

9.2 Competitive Analysis

Table 1: Competitive analysis

Competitor	Description	Features & Design	Strengths & Weaknesses
<p>ZapWorks</p>	<p>AR toolkit for designers and developers</p>	<p>Drag-and-drop</p> <p>Be able to make a simulation and preview it within minutes</p> <p>Does not require to know coding</p> <p>For sales / marketing</p> <p>Cloud-based deployment</p> <p>There are separate platforms depending on whether it's for 3D, 2D, or widgets</p> <p>Each of these tools look different from each other</p>	<p>Strengths</p> <ul style="list-style-type: none"> - easy for the novice user to get started quickly - drag and drop content - templates <p>Weaknesses</p> <ul style="list-style-type: none"> - expensive - no visual cues/ - not enough popularity or audience - looks a bit old school - bit of a learning curve after getting past the initial training material - seems like the Zappar app is needed in order to view the AR - privacy and security standards? - could not find this information

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<p>ARCore (Android)</p>	<p>Google's platform for building augmented reality experiences.</p>	<p>ARCore uses three key capabilities to integrate virtual content with the real world as seen through your phone's camera:</p> <p>Motion tracking allows the phone to understand and track its position relative to the world.</p> <p>Environmental understanding allows the phone to detect the size and location of all type of surfaces: horizontal, vertical and angled surfaces like the ground, a coffee table or walls.</p> <p>Light estimation allows the phone to estimate the environment's current lighting conditions.</p>	<p>Strengths: Available for multiple environments: Android, iOS, Unity3D, and Unreal Engine 4 Natural lighting for virtual objects</p> <p>Weaknesses: Not all devices are fully supported, and you may need to use Android Emulator for testing your projects Some iOS functionality is missing compared to Apple's ARKit</p>

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<p>ARKit</p>	<p>ARKit is Apple’s development kit for AR-based iOS applications.</p>	<p>ARKit uses Visual Inertial Odometry (VIO) to accurately track the world, combining camera sensor data with CoreMotion data. These inputs allow the iOS device to accurately sense how it moves within a room, eliminating the need for additional calibration.</p> <p>Either camera is used to capture a live feed of the surroundings, tracking differences in the picture when the angle of the iOS device changes. Combined with the movements detected within the CoreMotion data, ARKit recognizes the motion and viewing angle of the iOS device to the environment.</p>	<p>Strengths:</p> <ul style="list-style-type: none"> - Fully integrated into Apple’s hardware. - Improved tracking. ARKit tends to perform better than ARCore in terms of image tracking and recognition. If you intend to create AR apps that track user gestures to manipulate on-screen images, ARKit will usually be the more efficient option. - It translates movements into data faster than Google’s alternative. <p>Weaknesses:</p> <ul style="list-style-type: none"> - Only compatible with iOS platforms. - Some backwards compatibility issues – Apple has previously updated ARKit tools rendering older versions obsolete. This shouldn’t happen again, but users of tools like SceneKit have been required to totally update their AR apps with new ARKit versions.

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<p>Amazon Summerian</p>	<p>Amazon Sumerian is a managed service and set of tools for creating augmented reality (AR) and virtual reality (VR) applications.</p>	<p>It has a low barrier to entry, allowing developers with no VR/AR expertise to create applications. Allows for scenery design directly in a browser. Is platform-agnostic, meaning it is compatible with most popular mobile devices and hardware. It has a library of premade 3D assets -- such as models, hosts and textures. It has lifelike character designs that can be integrated with Alexa Voice Services (AVS). Provides a template for creating iOS ARKit and Android ARCore</p> <p>The service provides a web-based editor that allows developers to construct and animate 3D scenes without the need for specialized programming.</p>	<p>Strengths: easy to set up and it's AWS so it's quite compatible with everything</p> <p>Weaknesses: not have full control on the application on a structural level. requires time to learn. A bit overpriced</p>

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Adobe Aero	<p>Adobe Aero is an augmented reality authoring and publishing tool by Adobe Inc. on Creative Cloud.</p>	<p>Aero offers multiple options for crafting, sharing, and viewing AR experiences. Create in the app, capture a video for sharing on social, and send a link that lets anyone view it in augmented reality on iOS. Aero also lets you export and share a .real file containing all the interactive behaviors.</p> <p>The interface is easy to master and includes a tutorial that clearly lays out all the basic functions. This means even someone with zero experience can quickly block out a scene using 3D models or a layered Photoshop document in a matter of hours. Once you've added assets to your project you can assign them "behaviors". Behaviors are simple animations triggered by screen taps or proximity settings. The results can be visually compelling.</p>	<p>Strengths:</p> <ol style="list-style-type: none"> 1. It is effortless to set up the software and use it. 2. The UI of the software is very modern, and the features work flawlessly. 3. Aero can be easily integrated with other Adobe software for user's ease. 4. Aero lets you import 3D files and 2D layers from photoshop. 5. Anyone can do augmented Reality projects with Aero without having to code for it. <p>Weaknesses:</p> <p>Aero offers less control over 3D object materials, physics, and behaviors. It's difficult to position objects with precision, and I couldn't find a way to undo my last action. Imported PSDs were questionably low resolution and appeared without blend modes. You're also confined to creating a scene while in AR with the camera activated, which could make working in places without wide open surfaces challenging, not to mention battery intensive.</p>

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<p>ROAR</p>	<p>Augmented Reality Content Management platform for Creators, Educators, Businesses and Enterprises.</p>	<p>ROAR provides tools for creating various types of AR experiences; they allow the use of target image-based AR experiences, ARKIT and ARCore based experiences in which objects can be placed in the physical world and interact with a ROAR app. Lastly, Creative WebAR campaigns that users can experience on a browser.</p> <p>An uncluttered interface to learn and understand— numerous components to interact with to create an AR experience with little knowledge. The basic construct of an AR experience is based on a marker, be it an image or a 3D art to which users can add components such as Video, buttons, text, audio and 3D models. The design style is minimalistic and straightforward, but a few basic heuristics are missing, such as help and documentation and visibility of system status.</p>	<p>Strengths:</p> <ol style="list-style-type: none"> 1. Lots of options for creators to build an AR experience 2. Web-based and does not require any additional software. 3. No coding or prior AR knowledge is required. Has a mobile companion app to view AR experiences. <p>Weaknesses:</p> <ol style="list-style-type: none"> 1. Built on a pricey subscription-based usage model. 2. Missing an integrated help feature to understand the functionality.

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<p>Overly app</p>	<p>Overly is an online platform to build your augmented reality content without code.</p>	<p>The Overly app has a few questions when registering to understand the user. The questions focused on identifying whether a user was an artist/content creator, marketer/pr person, a museum or art gallery, a publisher or writer, educator or tutor, or used for personal use. However, there is no clear indication if these questions change the experience.</p> <p>The interface for Overly focuses on simplicity with clearly labelled icons. The web app tutorials and help were missing, although they did provide a blog post to help that drove people to another page. In terms of heuristics, the help and documentation heuristic can be improved to assist first-time users in navigating through the interface or their first creation.</p>	<p>Strengths:</p> <ol style="list-style-type: none"> 1. Lots of features for creators when building an AR experience 2. Web-based and does not require any additional software. 3. No coding or prior AR knowledge is required. 4. No cost for a basic plan for personal use (limited features) <p>Weaknesses:</p> <p>Missing an integrated help feature to understand the functionality, especially first-time users.</p>

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<p>Mirra https://mirra.co/home/overview</p>	<p>As a Creator, use Mirra's environments, components and drag-and-drop functionality so you can focus on executing your vision. You won't have to code, and you can build and view right in your browser.</p>	<p>Includes environments that can be modified. Upload any of your own assets to make your experience your own or use our library and market to help fill out your vision. For the first time, you can design multi-dimensional experiences filled with the sights, sounds, environments, and pathways you want.</p> <p>We tested the free version of the app on a MacBook Pro system on a desktop using a web browser. First you select an environment from either pre-defined defaults or uploading your own. Then you can choose to add objects to your scene which include 3D objects, 2D images, ,2D video, 360 image ,360 video, text, hotspots, audio, paths and charts using a simple drag and drop interface.</p>	<p>The authors distilled the software into 8 main steps, so you don't feel overwhelmed. It can be difficult to get back to previous steps. For instance, you can change the background, but when you want to go back to a previous screen to access tools, the tools do not remain fixed to the page. You end up hitting the back button in the browser. It was not intuitive how to save your work. If you hit the back button too many times, you can end up losing your work with no warning.</p>