

HPC Course Visualization assignment

Prerequisites

For this assignment you will need ParaView which can be downloaded for free from <http://www.paraview.org/>. This assignment consists of a challenge that needs to be solved through visualization. You can earn the credits that go with this course by solving the challenge and submitting a report that explains your approach. E-mail your solution to R.G.Belleman@uva.nl.

One submission per student. Make sure you mention your name and student number in the report. Deadline for submission is 18:00 on February 2, 2018.

Introduction

Download the mystery dataset from <http://bit.ly/1s7Vi3E>

All we know is that this dataset contains image data, much like what is generated by medical imaging devices, such as CT or MRI scanners. This particular dataset was located on an abandoned USB stick that was found on a crime scene. A range of experts have tried to identify the data but none have succeeded. This is where you come in: it is your job to visualize the data and identify its contents.

Assignment

Unzip the data and determine the size of the resulting file: it should be 8,388,608 bytes exactly. From experience you know that most imaging devices produce stacks of 2D images that are either 256 x 256 or 512 x 512 pixels each. Assume each pixel is represented by 1 byte (also referred to as a “unsigned char”): determine the number of images in the stack.

Read the data into ParaView as “Raw (binary) data”. Select the file using the Open command in the File menu. Configure the panel in the “Object Inspector” to reflect your findings. In particular: you need to figure out the correct settings for:

- Data Scalar Type: this is the data type for each pixel, for which there was a hint above;
- Data Extent: the dimensions of the whole dataset, which you just calculated.

Analyze the data with a Histogram filter. If you configured the panel correctly, you should see two spikes in the scalar distribution of this data. Figure out a way to visualize the content that corresponds with these spikes.

You should see one object. If you see multiple, you misconfigured the panel with the input dataset parameters.

You will notice the object looks “compressed”: alter the Data Spacing (: the size of each pixel, or “voxel” as it is called in 3D) in the input dataset parameters to compensate for this and report the numbers in your report.

Given that this data was found on a crime scene, create a visualization that shows both the outside *and* the inside of this object in a clear way to determine if the object suffered injury.

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