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Concept Generation

Morphological chart

Custom Controls	Display	Environment	Software
Gaming Controller	Monitor	Obstacle Course	Unity
Plane Yoke	VR	Forest	Unreal Engine
Motion controller	TV	Mountains	Blender
Dual Joystick	Projector	Urban setting	GameMaker
	Tablet	Rural setting	Godot

Concept 1-60 is from the morphological chart
60 - 100 used the crapshoot method

#	Concept Generation
1	Gaming controller with a VR display with an obstacle course created in Unity.
2	Gaming controller with VR display with a forest created in Unity
3	Gaming controller with VR display with mountains created in Unity
4	Gaming controller with VR display with urban setting created in Unity
5	Gaming controller with VR display with rural setting created in Unity
6	Plane yoke with VR display with obstacle course created in Unity
7	Plane yoke with VR display with forest created in Unity
8	Plane yoke with VR display with mountains created in Unity
9	Plane yoke with VR display with urban setting created in Unity
10	Plane yoke with VR display with rural setting created in Unity
11	Plane Yoke to fly through an Urban Setting in VR, using Unreal Engine
12	Plane Yoke to navigate an Obstacle Course in VR, designed using Unreal Engine
13	Plane Yoke through a mountain in VR using Unreal Engine
14	Plane Yoke through rural setting in VR using unreal Engine
15	Plane Yoke through urban setting in VR using unreal Engine
16	Motion controller with VR display with obstacle course created

	in Unity
17	Motion controller with VR display with forest created in Unity
18	Motion controller with VR display with mountains created in Unity
19	Motion controller with VR display with urban setting created in Unity
20	Motion controller with VR display with rural setting created in Unity
21	Dual Joystick with VR Display of Obstacle Course in Unity
22	Dual Joystick with VR display of Forest in Unity
23	Dual Joystick with VR display of Mountains in Unity
24	Dual Joystick with VR display of Urban setting in Unity
25	Dual Joystick with VR display of Rural setting in Unity
26	Motion controller with VR display with rural setting created in Unreal Engine
27	Motion controller with VR display with urban setting created in Unreal Engine
28	Motion controller with VR display with mountain created in Unreal Engine
29	Motion controller with VR display with obstacles created in Unreal Engine
30	Motion controller with VR display with forest created in Unreal Engine
31	Gaming controller with VR display with obstacle course created in Unreal Engine
32	Gaming controller with VR display with forest created in Unreal

	Engine
33	Gaming controller with VR display with mountains created in Unreal Engine
34	Gaming controller with VR display with urban setting created in Unreal Engine
35	Gaming controller with VR display with rural setting created in Unreal Engine
36	Dual Joystick with VR display of Obstacle Course in Unreal Engine.
37	Dual Joystick with VR display of Forest in Unreal Engine.
38	Dual Joystick with VR display of Mountains in Unreal Engine.
39	Dual Joystick with VR display of Urban setting in Unreal Engine.
40	Dual Joystick with VR display of Rural setting in Unreal Engine.
41	Gaming controller with Monitor display with an obstacle course in Unity.
42	Gaming controller with Monitor display with obstacle course in Unreal Engine
43	Gaming controller with Monitor display with obstacle course in Blender.
44	Gaming controller with Monitor display with obstacle course in GameMaker
45	Gaming controller with Monitor display with obstacle course in GoDot.
46	Gaming controller with TV display with obstacle course in Unity.
47	Gaming controller with TV display with obstacle course in Unreal Engine

48	Gaming controller with TV display with obstacle course in Blender
49	Gaming controller with TV display with obstacle course in GameMaker
50	Gaming controller with TV display with obstacle course in Godot
51	Gaming controller with projector display with an obstacle course in unity
52	Gaming controller with projector display with an obstacle course in GoDot
53	Gaming controller with projector display with an obstacle course in gameMaker
54	Gaming controller with projector display with obstacle course in Unreal engine
55	Gaming controller with projector display with obstacle course in Blender
56	Gaming controller with tablet display with an obstacle course in Unity
57	Gaming controller with tablet display with obstacle course in Unreal Engine
58	Gaming controller with tablet display with obstacle course in Blender
59	Gaming controller with tablet display with an obstacle course in GameMaker
60	Gaming controller with tablet display with an obstacle course in Godot
61	Create multiple environments in Unity so that when a user gets

	through one level and can transition into a new one
62	The user can fly through the night time with night vision like visibility and practice for that type surveillance and other applicable situations.
63	A gloved controller so that hand motions are tracked more in the simulation.
64	A curved screen that surrounds the simulation ground and gets the user immersed into the FPV
65	Combine all terrains into one so that a user can experience different obstacles in one sitting
66	During a collision there will be a realistic destruction of the drone on the display
67	Create game objectives and add incentives to complete tasks
68	Have a speaker in the controller that adds sounds based on the environment
69	Create a score system and the score goes up based on user movement.
70	Surround users with 6 monitors to achieve VR, use a gaming-like controller in order to control the drone.
71	Have a motion detecting camera as the controls, with VR headset.
72	Have an environment based on 3D Google Earth.
73	Have the controller give you small shocks during a collision.
74	Have two VR controllers
75	Have underwater water environment to simulate underwater flight
76	Combine multiple simulations in order to have multiple users in

	the same environment
77	Have a simulation racing circuit with multiple users
78	VR headset paired with VR controller in a realistic environment using unreal engine.
79	VR headset with AI providing real-time feedback and guidance to improve drone flight skills.
80	A VR drone simulator with multiplayer capability, where AI generates dynamic challenges in real-time.
81	Hand-tracking or sensors replace controllers in VR, with AI offering flight stability and auto-correction.
82	VR simulates mission-based drone tasks, with AI adjusting difficulty and creating adaptive challenges.
83	VR allows control of multiple drones simultaneously, with AI automating routine tasks and optimizing missions.
84	A VR experience where users oversee an AI-controlled drone performing autonomous missions, with real-time adjustments and learning opportunities for the user.
85	Have a space environment where there is no gravity.
86	Having random quick action events to ensure the user is paying attention.
87	Have a spray bottle attached to the controller to spray water to the user when it’s raining.
88	Have different live creatures that will chase the user.
89	Having a day and night cycle in the environment.
90	Gaming controller with a printer to display the forest setting in Unity. Since schools and education institutions have printer.
91	Gaming controller with a hologram fan to display the simulation.

	Hologram fan will generate wind making it more realistic.
92	Using a TV remote to control the flight with a TV display.
93	Making a monitor display with a fog machine to create clouds.
94	Using an Eye tracker to control the flight, so the user will look where they want to go.
95	Surround the user with six fans to let the user experience the wind in flight.
96	Add weather to the environment to generate wind, snow, or rain.
97	Have an abandoned factory for the user to fly through and practice flying through tight spaces.
98	Create and obstacle course that moves around and has bird like objects to ensure the user avoids collisions with object moving through the air
99	Unity software with a vibrating controller on a monitor and mountain course
100	Have a VR headset with fans attached to create wind from the simulation and run it on Unity with an obstacle course.

Some codes and standards to follow:

-General principles of safety in risk assessment, particularly relevant if your simulation is used for training purposes, where incorrect simulation outcomes could lead to real-world accidents.

-Human-Centered Design : This standard outlines best practices for human-system interaction, particularly useful for VR-based simulations to ensure that the VR controls and user experience are ergonomic and intuitive.

-AI standards for ethical and safe AI development, especially relevant when integrating AI models into the simulation.

-GDPR (General Data Protection Regulation): If your simulation collects any personal data from users (even simulated flight data), you should consider privacy laws like GDPR for data protection.

Justification

-Unreal engine is a medium fidelity concept due to the larger computing power needed to run the game engine. It includes features that are not needed for this simulation and would only take up needed computing power such as very realistic graphics. Unity demands less computing power due to its lower graphics.

-In order to provide the most realistic simulation to a real drone a custom gaming controller is the best match to a real drone controller. Other options such as a motion controller would take away from the idea of being able to practice for flying a real drone if the simulation has a different kind of controller than what is offered in the market.

The display being VR is a requirement from the customer and the environment will depend on the application and overall task we want to achieve with the simulation. Such as racing, obstacle avoidance or etc.

5 medium fidelity concepts

-Motion controller with VR display with urban setting created in Unreal Engine

-Gaming controller with VR display with urban setting created in Unreal Engine

-Motion controller with VR display with obstacles course created in Unreal Engine

-Gaming controller with VR display with obstacle course created in Unreal Engine

-Plane yoke with VR display with obstacle course created in Unity

3 high fidelity concepts

-Gaming controller with a VR display with an obstacle course created in Unity.

-Motion controller with VR display with obstacle course created in Unity

-Gaming controller with VR display with urban setting created in Unity