Simulated Virtual Restaurant

Cafe de Silva

By: Kolawole Ogunlana, Tenise Roberts, and Benjamin Harvey
Dr. Sharad Sharma
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Abstract

This paper offers an overview of the increasing use of Virtual Reality (VR) technologies for the simulation of restaurant environments. It provides a summary of howthree-dimensional computer modeling is being utilized to aid restaurant creation and development. The study considers the need for a digital representation of restaurants in order to raisesissues pertaining to advantages, barriers and disadvantages of creating a virtual environment prior to the creation of a restaurant environment. A case study of a pilot project on the visualization of a virtually modeled restaurant is examined to show an approach derived to show the advantages of a Virtual Reality representation of a restaurant environment through simulation. The process of this visualization is summarized and future research is outlined in relation to this restaurant model.

Introduction

Over the last 40 years, the introduction of Computer Aided Design(CAD) and other software packages such as VRML and 3Ds Max which were used in the development of the virtual restaurant, make 3Dmodeling achievable is shaping the way we create anduse restaurant models. Similar to their real life equivalencesrestaurantmodels are never a finished product. Restaurantswithever changing seating arrangements and other developing characteristic,trends and restaurant customer needs, require a dynamic platformwhere these modifications are possible with ease. Theadvances of information and communication technology,powerful hardware and software availability andaccessible 3D data are making it possible to createthese platforms. This paper offers an overview of therole of Virtual Reality (VR) in restaurant modeling andconsiders the issues in adoption of VR for the representationof restaurants. This paper also describes our workon developing a virtual restaurant model.

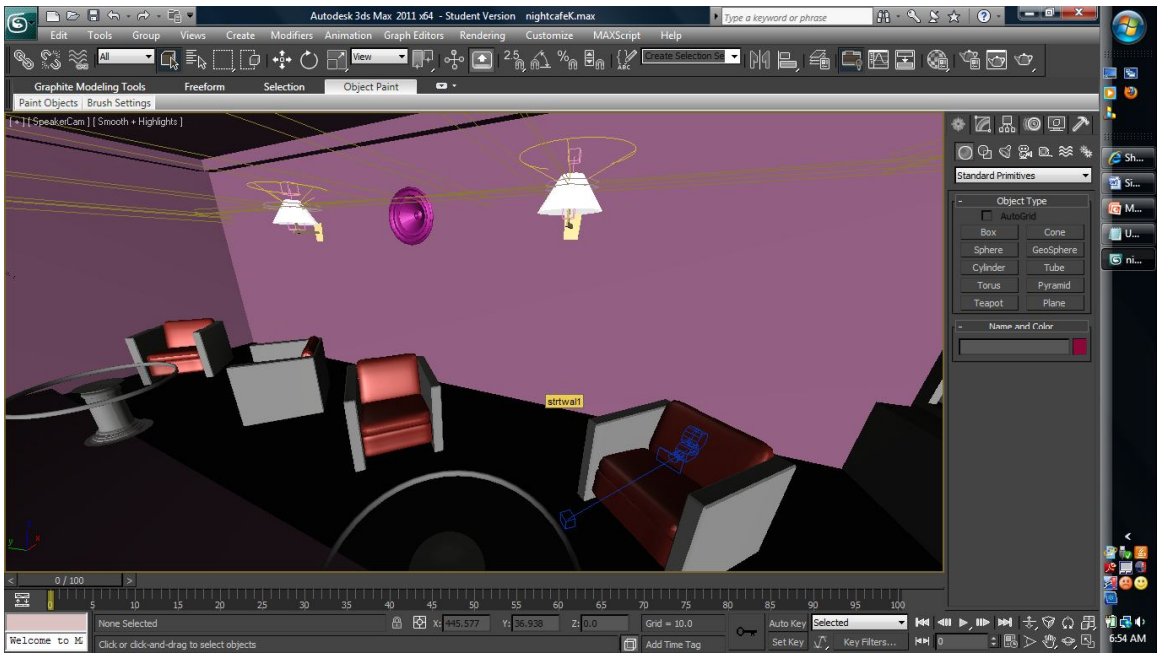
Goals and Objectives

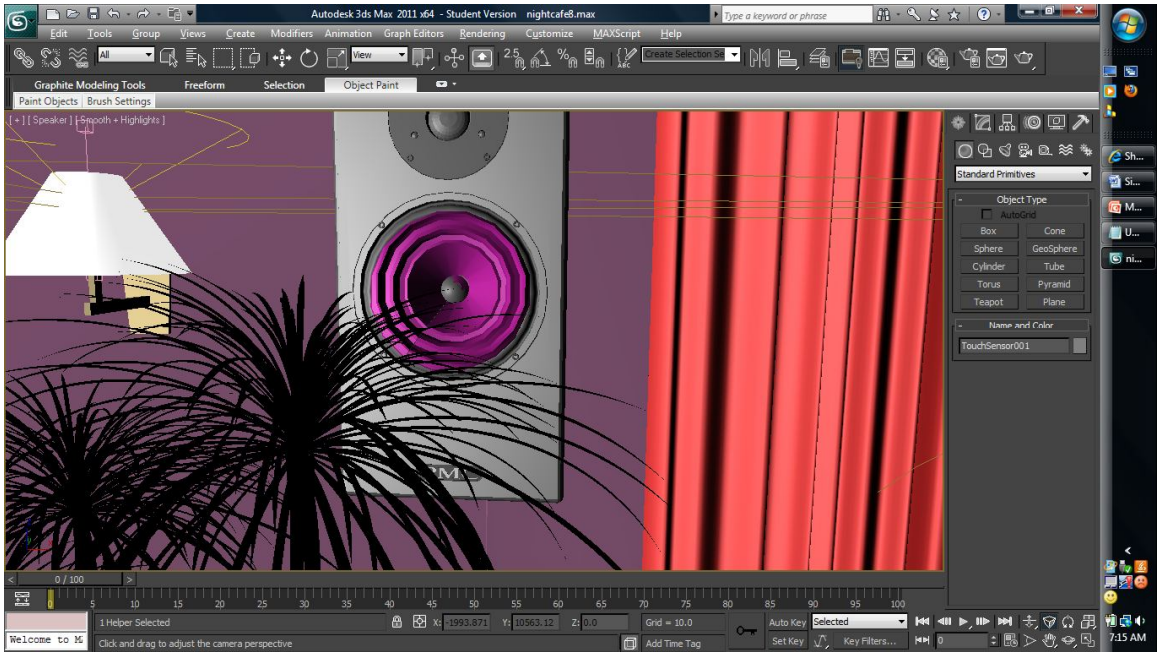
The goal of our group project was to simulate a restaurant environment giving our users the ability to explore a virtual tour of the 3D space. This was done by creating interactive attributes within objects such as a door that could be opened giving you access to a hallway, a SUV that could be seen driving around the restaurant, music speakers in a room that play music and human models placed in various strategic locations in the restaurant performing various actions. All these objects in our project would be improved

upon by future teams performing virtual reality modeling and building on the knowledge and expertise we gained working on this project.

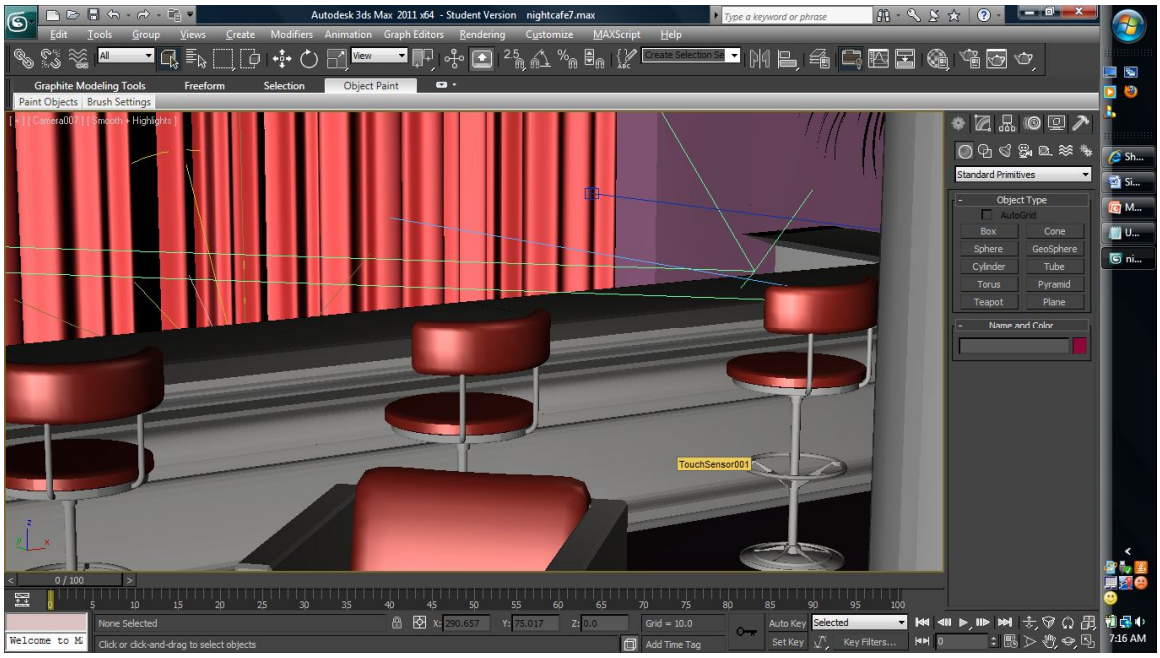
VRML and Modeling

A. **The Lounge Area:** main features in this area include a sound music system with touch sensors that play a beat for people to listen to in the restaurant. The speakers were modeled using the 3D max shapes and then sound clips were imported into the model.

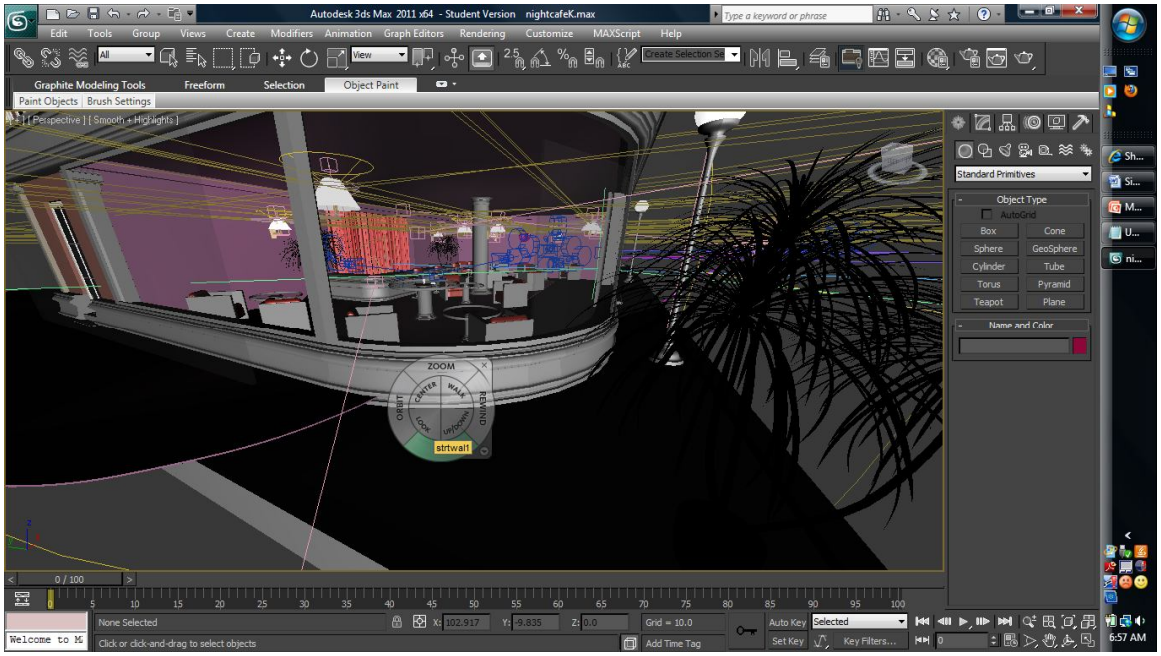




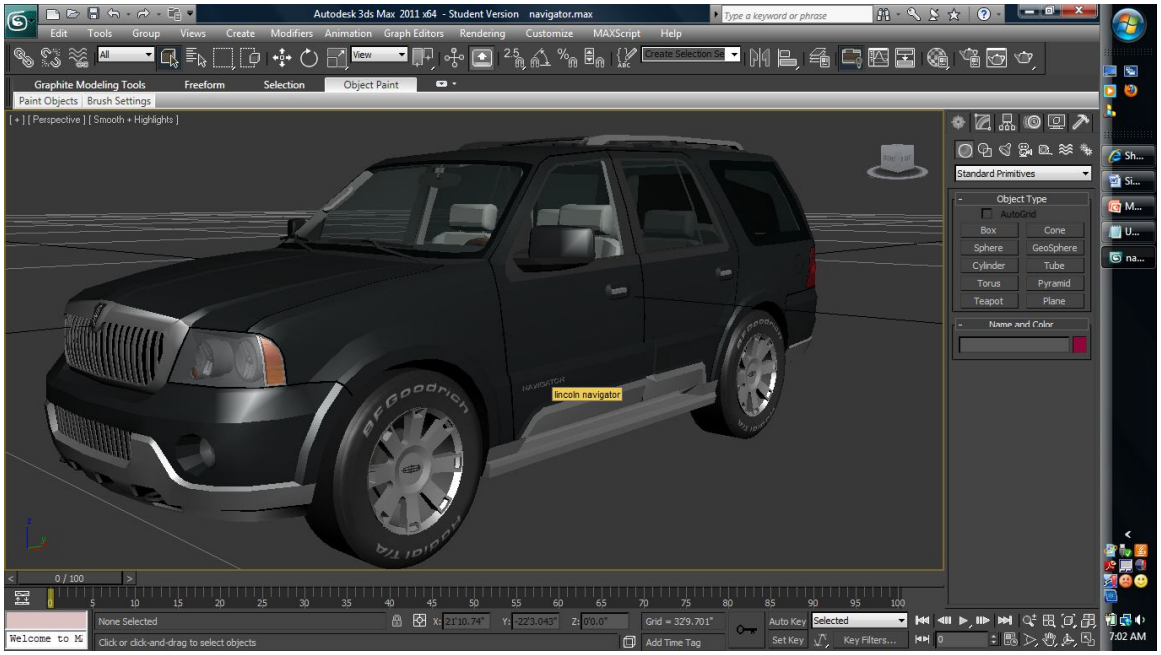
B. **Rotation Lounge Chairs:** proximity sensors allowing the chairs to rotate left and right based on the action taken by the user.



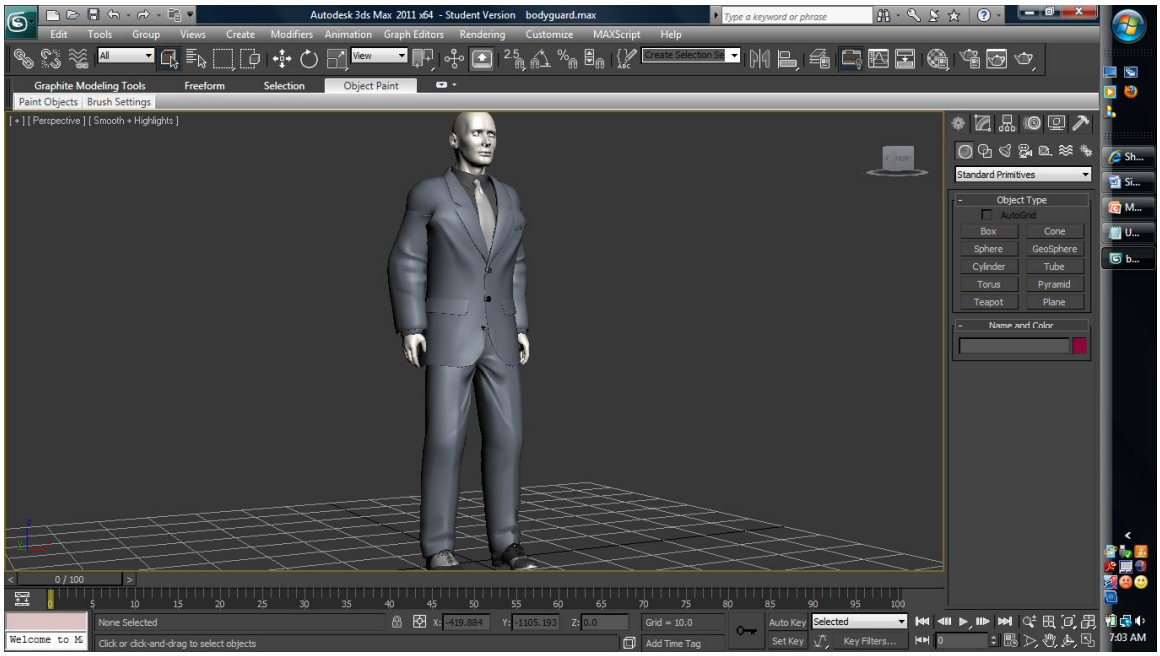
C. **Door: touch sensors** allowing doors to the left to open and close revealing a hallway that can be transversed by the user.



D. **SUV:** vehicle shown below can be seen driving pass the restaurant and projects a real life view of the 3D space. SUV can be seen from inside the restaurant from an outside window and interior of the vehicle can also be inspected.



E. **Human models:** male and female models were imported into the 3D space and bipeds produced ballet motion by using predefined .bip files brought into the modeling scene.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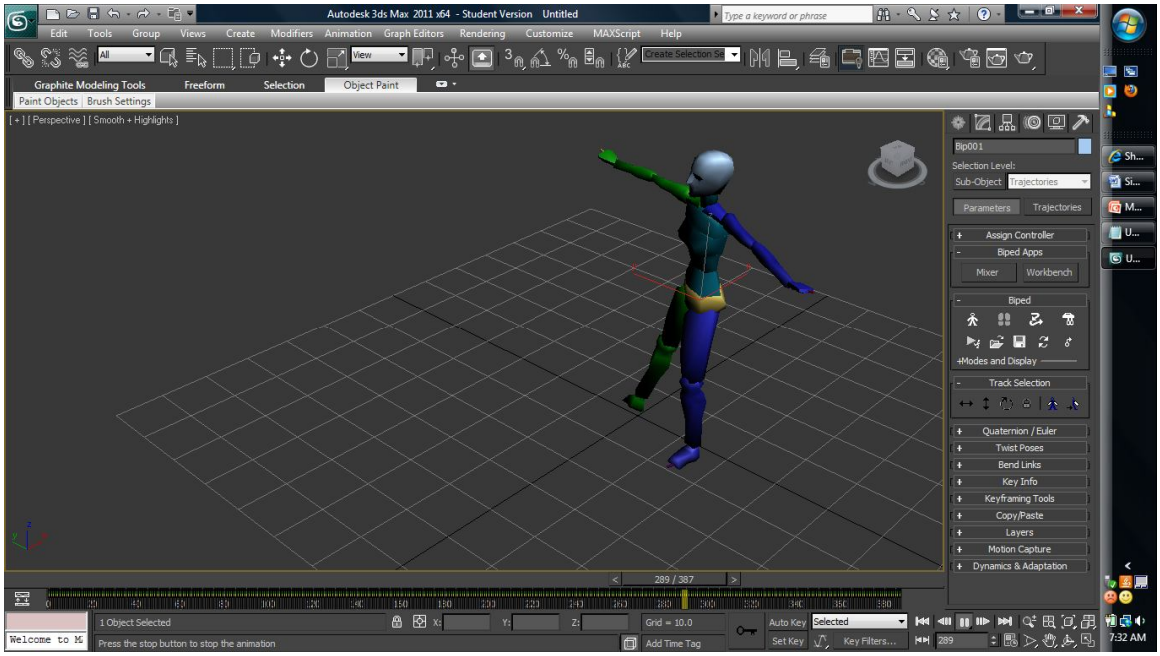
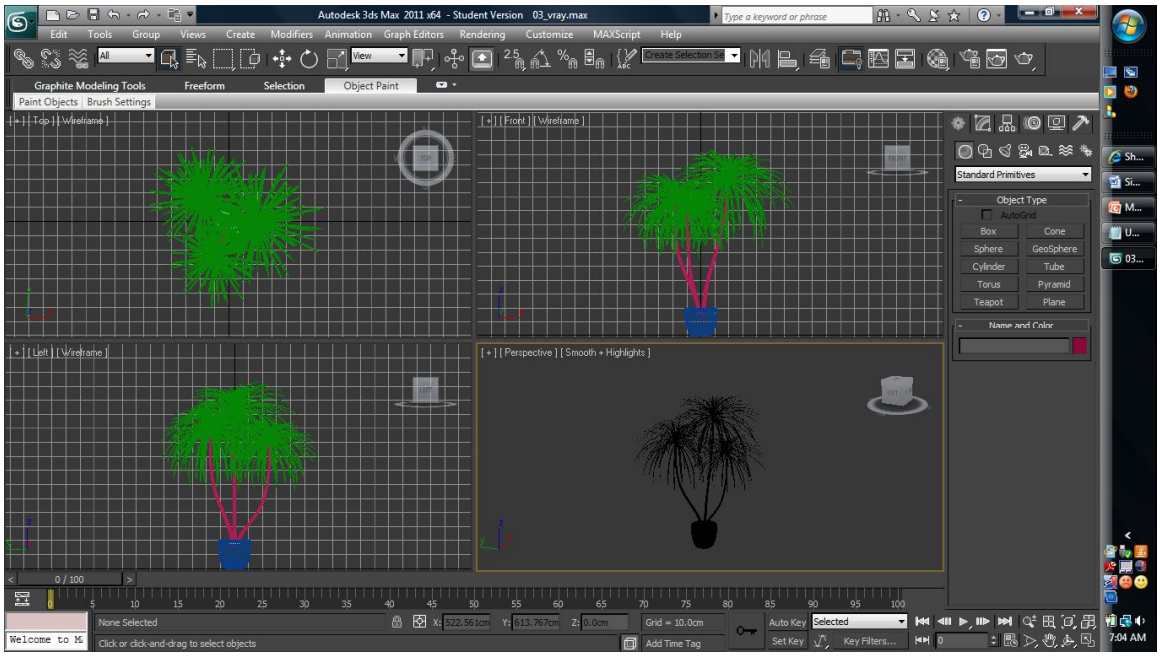
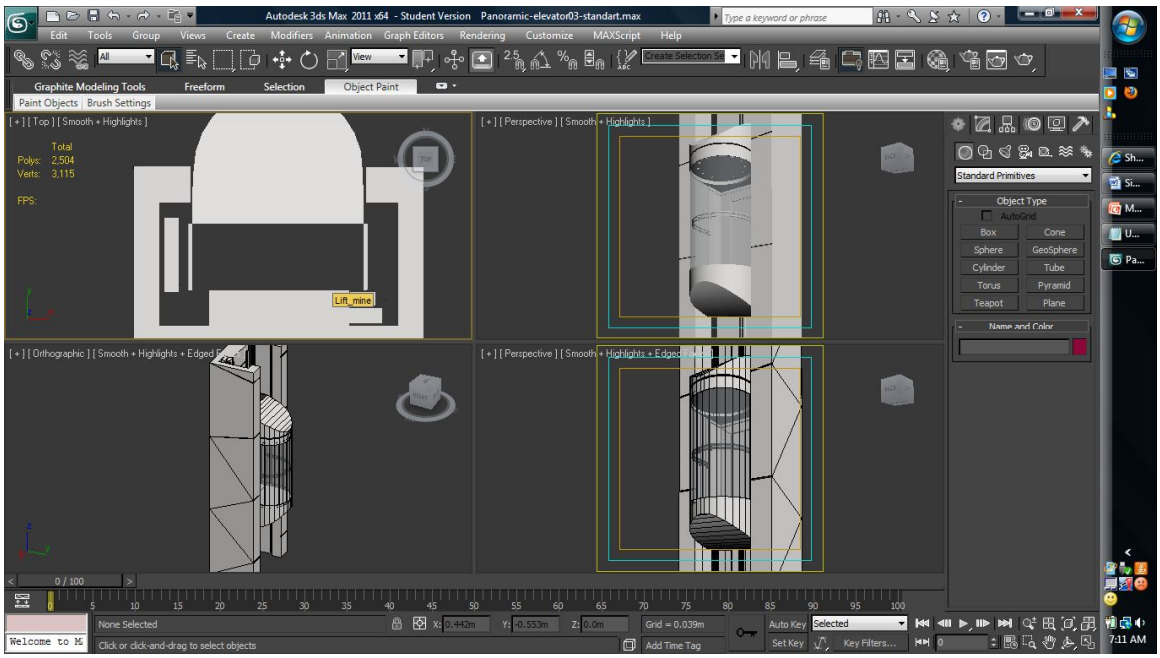


F. Plant models: plant models were imported to add to the richness of the 3D max scene.



G. Elevator:simulation of an elevator opening up with touch sensors and cameras on the first floor, allowing the user to get in and then going up to the next floor, then allowing the user to get out and explore the next floor.



Advantages of and Barriers to VR Restaurant Models

Advantages of Adopting VR Restaurant Models

- Enhanced communication and easy to explore restaurant context
- Freedom of movement (movement between different scales and levels of details)
- Different levels of immersiveness
- Ability to attach qualitative data to the models
- Portability
- Formally and informally sharing data with diverse stakeholders
- Ability to involve diverse disciplines together under one roof

Barriers to Adopting VRRestaurant Models

- Technical issues (software, hardware compatibility, recurrent updating etc.)
- Organizational issues (management of shared resources,data copyright and ownership issuesetc.)
- Ownership of the models
- Privacy and security

Design Environment and Implementation

The developed restaurant environment was created from a .3Ds file of the RPub Café from renderosity.com. This file was converted into a 3Ds Max file for further development and implementation. The restaurant model contained a complete interior and exterior scene with four floors: a detailed building with a cafe at the entrance floor. There were any different props are available for the scene, including: ashtray, plate, small plate, cup, cup with coffee, cigarette, napkin holder, spoon and toast. The restaurant is displayed within a night setting and the original development was done with the 3DS version, however, 3DS Max was able to easily create the necessary lighting to change the time setting of the scene. The original mood of the scene is highly dependent on lights and shadows.

The development started on the first floor with the creation of lighting in order to be able to view the file when exported to VRML. The original 3DS Max scene when exported to VRML could not be seen of viewed. With the lighting settings now enabled, we then modeled the building. Originally, there was no modeled furniture in either of top three rooms. In order to create furniture within these rooms, we cloned several pieces of furniture located in the bottom floor, scaled, and moved them to the other three floors. This was followed by the creation of a material to add a texture to the walls of the restaurant. Within the final stages for modeling we added plants, a stereo system, and an elevator to the scene. After the modeling was done for the restaurant we then worked on the sensors for the project. Since within VRML adding sensors was not a trivial task, we decided to use the built in VRML attributes within 3DS Max. This allowed for an ease of implementation with just dragging and dropping sensors attributes from VRML into the 3DS Max scene. We started out with creating a sensor to animate the opening of the door of the restaurant. This was followed by creating some animated movements for the furniture in the restaurant. We also added animation to the elevator to simulate going up the elevator to enter other floors within the virtual restaurant. Finally, we added biped human simulated interactive elements to the scene.

Results and Conclusion

How is the Application Used?

The Simulated Restaurant was created in a virtual world environment using 3ds Max and VRML97. To load the demo file it is simply loaded onto VRML or Cosomo player by drag and drop. The viewer know has the ability to interact with the virtual demo by panning to different camera views incorporated into the environment and clicking on installed Touch Sensors.Close your eyes and drag your mouse. There are three kinds of modes that most browsers have: fly, walk and point -- but each browser uses slightly different names or styles. In fly-like modes, it's like you are piloting a plane through a 3D space, arrow keys or mouse direction adjusts the direction you're headed in, and you also can move forward and (sometimes) backwards. Walk mode lets you move around on an imaginary flat surface, and you have to press special keys to move up and down.

Point mode is the best (maybe only?) excuse to use a mouse in navigating a VRML environment. You click on an object you see, and then you move towards it. Nice and simple.

Another feature of VRML is that you can have preset viewpoints that a world creator positions to let you look at special vistas or views in the world. Think of it as a movie director positioning a camera while filming a scene. You can usually switch between these by right-clicking and making a selection from a pop-up menu. In addition, there can be links inside the VRML world that link to other parts of the world -- other viewpoints!

Why is the application useful?

The application is very useful because it simulates an proposed environment for many purposes such as design effects, safety simulations, and demo projects.

VRML is useful for a variety of applications, including:

- data visualization
- financial analysis
- entertainment
- education
- distributed simulation
- computer-aided design
- product marketing
- virtual malls
- user interfaces to information
- scientific visualization

Why is virtual reality the appropriate technology?

Virtual Reality is a very valuable asset to our future in technology due to its vast abilities to create a safe world within a simulated environment. Virtual Reality is a way of interacting with real or imagined "environments." In our case it involves using information technologies in such a way that all consciousness of using a technology disappears. Until recently, this technology has been only available to a small set of computer hackers and active research projects. Currently, the costs and nature of the equipment to place someone in a "whole new reality" preclude access for the average individual.

When using a virtual reality system, the user gets a feeling of being "in" the environment like a fighter pilot in a flight simulator system. This is done by stimulating more than one sense, using natural movement as input and locking out external stimuli.

Problems encountered

In designing our virtual restaurant, there were minor problems encountered mostly due to software issues. The integration of 3ds Max files from each designer went very smooth, however when importing external files from internet sources caused several missing file errors due to outdated or missing software.Lab computers ran VRML files at slow speeds. VRML pad crashed during startup numerous times and would not reopen on request.Textures not applied correctly to VRML demo.

Remaining shortcomings?

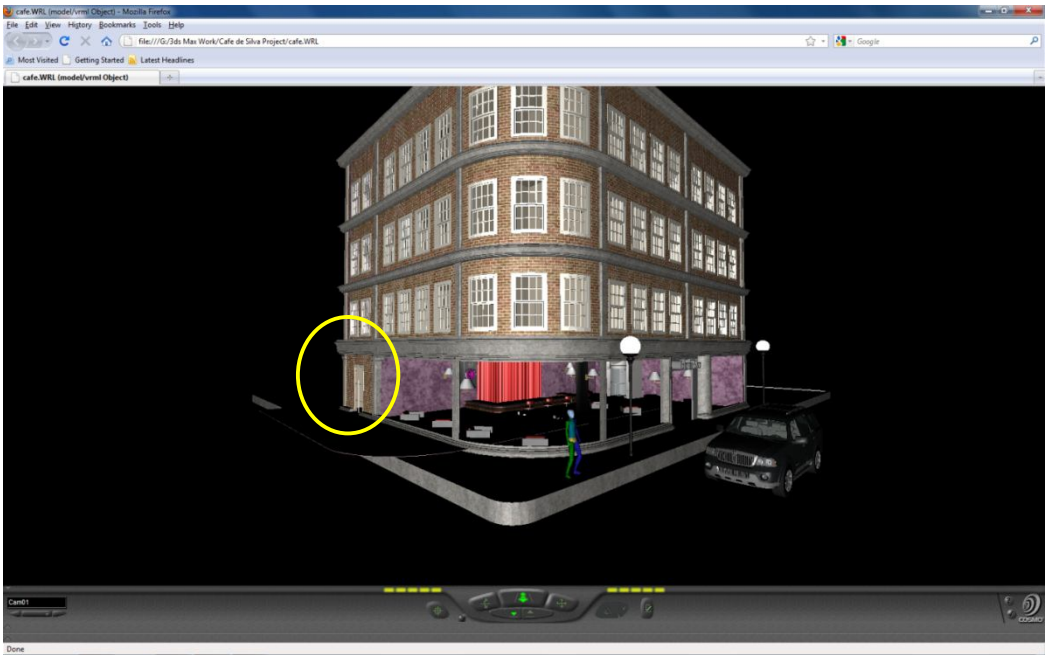
Final stages of the project would be to add skin meshes internal bipeds and background to the overall environment (i.e. street, traffic light, sky). Also add a biped in the driver's side of the SUV. Continue to simulate the SUV pause at the passenger pickup spot and continue to drive around the entire building back to original spot.

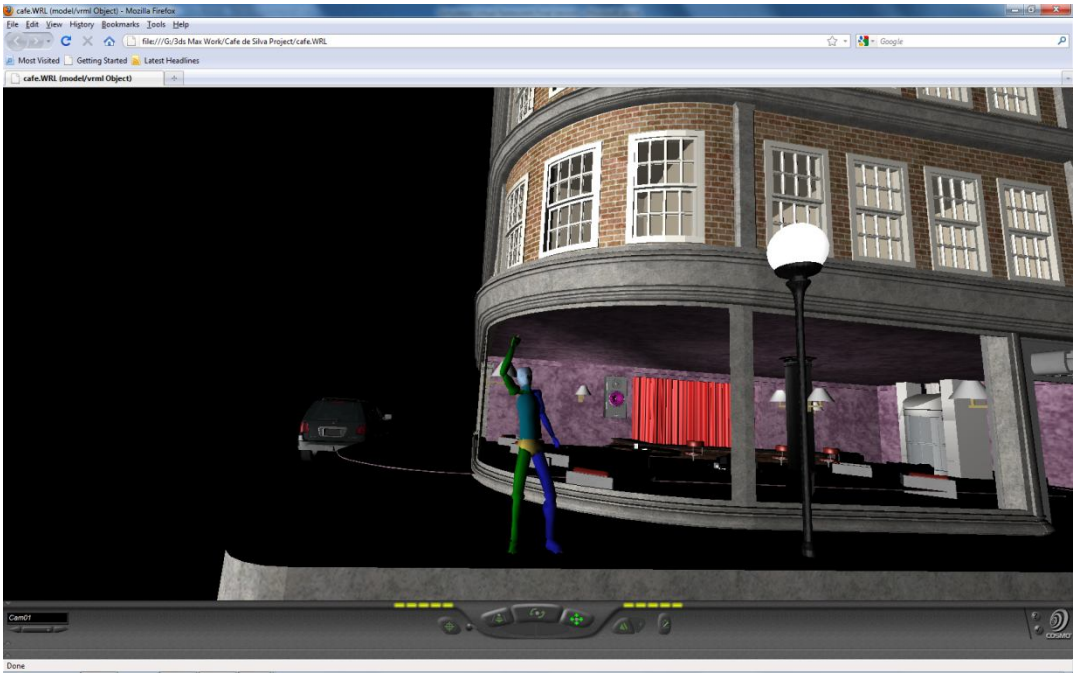
Recommendations for further improvements?

Add more texture, lighting, and bipeds to environment. Add more acoustic design to each room to give the restaurant a more elegant and realistic feel. Installing Cosmo player on all lab computers versus Web3D player.

VRML and 3Ds Max Figures

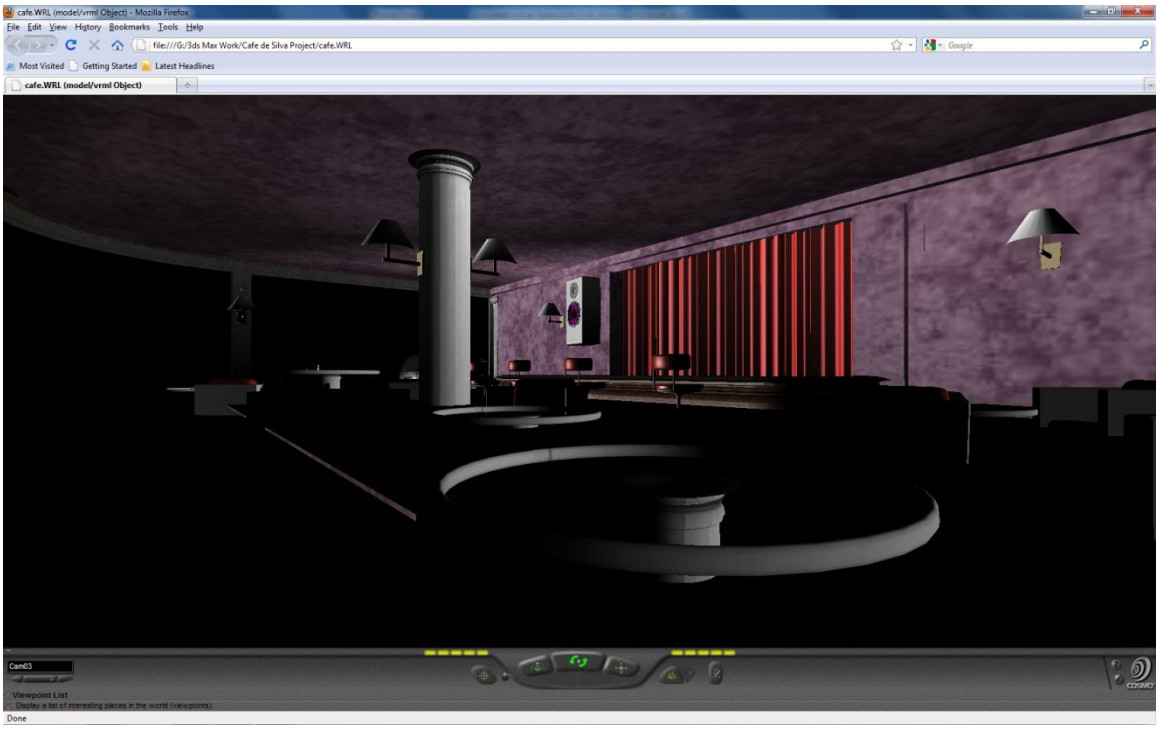
Cam01. Establishing shot of Virtual Restaurant where the SUV is seen driving around the front of the restaurant turning the corner, and stops to pick up a passenger as a simulated biped waves at the driver. Viewers will also see a biped exit the rear door on the left from this angle as well.



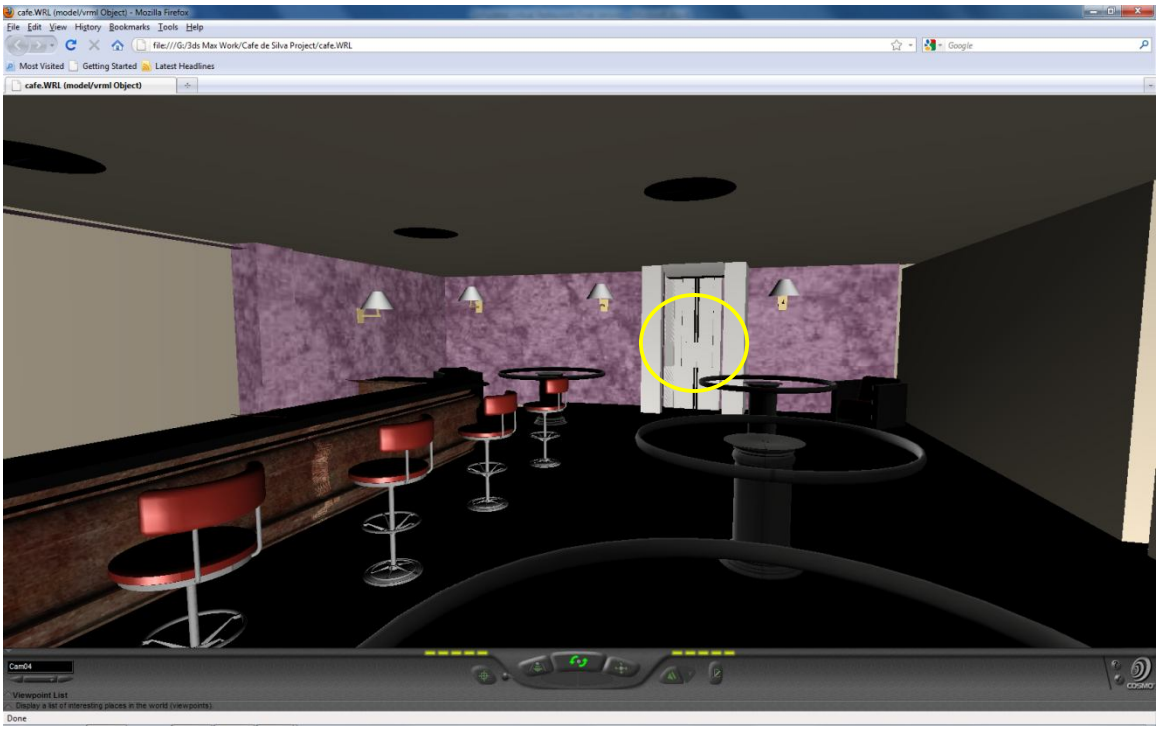


Cam02. Start point of SUV animation. Front view of *Cafe de Silva.*

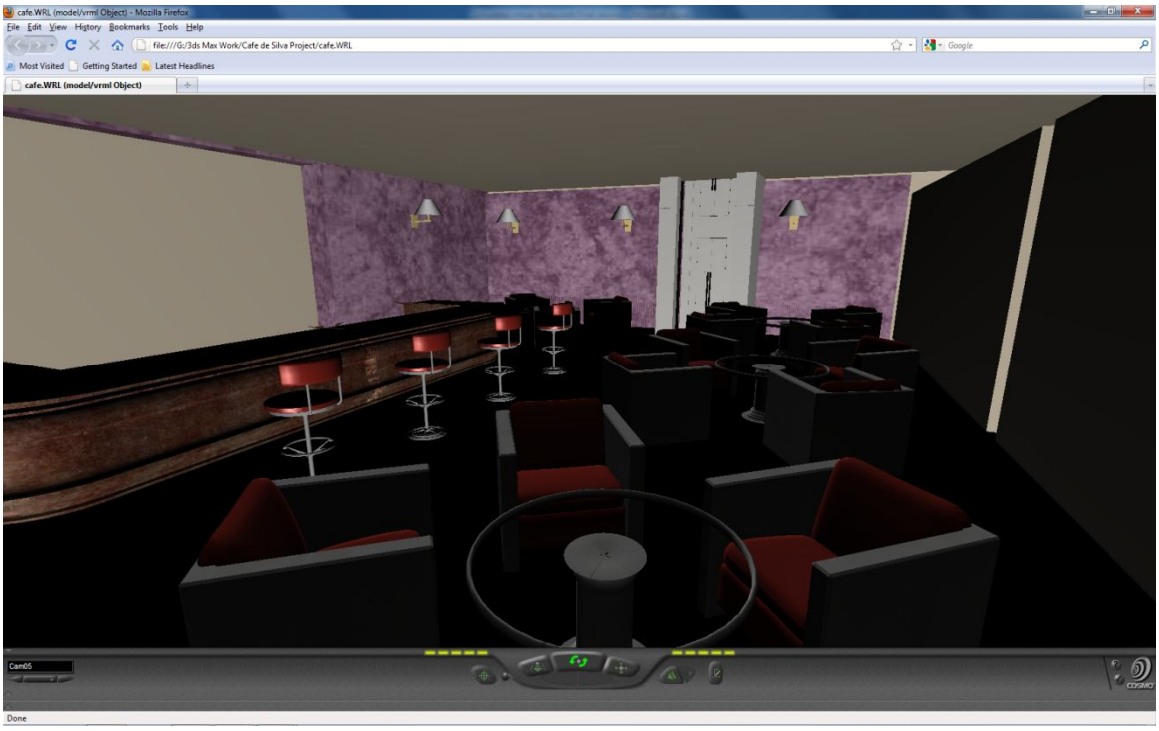
Cam03. Inside shot of first level of restaurant. Unseen bipeds will be added to this seen standing at the bar.



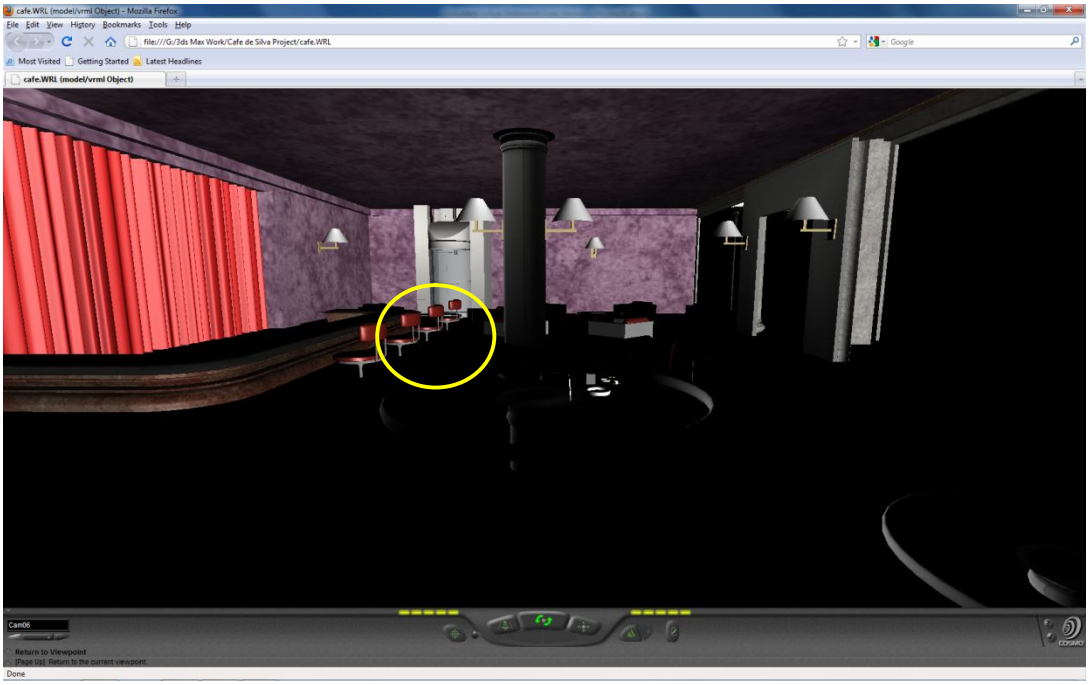
Cam04. Elevator shot on second level of the restaurant. Viewers will be able to use Touch Sensor located on the elevator.



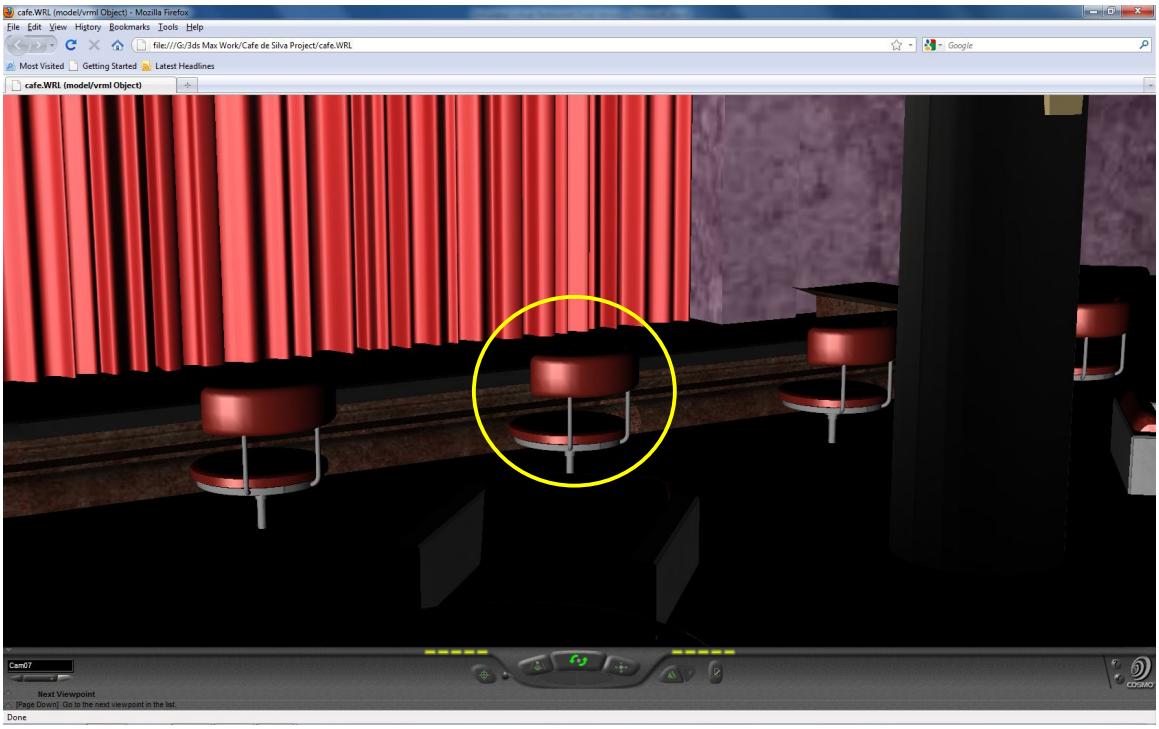
Cam05. Third level of restaurant. Unseen bipeds will be added to this seen standing at the bar and table area.



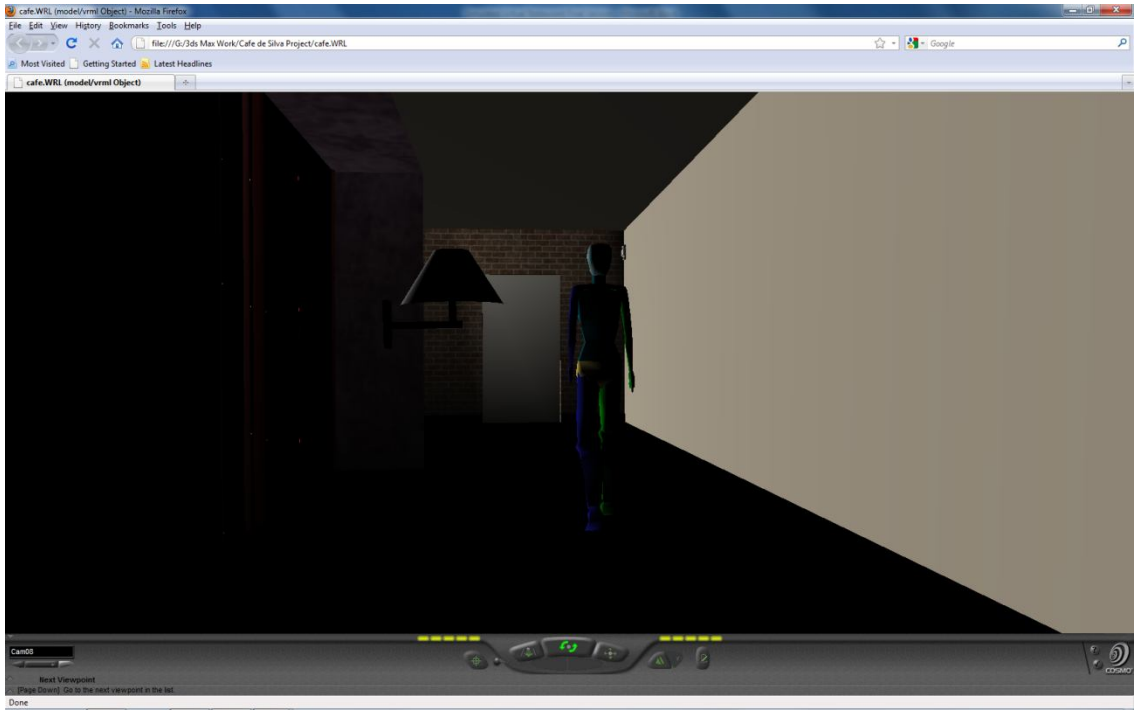
Cam06. First level of restaurant. Viewers will be able to use Touch Sensor located within the middle bar chairs.



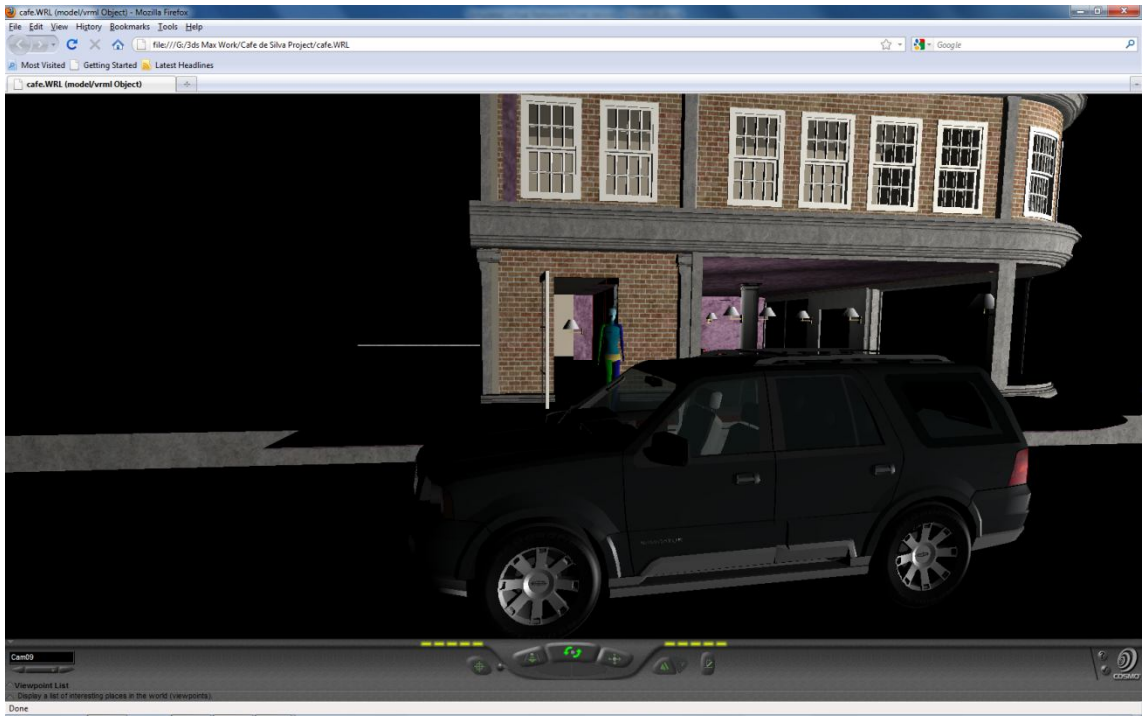
Cam07. Touch Sensor camera located on first level of the restaurant. Viewers will be able to activate touch sensor to swivel chairs.



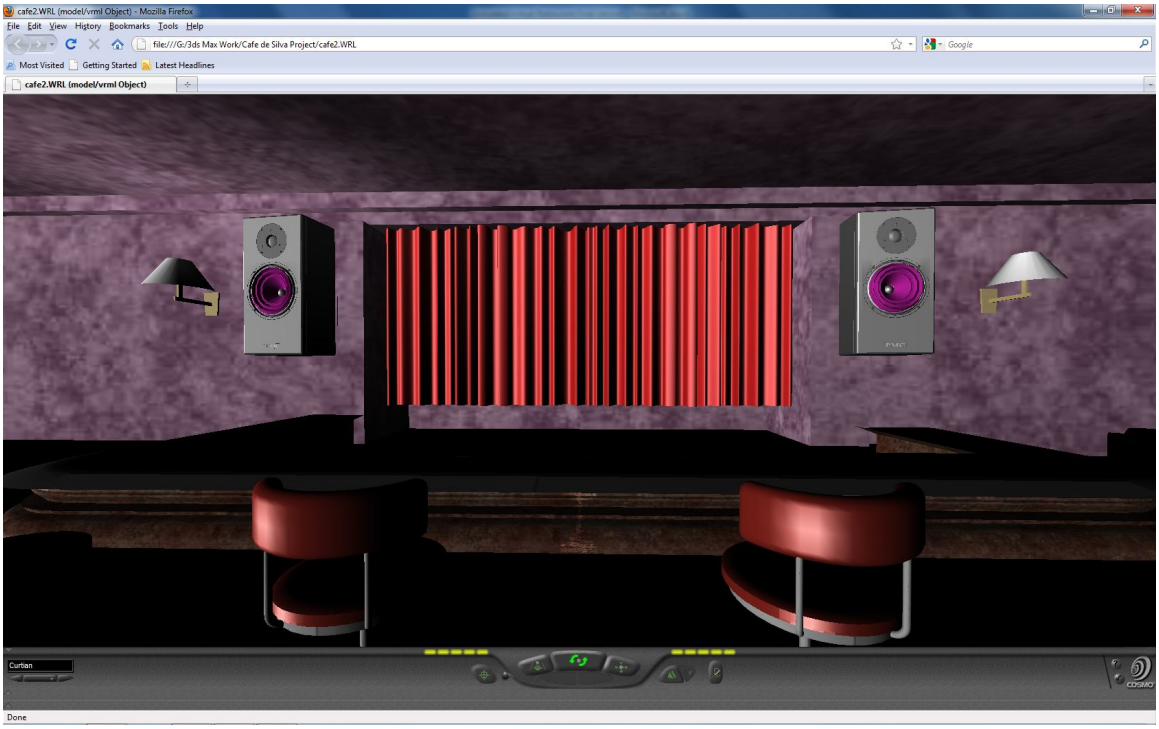
Cam08. Touch Sensor camera for animated biped and door. In this shot viewers will be able to click on biped to activate animation and click on door to open. Biped actually walks through the door and stops at SUV parked outside.



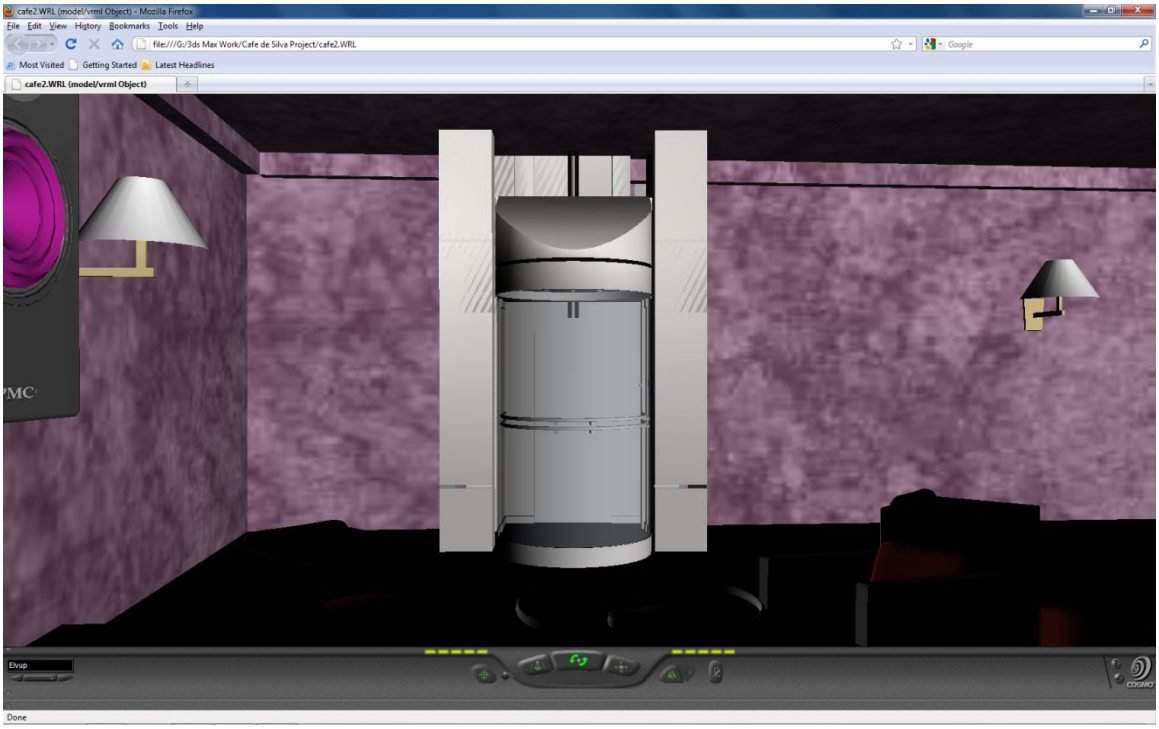
Cam09. Touch Sensor camera for rear door. Also shows biped shown in Cam08 exit.

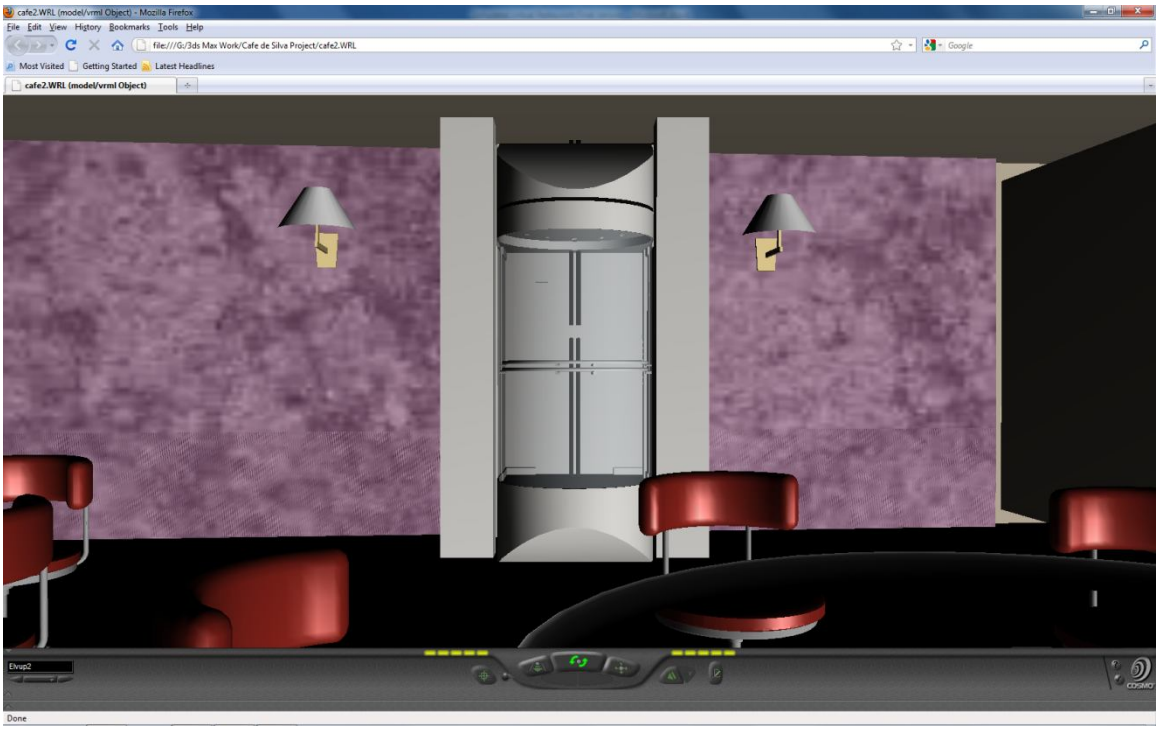


Curtain. Touch Sensor camera of curtain on first level of the restaurant. Viewers can click on curtain to animate (see below).



Elvup Cams (1-3). Touch Sensor camerasfor elevator on first through fourth floors of the restaurant. Viewers can click on the elevator on every level to animate it rising upwards to next floor(see below).





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