Project Command Center:
Presenting and researching in the VR world

DISCOVERY LAB GLOBAL

PURPOSE

The purpose of our project was to create a space in VR where researchers from around the globe could share their discoveries without the limitations of real world physics or the hassle of traveling. The Molecule, as we have designated it, was built for the express purpose of allowing researchers separated by vast distances to present their findings without having to deal with the complications of traveling.

PROJECT DESCRIPTION

Using the OpenSim software, we created a 3D model resembling an H2O molecule for a visually compelling structure. Then, to add functionality to The Molecule we used LSL (Linden Scripting Language) in order to improve its usability as a research center. In addition, a combination of LSL and Python was used to allow for the transferring of data between worlds. Information can be relayed between the real world and the VR world and can be accessed by both through the client side Python script, or the in world LSL data prim.

THE TEAM

[redacted] : SADE has enabled me to hit the ground running going into my college career. This experience has taught me how to be accountable, manage my time, and collaborate with others.

[redacted] : The SADE program has been a real learning experience for me as it taught me not only programming skills but also professional skills. Through these few weeks, we were able to combat some setbacks using our combine teamwork effort to build something sustainable and creative. I hope that at the end of our project we can show students and professionals alike that the virtual reality technology is our future and is ready to be built upon.

Alek S. : The DLG SADE Program has been an amazing experience! I've met new people, I've learned communication skills, and I've learned a programming language I never knew of before. Not only has the program been fun, it has been challenging as well, and I'm glad I was offered the chance to partake in this amazing experience.

[redacted] : The DLG program has been a very beneficial experience for me, in terms of developing my professional and technical skills in a real-world work environment. Not only did I get the opportunity to work with talented peers, but I also got to work on a real project with real implications. I learned LSL programming, got to use some Python and work with my teammates to build a both functional and aesthetic command center in the virtual world.

[redacted] : I have learned about a variety of different fields that interest me. I've also gotten to apply a variety of skills and develop new ones in a unique environment. In the end it all comes together into making something we can all be proud of.

[redacted] : The SADE program has been an experience and a half for me, I got to feel what it was like being in charge of a team dealing with a real world project and all of the responsibilities that came with it. On top of that, I learned some basics for two new programming languages and got to work with some really inspiring and wonderful people as apart of this project.

TECHNICAL DESCRIPTION

The Building Team used OpenSim's native building system and formed the entirety of The Molecule Command Center from basic primitives and textures. The Programming Team then took to adding functionality to The Molecule using Python and LSL. Python was specifically used to bring real world data into the virtual world through a url that was generated by LSL script within The Molecule. Using LSL a prim requests a URL, this URL is then placed into our Python code to allow for the "data" variable to be relayed into VR. This variable is the package that contains the real world data that researchers may want to bring in world. Moving on, using LSL we then extract the data from the url and then display it over the Data Presentation board within The Molecule. Thus, allowing for real world information to be brought into the virtual world.

```
key requestURL;

default
{

    state_entry()
    {
        requestURL = llRequestURL();     // Request that an URL be assigned to me.
    }

    http_request(key id, string method, string body)
    {
        if ((method == URL_REQUEST_GRANTED) && (id == requestURL) )
        {
            // An URL has been assigned to me.
            llOwnerSay("Obtained URL: " + body);
            requestURL = NULL_KEY;
        }
        else if ((method == URL_REQUEST_DENIED) && (id == requestURL))
        {
            // I could not obtain a URL
            llOwnerSay("There was a problem, and an URL was not assigned: " + body);
            requestURL = NULL_KEY;
        }
```

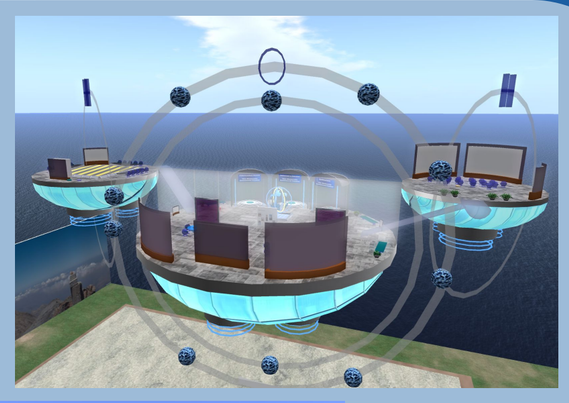
```
        else if (method == "POST")
        {
            // An incoming message was received.
            llOwnerSay("Received information from the outside: " + body);
            vector COLOR_BLUE = <0.0, 0.0, 1.0>;
            float  OPAQUE     = 1.0;
            llSetText(body, COLOR_BLUE, OPAQUE);
            llHTTPResponse(id,200,"Recieved.");
        }
        else
        {
            llHTTPResponse(id,405,"Unsupported Method");
        }
    }
}
```

WTDataTransfer.py

```
from urllib import request, parse

url = 'http://dm0007.dreamlandmetaverse.com:

data = {'WTData': str(123)}
data = parse.urlencode(data).encode()

req = request.Request(url, data=data)
response = request.urlopen(req)
print(response.read())
```

RESULTS

At the beginning of this project we had two requirements, make our research center visually compelling, and make it functional. We can proudly say that we have accomplished both these stipulations and more. The building team designed The Molecule, a sci-fi themed command center that comes equipped with all sorts of holographic furniture and decorations. Then, the programming team went in and added the functionality needed to truly make this a research institution. A live text editor, interactive whiteboard, functioning chairs to reduce server lag, teleporters, automatic greeting doors, display boards, and most importantly the data presentation board. The data presentation board is the focus of the command center, located centrally in The Molecule the data board is what allows for a connection to be made between worlds. The board creates the url that is needed to relay information and then displays it for all to see. This in conjunction with our client side Python script is what allows for researchers to bring in their data into the virtual world and is what truly defines The Molecule. Our project lays the foundation for VR to take its spot as king of R&D tools, allowing for researchers to be unrestricted by the normal limitations of reality and move on to greater scientific discovery. The internet changed the world in more ways than imaginable, now it's time for virtual reality to do the same.



WTData=123

CONCLUSIONS

In conclusion, our project is the stepping stone for further advancements into the use of a VR space as a research command center. It is a proof of concept of how the VR world can be utilized to bring about great enhancements to current day information sharing and research/development. For now, future work would involve: expanding the size of The Molecule making it large enough to host hundreds of avatars at once; adding more data collection centers/systems to further improve the functionality of The Molecule, allow for data to be saved and moved around world; and much more to come.

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