History of AR

Thr, June 25 (Week 1.5)
Pepper’s Ghost (Pepper, 1862)
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Beam splitter: the idea behind transparent AR displays.
Pepper’s Ghost (Pepper, 1862)

Beam splitter: the idea behind transparent AR displays.

Ghost on the stage is not real but only a reflection.
Stereoscopic Television Apparatus

Filed by Mccollum Thelma in 1943, granted 1945.

From Thelma’s application:

My invention relates to stereoscopic television apparatus. An object of my invention is to provide a new and improved stereoscopic television apparatus whereby a plurality of people can simultaneously and with equal facility view an object which has been transmitted by stereoscopic television.
Telesphere Mask (Morton Heilig)

Sensorama (Morton Heilig)

Philco Headsight (1961)
The Sword of Damocles (Sutherland, 1968)

or The Ultimate Display
The Super Cockpit (1986)

Boeing (Caudell & Mizell, 1992)

Coined the Term “Augmented Reality”

To increase productivity by telling what to do.

Figure 1. An application where the HUDset is used to dynamically mark the position of a drill/rivet hole inside an aircraft fuselage.
Boeing (Caudell & Mizell, 1992)
Other AR Systems (From Azuma 1997)

Figure 13. Video see-through HMD conceptual diagram.

Figure 14. An actual video see-through HMD. (Courtesy Jannick Rolland, Frank Biocca, and UNC Chapel Hill Dept. of Computer Science. Photo by Alex Tremi.)
Other AR Systems (From Azuma 1997)

Figure 15. Monitor-based AR conceptual diagram.

Figure 16. External view of the ARGOS system, an example of monitor-based AR. (Courtesy David Drascic and Paul Milgram, U. Toronto.)
Knowledge-based AR (Feiner et al., 1993)

Example: Printer Maintenance
Accurate Registration (Azuma & Bishop, 1994)

Figure 1: Wooden frame for calibration and registration

Figure 14: Wooden frame and static registration viewpoints

Figure 2: View seen in HMD, virtual axes on real frame
Room-sized Tracking (Wang, 1990)

Figure 1: The inside-out tracking system
Sony (Rekimoto & Nagao, 1995)
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Figure 3: The magnifying glass metaphor

Figure 4: NaviCam generates information about Rembrandt
Sony (Rekimoto & Nagao, 1995)
Mobile AR (Feiner et al., 1997)

A Touring Machine (a desktop on your back)
Mobile AR (Feiner et al., 1997)

Fig. 6. Hardware design of our prototype campus information system.
Visionnaires at somewhere of MIT (circa 1997)

Figure 2: Different styles of wearable computing hardware.
Wearable Computer

Steve Mann

Evolution of Steve Mann’s “wearable computer” invention
AR Headset as a Wearable Computer’s Display

Thad Starner
AR Headset as a Wearable Computer’s Display

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<h2>What’s a Wearable?</h2>

To date, personal computers have not lived up to their name. Most machines sit on the desk and interact with their owners for only a small fraction of the day. Smaller and

--**--Emacs: index.html 7:43pm 0.25
Write file: ~/*/scratch*
AR Conferencing (Kato & Billinghurst, 1999)
ARToolKit (1999)

A popular tracking library for AR applications.

Sold to Daqri in 2015, which stopped operating 2019, but still alive and the idea is living inside libraries, for example, OpenCV.
Magic Book (Billinghurst et al., 2001)

Fig. 3. Using the MagicBook to move between Reality and Virtual Reality.
Magic Book (Billinghurst et al., 2001)

Collaboration (Sharing)

Fig. 4. (a) Collaboration in the real world, (b) Sharing an AR view.

Fig. 5. Collaboration in the MagicBook.
SPAAM (Tuceryan et al., 2002)

The classic of calibration (registration) method.
Summary

60s: The First Attempts

80s–Mid 90s: Development of Basic Functionalities

Mid 90s–: Introduction of Applications