Volumetric Image Visualization

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Task 3

1 Planar reslicing (reformatting)

In lecture 7, we learned the algorithm to obtain a planar cut by aligning the normal vector $\mathbf{n}$ with a given arbitrary vector $\mathbf{n}'$ and placing the cut at point p_0 inside the scene (Figure 1). We also learn how to move the cut plane from p_0 to p_{n-1} in order to reslice the scene into a new one with n axial slices.

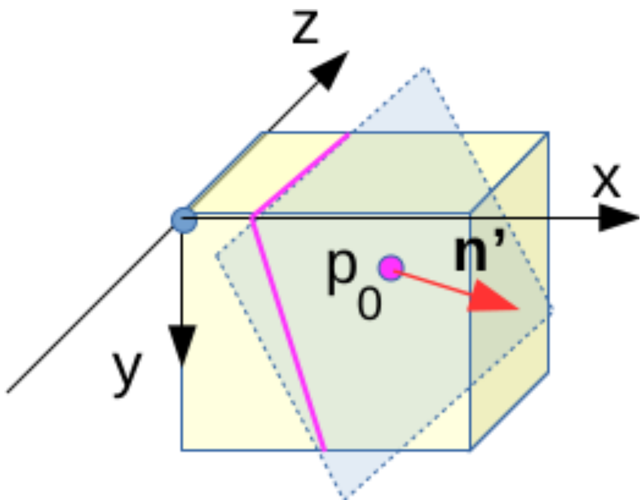

Figura 1: A planar cut at point p_0.

In this task, the vector $\mathbf{n}'$ is obtained from two given points, p_0 and p_{n-1}, in the image region. The spacement d'_z between the axial slices of the new scene will depend on the number n of desired slices. Vector $\mathbf{n}'$ is defined as

$$\mathbf{n}' = \frac{p_{n-1} - p_0}{\|p_{n-1} - p_0\|}. \tag{1}$$

For n slices, $\lambda = \frac{\|p_{n-1}-p_0\|}{n}$ in the ray casting algorithm. The new spacement d'_z between slices will be λd_z.

2 Task

You must develop a C code, reslicing.c, with the following usage:

reslicing P1 P2 P3 P4 P5, where

- P1 is the name of the input .scn scene.
- P2 are the $p_0 = (x_0, y_0, z_0)$ coordinates of a point p_0 in the scene.
- P3 are the $p_{n-1} = (x_{n-1}, y_{n-1}, z_{n-1})$ coordinates of a point p_{n-1} in the scene.
- P4 is the number n of axial slices of the new scene.
- P5 is the output .scn scene.