AR/VR Visualization of Data

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Our Team

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- Junior @ Rutgers
- Computer Engineering
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- Senior @ Stevens Institute of Technology
- Computer Science
- Minor in Mathematics

Azra Bano

- Sophomore @ Rutgers
- Computer Engineering
- Computer Science

Key Terms

AR: Augmented Reality

VR: Virtual Reality

Unity®

MRTK
MIXED REALITY TOOLKIT

C#

Our Mission

- Create applications to use AR/VR for visualizing data
- Create academic teaching materials to help us learn + teach others about AR/VR

AR/VR Curriculum

Overview of AR/VR Curriculum

Teaching Approach:

i. Theory and Application
   1. Project-based learning
ii. Real-world AR/VR use cases in healthcare, education, design

Outcome: Students developed their own working AR/VR apps and learned to code in 3D space.

Overview of AR/VR Curriculum

Development Tools

Unity®

MRTK
MIXED REALITY TOOLKIT

OpenXR™

C#

AR/VR

- Spatial Awareness
- Human interaction

HoloDraft

Our Motivation

CAD [Computer Aided Design]

- *Time consuming* and *inaccurate*
- Editing 3D models on 2D screens is *limiting*

Use of AR:

- Modify 3D models in real-world space
- Visualize and interact with designs in a true physical context

Evolution of Computer Aided Design (CAD)

Manual Drafting

2D Computer Aided Design

3D Computer Aided Design

HoloDraft - Augmented Reality Computer Aided Design

Project and Technology Overview

Goals:

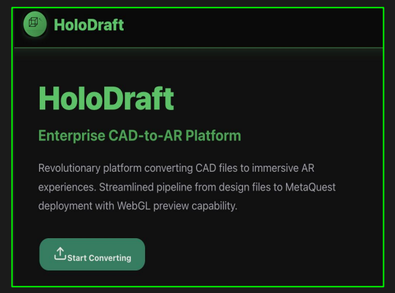
- Develop an Augmented Reality (AR) app to view and edit 3D models in real time.
- Create an AR/VR/MR curriculum for students

Technology:

- Unity
- C#
- Microsoft Hololens 2
- Supabase
- Blender

unity

Project Breakdown



User uploads STL file to website

STL file converted to GLB using Blender

GLB file saved in database

supabase

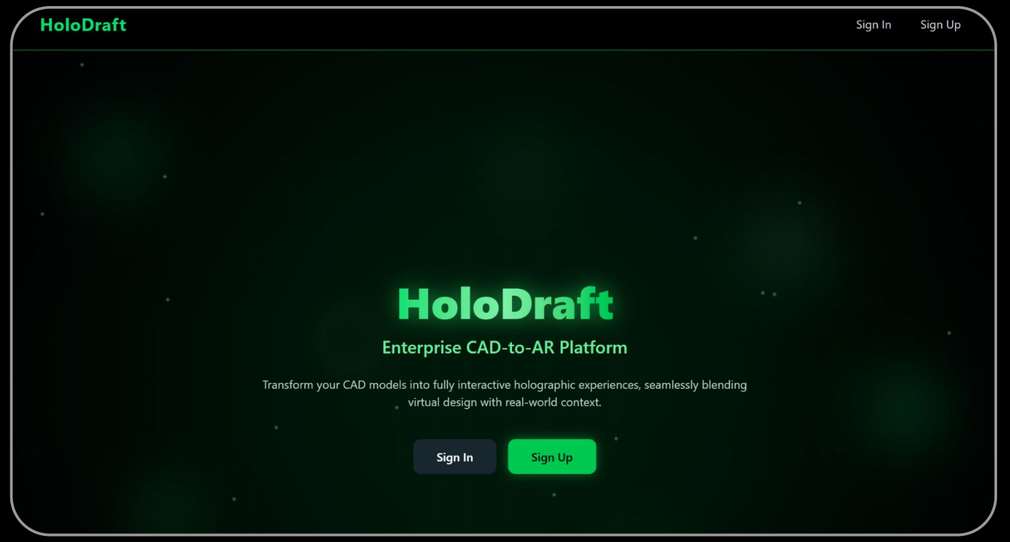
unity

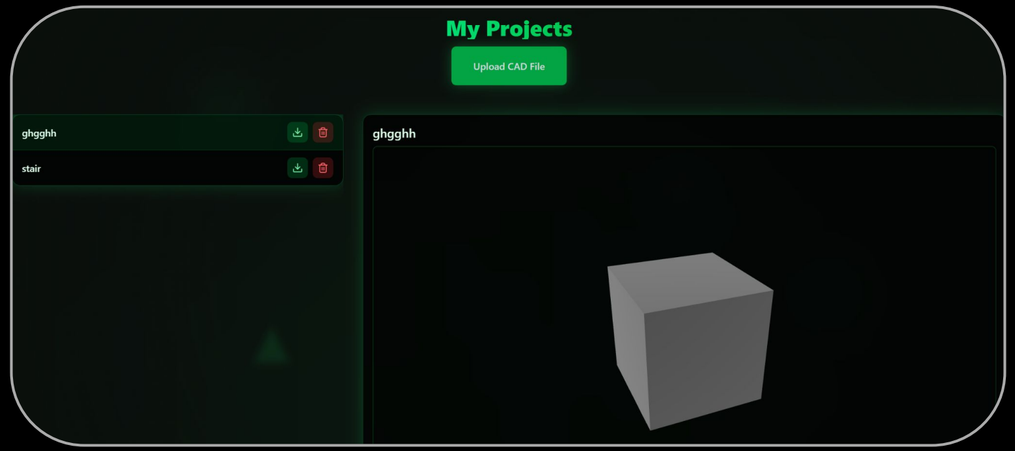
CAD model imported into application

Export to 3D printer

Website

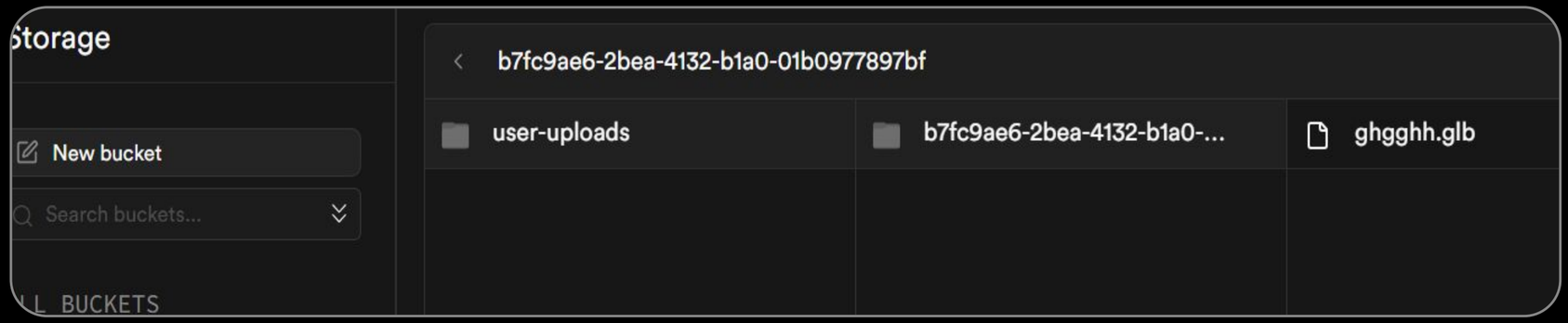
- Users can log in to keep track of projects
- Upload CAD files (STL, OBJ, STEP, etc.)
- Converts to Unity accepted file (GLB)
- Receive edited files from AR

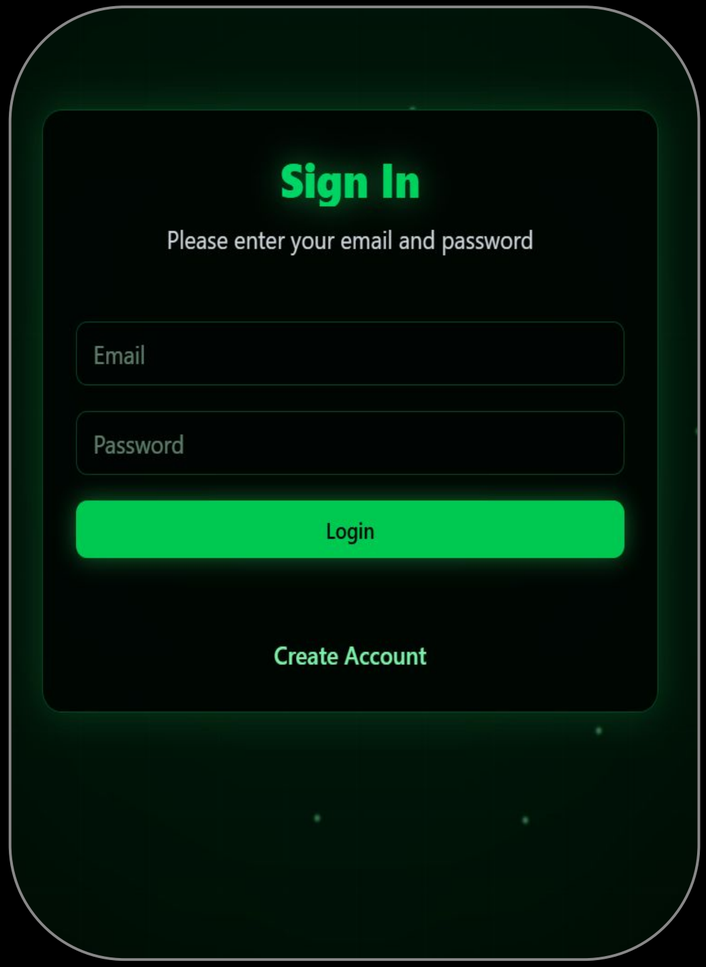




Storage

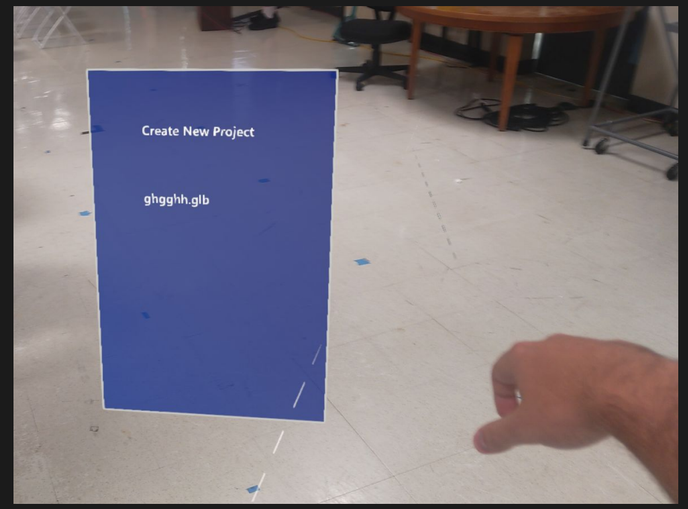
- User signs up/in
- Creates “buckets” for each user
- Uploaded files are stored in corresponding buckets



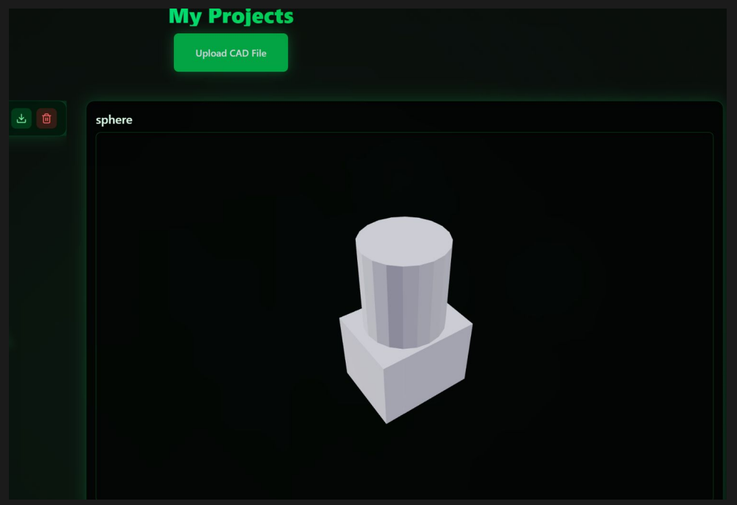


Editing and Viewing

- Users log in and chooses from a list of their projects
- Add shapes, manipulate dimensions, rotate, scale, grouping, etc
- Measuring tool
- Export



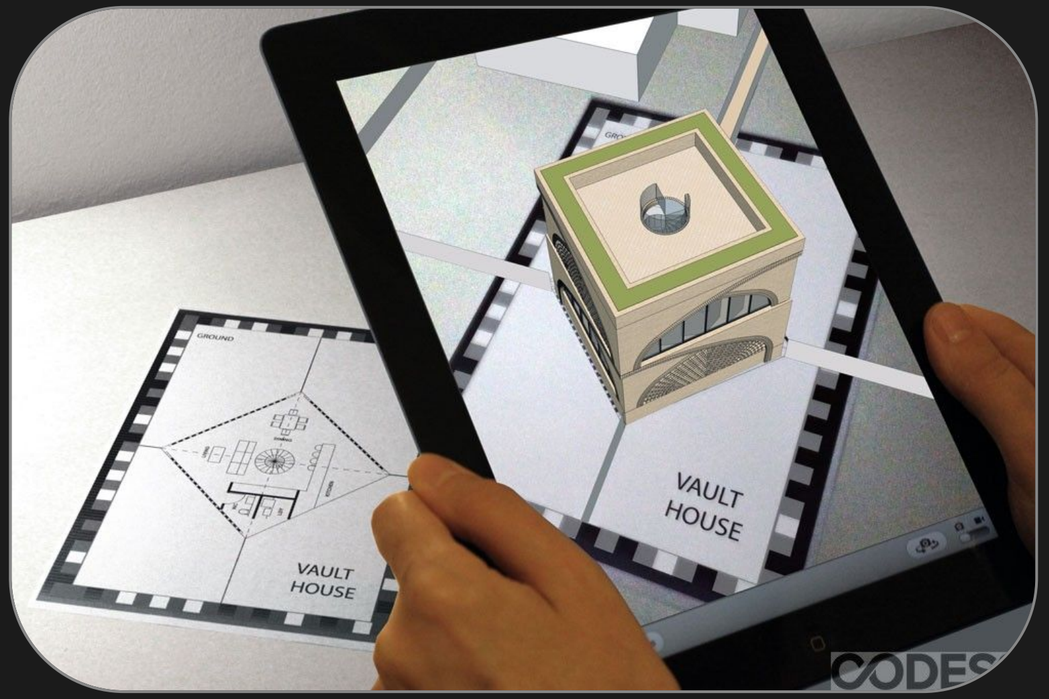
Results



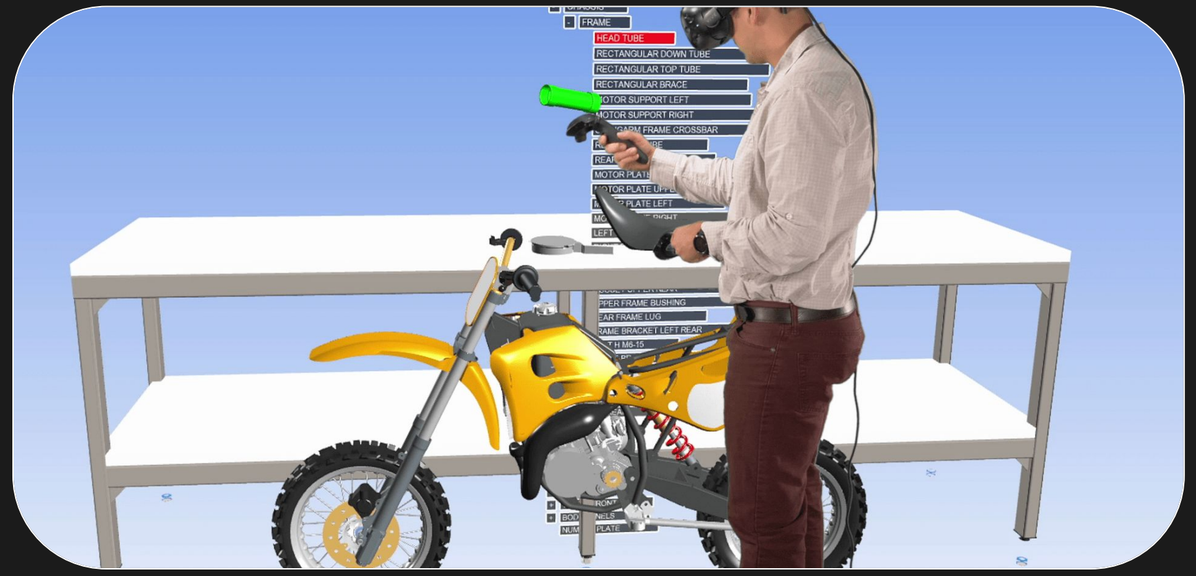
show demos

Future Plans

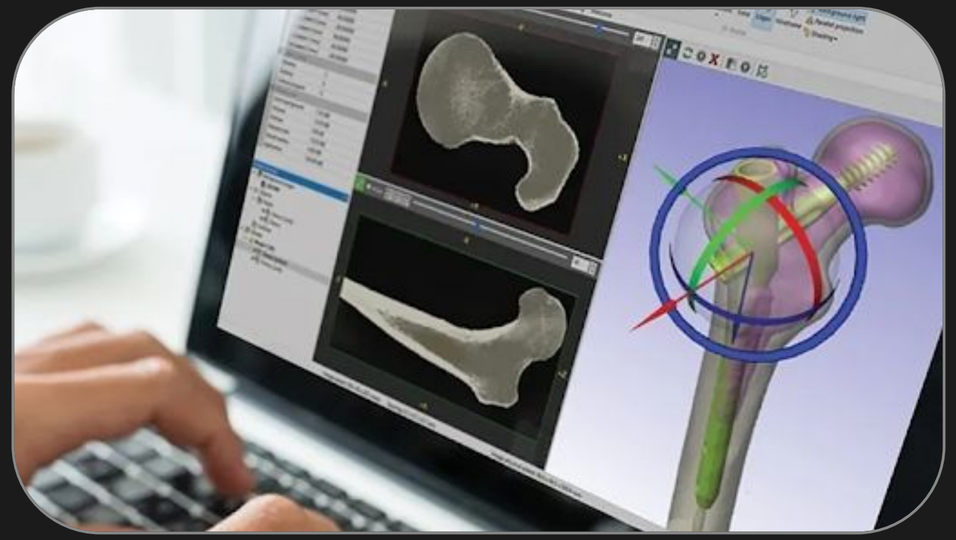
- Improve meshing of subtractive shapes
- Connect directly with 3D printer
- More shapes and tools
- Mobile integration



Potential Applications



- Civil Engineering/Architecture
- Medical (Prosthetics)
- Manufacturing



Thank You!