

AI-Powered Virtual Reality

How Artificial Intelligence, Virtual Reality, and Privacy Intersect

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VR in Training and Education

- Education, industrial safety, medical training
- Safe, repeatable simulations
- Performance feedback



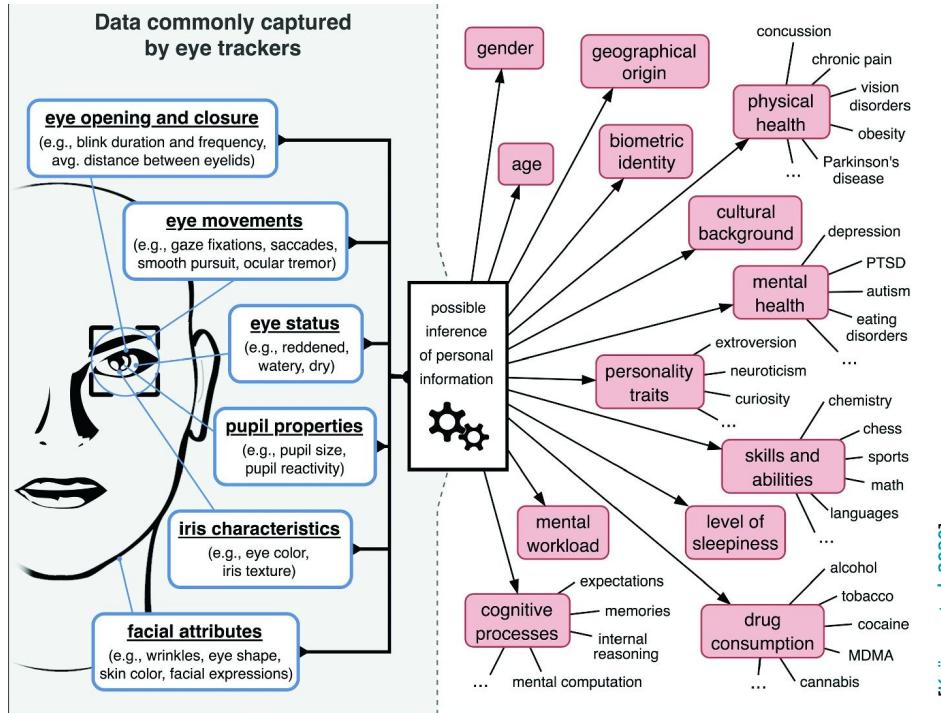
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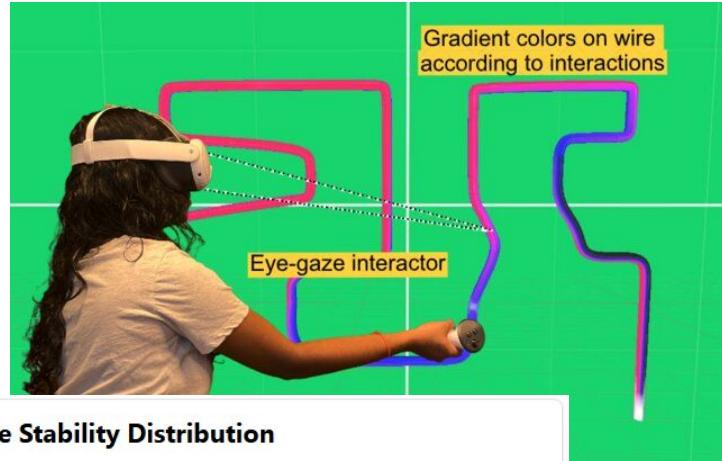
The Problem

- VR generates valuable data
 - Unused or forgotten
 - Storing raises privacy concerns

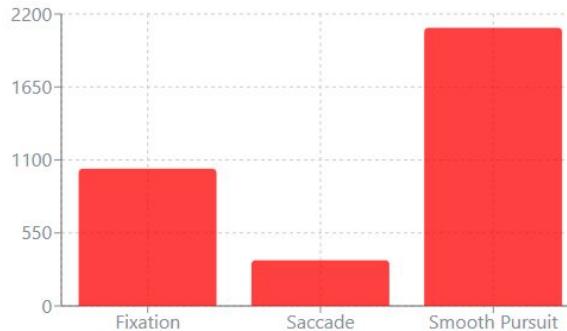


Making VR Reflective

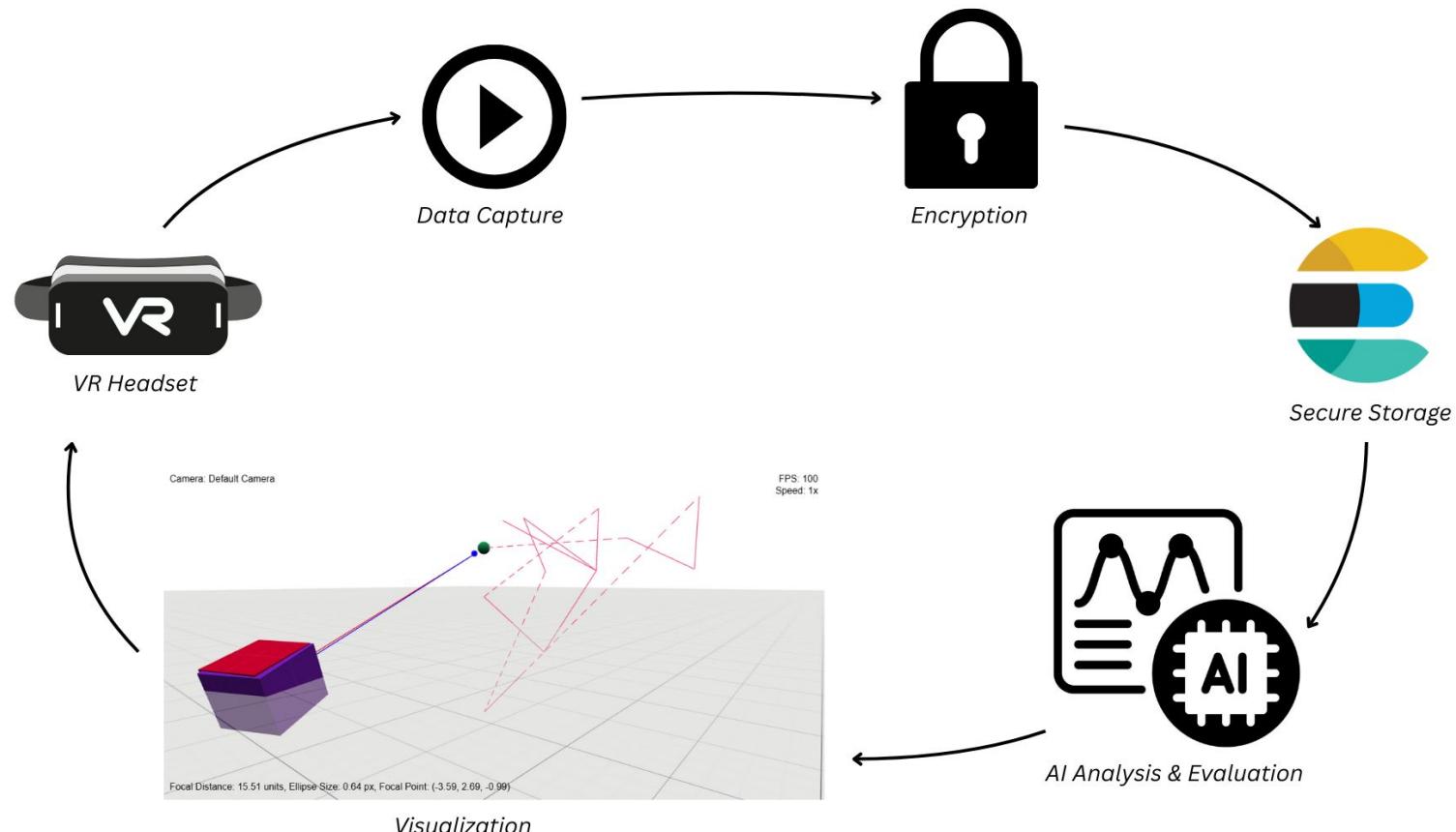
- Systematically **record** and store
- **Recognize** behavioral patterns
- **Feedback** and visualizations
- **Enhance** learning and performance



⌚ Gaze Stability Distribution

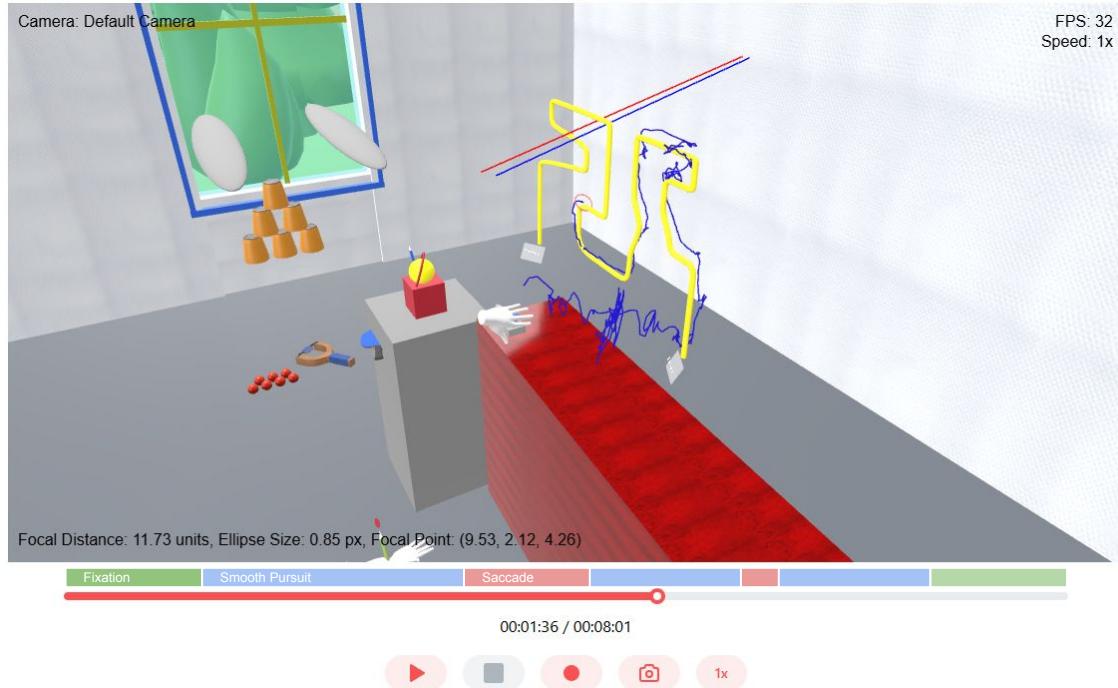


How the Data Moves



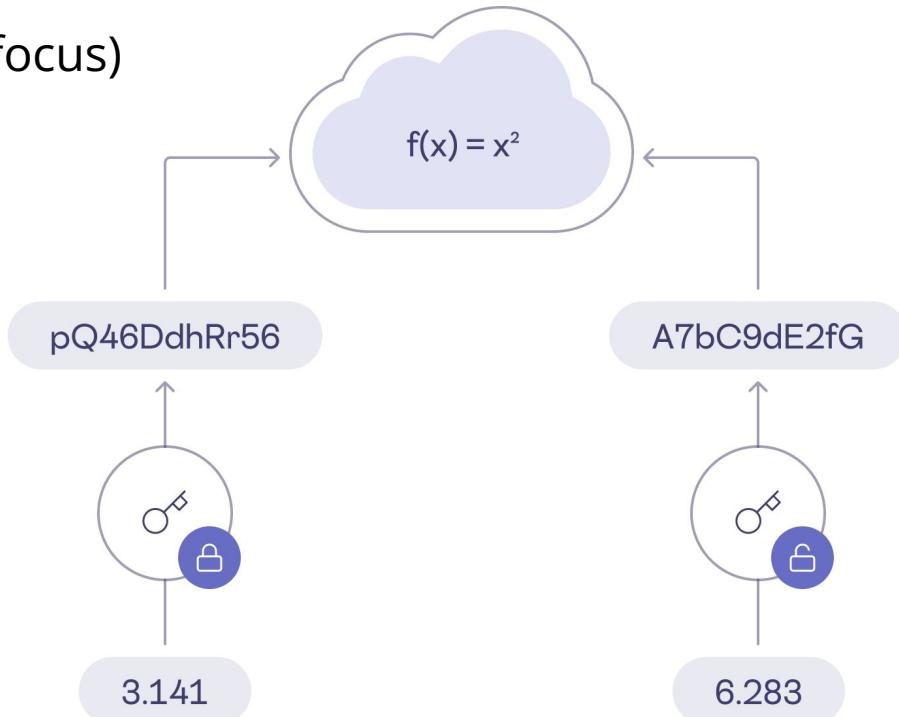
Smarter Insights with AI

- Identify patterns
- Highlight key events
- Data-driven feedback
- Adaptive systems

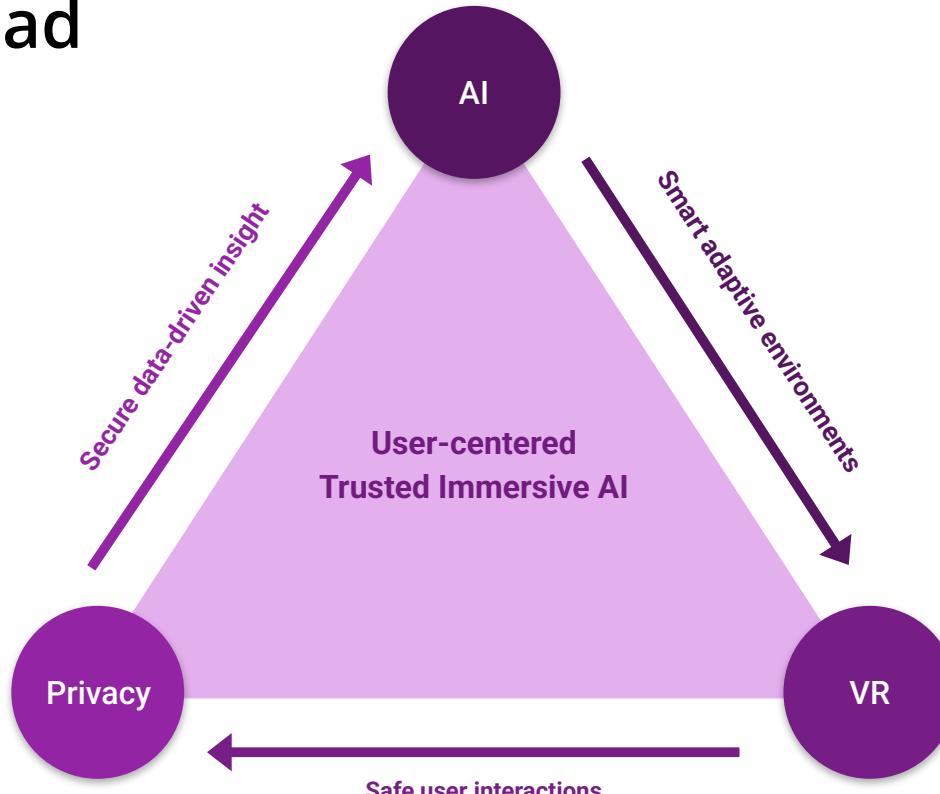


Privacy Matters

- Highly personal data (e.g., gaze, focus)
- **Homomorphic Encryption**
- Allow safe processing
- Utility without identity



Looking Ahead



Where intelligence, immersion, and ethics align

Thank You

References

- **M.J.M. Sunny, J.S.N. Guthula, A. Kharel, H. Rashid, M.N. Shraboni, P. Bhandari, J.P. Springer and A. Basu [2024].**
“Gaze Insights in XR: Real-Time Eye-Tracking Analytics with Elasticsearch.” *2nd Workshop on Gaze and Eye Movement in Interaction in XR (GEMINI) 2025*
- **Kröger, J.L., Lutz, O.HM., Müller, F. [2020].** “What Does Your Gaze Reveal About You? On the Privacy Implications of Eye Tracking.” *Privacy and Identity Management. Data for Better Living: AI and Privacy. Privacy and Identity 2019. IFIP Advances in Information and Communication Technology()*, vol 576. DOI: [10.1007/978-3-030-42504-3_15](https://doi.org/10.1007/978-3-030-42504-3_15)