

OpenFishBrain: 3D Zebrafish Brain Representation in the 3D Internet

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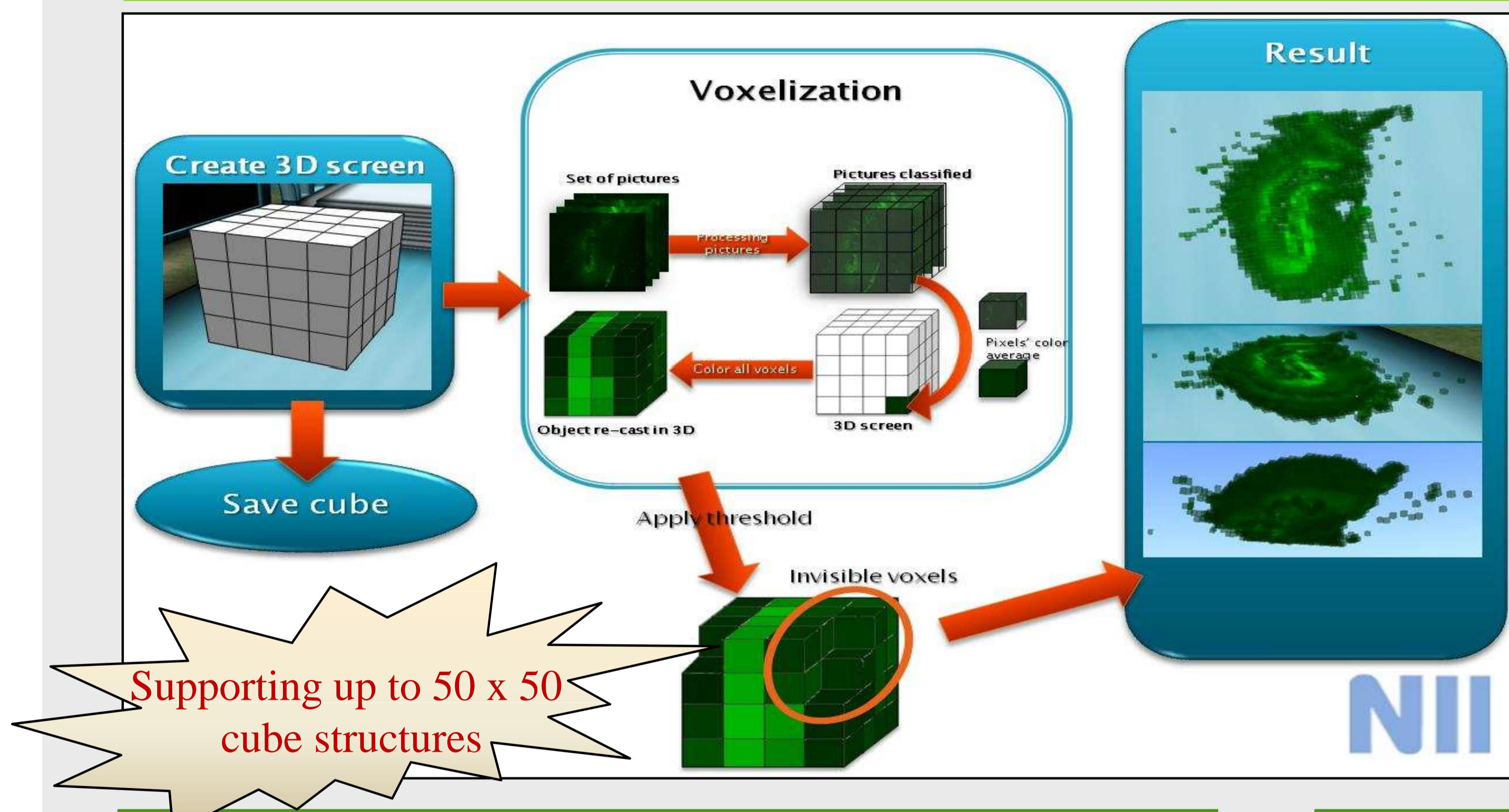
Background

In brain research, it is important to correlate the neural networks and areas in the brain with their activities and, normally, the result of this process is a series of pictures, in which cross sections of the brain are shown and specific areas are highlighted.. However, by using such a method only, it is difficult to determine the 3D boundary of the region of interest and much more difficult to share the results of those analyses with other experts to deepen discussion.

Objective

To solve these two issues, we propose the use of virtual worlds as a platform for displaying 3D representations of Zebrafish brain in a virtual space. The application takes a set of 2D images from the gene expression data of a Zebrafish brain and displays them in an Open Simulator based virtual world as a 3D object based on a technique called “voxelization”

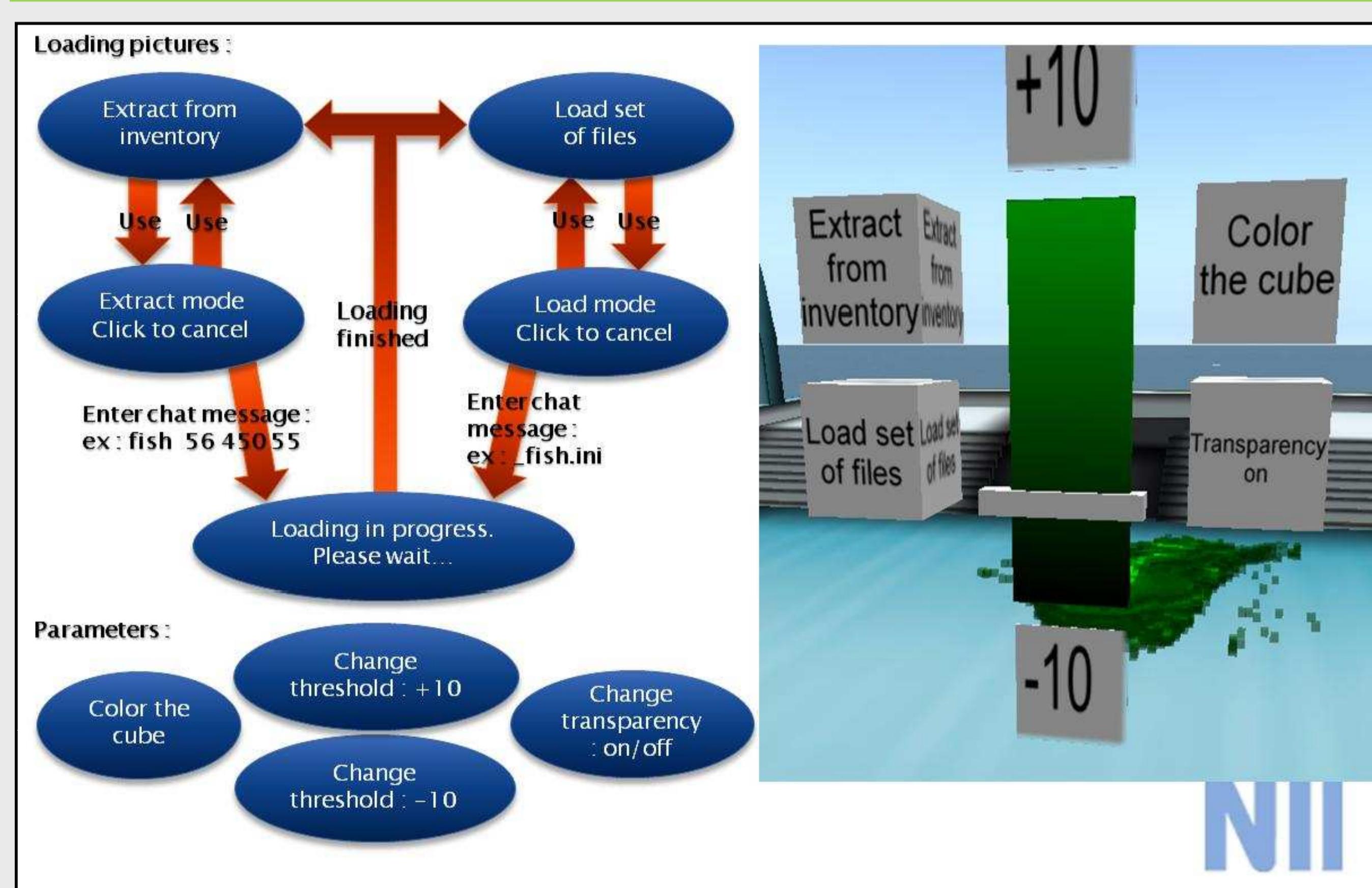
OpenFishBrain – Architectural Overview



Main Process Steps

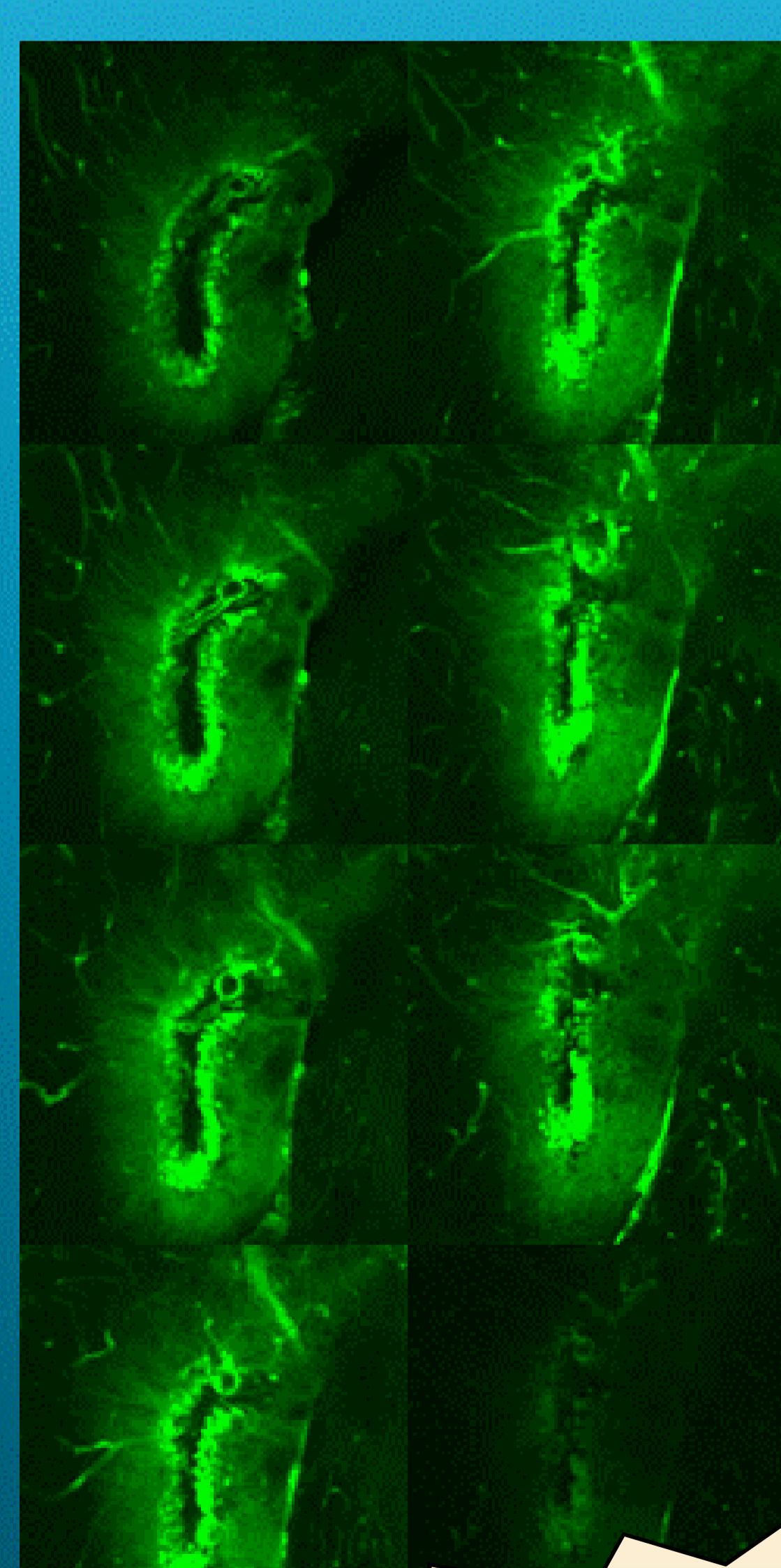
- ✓ OpenFishBrain creates a 3D cube object composed of small cubes, which define the voxels.
- ✓ Pictures representing slices of the brain are loaded and classified according to their intended position in the cube.
- ✓ The individual voxels are colored based on the average color value of the picture areas that fall into their scope.

User Interface Workflow

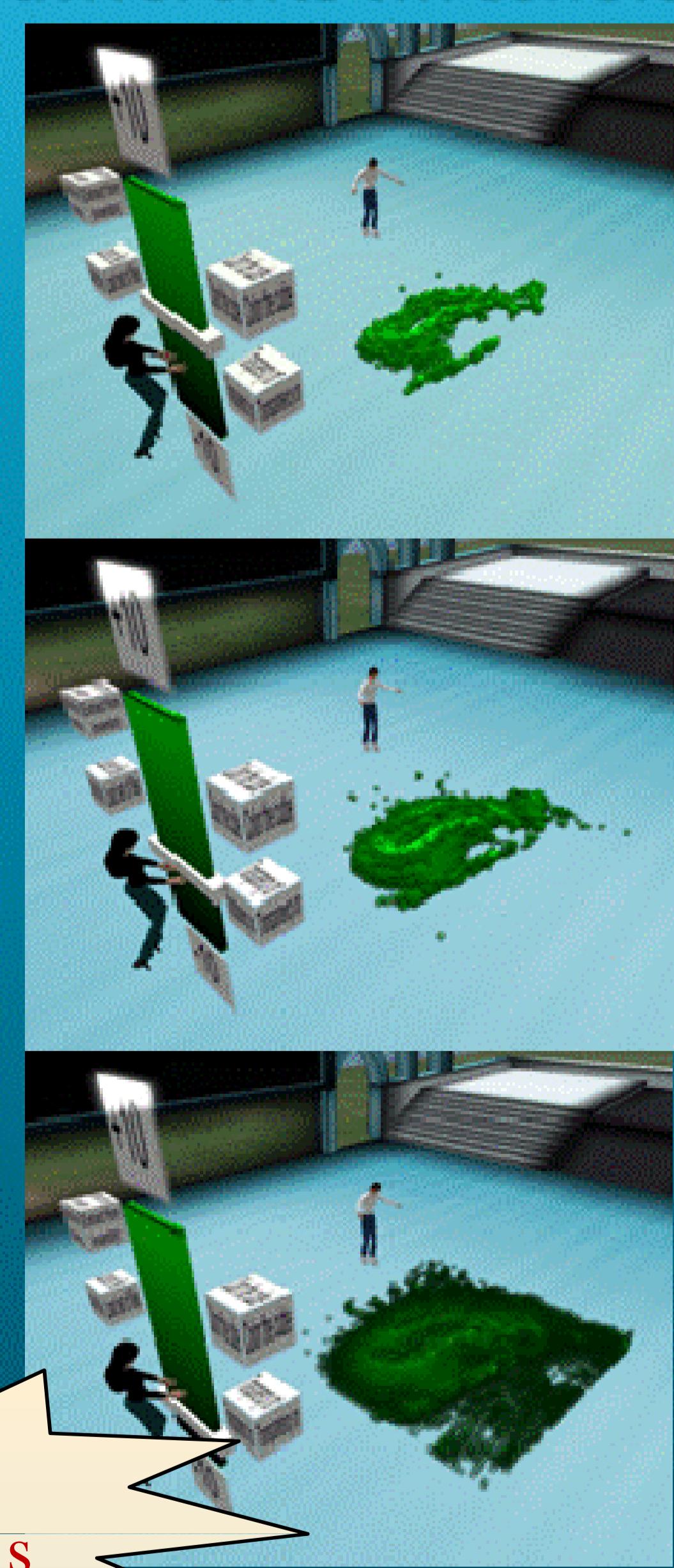


Visual Results

Set of 2D pictures



Object in 3D, with different thresholds



Real Time Analysis
and Collaboration

Featured Collaborative Functions

OpenFishBrain promotes a strong research collaborative framework by providing an appropriate functionality to:

- ✓ Process pictures from any avatar's inventory.
- ✓ Visualize sections through color manipulation
- ✓ Redefine the level of accuracy of the brain model by creating more detailed cube structures

