

VR Project Game Idea

The focus of the game is to show off game mechanics like a test area. The test area is going to be set in a medieval tavern there are going to be several interactable objects that the player will be able to play around with and do different things. The game will be going to have an AI that will walk in periodically and require a drink or food. The player will then have to make this and deliver it to them. There will be a checklist on the Hud that the player will have to complete to make sure the customers are happy.

Examples of Tasks

- Light candles around the Tavern before opening
- Flip open sign to show pub is open
- Cook Meat over fire
- Pour Beer into cup
- Play music for the guests
- Clear Table for next guest
- Stop bar fight

Each of these tasks the player will have to have different interactions between the objects and the player and will require them to use the full set of controls of the Vive to complete. Each unique task will have to be planned out to make sure that it is possible, and I know what is needed with each task.

Lighting the candles around the Tavern

The player at first will have to find the match box, this will be somewhere very easy to find for the player and will be bright compared to other objects so they can find it. As well as this I think it would be a good idea to put a holographic effect on the item to show it can be interacted with. After the player has found the match box, they will need to open it and take a match out. This may be very difficult meaning testing will have to be done. If this is too fiddly for the player a match could be next to the box for example. This the player will have to run the match down the side of the box at a certain speed to make it ignite. After the player will have to go around and touch the lit match to the wick of the candle to light. This will light up the room more and once completed will update the UI.

Flip the Open Sign

The player is going to have to use the teleportation movement to get to the front door. They will have to interact with this object using the door handle. The door will be on the hinge and once opened the player will be able to teleport just outside the tavern and beside there will be an Open / Close sign. The player will simply have to flip this to allow the AI to start to come in. The door will use a hinge and will have to be interactable to the player but also the AI will have to be able to open the door to.

Cooking Meat over the Fire

Another mechanic could be cooking food for the AI. You will simply grab a slice of meat and put it over the fire on a grill. The colour of the meat will change over time, and you will want to take it off when perfect. The player will know this because there will be a prompt on the wall showing what colour is perfect. Once it is done the player will grab a plate and combine the two objects and take it to the AI to eat.

On a similar mechanic the player will also have to get drinks from the keg, and they will have to grab a mug and put it under the keg and pull a lever to open it. The "Liquid" will then pour into the cup. The player must fill it to a correct amount and then give it to the AI to drink.

Clear Table for next guest

Once the AI has finished their food you can collect the utensils that they have used and put them in a pile somewhere once this is done the AI may leave and you have completed a loop of the game. This is when more AI will come in and you will have to cook and pour multiple things and more things may go wrong. For example, candles may go out after a random amount of time, or the AI will not be happy if their food or drink isn't completed in a limited time.

This game can be scaled depending on time constraints and the difficulty of the of making the mechanics. At this point this is aim for the high end of my current capabilities meaning I will try my best to include these mechanics but either if I achieve more in the time or less, I still believe that this will adhere to the marking scheme.

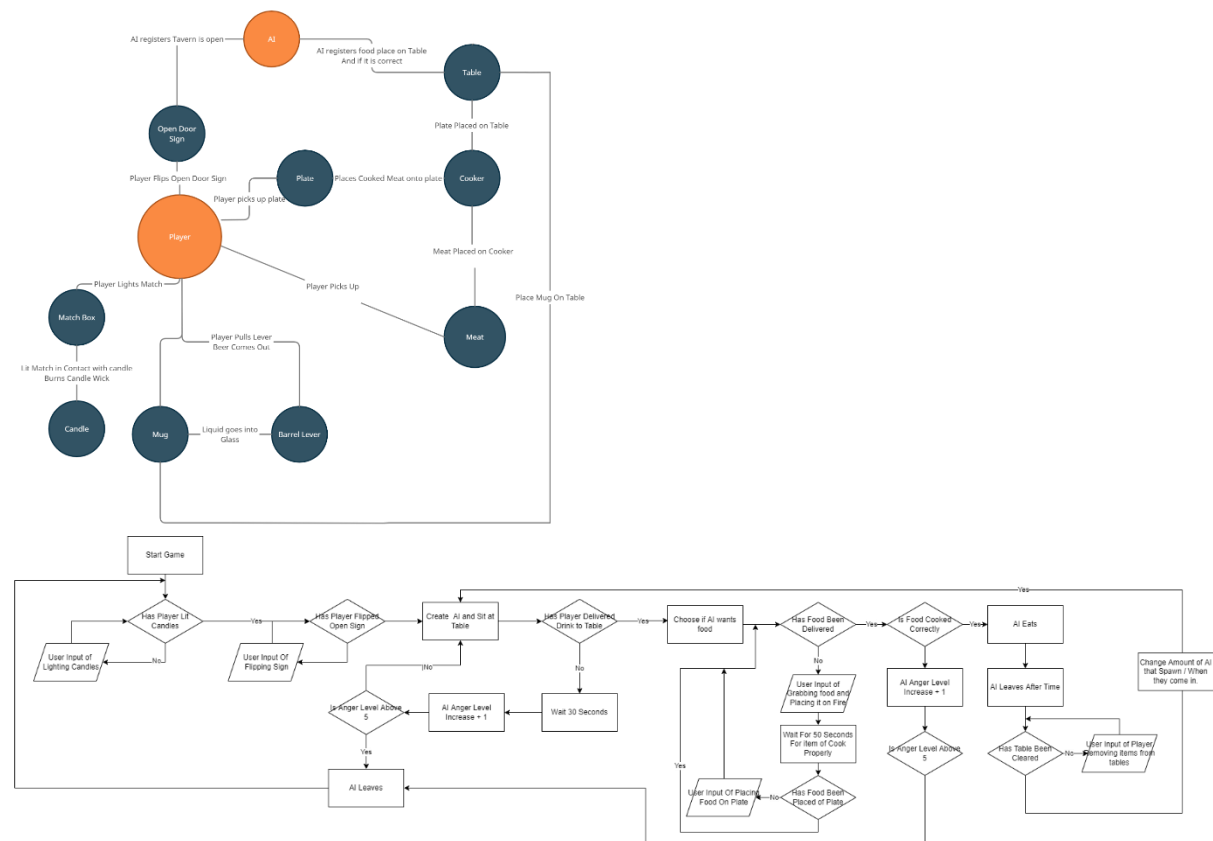
Audio

When making the game I will try and use audio to help the player understand what is happening. On the player actions I will add important sound ques. For example, when a customer walks in, I would like the door to creak loudly, so the player knows someone has entered. As well as that I would like some ambient noise such as the fire burning on the grill and some chatter if there are multiple AI. Some of this will be difficult to find but, if possible, I want to fill the user's ears with lots of sound ques.

UI + Relaying Information

When creating the game, I will use a mixture of types of UI. Non-Diegetic UI will be things such as the checklist in the players view to see what they have to do. I will also try keep the Hud to minimal things, so the player does feel like they are in the way. I will also use some Diegetic UI to display information back to the player such as the colour of the meat relaying how cooked it is. This will allow the player feedback that they will understand easily. The world will also have to have enough prompts and ques that the player knows what to do. The player will have to be taught how to do each action either with in game notes or instructions. I will also use the affordance of objects to make the player understand what they need to do. For example, the match box everyone knows how to use in real life, and I will try and translate this into the virtual world.

Flow Chart of Object Interactions



Game Overview

Game Title

TaVeRn – A play on the word tavern that is the setting of the game as well as showing that the game is set in VR with the letters being capitalized. This may also be shown in the logo once designed.

Game Genre

The game genre is a simulation VR game. The game emulates what it is like to run a medieval tavern and gives the player objectives to do.

Game perspective

Being a VR game, the game is going to be in the first person to accurately simulate what it is like to be the character in the setting.

Game mode

The game is going to be a single-player but interact with AI that makes it feel like they are having conversations and interactions with another person.

Core idea / Task

The focus of the game is to show off game mechanics like a test area. The test area is going to be set in a medieval tavern there are going to be several interactable objects that the player will be able to play around with and do different things. The game will be going to have an AI that will walk in periodically and require a drink or food. The player will then have to make this and deliver it to them. There will be a checklist on a blackboard that the player will have to complete to make sure the customers are happy.

Background story

You are a Tavern owner in medieval times and have to feed and supply drinks to the customers that come to your tavern to escape the nightmares of day-to-day life of medieval England.

Objectives

First Objective (Short Term)

There are going to be main short-term missions that the player will have to complete to make their way through the experience.

- Light candles around the Tavern before opening
- Flip open sign to show pub is open
- Pour Beer into a cup
- Cook Meat over the fire
- Give Food to Customer

For each of these tasks the player will have to have different interactions between the objects and the player and will require them to use the full set of controls of the Vive to complete. Each unique task will have to be planned out to make sure that it is possible, and I know what is needed with each task.

Main Objective (Mid)

Give food and drink to all customers at the bar to make them happy and at the end of the night leave. (Could add some sort of money-making mechanic. Adds score to the game as well as customers pay a different amount depending on satisfaction).

Total Objective (Long Term)

Enjoy the time spent severing the customers and the different interactions that are going to happen between you and the customers.

Game logic

The player can interact with all small objects and use them in their tasks to help them complete them.

The player cannot pick up objects that are too big or heavy.
AI will only leave once they have had food and drink delivered to them.
All missions should be completable at any point and there shouldn't be a limit to items.

Mechanics

Lighting the candles around the Tavern

The player at first will have to find the matchbox, this will be somewhere very easy to find for the player and will be bright compared to other objects so they can find it. As well as this I think it would be a good idea to put a holographic effect on the item to show it can be interacted with. After the player has found the matchbox, they will need to open it and take a match out. This may be very difficult meaning testing will have to be done. If this is too fiddley for the player a match could be next to the box for example. This the player will have to run the match down the side of the box at a certain speed to make it ignite. After the player will have to go around and touch the lit match to the wick of the candle to light. This will light up the room more and once completed will update the UI.

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Cooking Meat over the Fire

Another mechanic could be cooking food for the AI. You will simply grab a slice of meat and put it over the fire on a grill. The color of the meat will change over time, and you will want to take it off when perfect. The player will know this because there will be a prompt on the wall showing what color is perfect. Once it is done the player will grab and plate and combine the two objects and take it to the AI to eat.

Get Drink for Customer

On a similar mechanic, the player will also have to get drinks from the keg, and they will have to grab a mug and put it under the keg, and pull a lever to open it. The "Liquid" will then pour into the cup. The player must fill it to a correct amount and then give it to the AI to drink.

Clear Table for next guest

Once the AI has finished their food you can collect the utensils that they have used and put them in a pill somewhere once this is done the AI may leave and you have completed a loop of the game. This is when more AI will come in and you will have to cook and pour multiple things and more things may go wrong. For example, candles may go out after a random amount of time, or the AI will not be happy if their food or drink isn't completed in a limited time.

Hints and Help

The game is going to have a chalkboard that tells you the missions that you need to complete, doing this will allow the player to know what they need to do, this will be large and be able to see it from most of the level. As well as this AI is going to have icons over their heads like speak bubbles that show what thing they are waiting for. This will help the player work out what they want.

Game Resources / Scoring

The game isn't going to have a scoring system, but in the future, it may have a currency system where the AI pays for their food and your job is to make as much money as possible during the night (Time Designated).


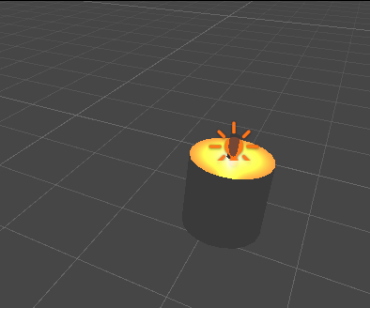


Game Progression

At the current time there is only one level and not much difficulty but, in the future, there could be more tasks added each night as well as more people per night. At the moment to complete the level the player must complete all the missions and finish serving all the customers.

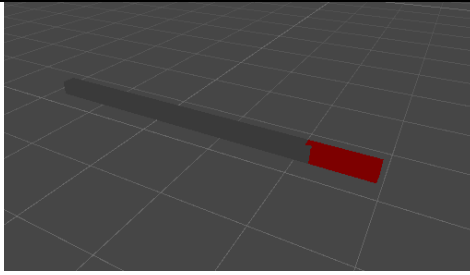
Characters and Non-Playable Characters

At the moment there is only one AI character, and they only need one drink and one piece of meat. In the future different AI could need different things and spend different amounts of time as well as do different actions. This could include different foods like steaks instead of chicken and drinks such as wine over beer.

Objects Throughout levels

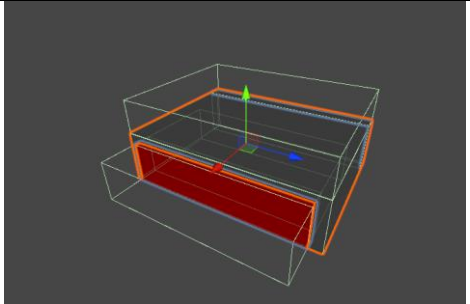
Name	Image	Use
Barrel		The lever on this item enables a stream of liquid out the bottom that can fill mugs.
Candle		Candles can be lit when colliding with a lit match.
Chair		The chair is interacted with by the AI. They can sit in the chair. Once in the seat they can start there food and drink consuming process
Cupboard Door		Interactable cupboard door that opens and closes.

Match



Can be lit when rubbed along the side of a match box.

MatchBox



Can light matches when rubbed along the red sides collider.

Meat



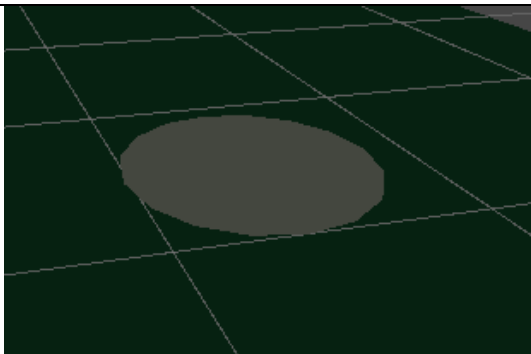
Meat can be cooked in oven and served to customers (Must be on plate)

Mug



Mug can be served to customers when full of liquid. Can be filled at a barrel.

Plate



The plate has a socket where meat can be placed upon

Sign		The sign can be flipped to show the other side that says open (Will open bar)
Oven		Can be used to cook food when placed on the coals
Button		Button can be used to spawn different objects. This depends on the colour of the button what it spawns. This one spawn more meat.
Blackboard		Tells you what mission you are on and what to do.

Constraints Of the Project

Constraints of VR – Movement / Interaction

The projects first constraints are the mechanics available to be made due to it being in VR. This includes movement and the speed the play moves and how they move. The projects main way of moving is by using a touch pad to move in the direction that the player is moving depending on which side of the touch pad is being pressed. The main issue with this is the feel of the movement and the chance of motion sickness. To combat this may ways of how the player moves will be tested

to find one that works the best, this could be as simple as having some form of acceleration to make the play still feel like they have weight. This method of movement can also be ideal if the player is constrained by play area or want to play while seated. As well as this because the game isn't a fast-paced game means that the player is less likely to feel like they need to rush around and move slower.

Constraints of limited design ability

In the project there could be a constraint of the game's final build because the lack of knowledge of games design. This could be as simple as optimising the design of the game as well as having a consistent art style throughout the game. These issues aren't going to stop the coding side of the project and therefore won't affect the overall outcome of the game. As well as this assets from the internet can be used to help therefore placeholders can be used for the project.

Constraint of working with only one VR System

When developing this project only one VR System is going to be used for development, because of this control schemes have only been designed for the HTC Vive meaning when testing the game there may be issues with other headsets or they may not work, this is justifiable because of the scale of the project and the time scale. This project is using the OpenXR platform to build on therefore it may be easily adapted to other headsets. To do this multiple headset would have to be sourced and tested, examples of these could be the Valve Index and Oculus Quest.

Constraints Of Using Unity / Implemented Components

The game is currently being developed on unity using some of the VR present code given to us, using this engine although flexible has some limitations with the components and overuse of them on a singular object. The engine itself is easy to use and very intuitive and also allows the user to develop at a high speed. To combat these issues a lot of the code given to use can be modified to work better for the use case or with more functionality.

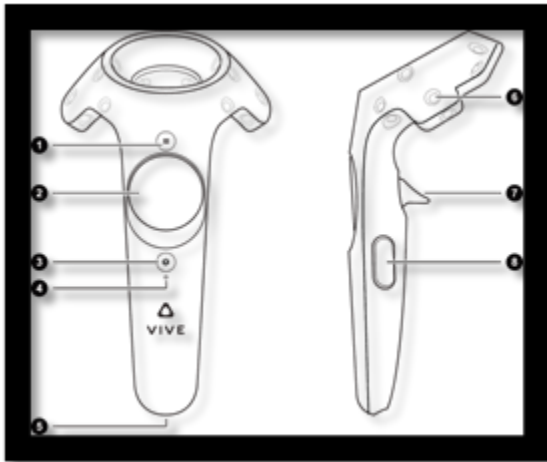
VR Configuration

Specify the configuration and specific technology proposed to deliver the implementation and show the justification for this specification

VR Headset: HTC Vive

The project is going to be developed and tested on an HTC Vive, this is because it is the headset that I have regular access to and therefore can spend the most amount of time developing from. As well as this it is a common headset that people owned therefore if the game was shipped it could be played by a decent number of players. The HTC Vive also has a lot of the feature that are on other VR setups, like a common layout of buttons as well as a touch pad. The only main feature that is missing is finger tracking that is on newer controllers like the Valve Index. Features like this aren't use in this project therefore using the Vive is perfect device to use.

Control Scheme



The control scheme is going to be set up for the HTC Vive. The grab button is going to be the back grip button (8) on either hand this allows the player to pick up items in either hand. This button is used because it is a natural motion to do when grabbing the object. The touch controls (2) are going to be used for movement on the left-hand controller to move around this is because it is the non-dominant hand for a majority of people therefore the player is more likely to pick objects in the right hand. In the future it may be worth giving the player an option to swap this. This button is perfect because it allows the player to press the direction they want to move, and it also has a sensitivity to scale the moment to. The trigger button (7) on the right controller will be used to activate the on-screen HUD to reappear so the player knows what goal they are working on. This is an easy to press and convenient to the player. The menu button (1) may also be bound to bring up a menu for the player to quit back to a main menu.

Unity

To create this project the Unity Game Engine Version 2021.1.17f is being used because it is a reasonable current version of unity that is also stable with all the XR plugins that are needed to create the XR Rig in the game. OpenXR 1.3.0 preview 1 which is the plugin that allows development on a large range of VR platforms is supported. This makes development a lot easier than without it. Some of the issues is that OpenXR is still classed as experimental which means there could some of bugs and conflicts.

Components used In Project

XR Rig

This project is going to use the XR Rig to use the VR controls and headset to track the player. This XR Rig components is going to have the tracking of each hand and the inputs of each one for the teleporter and controls for the grab. It also has the relevant code to track the head position and translates this to the game. The game will use a movement that has been developed by using the Input System in unity.

UI Layer / Canvas and XR UI Scripts

The project will have to use the Canvas Components to control what elements are shown on the UI. This will be used in the main menu for the buttons as well as the mission controller to show what to do in each mission. As well as this the speech bubbles over the AI heads will show images of what

they want. This will be a mix of world space and screen space UIs. Also the raycast UI interaction script will need to be used to press the buttons to leave and join the game.

Socket Script

The game will use a lot of socket scripts. Example of this will be the meat to the plate as well as the table that will take plates and mugs. This script will have to have some edits done. For example rotation the gameobject depending on what item is due to the objects rotation be off in the modelling software. As well as an addition to the code to have the gameobject in the script accessible so the AI can read what is in the socket.

XR Grab Script

The grab script will be used on a lot of objects. This is the primary way that the player will interact with the world. Example of this being used will be on meat plates mugs bottles and the door handles. This script allows the players controllers to interact with objects in the world by using the controllers position and rotation to do so.

XR Button Script

The button script will be used in the game on the button that are used to respawn items that are consumed by the AI. The button will interact with the player hands and will be used when the mesh overlaps with the players hands. The buttons will then spawn the object that was been placed in the component. In this game this is the meat and plate.

Rigidbody

Rigidbody are going to be used on all items that are interactable to simulate gravity or can be used the kinematic option if they don't have gravity but still need to be interacted with. As well as this objects can have their rotations and positions frozen this allows a lot of options on objects like levers to make sure they only go the direction you want them to move.

Colliders

Colliders are going to be very important when it comes to objects. Collisions will be on a lot of objects in the level. Colliders will be either convex meaning they are going to be use the mesh to try and create a shape similar to the object. These aren't always accurate so other collider shapes will be used to try and accurately recreate the same shape as the object. A collider will be added to the player so when the new movement script is used the player cannot go through the walls or objects.