PRESENCE

What It Is.

PRESENCE is a toolset for hyper-realistic XR-based human-human and human-machine interactions.

Haptics technologies bring the sense of touch into virtual and augmented reality experiences, enriching immersion through tactile feedback.

By simulating sensations such as vibrations, pressure, and temperature, haptics allows users to intuitively interact with virtual objects and environments. Unlike visuals or audio, it directly engages the user's sense of touch, creating a cohesive multisensory experience.

Although current systems don't replicate touch perfectly, they significantly enhance presence, enabling intuitive engagement and a more convincing digital reality.

Key Features.

- **Multimodal Feedback:** Combines kinesthetic feedback with vibrotactile, contact, and temperature cues for comprehensive sensations.
- **High-Fidelity Resolution:** Supports texture identification or delicate object manipulation.
- **Seamless Device Compatibility:** Enables use across haptic gloves, vests, and controllers.
- **Dynamic Signal Encoding:** Standardized haptic coding allows consistent, scalable feedback across multiple devices.
- **Multisensory Synchronization:** Ensures tactile feedback aligns perfectly with visuals and audio, amplifying realism

What It Can Do.

Haptic technologies unlock new dimensions of XR interaction by delivering realistic touch sensations. With haptics, users can:

- Experience natural, tactile engagement with virtual objects in real-time.
- Perform training simulations that mimic real-world feedback, fostering muscle memory.
- Enhance emotional and physical immersion in XR-based gaming and storytelling.
- Augment healthcare applications by simulating touch in medical or rehabilitation contexts.

Advantages.

Haptics resolves one of XR's key limitations: the lack of tactile engagement. By adding the sense of touch, it:

- Boosts user immersion and embodiment in virtual environments.
- Enhances learning retention in training by simulating real-world feedback.
- Improves interaction naturalness, making XR experiences intuitive and enjoyable.

How Does It Work?

PRESENCE's unified haptic coding format unlocks the full potential of haptics across devices and industries. This advancement paves the way for scalable, immersive applications that seamlessly blend virtual and physical interactions.

The Tech Stack.

- **Wearable Haptics** Devices like gloves and vests simulate localized sensations, such as texture, pressure, and impacts, tailoring feedback to useractions
- **Grounded Tools**
  Haptic pens and robotic arms provide precision and kinesthetic resistance, essential for specialized tasks.
- **Advanced Actuators**
  Technologies like vibrotactile motors, piezoelectric actuators, and pneumatic systems deliver customizable sensations for varied applications.
- **Dynamic Rendering** PRESENCE ensures standardization, ensuring seamless feedback compatibility across diverse devices for scalable, interoperable experiences.

Impact.

Haptics transforms interactions across industries, offering new possibilities in:

Professional Collaboration

Remote teams enhance interaction with lifelike tactile engagement.

Manufacturing & Training

Improve efficiency. Simulate the feel of realistic tools to improve skill-building and safety.

Health

Provide immersive rehabilitation tools and precision touch in training simulations.

Cultural Heritage

Bring history to life. Allow users to interact with artifacts in a more intuitive way, making storytelling more incredible and engaging.

Co-financed by the European Commission under Grant Agreement ID 101135025