

The Impact of Augmented Reality (AR) in Interactive Art:

Today, hugging the rim of the 21st century, art is no longer just a canvas hung squarely on the wall. It's more than that. It's coming full circle and finding fresh life. The whole of art is barreling headfirst toward another new frontier; only this one is full of computer code.

Augmented Reality entered the scene during one of the most polarizing decades in history, the 1960s. As war, protests, sit-ins, and the hippie counterculture emerged, new and exciting advancements were being made on the tech front. The invention of AR will forever be wedged between the start of the now-famous Rolling Stone Magazine and Neil Armstrong's first steps on the moon.

It was the computer scientist Ivan Sutherland who developed an AR head-mounted display system during his time at Harvard. It was named The Sword of Damocles, after the legend where Dionysius, a nature god of the Greek Myths, invited Damocles to a banquet and seated him beneath a sword suspended from the ceiling by a thread. The headset offered a mixed reality by displaying computer-generated graphics.



(The Sword of Damocles - the first AR headset. Source: codereality.net)

AR began to expand as universities and large companies grabbed tight and ran with the invention. Early forms of the technology were used for military and aviation simulations where virtual data was placed over the physical environment.

Now, for the sake of this particular article, we have to leave 1968 and the decades that followed and jump backward into the past.

Interactive art before Augmented Reality

Interactive art is interesting because, on some level, it feels like humans have been interacting with art since the beginning. Since the days when we were painting on cave walls. However, in 2019, Barbara Ehrenreich published a piece in [The Guardian](#) about our current self-obsessed society and how the cave art of the Paleolithic Age didn't put humans at centre stage. The art, mostly of animals and wildlife, lived on cave walls, only to be painted over again and again.

There was an understanding of the impermanence of what we could imagine and a fair distance between the artist and the art.

Yet - as time catapulted forward and humans evolved, by the end of the 19th century, as George Fifiield, founder of [Boston Cyberarts](#), put it, everyone understood that the artist was in charge of making the art. And by the end of the 20th century, just 100 years later, there was interactive literature, web art, interactive installation art in museums, and video games.

The definition of interactive art is art in which the viewer can participate, where their participation produces an outcome. Basically, it's art that the viewer can play with in some form. While many definitions say that interactive art is always technological, George Fifiield's definition rings the truest – not all interactive art is technological, and not all technological art is interactive.

With interactive art, there is an element of chance. We don't know what will happen when the viewer interacts. There is, in most cases, no set outcome.

John Cage, an American composer and visual artist, started to work with chance after studying Zen Buddhism and Eastern Philosophies. It was after discovering the I-Ching (Yijing), the Book of Changes - an ancient Chinese divination text that used a set of coins to come up with one of 64 possible hexagrams, all with their own meaning, that composed the solo piano piece titled Music of Changes. Written in 1951, it used the flipping of coins to determine the music's pitch, rhythm, dynamics, and duration.

In 1963, Nam June Paik started to experiment with television as a medium for art, inspired by the German [Happenings](#). His exhibition, The Exposition of Music - Electronic Television at the Gallerie Parnass in Wuppertal, Germany, featured TV sets that viewers could interact with.

There was the piece, 'Zen for TV,' in which a viewer could meditate in front of where Paik turned a TV on its side, which had a white line running down the middle of the screen.



(Zen for TV interactive art piece by Nam June Paik. Source: ArtStation)

There were others in what was called Participation TV. Viewers could interact with each to provoke different emotions and energy, making them active participants in the artistic experience.



(Participation TV by Nam June Paik. Photograph: [Peter Brotzman](#))

As art and technology began to mix, there was an inherent need for the viewer to engage. Video games and video cameras became artistic outlets. This set the stage for what was to come with Virtual Reality and Augmented Reality, immersing the participant in the artwork itself.

Augmented Reality and art find their place

We left AR back with Ivan Sutherland and the beginning of its use by military and corporate entities.

In 1981, the artist [Jeffrey Shaw](#) created pioneering sculptures using augmented reality by using a Fresnel lens and a semi-transparent mirror placed on top of a monitor, allowing the viewer to move the monitor while viewing a number of computer-generated objects through the mirror.

By 1999, the ARToolKit was developed by [Hirokazu Kato](#). It was one of the first AR SDKs for mobile, which first ran on Symbian and then iOS with the iPhone 3G in 2008. It works as an open-source computer tracking library for the creation of augmented reality applications that overlay virtual imagery over the real world.

This meant that people could create AR applications for mobile with viewpoint tracking and virtual object interaction. With this new technology, it would be possible to point your mobile device at an object and receive information about the object in real-time.

Rather quickly, museums began to see this technology as a way for audiences to interact with artwork that would usually remain still and encased behind glass.

In 2005, artist [Hugo Barroso](#) created an installation piece titled Pret-a-Porter for the National Centre of the Arts in Mexico City. It used wearable AR. The user could stand in front of a digitally augmented mirror wearing simple clothes and headgear that sported AR markers. Depending on the markers worn, different costumes would appear over top of the user's own clothing.

That same year, artist [Rafael Lozano-Hemmer](#) displayed a public art installation based on self-representation that used robotic projectors, computers, and surveillance cameras called Under Scan. Thousands of video portraits were projected onto the ground but only became visible when viewers walked over the top of them to create a shadow. When a person moves, taking away their shadow, the portrait would react by turning away and becoming dormant and eventually disappearing.



(Photo of User Scan video. Source: the artist and bitforms gallery NYC)

In 2009, the Powerhouse Museum used location-based AR applications to highlight photographs of Sydney's earlier eras. The photos were plotted on a map, which displayed them as "points of interest" to users.

And in 2018, the Cleveland Museum of Arts introduced the ArtLens Studio. It offered prompts that allowed users to play games, sculpt, and paint in AR using 3D scans of objects that were in the museum's collection.

Where are we now

We're at the edge of the future, of course. Within the last few years, art and technology have intertwined like never before. Augmented Reality has allowed for art and its data to become more accessible to every day viewers.

It also provides the ability to convert an empty space into a vibrant and interactive piece of art.

In an amazing display of music and art interacting with the audience, artist Rafik Anadol worked with the Philadelphia Orchestra to perform Beethoven's Missa Solemnis, one of history's most stunning musical creations. Missa Solemnis 2.0 uses a database of 12 million images of buildings that Beethoven would have known in Europe – and custom software that allows

artificial intelligence to listen to the Orchestra and create architectural images from the composer's time.

In December of 2023, [Global Street Art and Google Arts & Culture](#) partnered to create new augmented reality murals powered by Google's Geospatial Creator in Adobe Aero. The tools empower creators to design and share augmented reality experiences without having to code. The artists were able to create their work remotely. Audiences used a QR code painted on the side of a street mural to immerse themselves and interact with the augmented pieces.

Recently, [HATO](#) - a gallery-like restaurant, partnered with Sketch to create an app that works to bring to life [David Shringley's](#) artwork with AR technology. The app uses stickers that can be placed around the user's surrounding area. The stickers then become animated and interact with the AR world as viewed through the user's phone.

Machines and computer code have become a tool for self and creative expression. By interacting with augmented reality, we form a stronger connection with the artwork, allowing it to take a new shape. With some, we are confronting old and unkempt parts of our psyche as the individual and collective. With others, we are simply at play, enjoying a meal while experiencing prize-winning art.

Augmented reality leaves room for both education and good old-fashioned fun. As we move forward, we'll continue to see it used in everything from gallery exhibitions to TikTok filters. The Avant-garde artists of today will continue to push the barriers and expand our understanding of what it means to participate in their creations.

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