

# Dental Pen Visualizer

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## 1 Introduction

This document will help you walk through the Visualization Project for the Medical Pen.

To begin, have Unity Hub installed. Then download Unity 2022.3.8f1 to be on the same version as the project. Download the project from the cloud, if you have access to it.

The scene for the visualization can be found in the Assets/Scenes folder. It is named Dental Room.

## 2 Overview

The user loads in, and is looking at the patient. The user clicks and drags the patient's mouth to open it. On opening, the pen will float over, and the user clicks the pen. When the pen is clicked, the screen fades to black and the user switches perspectives to the camera attached to the pen.

From the point of view of the pen, the user sees a Torus which is highlighted yellow. The user's cursor is a red circle to represent the laser. The user will trace the outline of the torus, and on successful tracing, the gum segment is removed, and the scalpel will be used to perform some action. Then the gum segment is re-attached.

### 3 Components

The scene has a few components.

1. The Room - Collection of game objects that include the walls, furniture, etc.
2. Patient Parent - The patient game object including armature rigging, the gum, teeth and tongue. This will be broken down further.
3. User - Initial user game object with a capsule for the player, an empty game object child for orientation, and a camera position game object
4. Camera Holder - Game object with moveCamera.cs attached to it to move with the player. Contains a Camera child (with CamControl.cs attached to rotate camera with right click), and a quad covering the camera to fade to black.
5. updatedPenColors - Imported fbx for the medical pen. This object has GrabPen.cs attached to it. Contains a Camera as a child, which in turn has a cylinder 3d object or a line renderer as a laser.
6. Scalpel - Imported fbx for the scalpel. Has animator attached to it.

## 4 Scripts

There are a few important scripts. These are all in the Assets/Scripts folder. We will go over them. The scripts are commented and all parameters are explained.

1. AddOutline - Adds a yellow outline to the mesh its attached to (and its children).
2. CamControl - Rotates the camera with right click.
3. DetectMouseCube - Detects if mouse has entered the collider region. Trigger animation if yes, and set isHit to true.
4. GrabPen - When user clicks on pen, trigger sequence of actions to fade camera to black, switch user cam to penCam, then change the cursor to laser, and enable the tracing scripts.
5. Laser - For Line Renderer implementation. Check if laser is hitting something and don't render the laser beyond that point.
6. MouseTrace - Monitors mouse movements and checks if mouse has visited all target markers. Once successfully completed, following sequence is triggered.
7. MoveCube - Used to rotate the jaw. User has to click and drag the jaw open. On succesful opening, the pen will float to next to the mouth for the user to click on. (Rotation set to X axis, -20 min, 5 max)
8. MoveUser - disabled, but if used, player can move around with WASD.

Other scripts are technically not needed, but deleting might break something, so they are staying put for now.

## 5 Models

The dental room and patient were bought as an asset. The gum segment was cut into a separate object in Blender. The pen, and scalpel were made in Blender.

The patient model can be thought of as being broken into 3 components.

1. Armature - Rigging to move the model parts. Navigate to the Jaw to move around during development. The jaw has the MoveCube script attached to it to open the mouth.

2. Skin - Meshed game objects that are the body of the model. These include game objects outside the Armature such as teeth, teeth.001 - teeth.031 .

3. Gum Segment - Separate Gum portion that can be removed from the model, and subsequently manipulated as needed. Contains the "Torus" shape game object with the AddOutline and MouseTrace scripts attached to it. The Torus has 4 box colliders as children, one for each edge. Each child has the DetectMouseCube script attached.

## 6 Contact

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