King Abdullah University of Science and Technology

Fall 2015 CS 247 Scientific Visualization Assignment 1

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1 Slice Viewer

1 DownloadVolumeAsTexture

In this function, we need to set up and download texture to GPU.

```
glEnable(GL_TEXTURE_3D);
glGenTextures(1, &vol_texture);
glBindTexture(GL_TEXTURE_3D, vol_texture);

glTexParameteri(GL_TEXTURE_3D, GL_TEXTURE_MIN_FILTER, GL_LINEAR);
glTexParameteri(GL_TEXTURE_3D, GL_TEXTURE_MAG_FILTER, GL_LINEAR);
glTexParameteri(GL_TEXTURE_3D, GL_TEXTURE_WRAP_S, GL_CLAMP);
glTexParameteri(GL_TEXTURE_3D, GL_TEXTURE_WRAP_T, GL_CLAMP);
glTexParameteri(GL_TEXTURE_3D, GL_TEXTURE_WRAP_R, GL_CLAMP);

glTexImage3D(GL_TEXTURE_3D, 0, GL_INTENSITY16, vol_dim[0], vol_dim[1],
    vol_dim[2], 0, GL_LUMINANCE, GL_UNSIGNED_SHORT, data_array);
```

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1 Display Slices

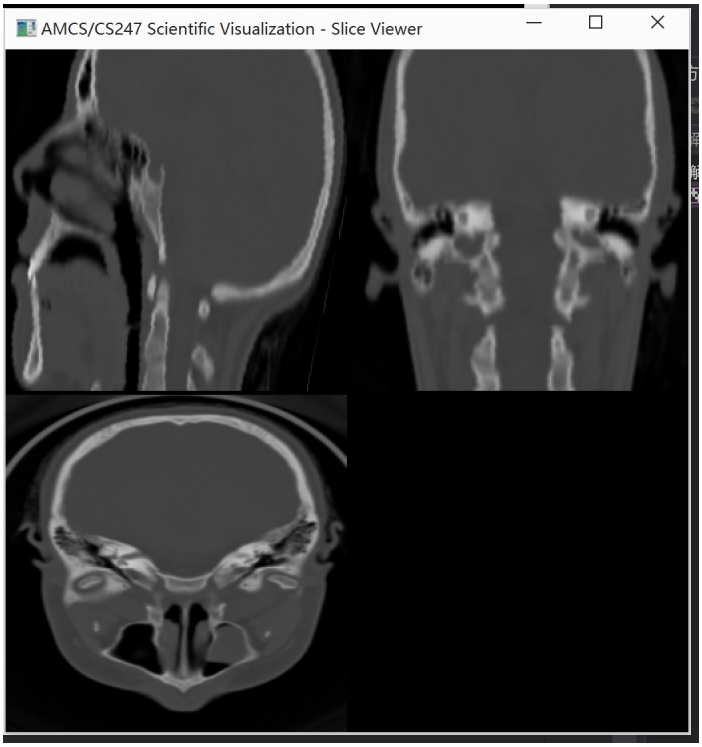
The current texture coordinates are part of the data. **display** function is to texture coordinates associated with each vertex.

```
float slice = current_slice[current_axis] / (float)vol_dim[current_axis];

glBegin(GL_QUADS);
glTexCoord3f(tc[current_axis][0], tc[current_axis][1], tc[current_axis][2])
glVertex3f(-1.0f, -1.0f, 0.0f);

glTexCoord3f(tc[current_axis][3], tc[current_axis][4], tc[current_axis][5])
glVertex3f(0.0f, -1.0f, 0.0f);

glTexCoord3f(tc[current_axis][6], tc[current_axis][7], tc[current_axis][8])
glVertex3f(0.0f, 0.0f, 0.0f);

glTexCoord3f(tc[current_axis][9], tc[current_axis][10], tc[current_axis
    ][11])
glVertex3f(-1.0f, 0.0f, 0.0f);
glEnd();
```

1 Bonus: show three views

We can divide the screen into 4 parts via **glVertex3f** function.

The final results look like below: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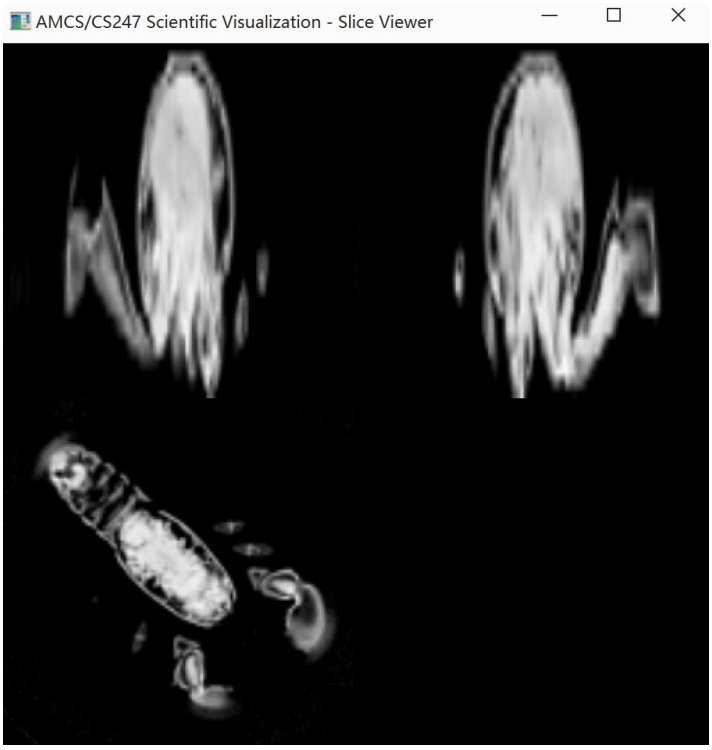
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