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Daily Life 3D Modeling Made by OpenGL

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1 Introduction

The three-dimensional model is designed to imitate a genuine McDonald's drive-in restaurant scenario, which includes a two-story McDonald's restaurant, a road sign to the left of the restaurant, and two moving cars in front of it, as well as the ground and background. The drive-in restaurant and the signboard, which is based on a real-life McDonald's restaurant, are the key elements of this scenario. In addition, realistic ground and backdrop textures are used to create a more immersive daily life atmosphere. Aside from static models, the animation of the car driving and the opening and closing of the restaurant's front door replicates a more vivid scene of stepping out of the car and entering the restaurant. Likewise, the program provides a certain level of interactive functionality, preliminary accomplishing a specific range of human-like perspective adjustments, allowing the user's view to be remoted by keyboard input. In this manner, the scene can be viewed from several angles.

2 The designs and features

2.1 The ground and the background

The most fundamental part of the modeling are the ground and background, which contribute to construct the environment of the scene. In this case, we used a texture map with a mottled concrete floor as the ground, as well as a texture map

with a shot of a real scene taken as a background in real life, which is a daytime road scenery with a floor made of same material as the ground. The background environment of this scenario is produced as shown after being adjusted to the proper size.

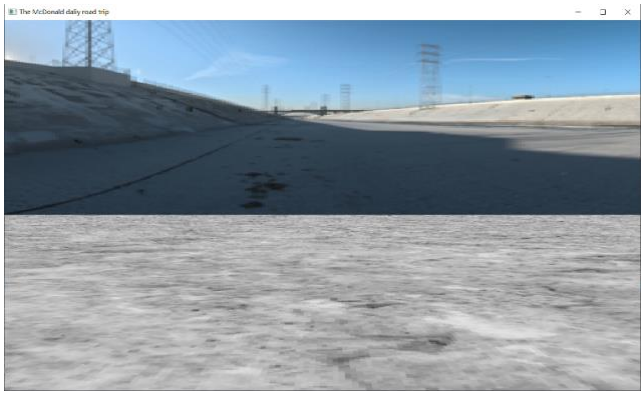

Figure [1]. The background environment of this scene

2.2 The McDonald's drive-in restaurant and the signboard

The McDonald's drive-in restaurant is made up of several elements. To match the McDonald's style, the façade features two distinct color schemes. The classic orange and gray color pattern of McDonald's is used for the front side. In details, a row of two-story high orange pillars is embedded in the wall with a yellow and white iconic McDonald's logo posted on the surface of the first floor of it. The first-floor windows are immediately close to the left of the orange pillar, and the front door is located between the windows. The windows and doors are built of gray cubes that have been transformed. For the windows on the leftmost and rightmost sides, they are similarly embellished with a series of long orange cubic fillers arranged horizontally according to their height. Next to the window on the leftmost are the gray-framed doors to this drive-in restaurant. It is noticeable that the door on the right can rotate with the part of it that overlaps with the window on its right serving as the turning axis. In this way, the door is capable of the animation of opening and closing. Between the door and the rightmost window are two more windows of the same size as previous one. The door and the two indicated windows have no padding to create a perspective effect, allowing the features of the restaurant's interior to be seen from the outside. Furthermore, there is a display area for posters for McDonald's in the right corner of the front, where there are two orange boards and the down board is posted by a 'McCafe' logo. In its above, that is, the protruding part of the roof of the first floor, there is a similar board on which a red and yellow logo of McDonald's is affixed. Then, it comes to the second floor of the front side, which has two windows without filler embedded into the gray wall. These two windows also have a similar striped orange bar arrangement in the middle of the structure like the orange pillars mentioned above. Similarly, on the right side, there is a part with a series of orange bars and a gray display board with a red McDonald's emblem on its surface. The

sight on the second story is also visible via the windows.

Figure [2]. The front façade of the drive-in house

For the façades other than the front one, the iconic yellow and green color scheme of McDonald's is utilized for the façades, and the left façade has two windows on the second-floor, with a yellow and green McDonald's logo pasted in the center of the windows. Below these two windows, the two bulged sections indicate canopies. Under the canopies are two ports that for the take-out and payment, which establish a scene of the McDonald's "Drive-thru" where in the real world the driver can order and pay at the first port and then pick up at the second port.

The signboard is similar to the board of the front door. It features a cylindrical pole at the bottom, while the top of the signboard is painted orange with a white and yellow McDonald's logo. Here, the overview of the left façade and the signboard is displayed in figure 3.

Figure [3]. The left façade and the signboard of the restaurant

2.3 Internal structure of the drive-in house

The internal structure of the first-floor scene is consisted of several tables, a counter and a stair leading to the second floor. There are two types of paired tables and chairs: the small table, which is red and yellow like the McDonald's classic red logo, and the yellow-brown long table set, which has cylinder legs under both the large table and its chairs. The small tables are located near the window, while the long table is located on the right side of the first floor, away from the window. The figure below shows the overview of the tables in the 1st floor.

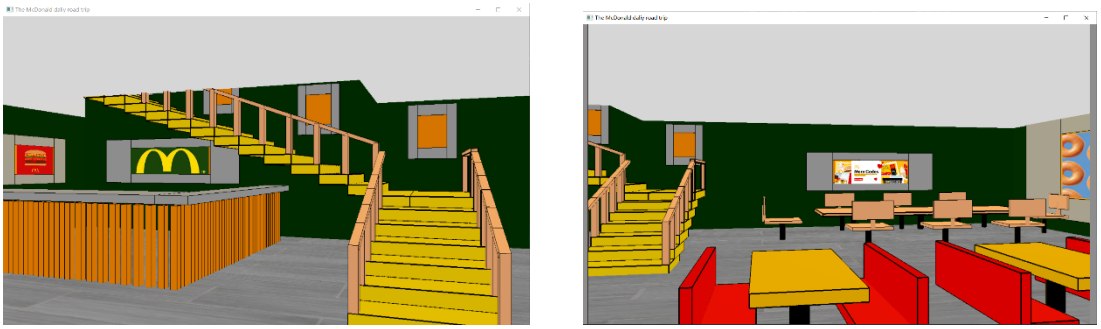

Figure [4]. The layout of the 1st floor

The store counter is on the right hand, which is also painted as grey and orange. And right next to it is the stairs, whose handrail of is composed of light-yellow-brown bar, and the main body of the staircase is made of yellow cubes by splicing.

The stair ends at the upper left corner of the second floor after going upstairs. The layout of the second floor is similar to that of the first floor. positioned vertically on the right side, as well as tiny tables near the windows and on the right side against the side wall. Likewise, in the interior of the house, there are many McDonald's posters on the walls in each floor and a yellowish light source which will make the entire house look like a McDonald's restaurant. The following picture shows the views of 2nd floor.

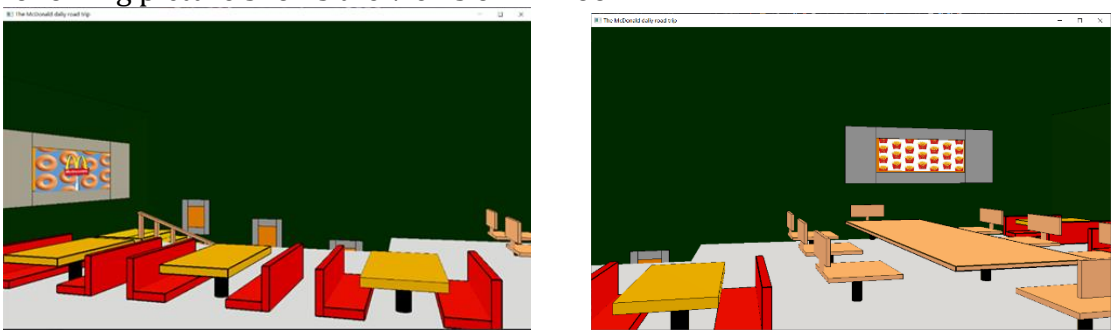

Figure [5]. The layout of the 2nd floor

2.4 The moving cars

The moving car is comprised of two cubes as the body as well as front and rear wheels on the bottom. Because the road is two-lane, there are always two cars on the road at the same moment in this scenario, with the car in the outer lane driving faster and the car in the inner lane driving slower. It is worth mentioning that the wheels will remain spinning as the car runs on the road in front of the house, and the car in the inner lane will stop each time it reaches the front door of the drive-in restaurant and then make a match with the opening and closing action mentioned earlier, until the opening and closing action is completed, at which point the car will continue to move forward. This procedure embodies the action of exiting the car and entering the house.

2.5 Interaction

The interaction is mostly controlled by the input of the key board. The operations that each key can perform are shown below:

q/Q ----- exit program r/R ---- set the view mode w/W ---- move forward

a/A ---- move backward ***s/S ---- Shift left*** ***d/D ---- Shift right***
i/I ---- look up ***k/K ---- look down*** ***j/J ---- look to the left***
l/L ---- look to the right ***u/U ---- going up*** ***“ ” ---- going down***

2.6 Instruction about running the program effectively.

- Step1: run the program directly, you will see the McDonald’s house and the signboard cars in the environment of Figure [1]. You will see the car stops at the front door and wait until the door open and close. Then the car of the inner lane will keep running again.

Figure [6]. The car is approaching the front door

Figure [7]. The car stops, the door opens and closes.

Figure [8]. Then the car continues to move

- Step2: press any of the “w/W”, “a/A”, “s/S”, “d/D”, “u/U“, “ ”, “k/K”, “i/I”, “j/J”, “l/L” to experience the movement of the view in a certain range. You can move and change the perspective **at will** to get the any kind view of the scene (e.g. move the view to inside the drive-in to see more details as described.) This is the final step, please enjoy my work.