

Remote Collaboration Applications



Existing Solution

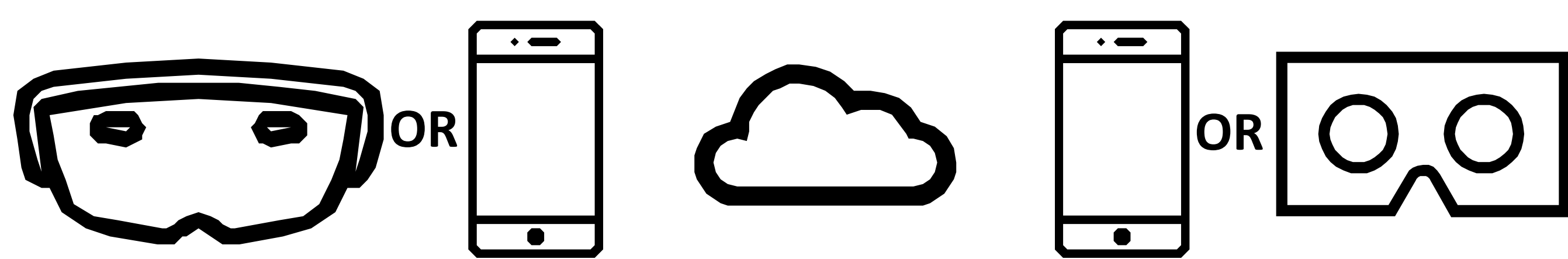


HoloLens



Oculus Rift

Proposed: Flexible Solution



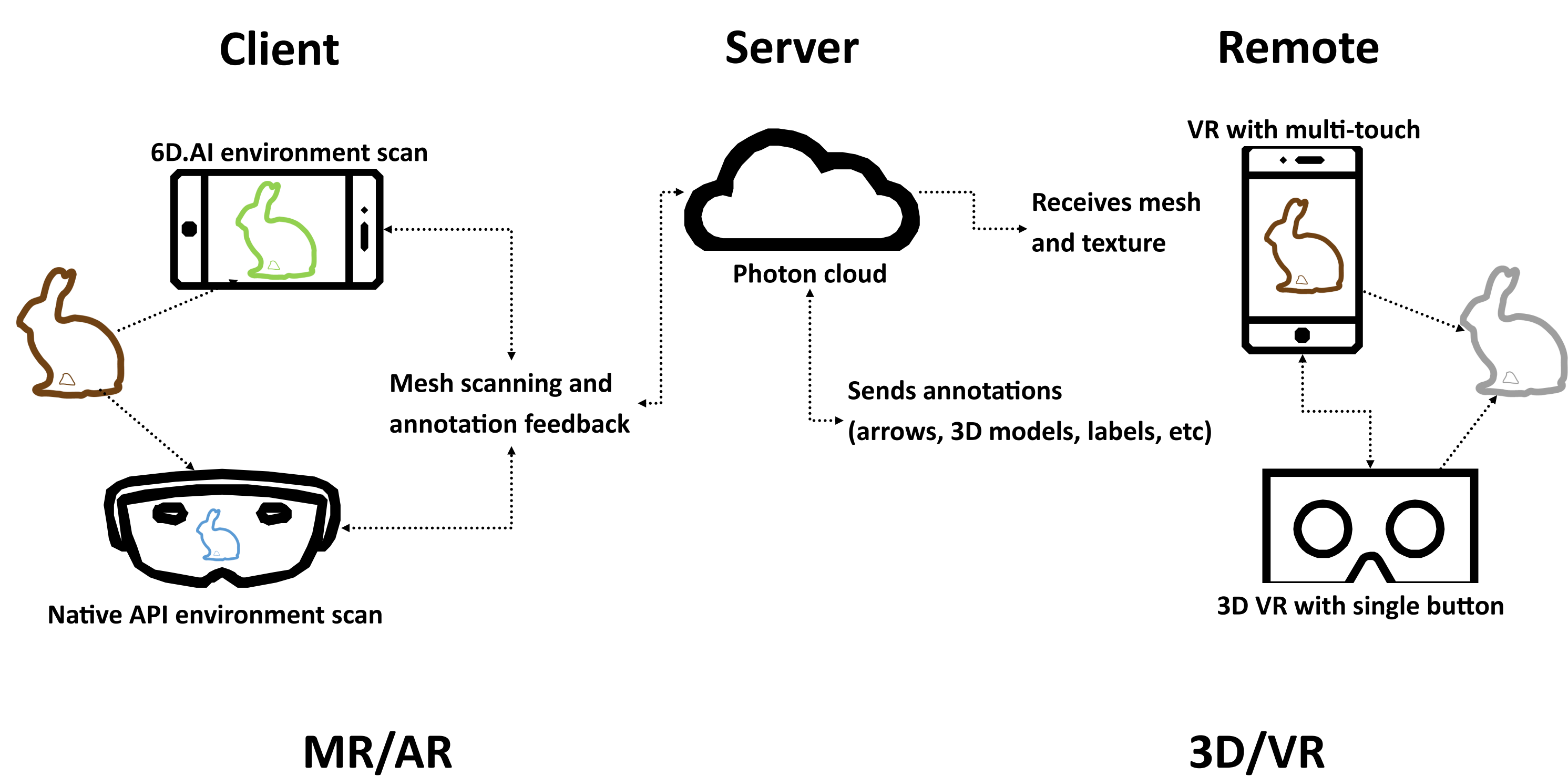
Mobile MR/AR

Cloud

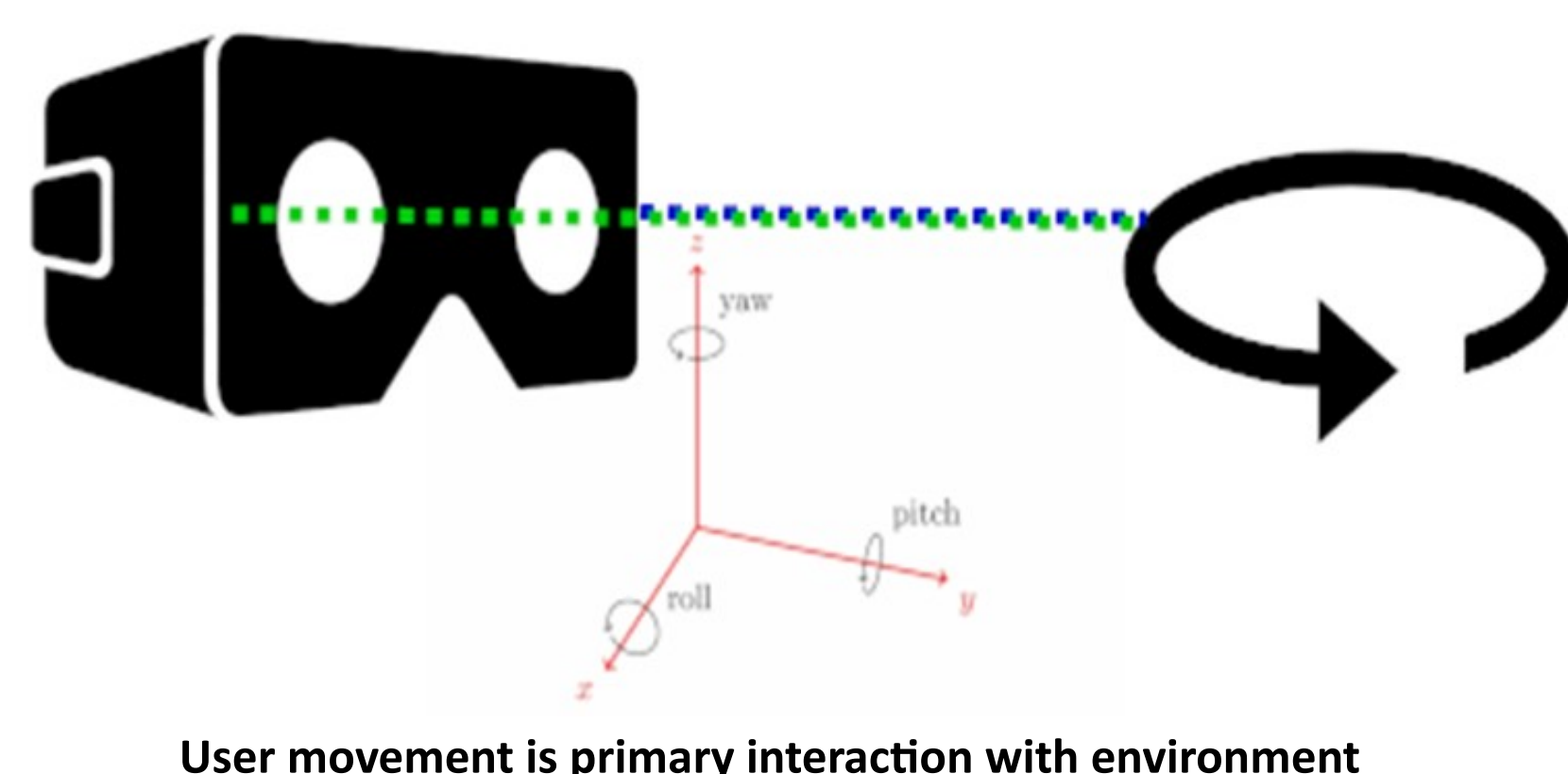
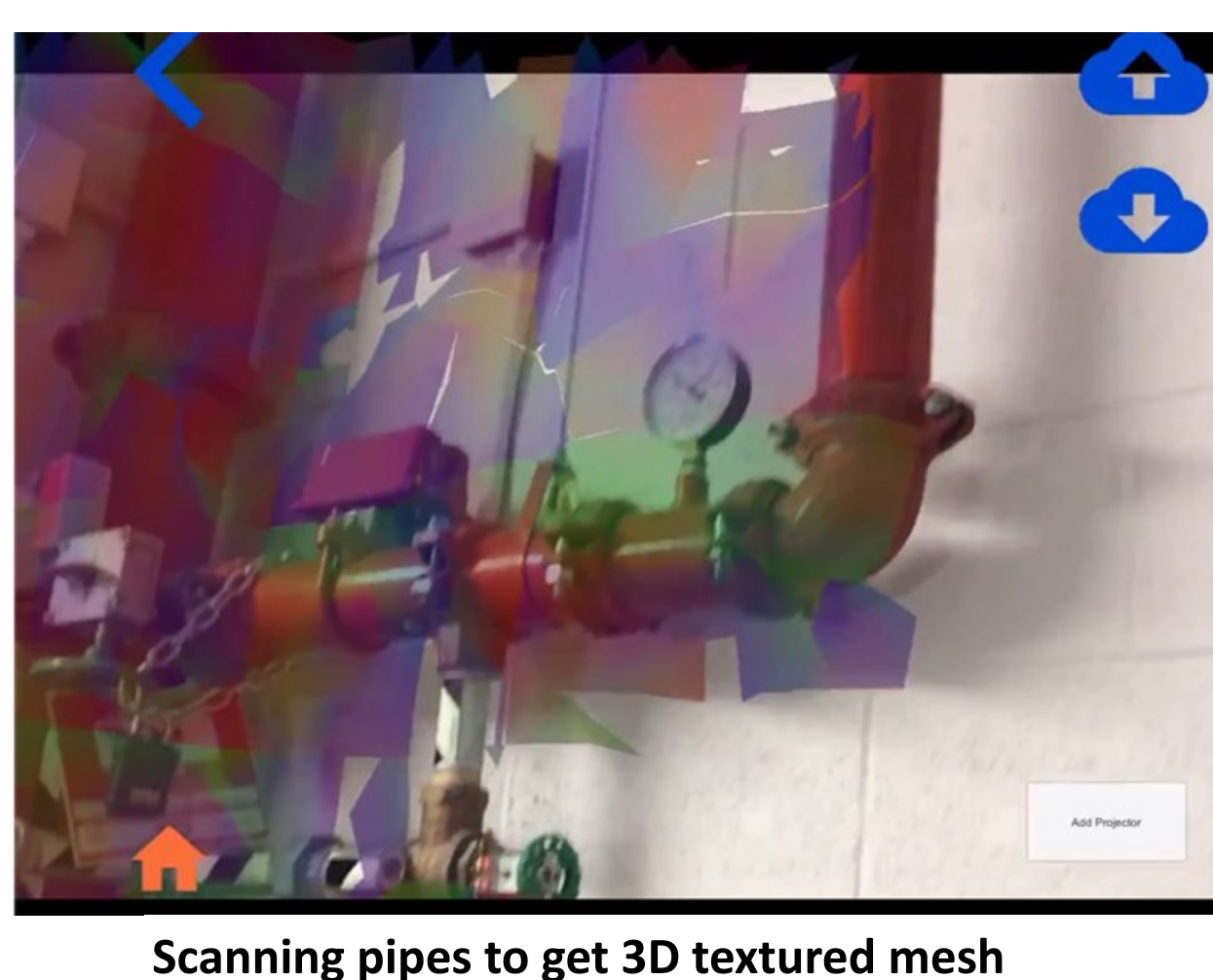
Mobile 3D/VR

Challenges

- Few mobile devices have depth sensors
- Existing mobile AR does not offer textured 3D model
- Annotations are limited to 2D without 3D models
- Mobile VR has very limited interface functionality



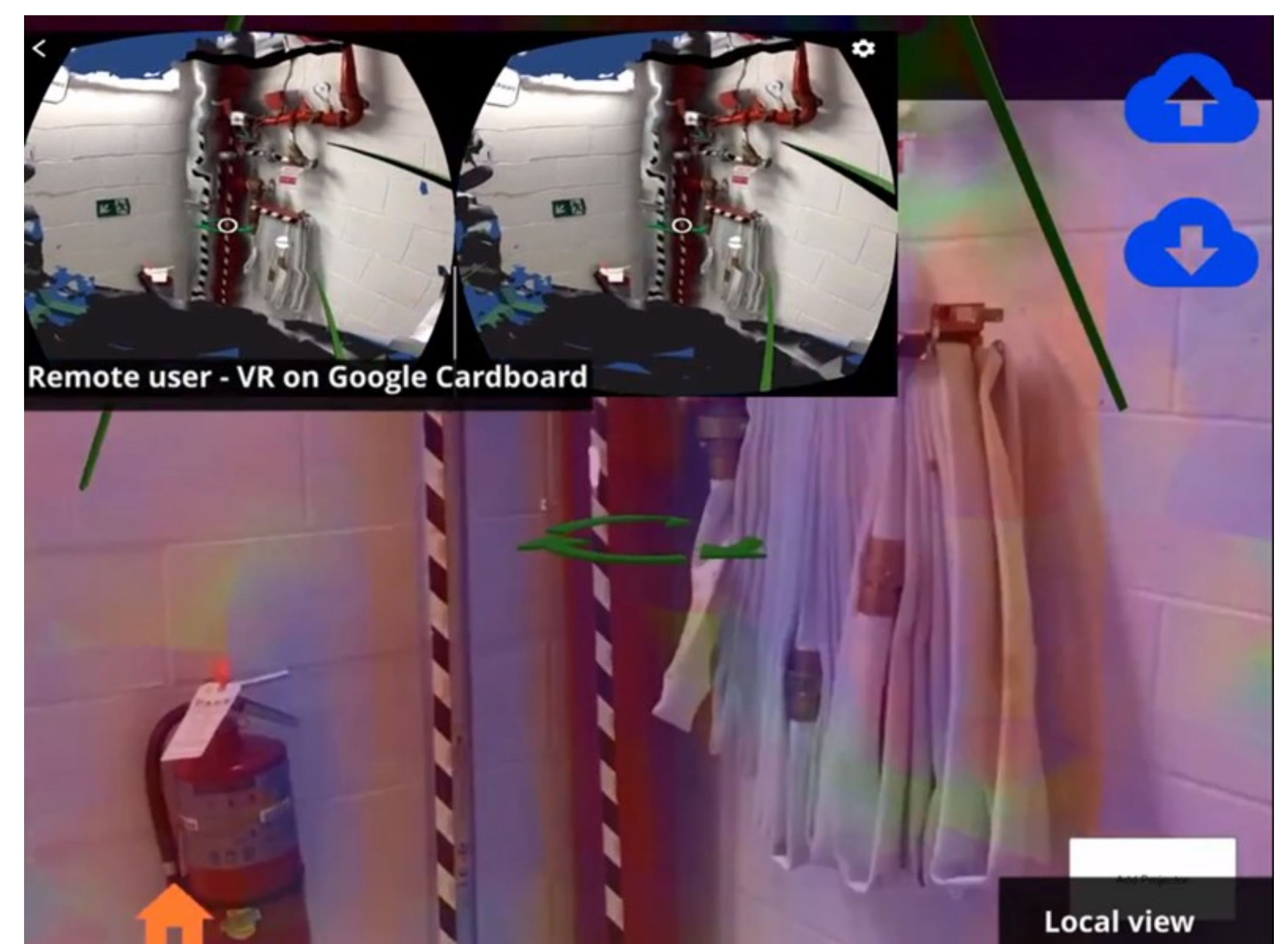
- Scan local scene to get 3D textured mesh
- Upload textured mesh to cloud
- Render annotations from remote side
- Render textured 3D mesh in mobile VR
- Use ARKit to navigate environment
- Similar inside-out tracking on desktop



Interaction Between Client and Remote

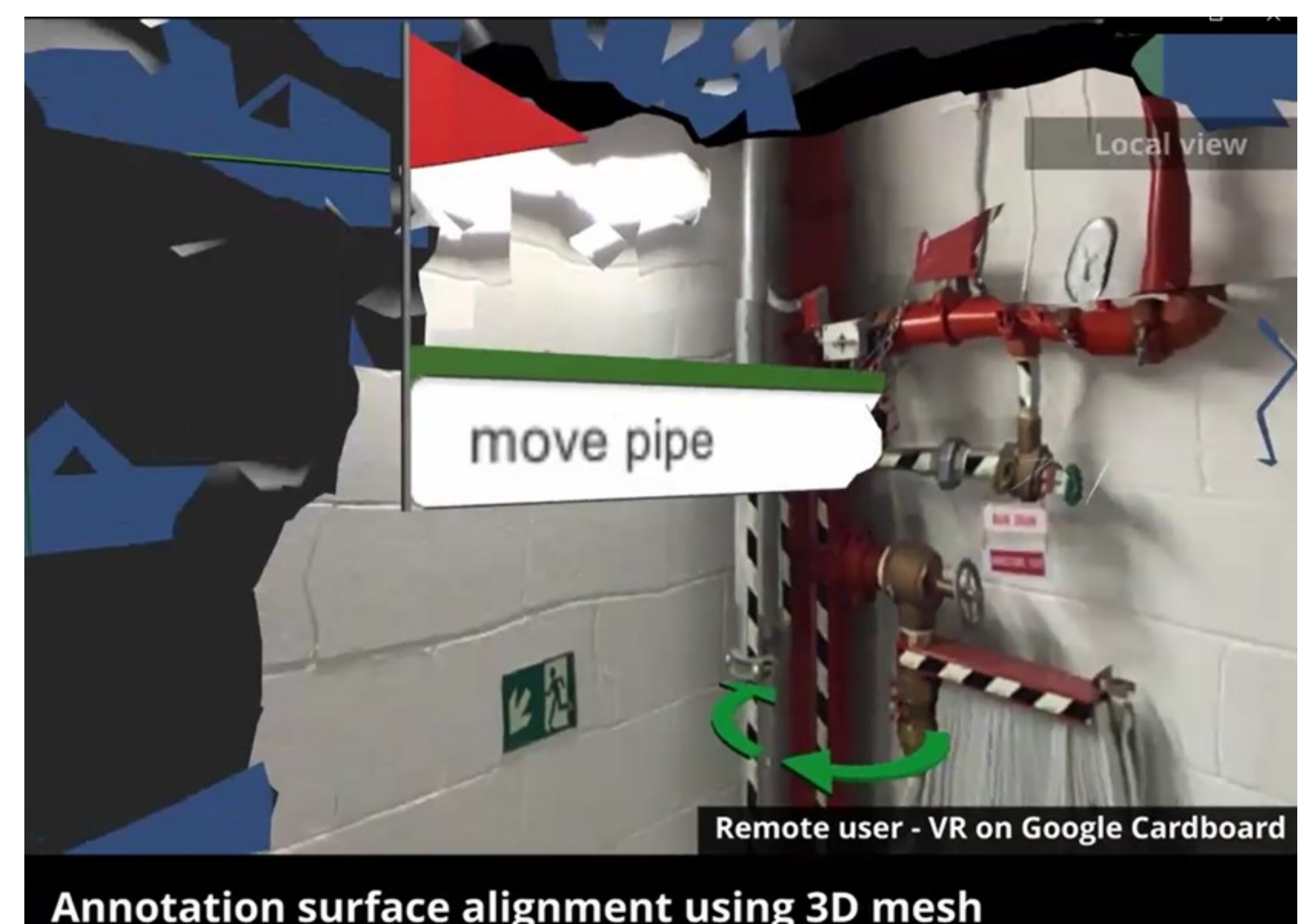
- Prebuilt 3D models and/or drawn annotations
- Independent POV or synchronized POV
- Virtual laser pointer or AR walking path
- Virtual landmarks

Gaze Indication



Both the client and remote views include gaze indicators so remote users know what their collaborators see.

Annotations



A pre-built annotation (circular arrows) and a virtual landmark with text annotation (red flag with text) in the remote 3D/VR view. The virtual landmark is aligned with the 3D wall surface for easy visualization.

Conclusion

- Viable mobile solution for remote collaboration
- Annotating feature using 3D models
- Simple interaction via user movement and touch
- Live feedback to both sides with individual POV

Acknowledgments

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