Group M1.03 – AR & Digitization Experience
HAAS VF 2YT Training

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Problem

- **Safety Risks:** Inexperienced operators risk personal injury and significant machine damage
- **High Costs:** Conventional training ties up equipment and personnel and leads to increased cost, wear, and downtime
- **Accessibility & Scalability:** Training is often restricted by shop hours and the availability of physical machines, making it difficult to standardize instruction across multiple sites.

Objective

- **Immersive Learning:** Provide a safe, interactive environment where trainees can master essential machine procedures
- **Advanced Visualization:** Utilizing the Apple Vision Pro to create realistic simulations such as rotatable CAD models for better user orientation and workflow evaluation.
- **Future-Proofing Local Resources:** Establish a scalable AR framework within the Ingram School of Engineering that can be expanded to other laboratory equipment.

Technology Used

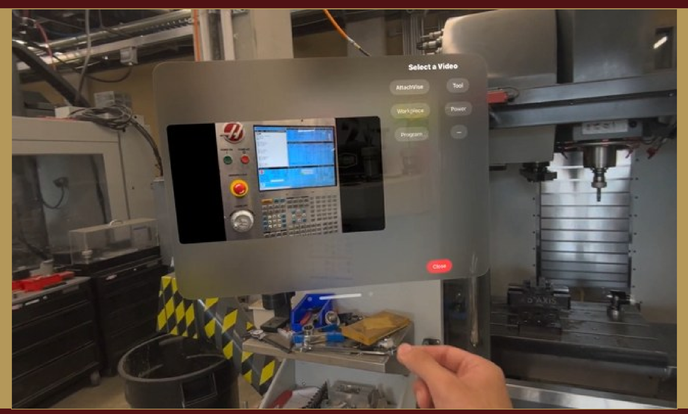
Haas VF-2YT

ARKit

Xcode

Apple Vision Pro

Result



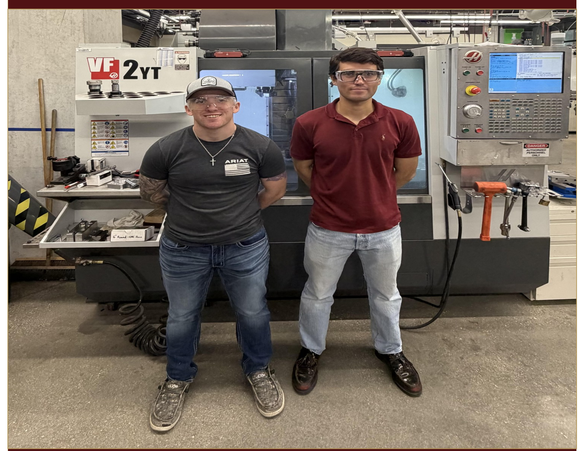
Process

1. **Research & Planning:** Evaluated previous models and researched VR/AR applications in the manufacturing industry to define the project scope.
2. **Asset Creation:**
   - 3D Modeling: Converted SolidWorks assembly files into USD files to allow for interactive rotation and manipulation within the AR environment.
   - Content Production: Scripted, filmed, and edited instructional videos for core machine functions like "Zero Machine," "Load Tool," and "Start Machine."
3. **Software Development:**
   - Platform Selection: Transitioned from Microsoft HoloLens 2 to the Apple Vision Pro to leverage its superior hardware and future-proof support.
   - Implementation: Developed a visionOS application in Xcode utilizing ARKit for image tracking, allowing the software to recognize the physical Haas CNC control panel and anchor digital content to it.
4. **Integration:** Added CAD models and instructional videos into the code to create a functional tutorial menu.

Conclusion

- **Effectiveness:** Use of the Apple Vision Pro provided a highly fidelity experience, with features that are cutting edge technology
- **Impact:** By shifting training to a virtual environment, organizations can significantly improve operator safety, standardize instructions, and optimize the utilization of physical CNC machines
- **Future Readiness:** The successful integration of image tracking and interactive 3D models establishes a scalable foundation for expanding training to other complex machinery within the Makerspace

Meet the Team



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