

# **Augmented Reality**

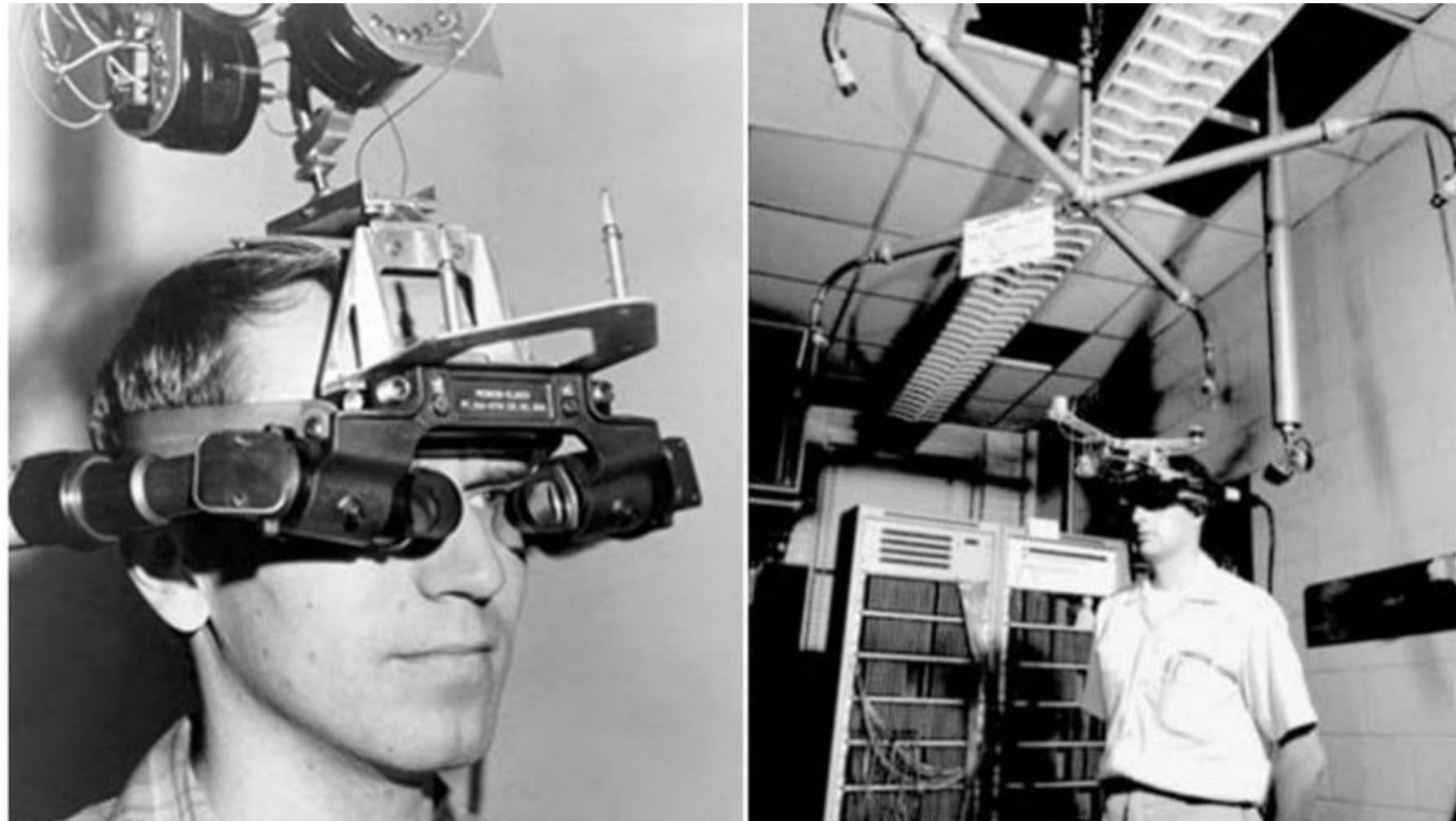
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02

But First, a  
Historical  
Outlook

# 1968

Ivan Sutherland creates the first augmented reality system, which is also the first virtual reality system.



It uses an optical see-through head-mounted display that is tracked by one of two different 6DOF trackers: a mechanical tracker and an ultrasonic tracker

03

# 1974

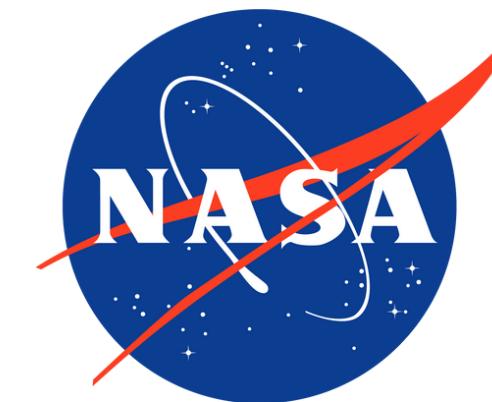
'Videoplace'. This was the name given to a laboratory that was built by Myron Kruger, a computer researcher and artist, at the University of Connecticut;

Here, projection and camera technology were combined to create an interactive experience where silhouettes were emitted onto a screen and were used as a form of interaction with the system;



# 04

# 1990s



## 1990, 1992

With the term 'Augmented Reality' being coined in 1990, 1992 brought the first fully functional AR system created by Louis Rosenberg.

05

## 1998

Sportsvision broadcasts the first live NFL game with the virtual 1st & Ten graphic system – aka the yellow yard marker. This system has since been updated to be used in different sports.



## 1999

NASA created a hybrid synthetic vision system of their X-38 spacecraft. The system leveraged AR technology to assist in providing better navigation during their test flights.



# Back to the 2000s

2000

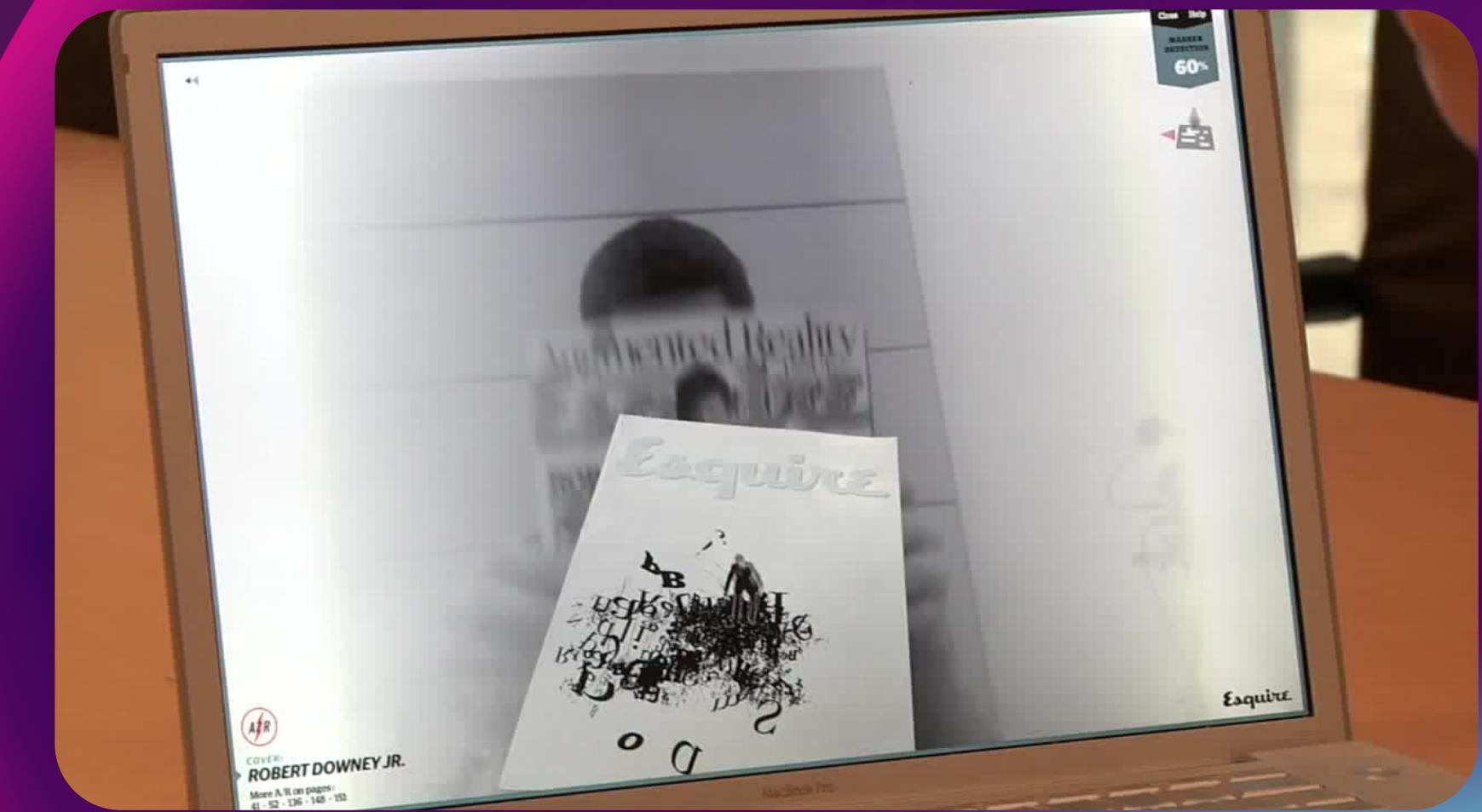
The first open-source AR development library was developed: **ARToolKit**

2003

Sportvision, a sport TV channel, gave viewers an aerial shot of a football field, all projected on a physical logo structure

2009

Esquire Magazine uses AR to print media. If the reader scanned the magazine cover, an AR segment would appear



06

# 2010s

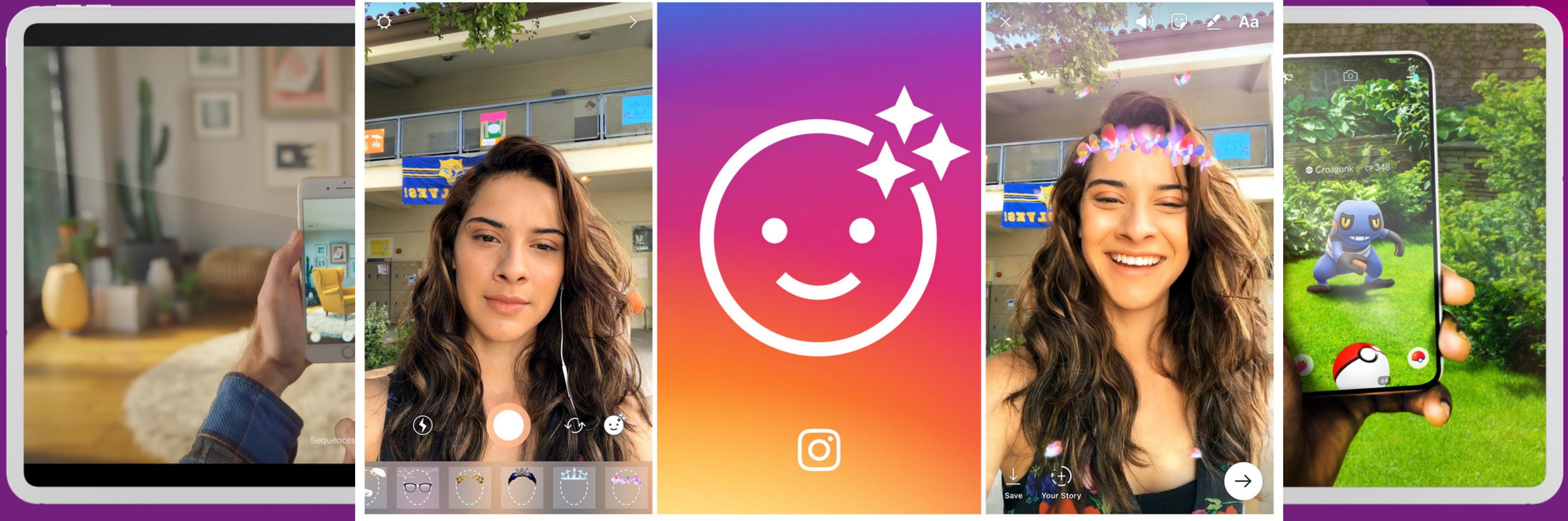
2013: Volkswagen incorporates AR into their in-house technical applications, which show mechanics how to operate and work on a vehicle;

2014: Google Glass - pair of AR glasses that users could wear to have an immersive AR experience;

2016: Microsoft HoloLens - Windows 10 running on a pair of glasses, with scanning of surroundings, user customisation and adaptation;

2017: IKEA's Place app - virtual preview of home decor;

# Today?



09

What is it?  
How does it all  
work?

# 101 on Augmented Reality

## What is it?

A computer system that immerses its users' senses in a way that they can interact with computer-generated objects, in real time and in the real world.



## How does it all work?

- It all begins with a camera-equipped device;
- The user aims the device onto a surface, and the device interprets it;
- A 3D model is then loaded onto the device and projected onto the surface;
- The user moves around and gets to see the various angles of the model.



What is it  
useful for?

# Archaeology

Allows Archaeologists to formulate possible site organizations according to the already existing structure;

Computer generated models of ruins, buildings, landscapes, etc., have been included in touristic applications.

These images can also show how archaeological sites experienced different stages of excavation.

# Medicine

Most probably the most important field where AR can be implemented is within the medical field.

Here users can:

- View locations of life-saving devices such as defibrillators and first-aid kits;
- Patients can describe their symptoms better using AR;
- Nurse assistance in day-to-day activities (ex. finding veins);
- Operation Room assistance;
- Education, both for med-school students and for children learning about their body.



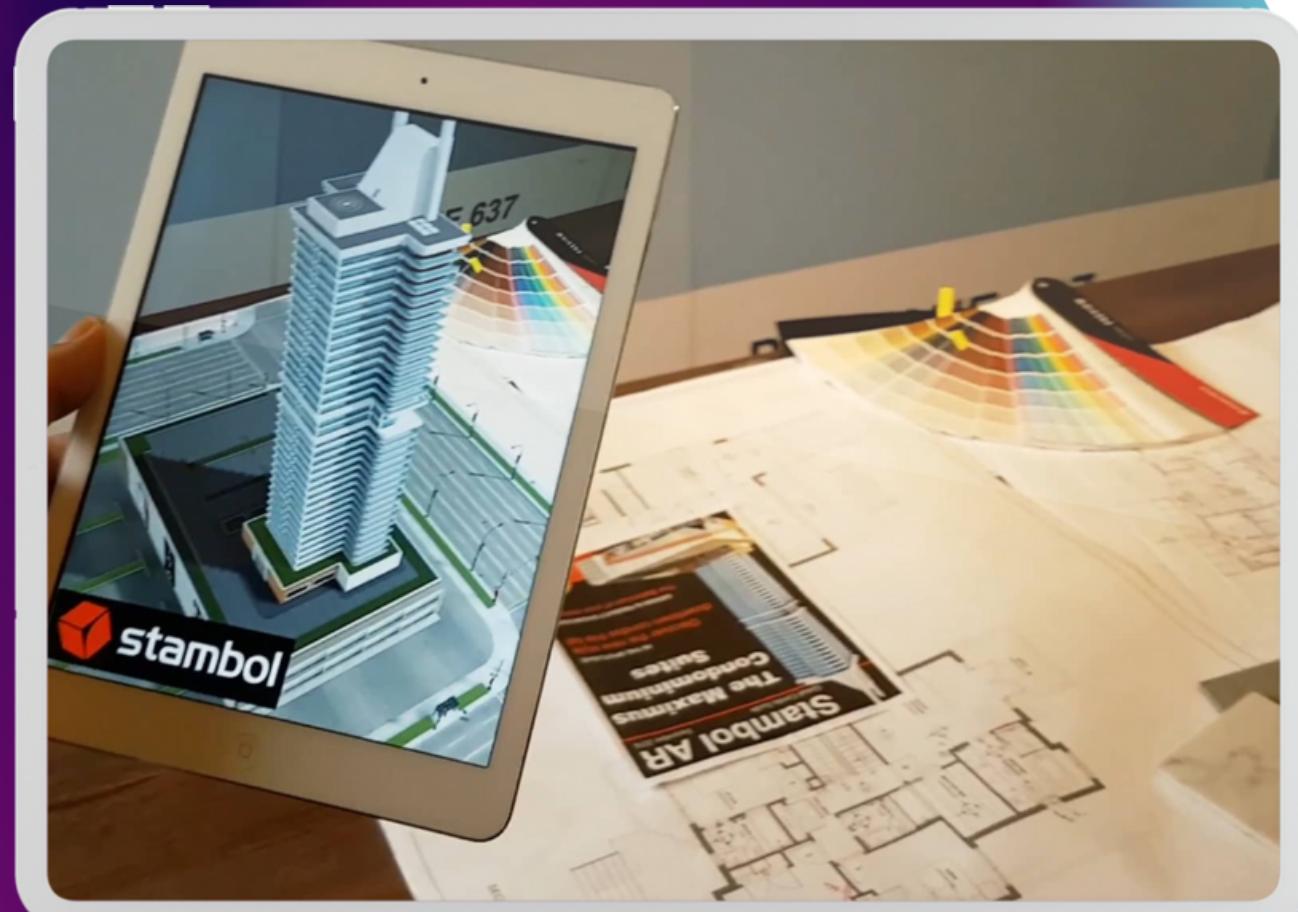
# Architecture

Building visualisation can also be aided by AR. When building on a property, showing a client an alteration, the possible end-product of a project;

AR can make this all possible as it can project the 3D image onto the unoccupied property;

AR can also be applied as an architect's workspace, rendering 3D visualisations of 2D designs;

Sight-seeing can also be enhanced by AR, giving a new experience to tourists that have an interest in architectural sight-seeing.



# Urban Design and Planning

01

AR can be used to create augmented reality maps, buildings and data feeds projected onto tabletops for collaborative viewing by built environment professionals.

02

Outdoor AR promises that designs and plans can be superimposed on the real-world, redefining the remit of these professions to bring in-situ design into their process.



# Commerce

Trigger images, such as QR codes and barcodes can be used as a form of triggering another form of media to transmit different forms of virtual marketing

Traditional print-only publications are making use of AR to connect these forms of marketing so as to give a different form of interaction with potential clients

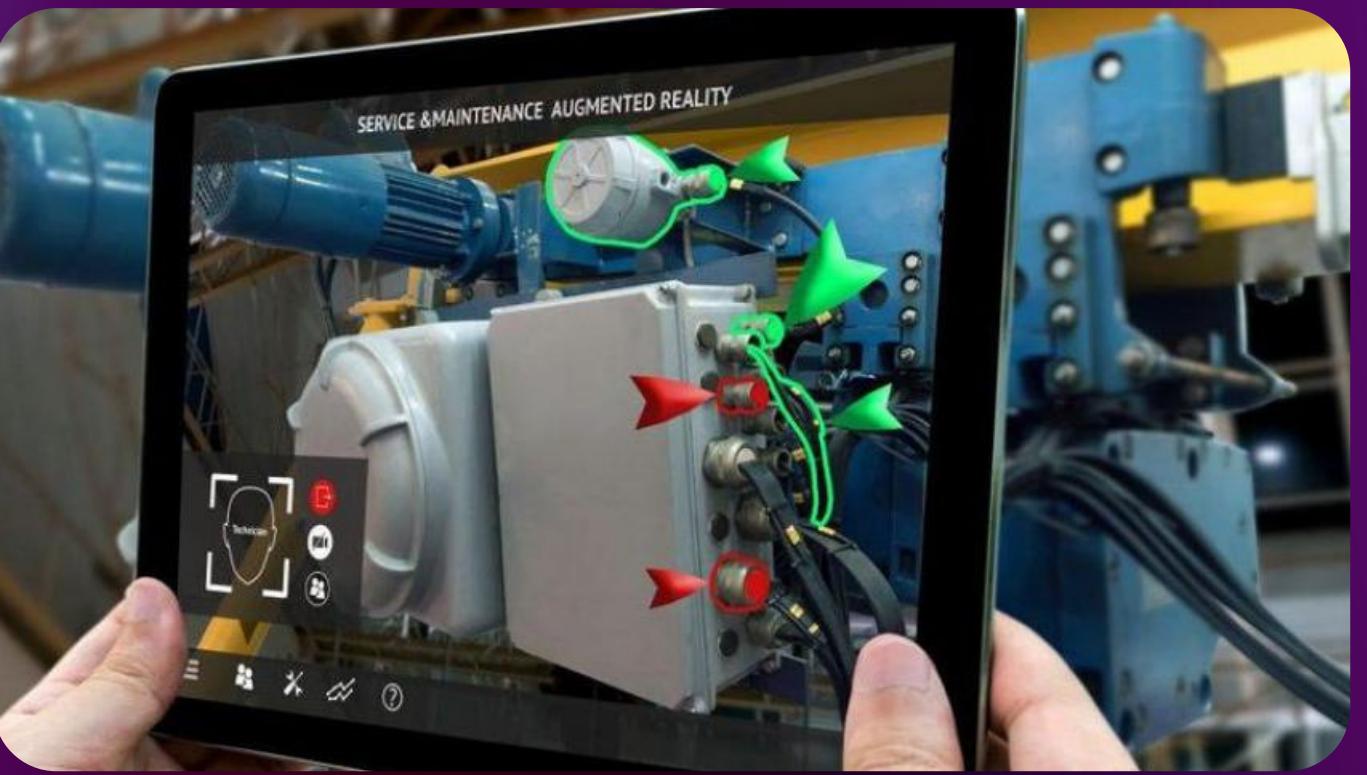


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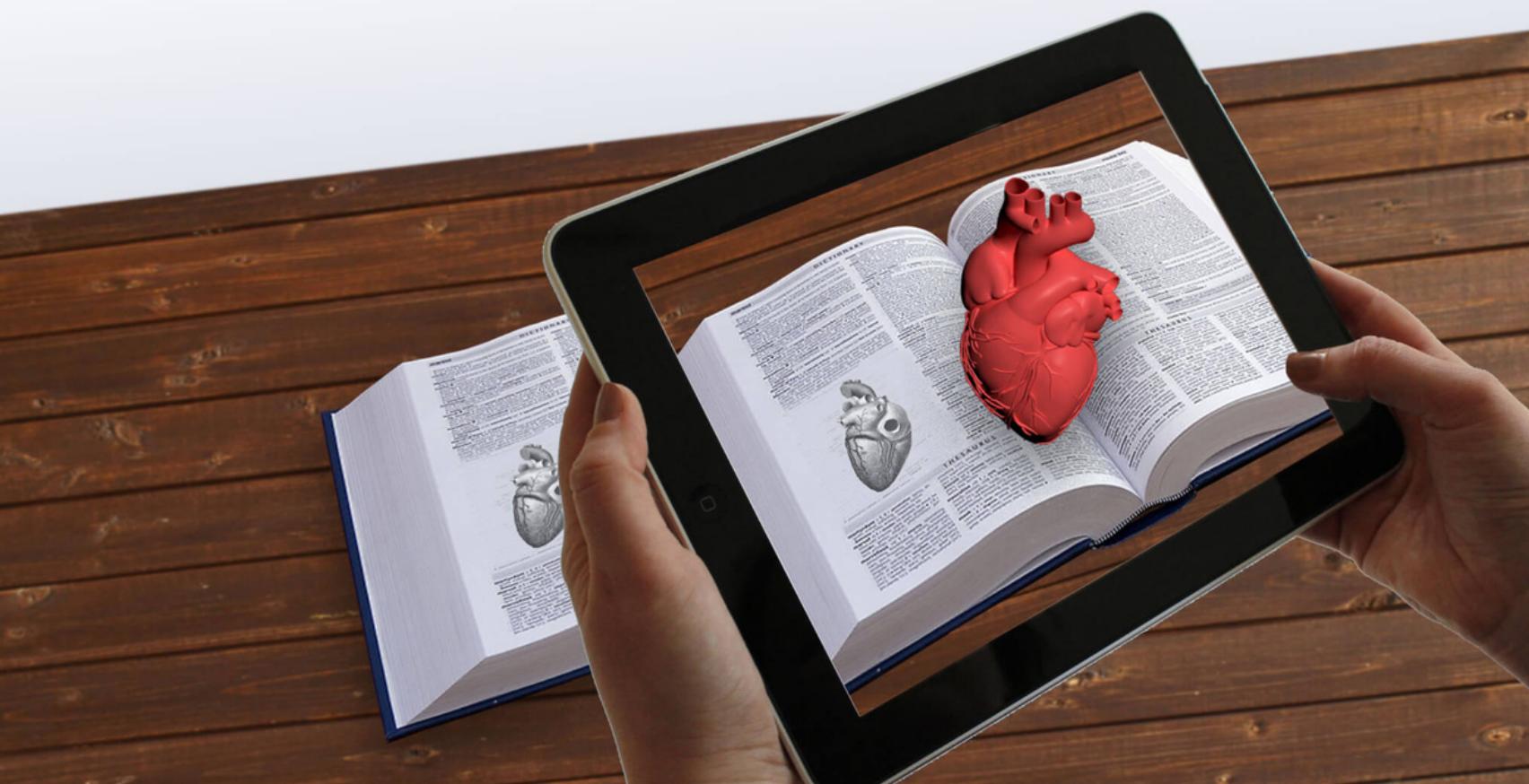
# Industrial Applications

AR can be used as a substitute for physical, paper-based operations manuals, where physical parts of the system are projected onto the user's device, which helps reduce mental effort and eases workflow

Digital instructions increase operator safety by removing the need for operators to look at a screen or manual away from the working area, which can be hazardous. Instead, the instructions are overlaid on the working area



# Education



With the evolution of Google Glass and the HoloLens, a new method of teaching can surge, where texts, video, audio, textbooks, all learning material can be a supplement within the already existing teaching method;

In higher education, Construct3D, a Studierstube system, allows students to learn mechanical engineering concepts, math or geometry via the use of supplementary AR generated elements;

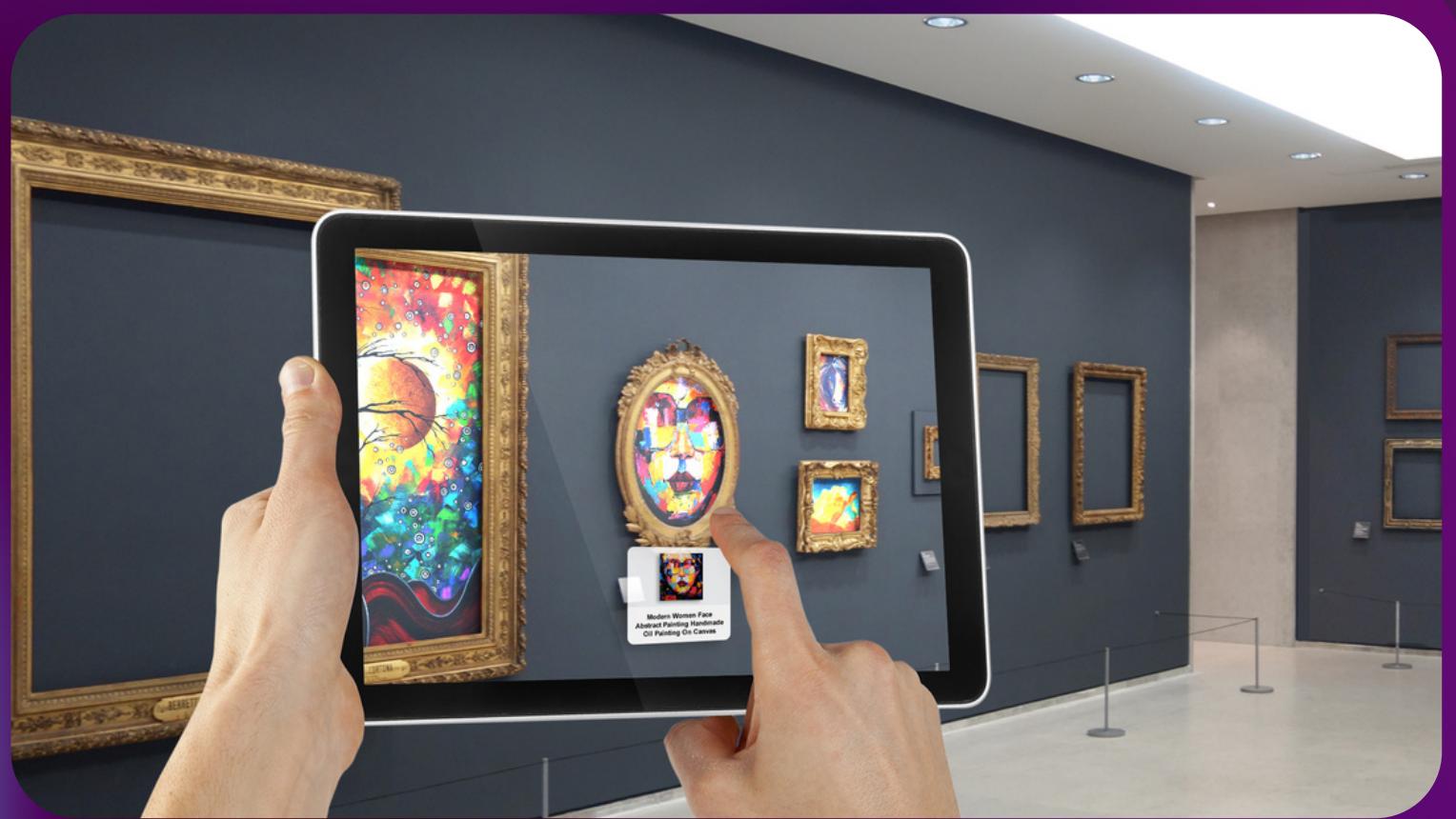
Chemistry AR applications allow students to visualize and interact with the spatial structure of a molecule making use of a marker object held in the hand.

# Visual Art

An AR app called Trace and Draw allows visual artists to trace the real world onto their smart device, where Artists can save an image to their mobile device and then incorporate it into the live camera feed;

The best example of AR application is that of the New York Museum of Modern Arts (MOMA) where the famous Pollock gallery was, to the naked-eye, quite average;

But, once visualised through the museum's mobile application, a different view was given, allowing users to interact with generated objects, molding and altering accordingly





# Video Games

Pokemon Go must be the most well-known mobile game which has AR incorporated into the user's experience, but there are many others;

Regarding gaming, AR is seen as the future within the mobile gaming paradigm, whilst it's causing Virtual Reality, is the route taken by console and computer gaming.

# Augmented Reality on Android



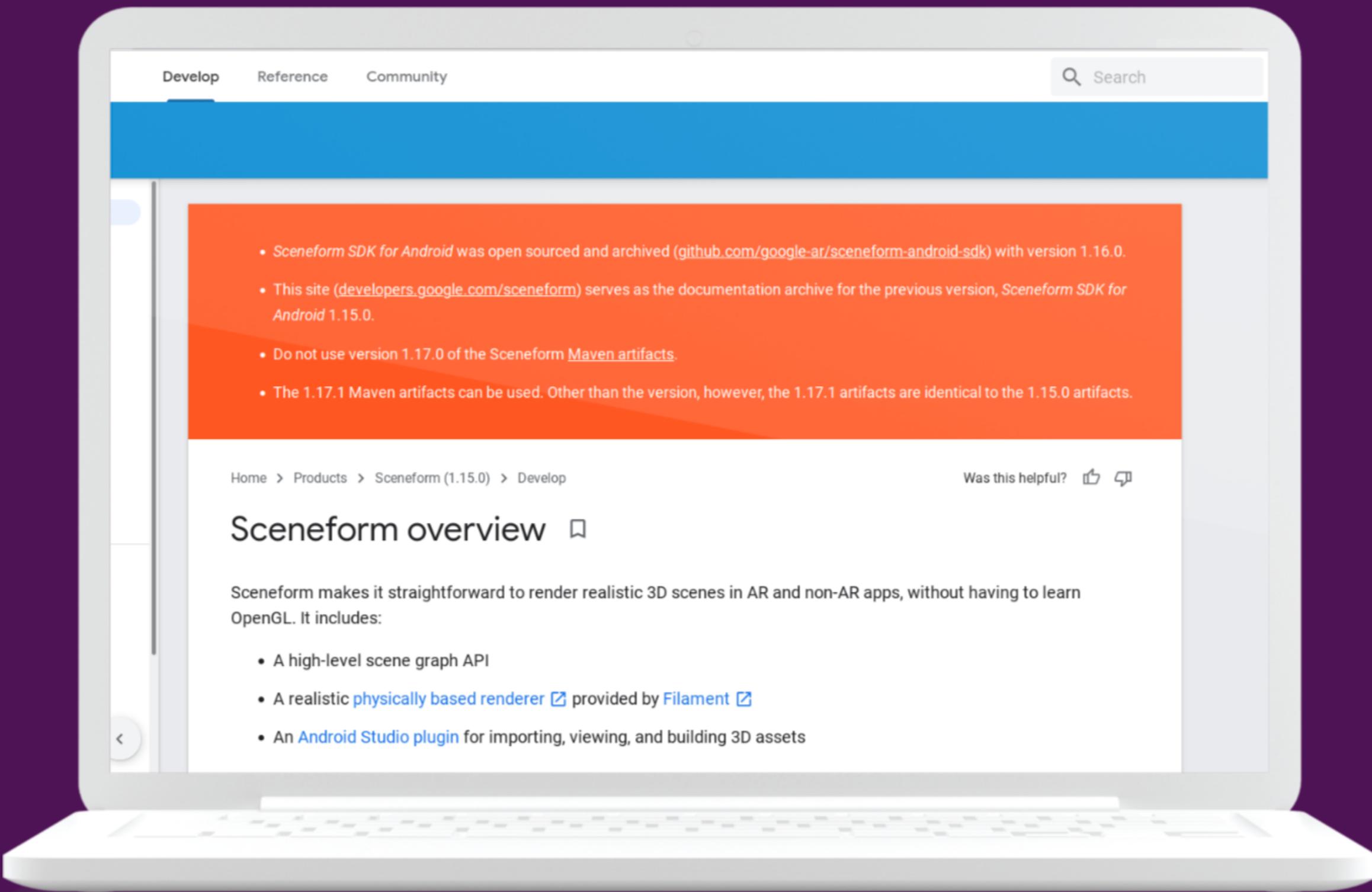
# Google ARCore



# Google Sceneform



# Google Sceneform Deprecation



# Sceneform Maintained





The background features a dark purple gradient with several overlapping circles in shades of blue, green, and yellow. Superimposed on these are thick, curved arrows in red, yellow, and blue, forming a dynamic, circular pattern.

Now, Hands-on Action

# Demonstration and brief explanation of a sample project





Thank you  
Any questions?