

Medical Core · Multi-user VR

OMFS VR - Multi-user surgical consultation

Build an application where clinicians and a patient join the same VR consultation room and look at one shared 3D jaw model and surgical plan together.

Period 2023.07 - present | Evidence state Ongoing | Portfolio tier Medical Core

Built a three-user VR consultation session in Unity with Photon PUN2 and Voice, where roles are assigned by join order and all three viewpoints share the same state of a CT-derived 3D jaw model and its measurement panel.

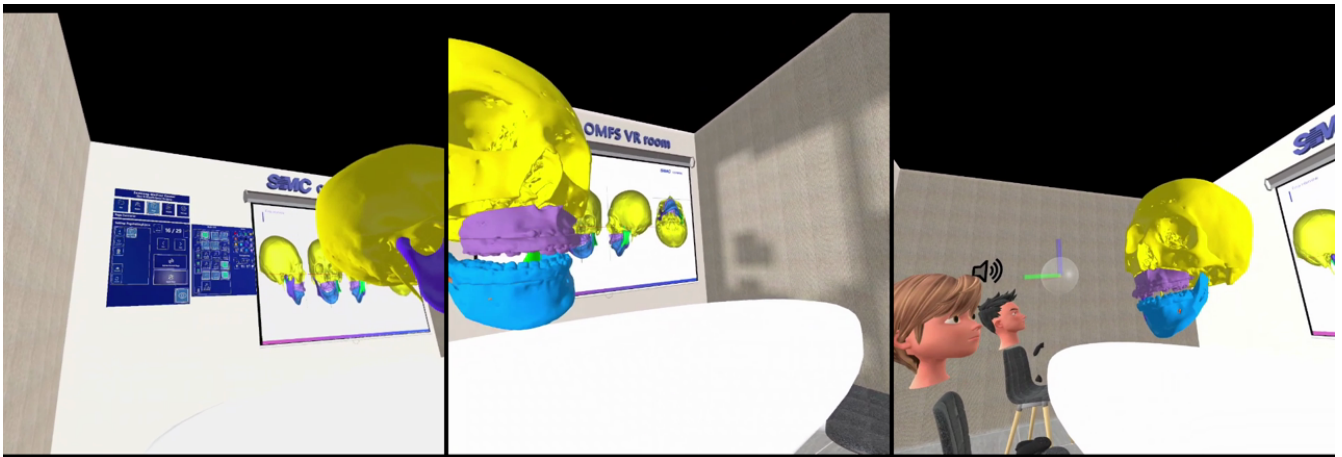


Figure 1. A 24-second clip of a three-user VR consultation session recorded from each participant viewpoint at once: clinician 1 (master) on the left, the patient in the middle, clinician 2 on the right; moving the model in one view updates all three.

Problem and system boundary

Orthognathic consultation has to explain 2D measurements and 3D skeletal change at once, and gathering around a single monitor gave no way to confirm that clinician and patient were looking at the same thing.

Owned decisions and implementation

My role

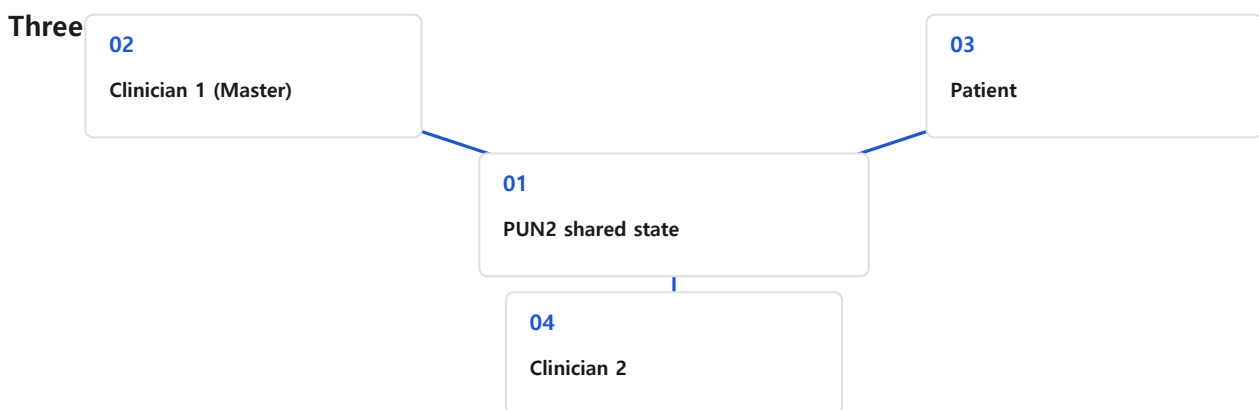
Owned the Unity client end to end: Photon rooms and role assignment, synchronization of model pose, segments, and page state, voice chat with speaker indication, DICOM volume loading, and backend integration, then carried out the port off a vendor-specific SDK onto OpenXR and Android XR.

Shared state

Assigned the clinician, patient, and clinician roles by join order, and reflected model pose, segment state, page number, and speaker indication to all three participants together.

Consultation space and client scope

Laid out the room around the consultation itself: three seats for clinician 1 (master), the patient, and clinician 2, a 2D measurement panel, and the 3D model area. Built the login to lobby to consultation-room flow, so that selecting a patient case served by the backend loads that CT volume as both a 3D model and cross-sections, then moved the input and camera rig off a single vendor SDK onto the OpenXR and Android XR standards so one build runs on more than one headset.



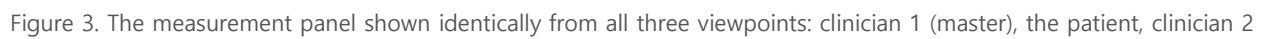
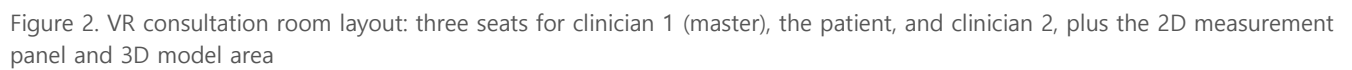
Explanatory system relationship diagram; it is not photographic or experimental evidence.

Verification and evidence ledger

A consultation-session clip recorded simultaneously from all three participant viewpoints is the evidence. Clinician 1 (master), the patient, and clinician 2 sit in one frame, so a viewer can check directly whether one person moving the model leaves the other two views showing the same pose and the same measurements.

Multi-user demonstration

Recording all three viewpoints at once makes the evidence checkable: one participant manipulates, and the other two views show the same state.



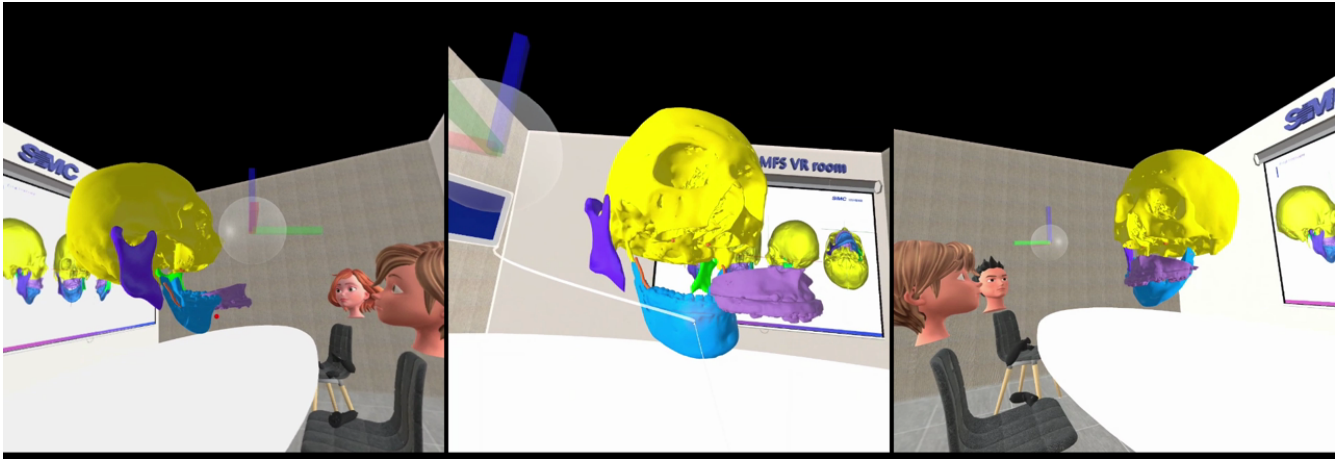


Figure 4. A detached maxillary segment reflected across all three viewpoints at once, with two avatars visible in the right-hand view



Figure 5. A headset session run in a hospital waiting area (faces de-identified)

Role, team result, and limits

Team result

Software copyright registration, the patient demonstration and survey, and the planned external-hospital validation are joint research-team results. The demonstration and survey are under way; the external validation is still only planned.

Limitations

The clip shows that synchronization and spatial layout work; it claims no improvement in consultation quality or treatment outcome.

Adoption boundary

The patient demonstration and survey are under way and the external-hospital validation is still planned. Do not turn the research team registration, demonstrations, or validation plans into individual or clinical-outcome claims.

Collaboration boundary

Oral and maxillofacial surgeons reviewed the consultation scenario and screen layout, and ran the headset sessions with the research team.

Implementation technologies

Unity 6 · Photon PUN2 · Photon Voice · OpenXR / Android XR · Meta Quest 3 · Galaxy XR · DICOM 3D

Primary capability

XR Application Engineering · Medical Navigation & Visualization

Registered public evidence

No external public link is currently registered.

What to bring

Share the problem, data or sensors, target validation, and schedule. We can define coordinate and evidence boundaries together.

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