Abstract-**Placement of N bars around the head of subject during an MR or a CT imaging session provides physicians, neurosurgeons with an analytical ability for preoperational target position determination in surgery planning. Since axial slices yielded by a system mentioned above has 9 N bar spots, where the actual length between them is known, determination of the position of a point can be calculated by N bar points respect to any pre-selected origin.**

Even though, X-Ray CT and MRI are both complex, developed imaging modalities, none of them can be defined as perfect because of their limitations. Namely, when MR imaging is fine for soft-tissue filming, which turns it to be a strong candidate for neurosurgeries, where detailed imaging is important, CT is not as good as MRI. On the other hand, MRI is limited due to mostly, chemical shift, field non-uniformity for preoperational target determination, hence CT imaging becomes more appropriate for such a purpose.

Our goal is to integrate brain atlases and CT images to

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Abstract

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ACTR's functions can be decomposed into two main parts: Slice manipulation and BA-CT image registration. Using left button of mouse, the user can pick up a slice to show on the screen. For instance, if a point on the frontal CT is clicked with the left button, its corresponding sagittal and axial CT images appear on the screen after the choice of "Go" command from "Function menu" is clicked on. This process is all valid for sagittal, frontal and axial slices. So as to zoom a certain portion of a slice on screen, a point close to that area is to be clicked. To see zoomed view of the portion the user should choose "zoom" function from "function menu"

The registration of Atlas-CT images is achieved by following the steps below. The user must, first, place the atlas slices on their places on zoomed sagittal CT by clicking on "Landmark Selection on zoom" through "Atlas" menu. This action is done to choose AC and PC points on the zoom. The click on the "Display Atlas Slices on Zoom" places frontal atlas slices on zoomed of sagittal slice which shows the sagittal plane passing through the AC-PC line. The action of "Display Atlas-Frontal Slice Matching" yields the status shown in Fig. 3.

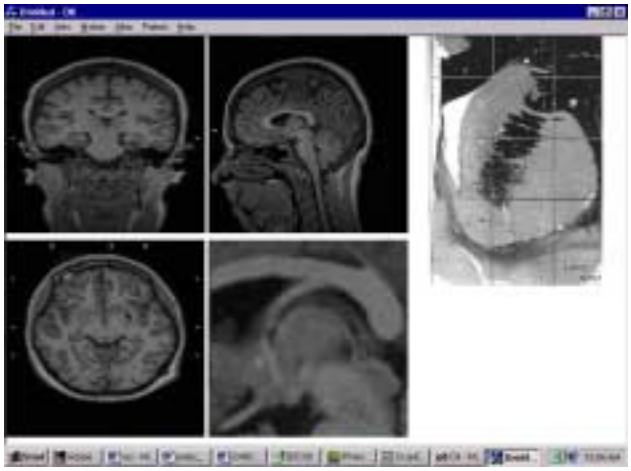

Fig 2 General Overview of ACTR

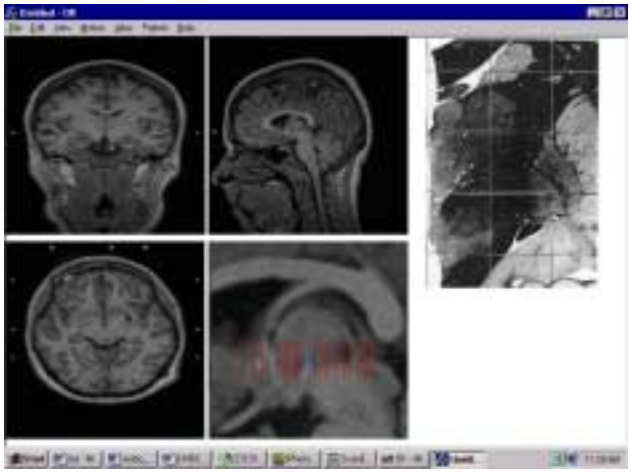

Fig. 3 ACTR Showing places Atlas Slices on zoomed sagittal view with red lines on zoomed sagittal view. The blue line is for indicating the place of frontal view on zoomed sagittal view.

The user then is to click on the "Atlas-Frontal Slice Display" so as to have the zoomed view of the frontal slice in zooming part of the ACTR. This case is displayed in Fig. 4

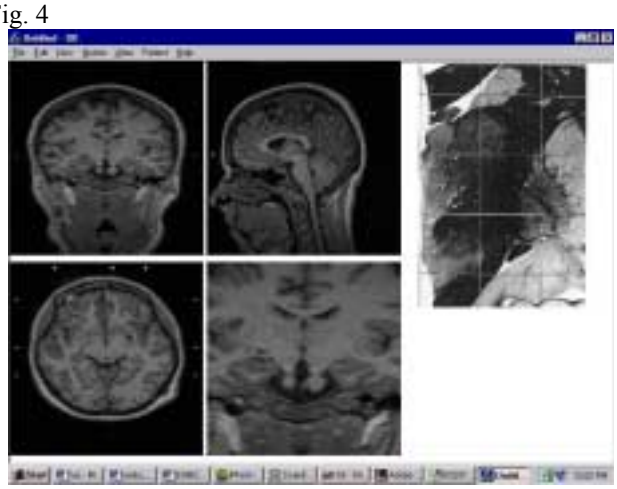

Fig. 4 ACTR showing frontal slic(s)3.d5.6(e)-12(f)7.3(r114(n)-15)9(tad8)-1516.2(l)0.5(th15.8( )(T)-15me go 8i T "e t2e

The Fig. 5 shows the result of the clicking on “Place” button on the “Function” menu. This function is the final of the process.

III. DISCUSSION & RESULTS

The main result of the work is the integration of brain atlases with CT (or MR) images. This integration is the only thing applied to brain atlases. Since the brain atlases belong to a certain person they are static entities. This static pattern is surmounted by the application of a deformation to them. Deformation of these brain atlases yield in proper changes in them to fit a subject. Consequently, distinct entities MR or CT images and brain atlas slices are integrated in a form to fit a patient’s anatomy.

For future work the integration of CT and MR with brain atlases is a good target. This kind of integration can yield in more informative manipulation of images.

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