

FAMU-FSU VR Museum

Sponsored by Dr. Bernadin

10/18/2024, Team 314, (A.K.A Team π)

Speaker: Jaewan McPherson

Team Members



Jaewan Mcpherson -
Team Leader



Evan Rundlett - AI
Implementor



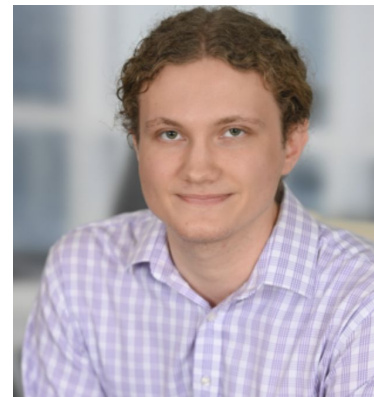
Christian Higgs -
Primary Developer



Devin Nobles -
Secondary Developer



Jason Muse -
Blender Expert



Ethan Myers -
Creative Lead

Sponsor and Advisors

Sponsor:



Advisors:

Dr. Shonda Bernadin



Dr. Migara Amarasinghe



Introduction

- Museum of the arts & sciences observable in VR
 - i. Interaction between arts and sciences
 - ii. Utilize AI in generation of exhibits; highlight future of AI in artistic endeavors
- Motivation
 - i. Designed to educate on a variety of topics
 - ii. Inspire prospective students/engineers



Introduction cont.

- Artistic/creative museum in Virtual Reality
 - Users will be able to explore and interact with numerous exhibits
 - Immersive environment
- Uses Unity/Blender for graphics and models
- Users should be able to interact with the museum via headset controls
 - Microphone included in headset
- Certain aspects should use Artificial Intelligence
 - Some art and images will be AI-generated
 - Sounds and voices can be AI-generated



Introduction cont.

Currently established exhibits:

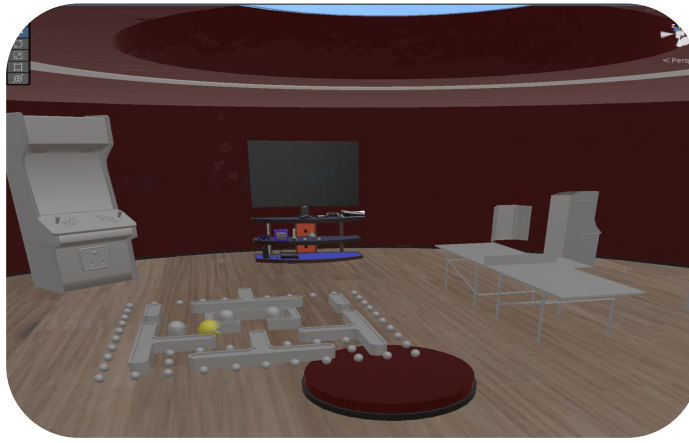
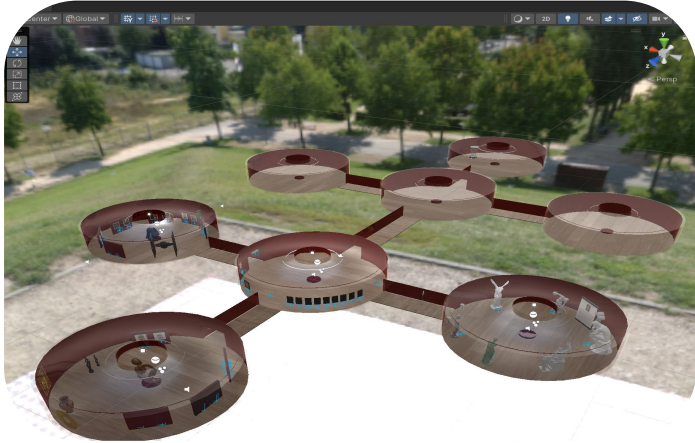
- Game
- Fashion
- Sculpture
- Star Wars/Marvel
- African Culture
- FAMU-FSU COE History

Improvements:

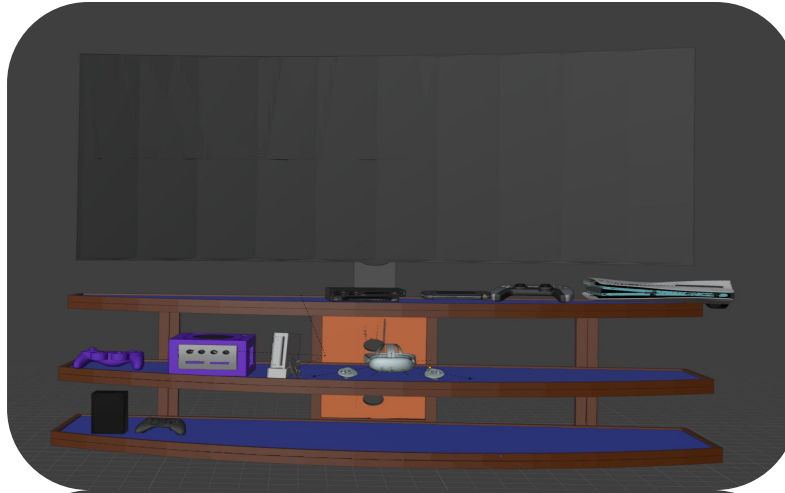
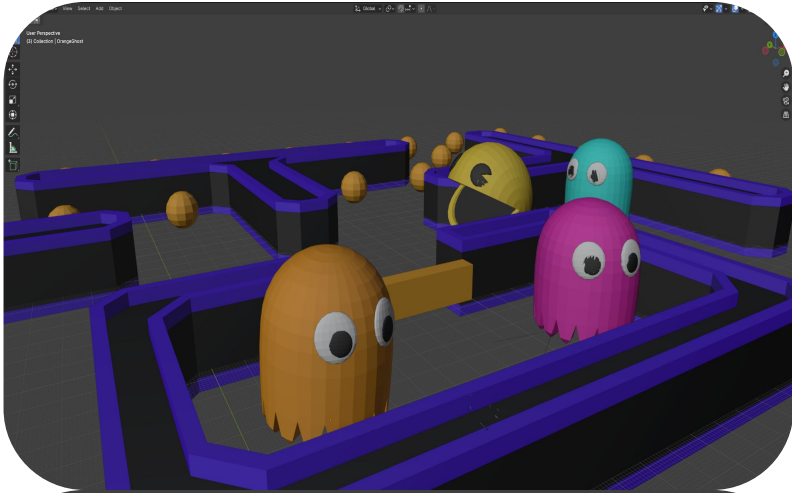
- Maze Exhibit/First-person Pacman
- Additional exhibit features - more interactivity, more blender objects, playable games
- General features - NPCs, spatial audio, animations, gamification



Previous Work

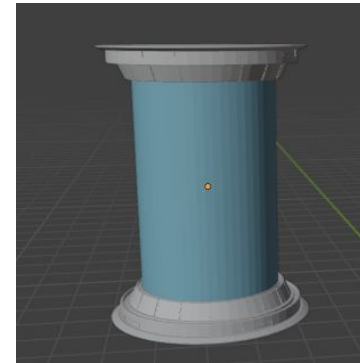
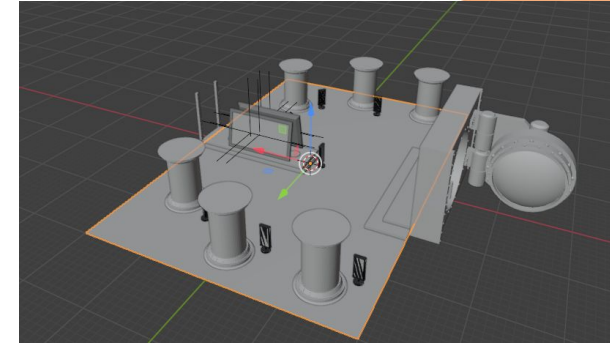


Previous Work cont.



Previous Work cont.

- Blender used to create layout of exhibit used for history of fashion
- 3D models of clothing/outfits of different decades
- AI used to create descriptions of the different eras



Project Scope

Primary Goals:

- Educate students about the inclusion of art in the STEM field
- Create an immersive environment that encourages passion about historical/cultural topics.
- Educate consumers about future development of AI and VR and their incorporation in numerous fields

Secondary Goal: Explore alternative uses of AI



Project Scope cont.

Primary market: Engineering Students/Educators

Secondary market: Younger students interested in the arts & sciences

Tertiary market: Virtual Reality enthusiasts

Assumptions: AI will be used to generate parts of exhibits, VR will be the medium for use

Stakeholders: Google/COE, Dr. Bernadin, Dr. Migara, Dr. Chuy, Dr. Hooker



Customer Needs

Sponsor: Google, Dr. Bernadin, & Dr. Migara

Major Focuses:

- **Virtual Reality and Artificial Intelligence implemented in museum (mandatory)**
- **Focus on the inclusion of the arts in the field of STEM**
- **Immersion and smoothness in experience**
- **More exhibits and more interactivity**

Customer Needs - Ranking

No.	NEED / STATEMENT	SOURCE
1	Virtual Reality Interface	Customer
2	Use of Artificial Intelligence	Customer
3	Interactive Exhibits	Customer
4	Historical and Artistic Exhibits	Customer

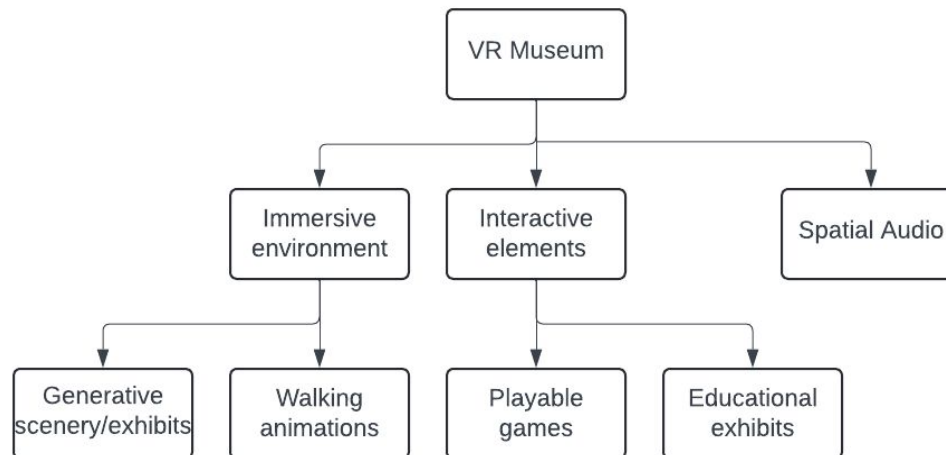
Requirements

No.	NEED / STATEMENT	SOURCE
1	Virtual Reality Interface	Customer
2	Use of Artificial Intelligence	Customer
3	Interactive Exhibits	Customer
4	Historical and artistic exhibits	Customer

No.	NEED	INTERPRETED REQUIREMENTS
1	2,3,4	AI shall help create and modify the exhibits: audio generation, visual aspects, etc.
2	1,3	The exhibits shall be designed for an immersive VR experience.
3	3	Shall have exhibits that change or play audio when users interact with them; shall implement voiced characters to interact with.
4	2,4	Visitors shall explore rooms dedicated to classical music, paintings, and sculptures, bringing the museum to life in an interactive 3D space.

Functional Decomposition

- Shall create 3D models and incorporate interactive elements
 - Animations currently designed in Blender
- General functions are to create an immersive and educational environment
 - immersion improved by interactivity and user-specific experiences
 - games/images that cater to each user



Targets

FUNCTION	TARGET	METRIC
Virtual Reality	i. Smooth VR experience; > 72 FPS ii. 1080 x 1200 resolution	i. Frame Rate monitoring via engine's profiler ii. Test each headset for resolution compatibility
Artificial Intelligence	i. Reduce response time for AI to 2 seconds or less	i. Monitor response time from input
Customer Needs	i. At least 80% of user satisfaction	i. Conduct user surveys after user test
Immersion	i. 4 out of 5 score in user feedback (average)	i. Immersion score from user feedback
Interactivity	i. At least 1 interactive element per exhibit ii. Functional interactive elements	i. Monitor interactions through engine ii. Testing interactivity after implementation
Artistic Expression	i. Showcase 3 artistic mediums within the museum ii. Minimum 4/5 average rating for artistic quality	i. Number of artworks or styles presented ii. User ratings of artistic elements collected through surveys

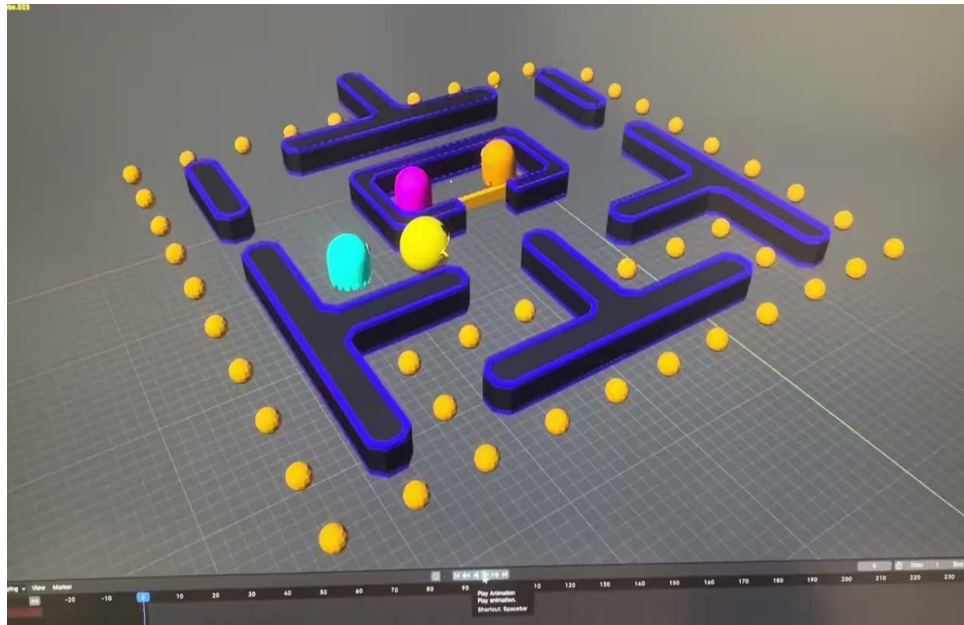
Future Plans

- Improved game room
 - Users can play against a connect-4 AI
 - Fully functional Pacman
- Add more exhibits
 - History of AI room
 - Maze room
- Improve FAMU-FSU COE History room
 - Implement the use of AI more
- Speech-to-text image gen. (Credit Dr. Migara)
- Fix current issues
 - clipping errors
 - Pacman fixes



Future Plans cont.

- Blender used to develop Pacman model and create animations
- More animations and models planned to be added
- Animations for Pacman currently not working properly
 - Once animations are fixed, game will be playable in exhibit



Budget

- \$500, but may not be needed
- Dependent on hardware performance:
 - New PC, Upgrade VR headset, access to better AI models, etc.



Project Management

1. Research / Concept Development

1.1: Customer Needs Assessment - Whole Group

1.2: Concept Generation - Whole Group

1.3: Concept Selection - Whole group

2. VR Development

2.1: 3D Modeling - Jaewan

- Create new rooms/models

2.2: Programming

- Program Interactive Elements - Chris
- Integrate Sound / Visual Effects - Devin

Project Management cont.

3. AI Integration

3.1: Image generation - Evan

- Use AI for exhibit art

3.2: Other AI generation - Ethan

- AI tour guide
- Text generation exhibits

4. Design Review/Improvement

4.1: Test run the museum - Whole Group

- Allow other students to test the museum near completion; conduct surveys

4.2: Prepare final presentation for Sr. Design - Whole Group

Summary

- Virtual Reality Artificial Intelligence FAMU-FSU College of Engineering Museum
- Currently existing in Unity, with ~6 room foundations

Purpose: Educate and entertain anyone interested in STEM or the arts in a fun interactive way. To inspire passion about the collusion of the arts and sciences.

Our Goals:

- Enable more interactivity
- Implement AI concepts
- Add more exhibits / improve existing ones
- Showcase the inclusion of arts in the STEM field



End of Presentation

Any Questions?