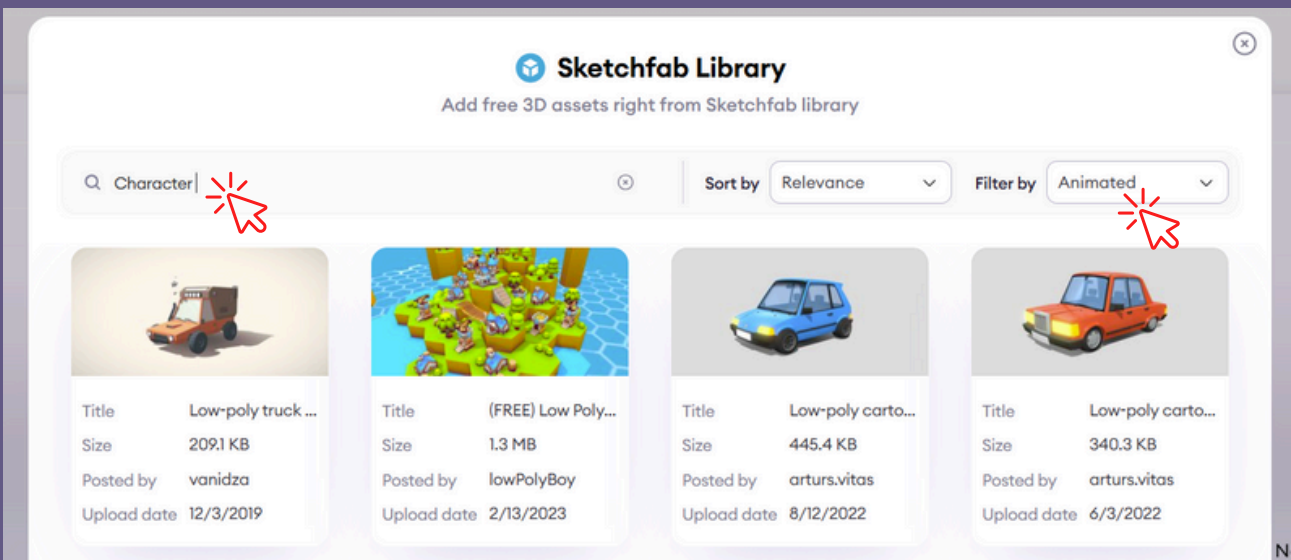


3 ADDING 3D MODELS

In addition, you can use stock assets via Sketchfab or Tenor, add 3D text and/or embed music from Spotify.

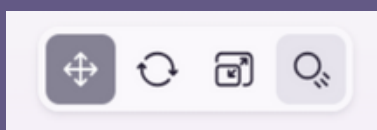


Search any 3D Models in search area, Filter either Animated, Non Animated or All.

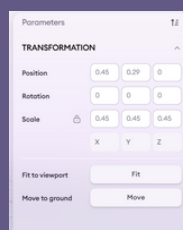


3 EDIT

Use the Move, Scale, Rotate assets to design the scene. Here you can add your own code per model, add or remove shadows as well as rename your assets.



Move Rotation

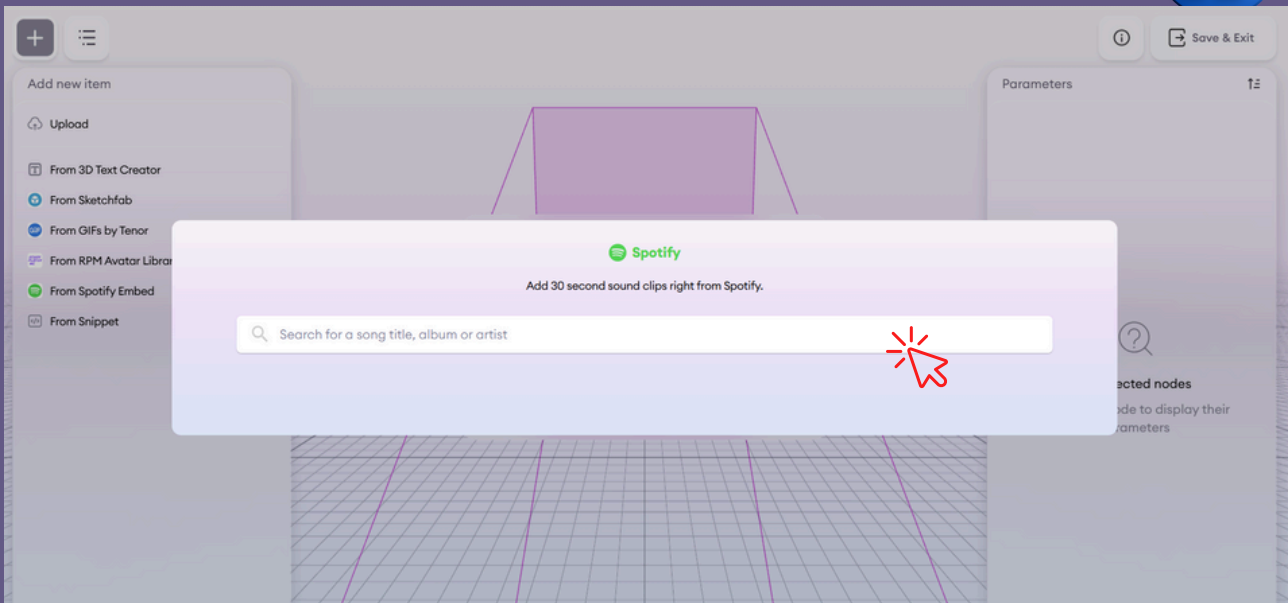


Scale

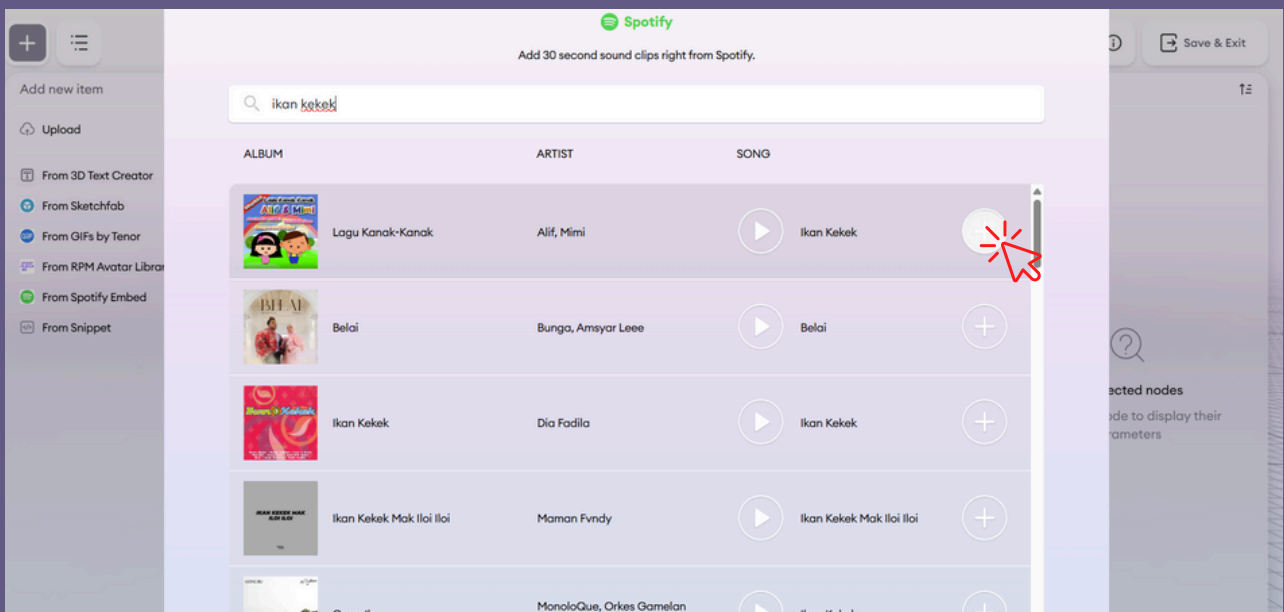




3 ADDING MUSIC FROM SPOTIFY

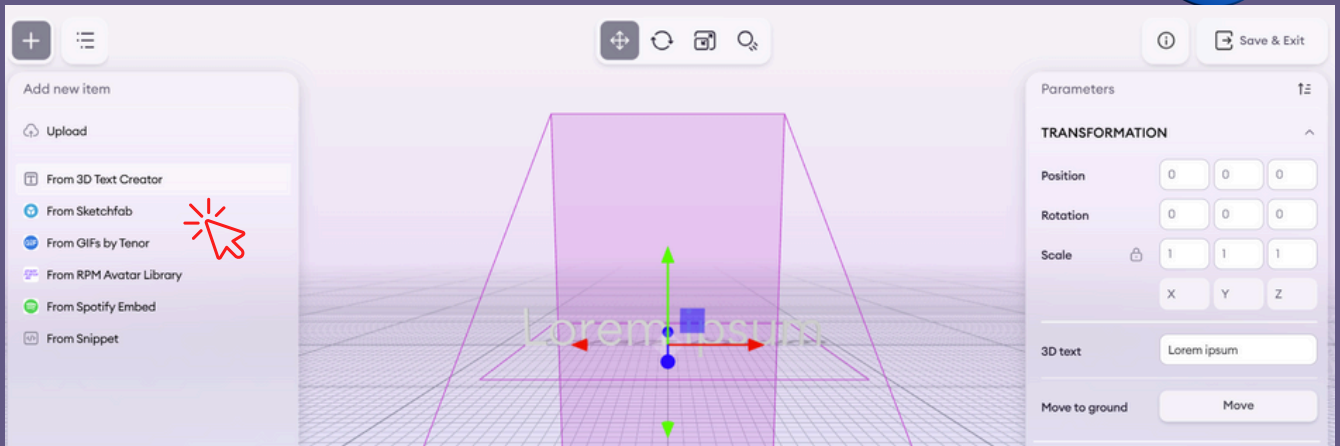


Search song title > click +

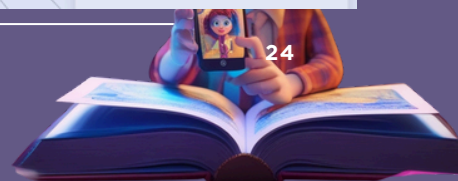
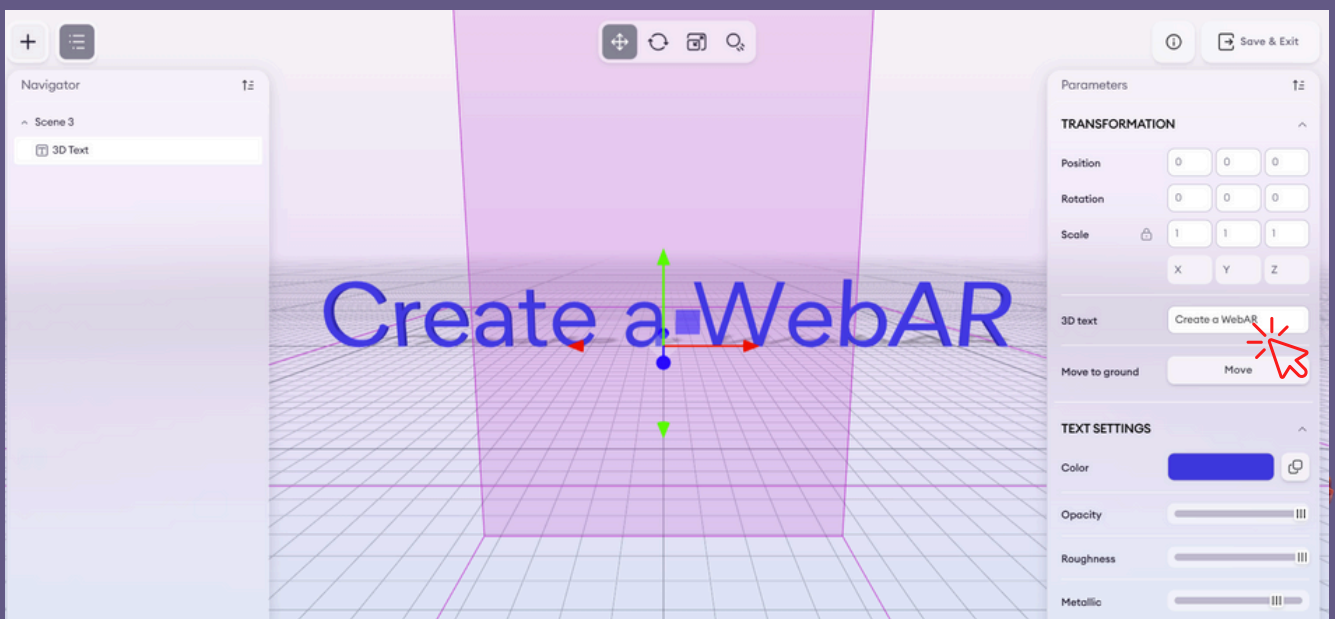
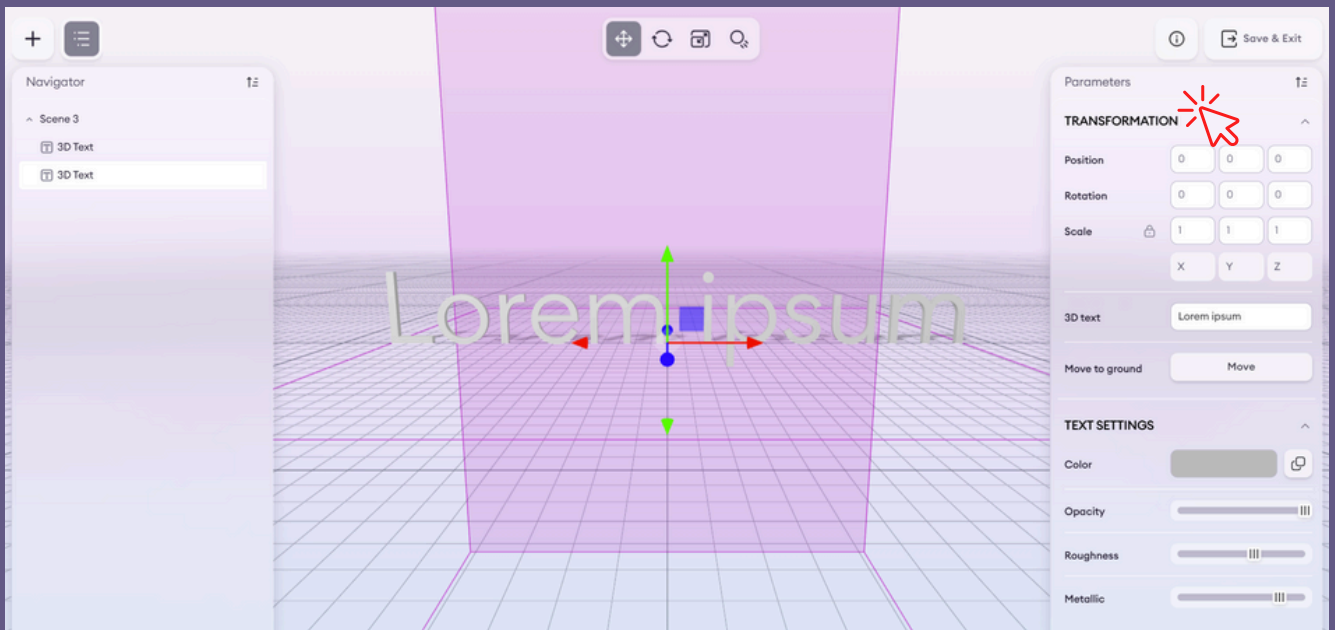


3 ADDING 3D TEXT CREATOR

Choose From 3D Text Creator

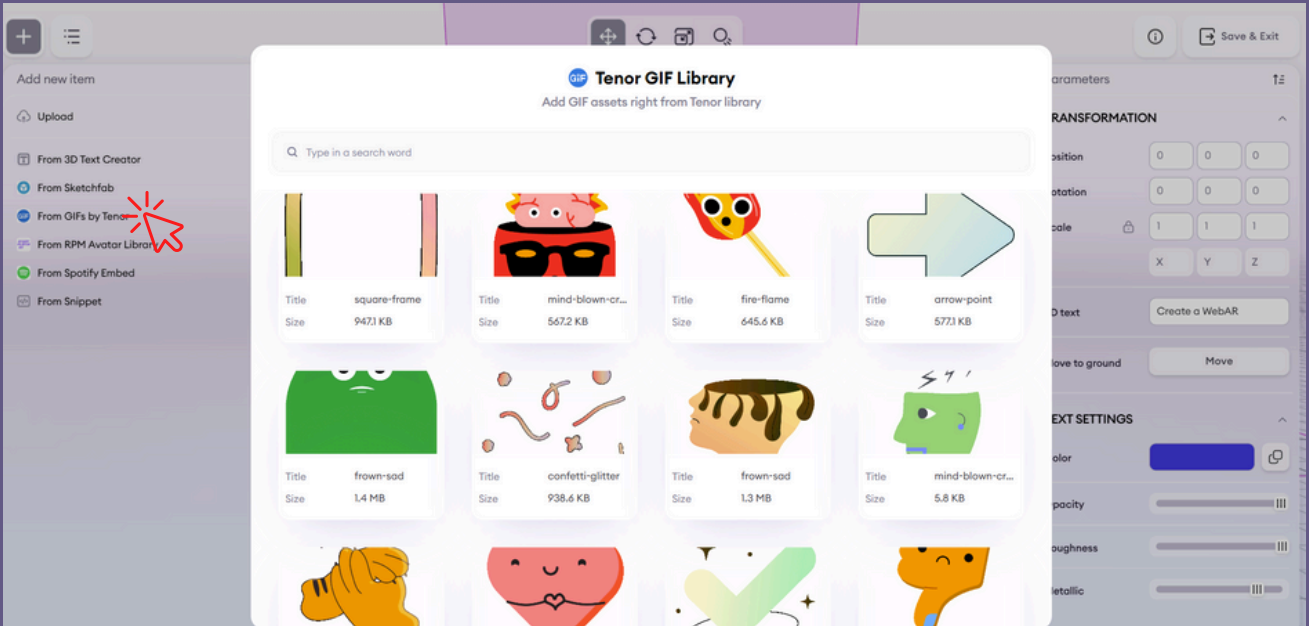


Edit 3D Text and setting text colour, opacity, roughness and metallic at text setting.

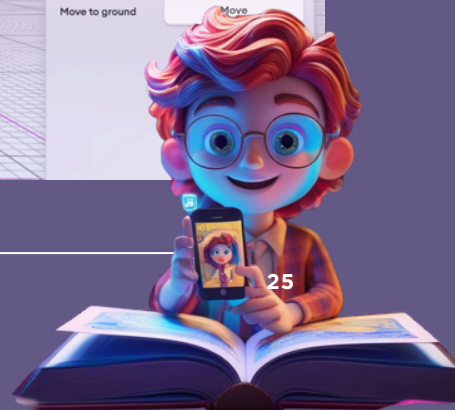
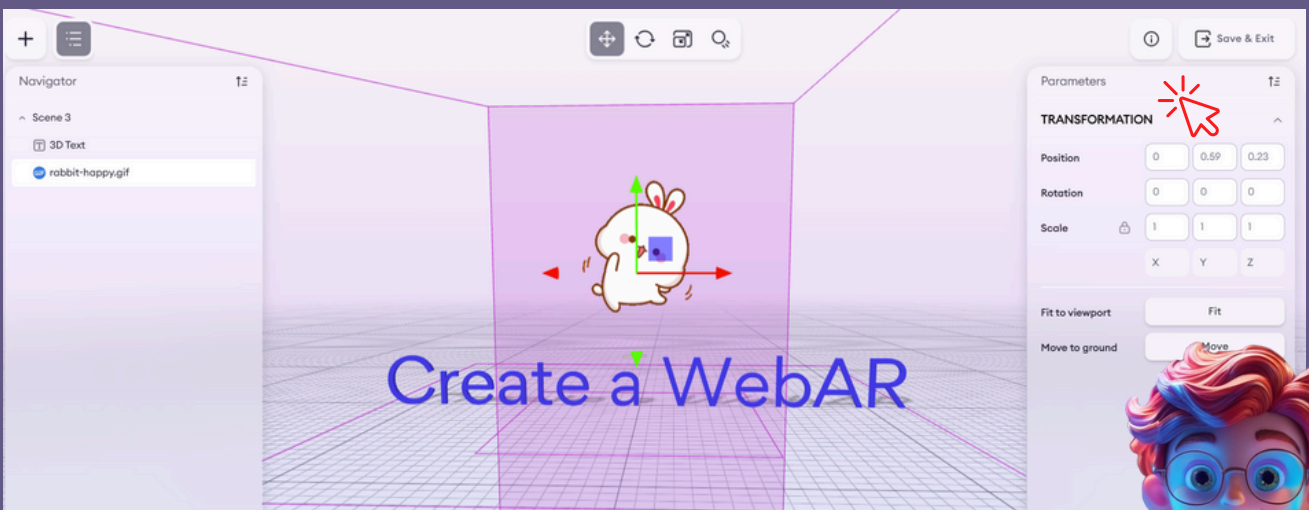
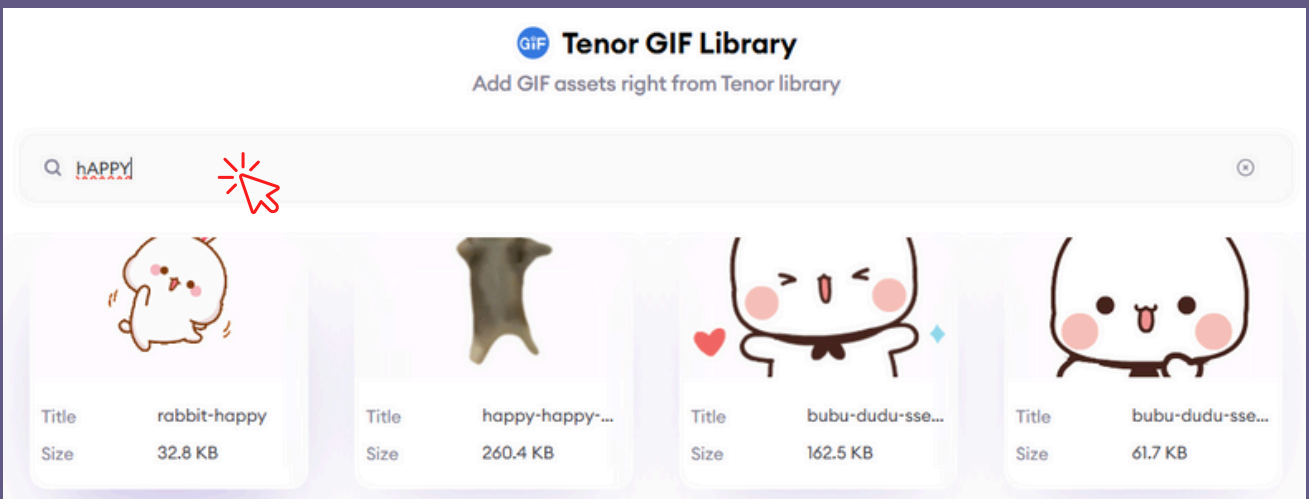


3 ADDING GIFs ANIMATION

Choose From 3D Text Creator



Choose GIFs > Reposition and rescale if needed

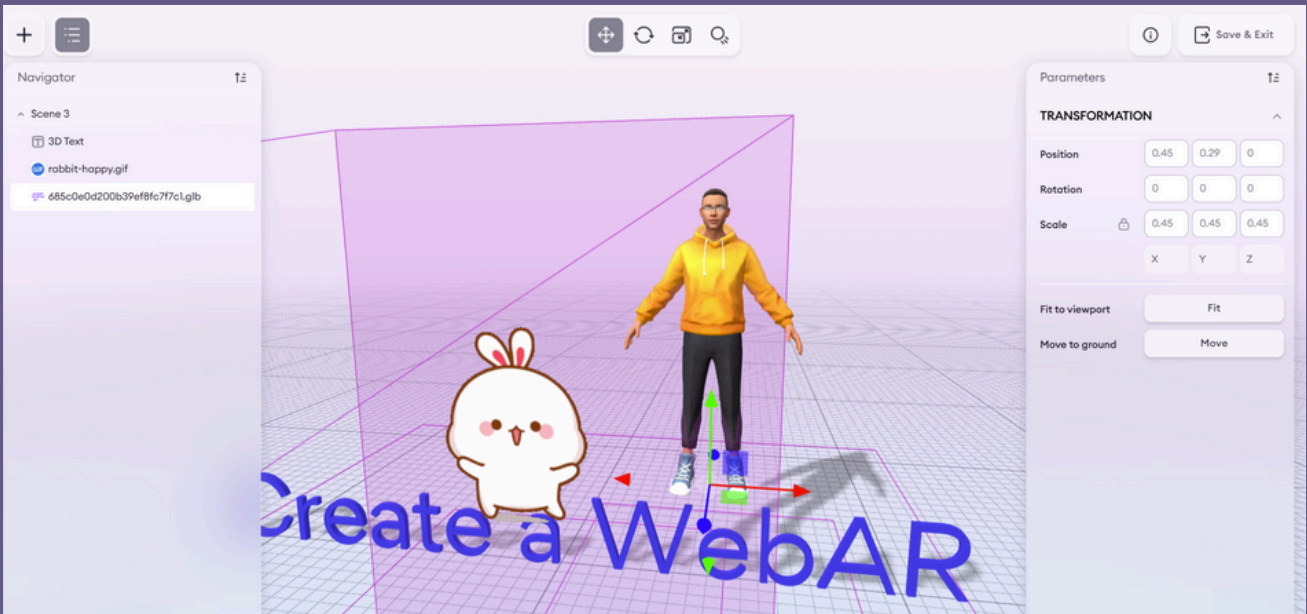


3 ADDING AVATAR

Choose From RPM Avatar > Setting the avatar with clothes, face, hairstyle and accessories

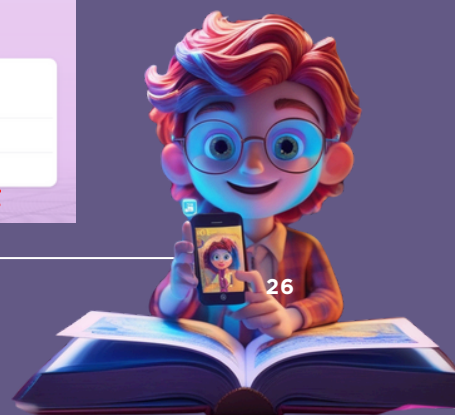
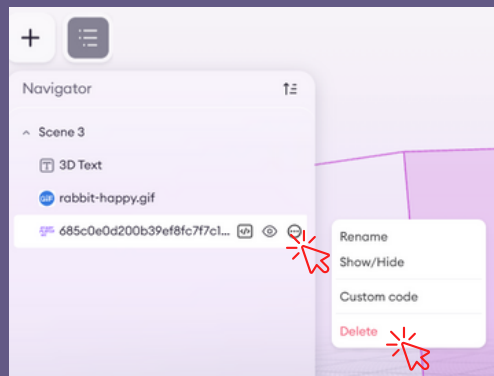
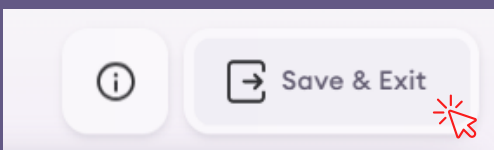


Add avatar into scene.



If you want to delete asset, click 3 dots button, and choose delete.

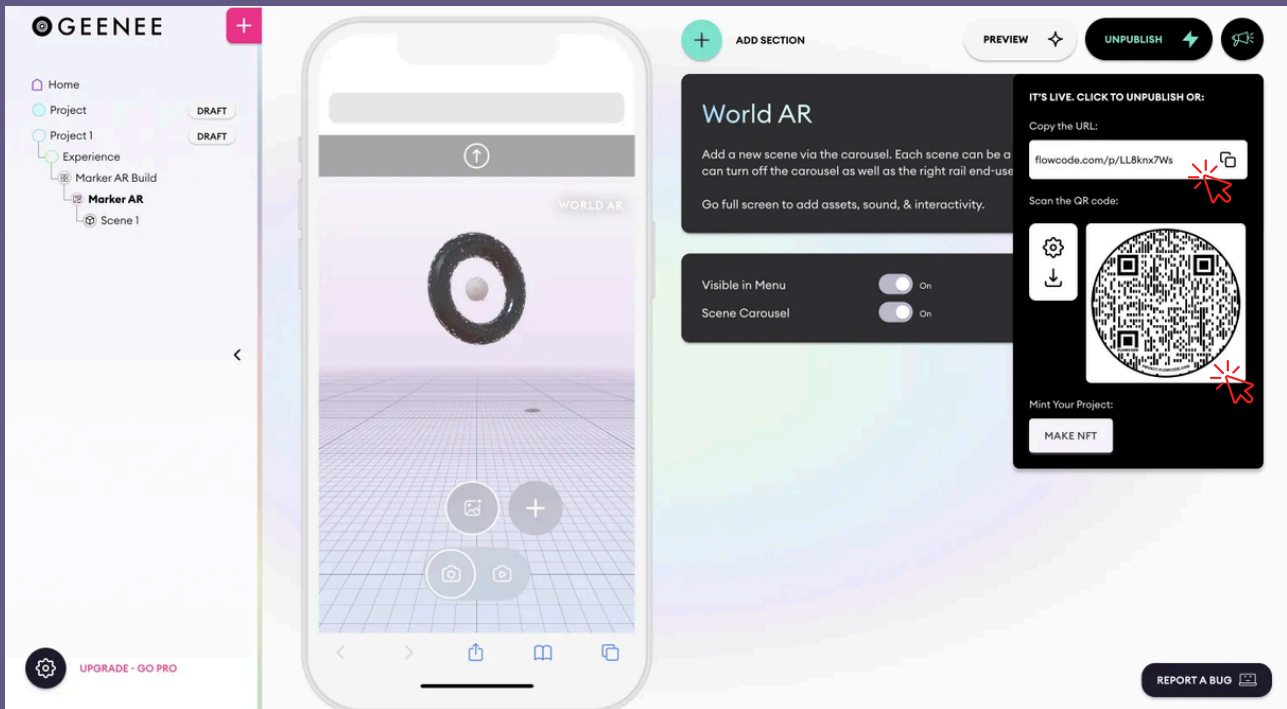
If you finish edit, click Save & Exit





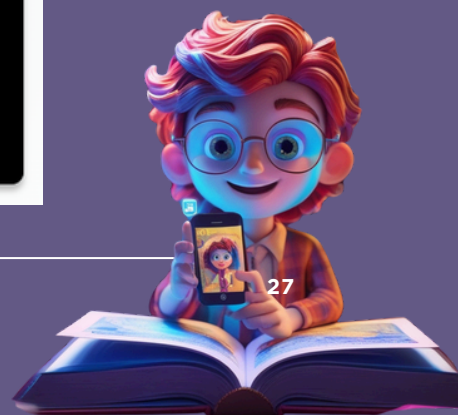
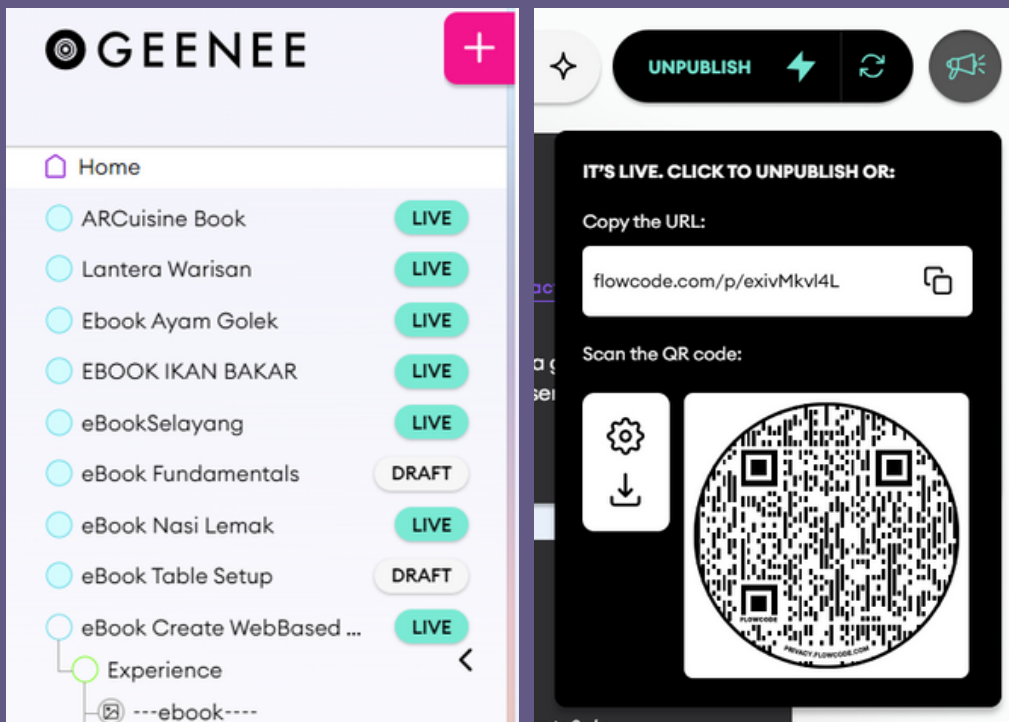
4 TEST & PUBLISH

Close your window and click **Preview** to test and then click **Publish** to make the URL available to the public. Then Scan QR code OR copy link to experience. No app download needed.



Once you publish, status book name in layer will change to LIVE.

You can keep update your AR, but remember, you must click again Unpublish > Publish. The Flowcode and QR Code will remain the same. Download and you can share to user.



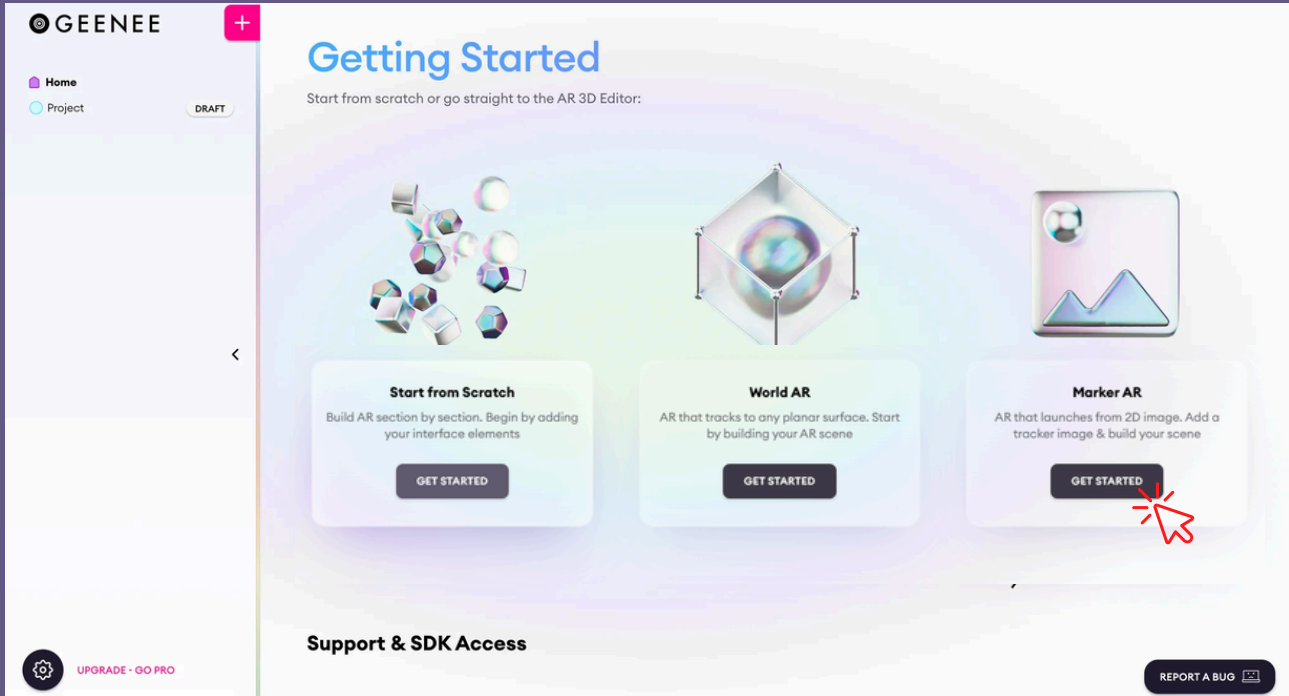




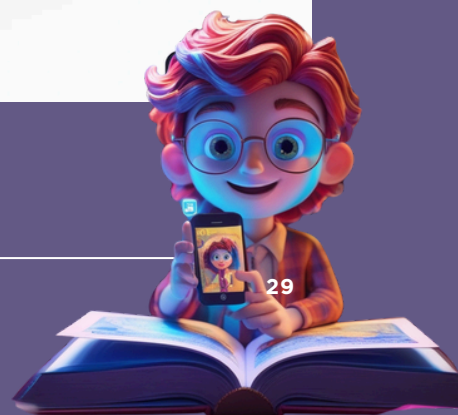
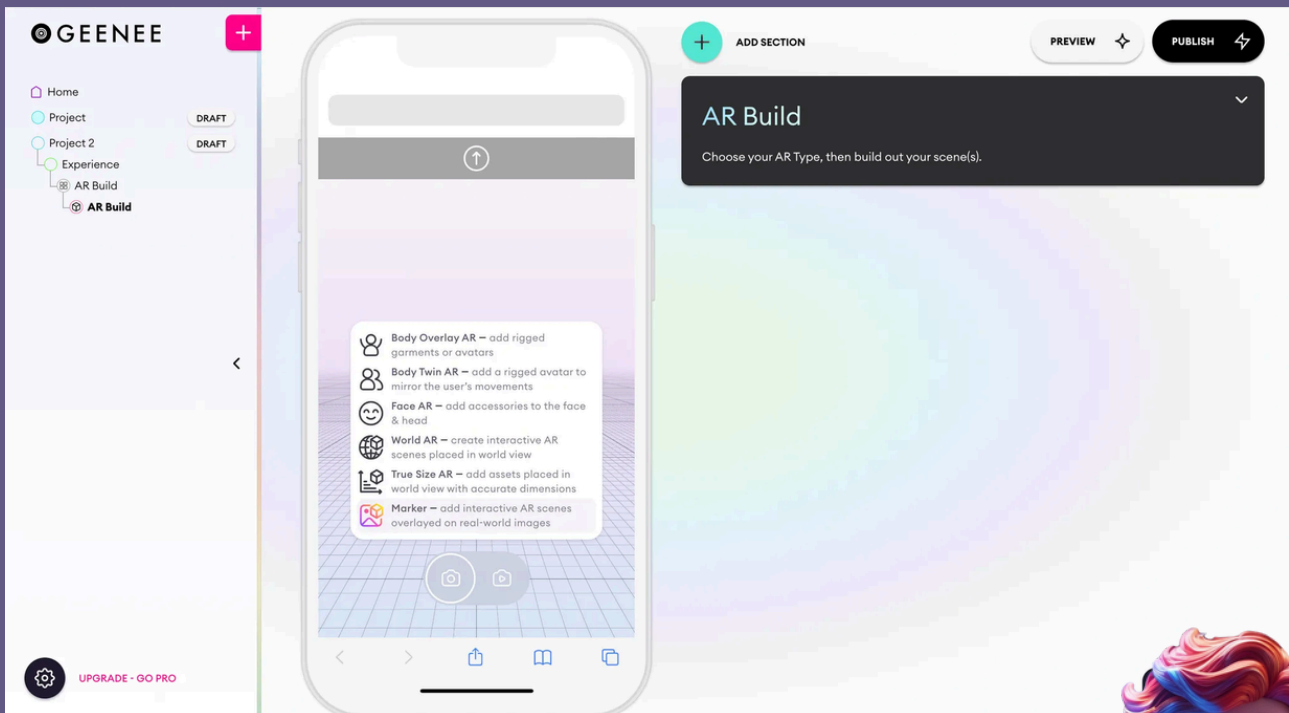
MARKER-BASED AR

1 START

Go straight to the Marker AR 3D Editor from the Getting Started page.



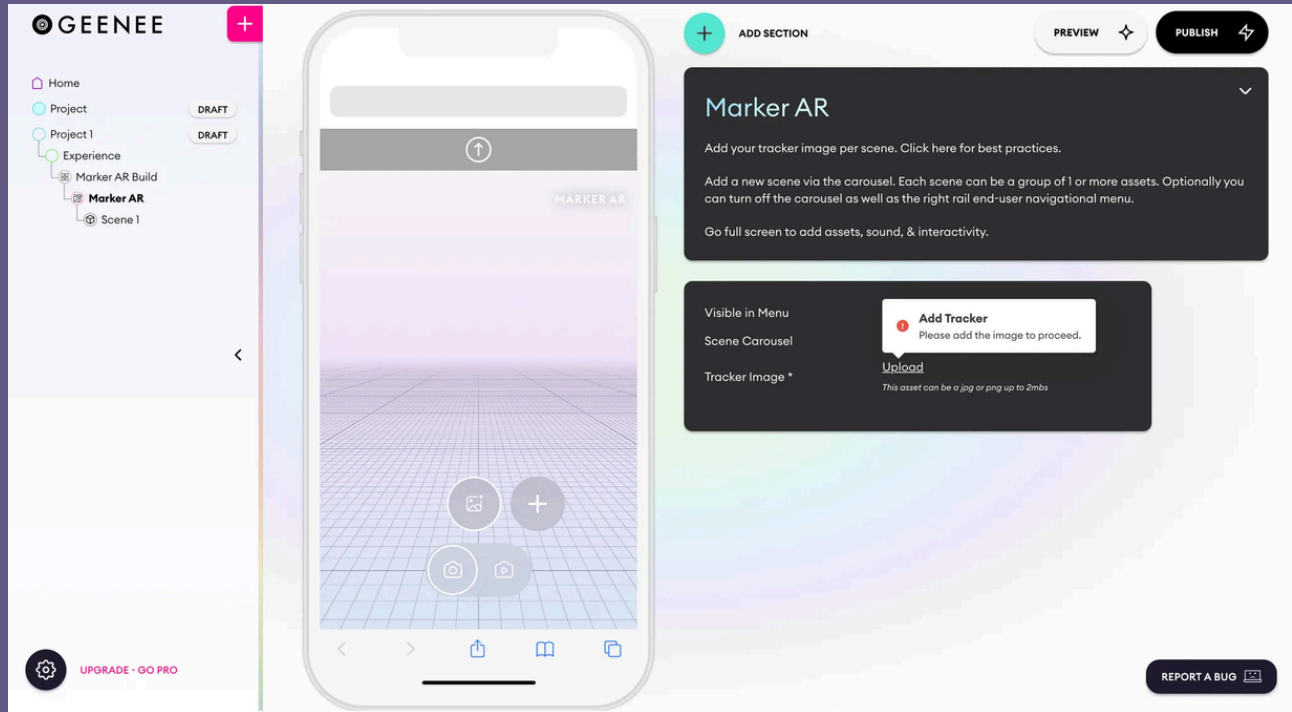
OR Start New Project → Add Section AR Build → Marker AR





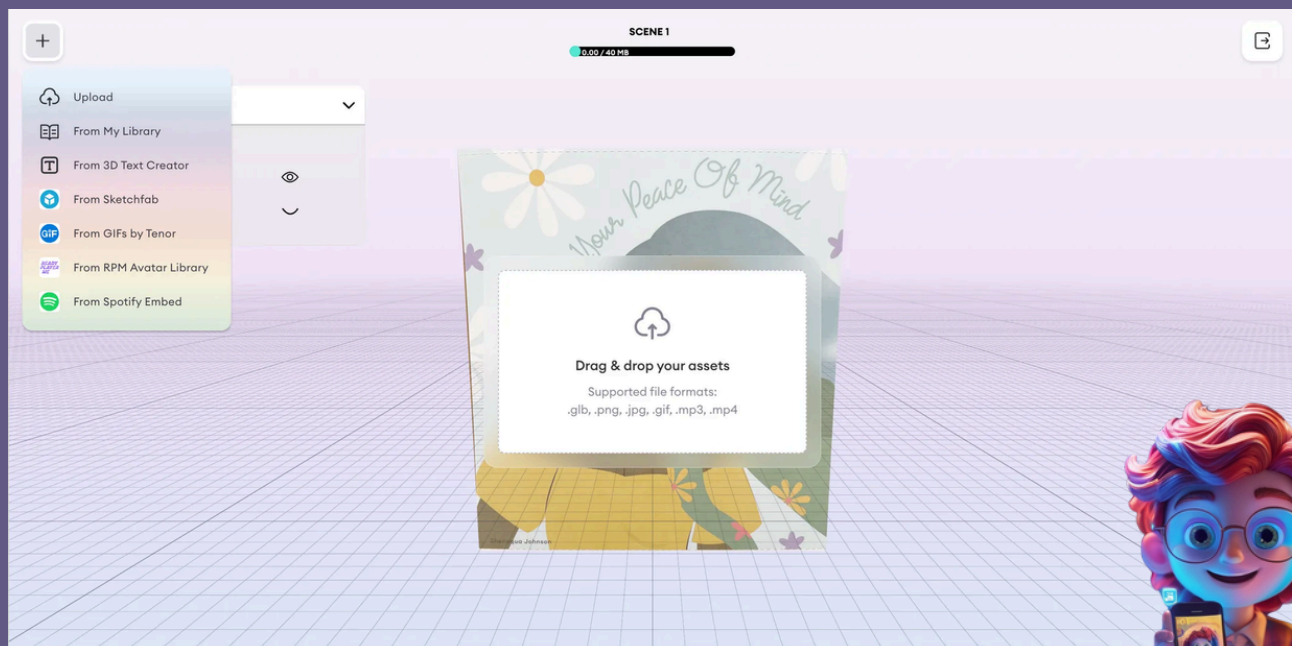
2 ADD TRACKER

Prior to uploading your 3D assets, upload the **Tracker Image** (the image the 3D asset attaches to) in the Marker AR Build. The asset can be a .jpg pr .png and up to 2 MB in size.



If your tracker image does not have enough contrast, the phone's camera may not be able to detect the image and properly attach the WebAR assets.

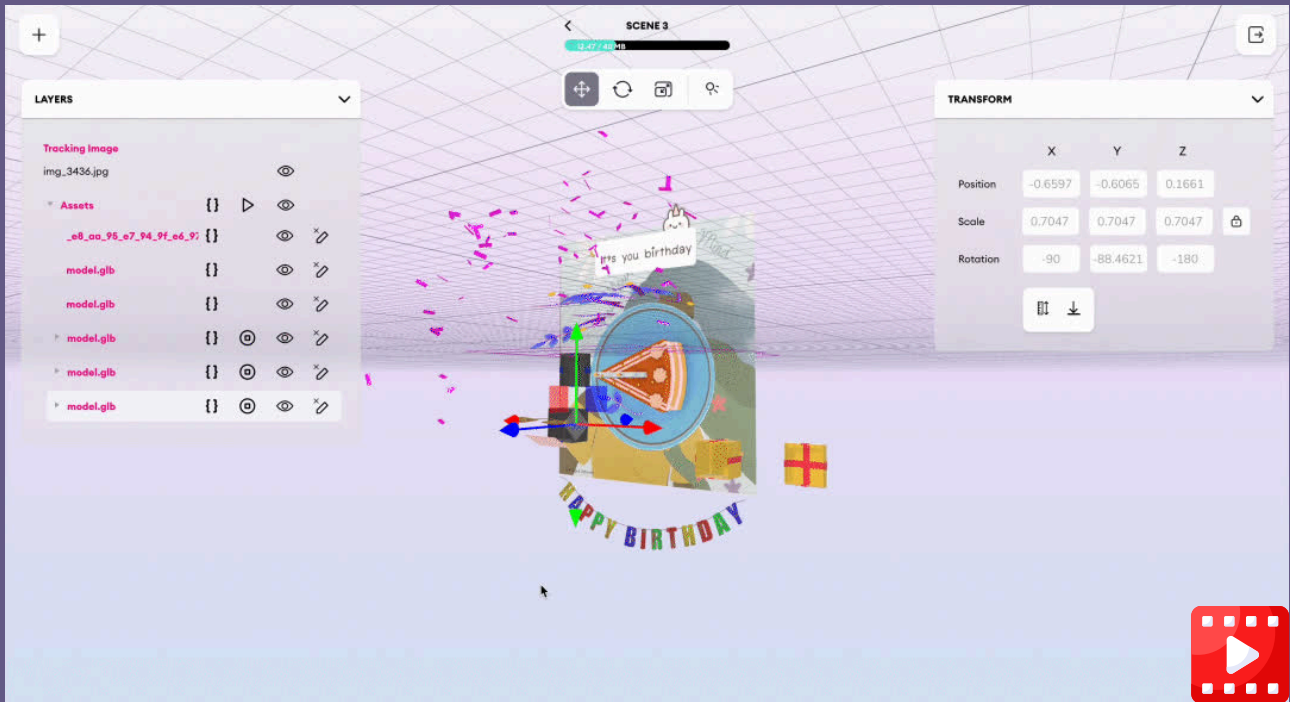
Roll over the phone's content and tap to go full screen to add your own assets. Once in the 3D editor, you can drop in your assets or use the + button to upload. In addition, you can use stock assets via Sketchfab or Tenor, add 3D text and/or embed music from Spotify. Supported file formats: .glb, .png, .jpg, .gif, .mp3, .mp4





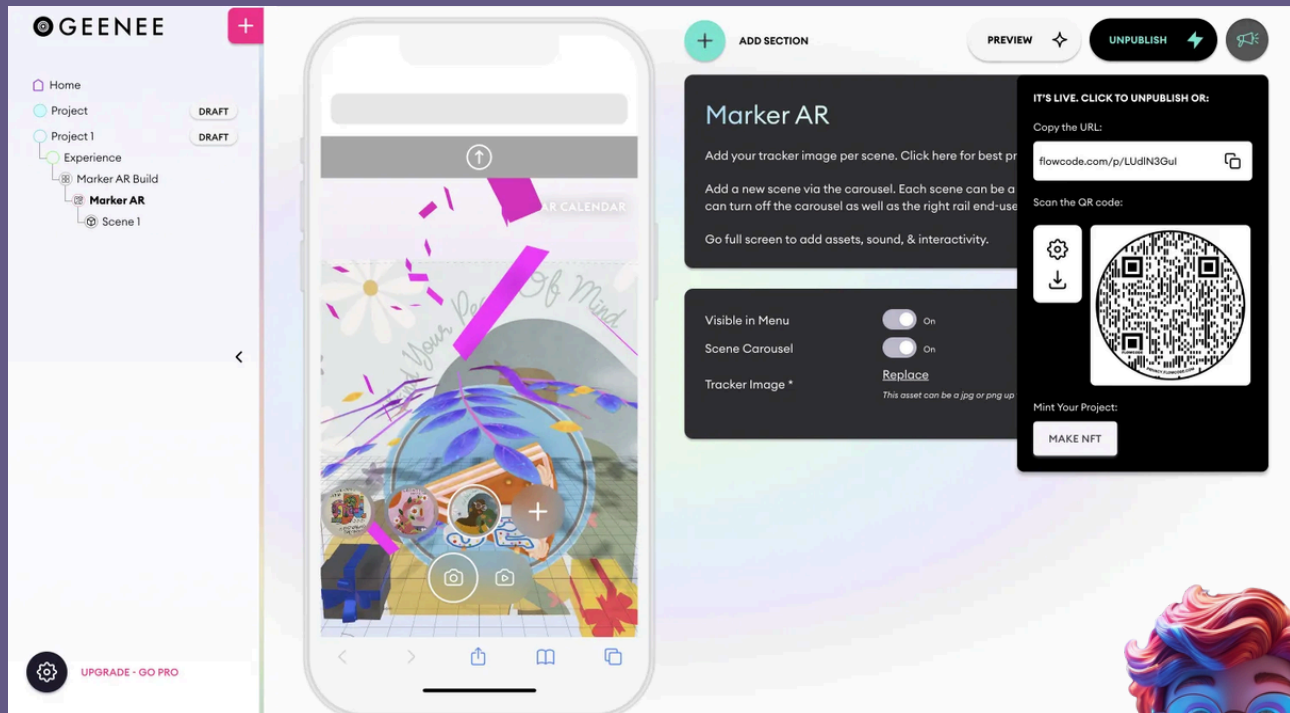
3 EDIT

Move, Scale, Rotate assets to design the scene.



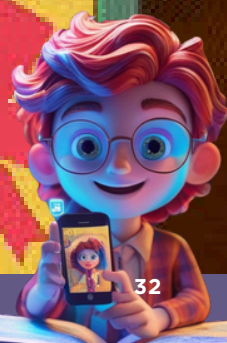
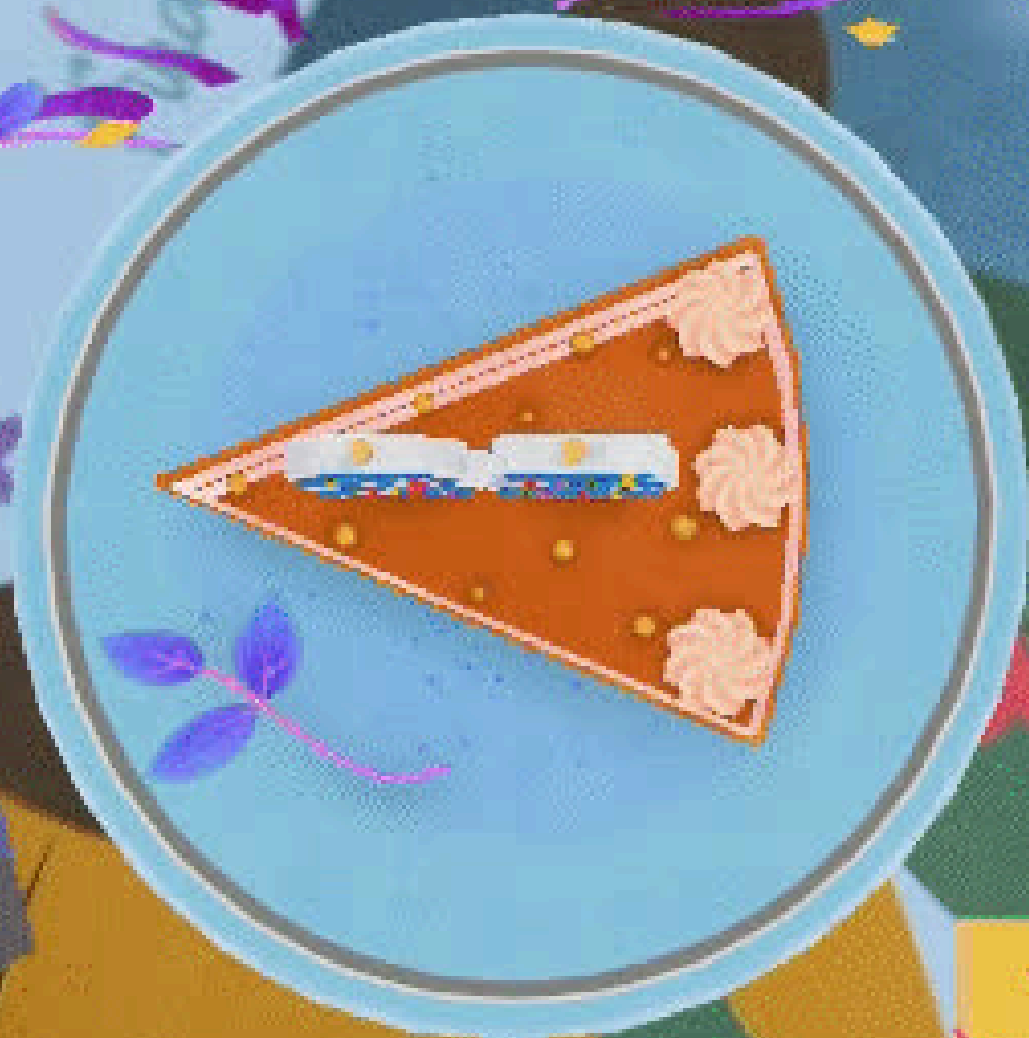
4 TEST & PUBLISH

Test by clicking **Preview** to test and then click **Publish** to make the URL available to the public. Scan the QR code and point your phone's camera to the Tracker Image and watch it come alive in AR.





It's your birthday





What is the main advantage of using Geenee to create an AR eBook?

It requires coding skills

It only works on mobile apps

It allows no-code AR creation via web browser

It needs special software installation

Submit

● Loading...



QUIZ 2



Which type of AR uses GPS, camera, and motion sensors to determine the user's position?

Projection-Based AR

Marker-Based AR

Location-Based AR

Web-Based AR

Submit

● Loading...





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