AR AND VR IN GAMING

Matthew Lessman and Conner Hubbell

THE BEGINNING

AR & VR HISTORY

ORIGIN STORY

1830S

Charles Wheatstone invents Stereoscope

BASED ON STEREOPSIS

“Our two eyes perceive objects from differing perspectives”

THE FIRST VR MACHINES

Moving pictures come along in the 1960s

Depth perception and a 3-D view of the world

SENSORAMA

The world’s first VR headset!

SENSORAMA AND THE SWORD OF DAMOCLES

SENSORAMA

Mini TV tubes for vision

MAJOR FLOP!!!

Too big and bulky, ahead of its time

FIRST AR DEVICE

Sword of Damocles: interaction with a wireframe ‘rooms’

Gives way to “Sword of Damocles,” also being the first computer-connected success

THE 1990S CRAZE

FAILED PROTOTYPES

Sega, Virtuality Group, and others

NINTENDO'S VIRTUAL BOY

Only at-home VR device in the 1990s

A NEAR MISS

Few users due to high price and poor graphics

FINALLY – COMMERCIAL SUCCESS!

2012 OCULUS RIFT

First commercially viable VR device!

MODERNIZING VR

First VR headset that saw widespread attention

OTHER COMPANIES

Google, Apple, Playstation, Microsoft, Meta, etc.

Paved a path for the modern headsets we know today

IMPROVEMENT TO CONSUMER-GRADE VR

2016

MORE COMMON CONSUMER ITEM!

RISING GAME CREATION

GAME PRODUCTION

INDIE GAMES

Notable games: *SuperHot VR* and *Job Simulator*

SIMPLICITY IS KEY

Lower movement; keeps things in front of the user

AAA (HIGH PROFILE) GAMES

Duds (ex.): *Skyrim*

Simpler graphics so the system and user are not overloaded

GAME PRODUCTION – CONTINUED

AAA STUDS

Resident Evil: 7 and
Half Life: Alyx

FIRST 'KILLER' VR GAME

The well-known:
Beat Saber

HALF LIFE: ALYX

Improved mechanics (weapons, items) and physics in-game

ABOUT THE METAQUEST 3

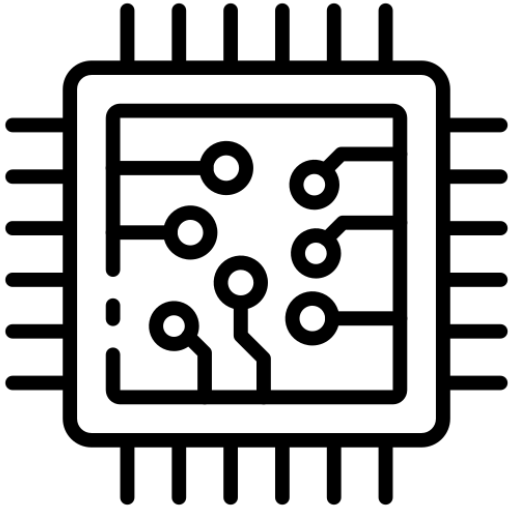
The Meta Quest 3, released in late 2023, is the successor to the widely popular Quest 2

DISPLAYS

- Dual LCD displays.
- Resolution: 2064x2208 per eye.
- Maximum refresh rate: 120Hz.

INTERNAL HARDWARE

- Chipset: Snapdragon XR2 Gen 2 (4nm).
- RAM: 8GB.
- Available Storage: 128GB and 512GB.
- Wi-Fi 6E for better connectivity.



SOFTWARE AND USER INTERFACE

BACKWARDS COMPATIBLE

Compatible with the existing Quest catalog.

INTERFACE

Familiar user interface for people upgrading

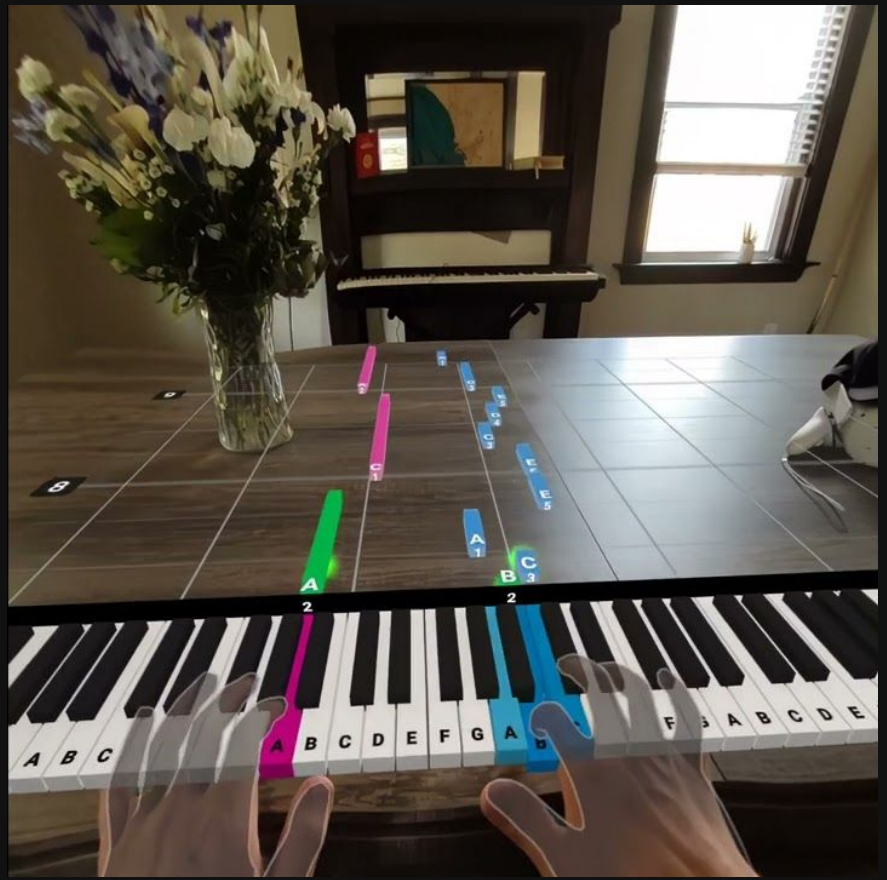
AR CAPABILITIES

Mixed reality mode and colocation features.

STEAMVR

Wired or wireless connection to PC

MIXED REALITY



CONTROLLERS - TOUCH PLUS

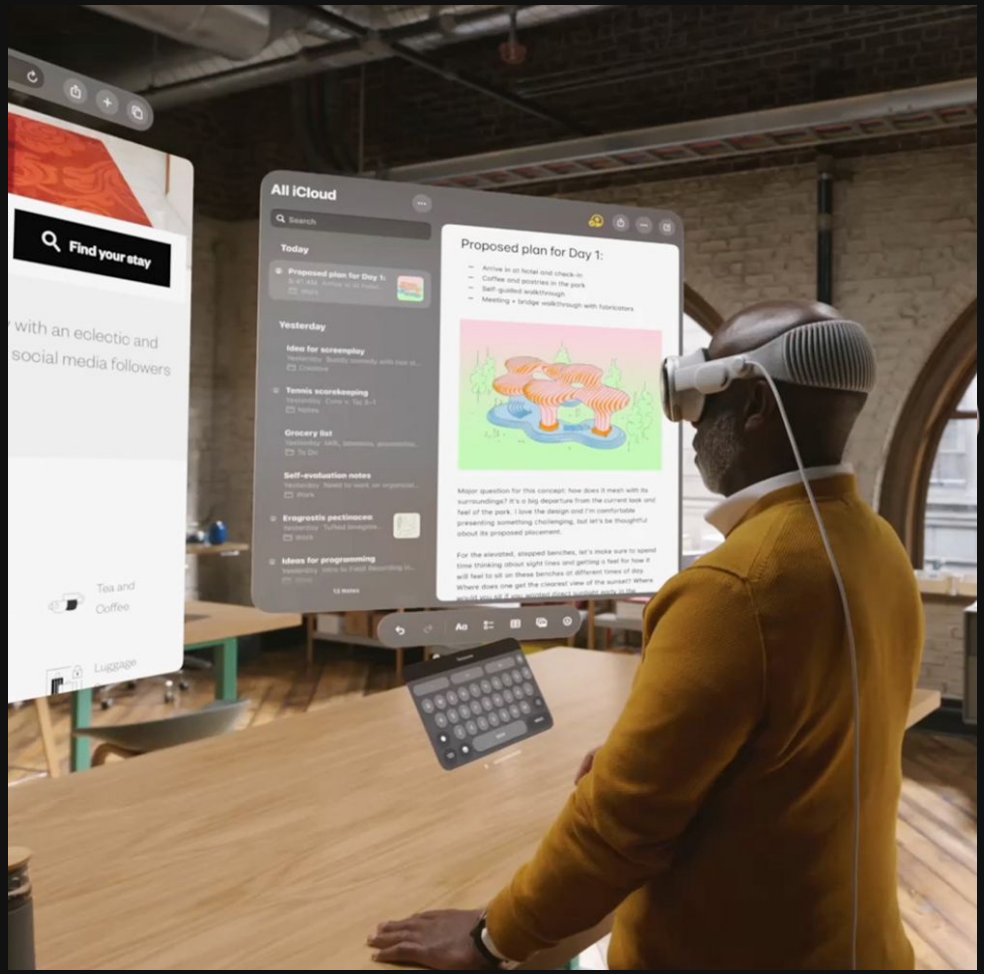
- Uses infrared LEDs for tracking
- Ringless design for easier use
- Controllers work together with continuous hand tracking.

THE FUTURE

APPLE VISION PRO

"A New Era of VR Technology"

AR AND VR EXPERIENCE



DESIGN AND COMFORT

FIT

- 3D Face Scan
- Light seal sizes
- Adjustable headband
- Balanced weight distribution

DESIGN

- 600g Weight
- 2.5 hour battery life
- Apple style

DISPLAY TECHNOLOGY

23 MILLION

Total pixels

- Over 4k per eye
- Less screen door effect

RESOLUTION

100 HZ

Refresh rate

- Low latency
- Smooth motion

FLUIDITY

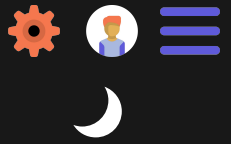
24/30 FPS

Video Playback

- For standard video or 24 fps films

CINEMATIC

VIDEO AND AUDIO CAPABILITIES



3D AUDIO

Spatial Audio with dynamic head tracking

AIRPODS

Lossless audio with AirPods Pro

AUDIO FORMATS

Supports Dolby Atmos, HEVC, and more

APPS

Most iPadOS apps already supported

PROCESSING POWER

M2 CHIP

8-core CPU, 10-core GPU

R1 CHIP

12-ms latency, 256GB/s memory bandwidth

Camera and Sensors

AR CAMERAS

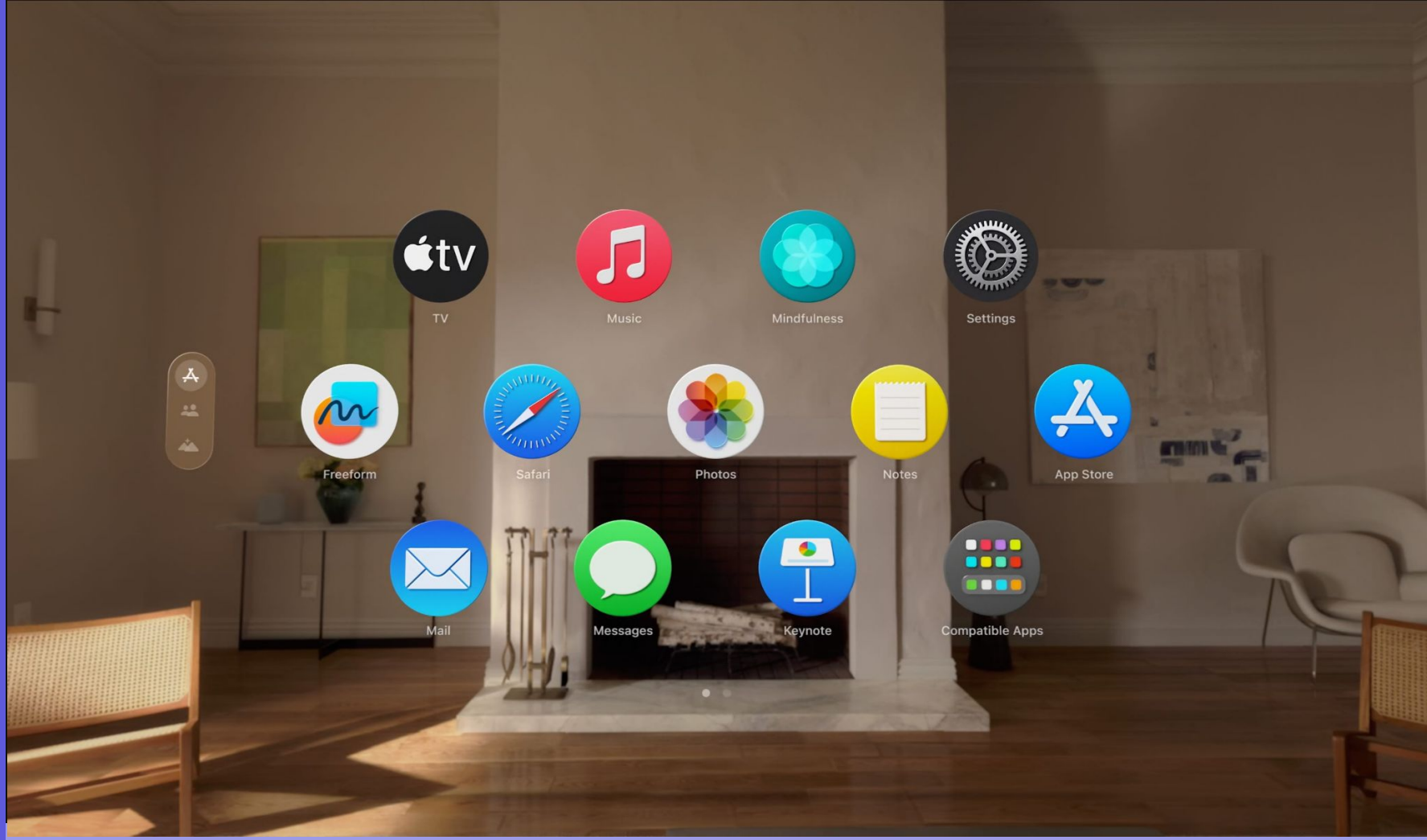
Stereoscopic 3D main camera system

LIDAR

Multiple high-resolution cameras and LiDAR Scanner

IRIS SCANNING

Optic ID for secure iris-based authentication


TV
Music
Mindfulness
Settings
Freeform
Safari
Photos
Notes
App Store
Mail
Messages
Keynote
Compatible Apps

OPERATING SYSTEM AND INPUT METHODS

VISION OS

- Custom apple OS for this device
- Intuitive Gestures
- Virtual Keyboard
- iPad App Compatibility

INPUTS

- Diverse options: Hands, Eyes, Voice
- Compatible with various accessories
- MacBook connectivity

DISCUSSION

FUTURE REALITIES

An AR/VR guide to future possibilities and dilemmas

AR AND VR CHALLENGES

AUGMENTED REALITY

- Short battery spans
- Heavier glasses
- Small display size
- Motion sickness
- Uncomfortable headsets
- Limited accessibility
- Prices

VIRTUAL REALITY

- Motion sickness
- Disorientation after long periods
- VR arcades going out of business
- 0.4% of gaming market as of 2023
- Hard-to-understand hardware
- Limited accessibility
- Prices

AR AND VR CHALLENGES – CONTINUED

VISUAL

Still some issues to figure out in terms of graphics and motion sickness

HAPTIC FEEDBACK

Feeling: delays or inaccuracies

OLFACTORY

More smelling features - hard to implement

NETWORK ISSUES

Can create lag and cause the VR to be inaccurate

AUDITORY

Good sound; but creating realistic sounds is still a struggle

SERVER ISSUES

Lag, inaccurate computing with AR

AR AND VR BENEFITS

MIXED REALITY

- Offers the best of both worlds between AR and VR
- More interactive for the user in terms of learning a game or new skill
- Applications in education and healthcare that reach beyond gaming
- “See through” cameras

IMMERSIVE VR WORLD

- Could potentially allow people to get together in a virtual world and play as themselves (self Minecraft)
- Allows users to interact with family through games and different worlds in the future

FUTURE IMPLICATIONS

THE POTENTIAL IT HAS

- Potentially the greatest tech ever
- Potentially a fad
- AI??? The Matrix???
- A ‘global game’ that everyone can tap into
- Create Role Player Games that span the cosmos and bend reality

WHERE IT CURRENTLY LIES

- People are starting to be able to learn quicker (games and other)
- Becoming more affordable and common; more opportunities
- Power control and matching all senses with the reality are a struggle
- It has come a long way since a 3D photograph

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