VRDML REIMAGINING VR SPACE



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Virtual Space as a Carbon Copy of the Physical Domain

Virtual Reality (VR) is currently mostly being used in two distinctive ways:

One, as a representational tool wherein real world scenarios are being brought in to VR space Two, as design tools, in which multiple scenarios are being tested and evaluted.

Both options rely on a mere replication of the physical domain on which designers try to impose the the laws of physics as they are experienced within the built environment.

Virtual space therefor becomes a carbon copy of the physical domain whilst the laws of physics as we know them in the physcial world are completly absent in the virtual one.

Designers often fail to capitalize on this notion, leaving unique theoretical and design scenarios to be unexplored.





VIRTUAL USER CENTERED INTERACTION SPACE

UNStudio proposes to deviate from the previously mentioned two paths and explore a third option while critically questioning and evaluating traditional ways of wayfinding, navigation, representation and interaction in virtual space.

The aim is to explore a *virtual user centered interaction space* as an alternative to the current methods.

Unbound by the laws of physical reality, VR as an integral part of the design process opens up opportunities to represent and interact with a three dimensional form in novel ways.



Escher left a legacy by producing intricate drawings that challenged physical reality.





VIRTUAL USER CENTERED INTERACTION SPACE

Navigation and movement in VR have traditionally been "solved" by the teleportation to predetermined points or even facilitated by omnirectional treadmils.

This is mainly the case due to the fact that the VR setup of tradional systems is based on sensors and therefor often limited to a roomscale setup, inherently imposing the limits of the physical world to the virtual one.



Movement is currently being executed by transportation



A VR user has to remain in a confined space due to the fact that sensors are limited to a roomscale setup



REVOLVING SPACE TO CHALLENGE CONVENTIONAL METHODS OF NAVIGATION

The experiment we propose would aim to challenge the notion of navigation by **not letting the user move through space by letting the space revolve around the user itself.**

The concept can further be elaborated by imagining a Rubik's Cube in which the user would be centrally located and allow the surrounding cubes to be the dynamic part of the equation.

By making the VR-user stationary and eliminating traditional types of navigaton one would make optimum use of the strenghts which the virtual medium embodies. Furthermore, the room scale VR setup the user normally is subjected too, no longer becomes a factor in the movement through virtual space.



A static user would eliminate the "room scale vr setup" since movement in physical space is no longer necessary.



AN EXPLORATION OF SPATIAL CONCEPTS

Environments not shaped for or by humans are often non-orthogonal because there are different forces at work. Some examples:



An glacier carved out by the forces of water.



The flood shafts of Tokyo



AN EXPLORATION OF SPATIAL CONCEPTS

Movies have challenged the laws of physics in various ways.



Inception altered the laws of physics while the characters were in a dream world.



The cult classic "The Cube" guided the characters through as series of ever changing spaces.





CONCEPTS Geometrical Explorations

Various geometrical concepts were explored with Rhino, Grasshopper and Maya to craft a space that was suitable to revolve around the user in VR in which the non-directional character of the space was key.

Concept 1: The Folding Isosurface

Concept 2: The Procedural Network

Concept 3: The Morphed Gyroid





CONCEPT 1 The Folding Isosurface

The folding isosurface uses metaballs to generate a series of interconnected spaces through which the user can traverse. The result is a non-directional fluid environment that hosts a wide range of spatial conditions.







CONCEPT 1 The Folding Isosurface









CONCEPT 2 The Procedural Network

The procedural network is based a series of points that are connected with curves based on a closest point component. This subsequently is wrapped with a surface which finally results in a 3 dimensional network of paths.







CONCEPT 2 The Procedural Network

A nexus within the network with 2, 4 and 6 directions







CONCEPT 2 The Procedural Network

The completed network with all the paths and branches





A view from within the procedural network.





CONCEPT 3 The Morphed Gyroid

A traditonal gyroid doens't contain any straight lines or planar symmetries and can be multiplied and linked from each of its edges.







CONCEPT 3 The Morphed Gyroid

The morphed gyroid breaks the stacked repetition by twisting the entire geoemetry around 1 axis thereby providing a rich variations in spatial experiences for the user to explore.





A view from within the Morphed Gyroid





CONCEPT 3 The Morphed Gyroid







Navigation and Non-Directionality

The experiments with the models in VR resulted in suprisingly little motion sickness for the users due to the fact that the viewpoint remained static while geometries could be "revolved around" and "pulled towards" towards the user.

Furthermore, navigation and the sense of orientation was not lost dispite the movements of the geometry, partialy due to the fact that the user was in control of the operations.

Finally, the non-euclidan spaces appear to be a solid match for this type of movement and navigation due to the fact that planar faces would give direction to the experience. A lack of hierarcy appears to be key.

In all the three explored concepts, there is no up or down, left or right since the space doesn't contain a noteable hierarcy nor "preferred" orientation.

By not incorporating the traditonal rules of physics (such as gravity), not trying to emulate the physical world (recreating what we know) and furthermore removing directionality from the environment, an experience was created that proved to be a great way to challenge the classic notion of what a VR space is.

