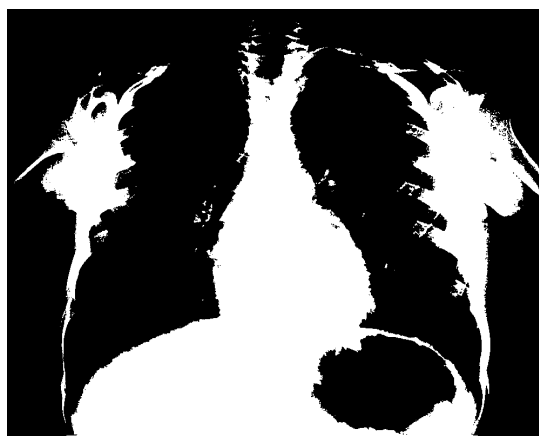
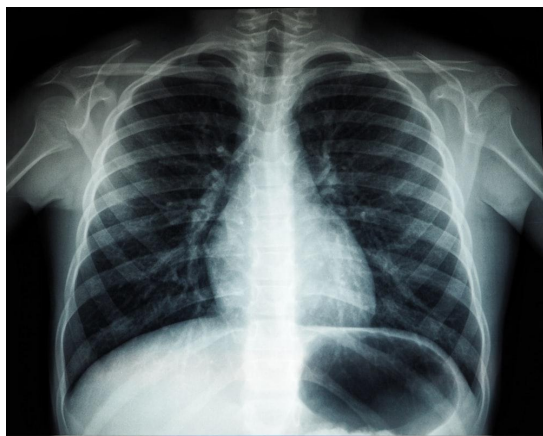
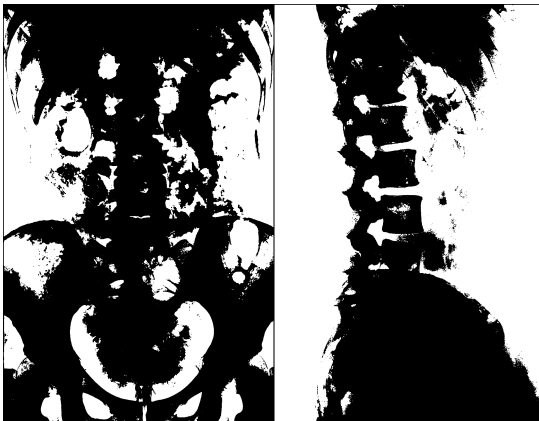
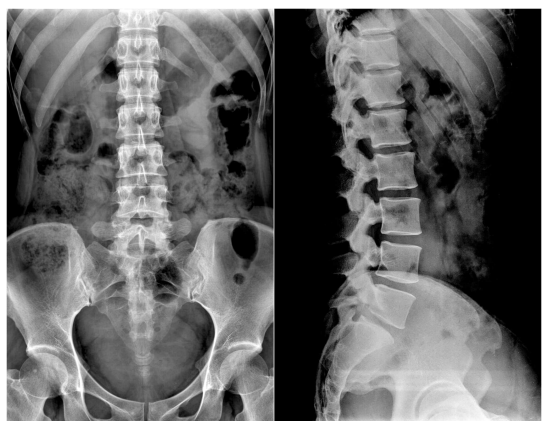
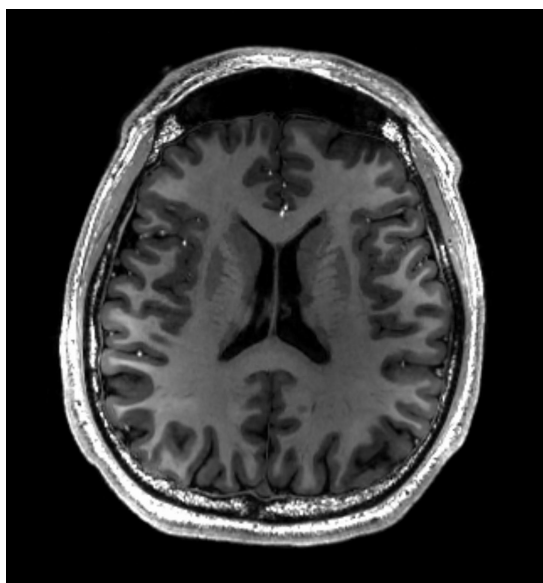




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**Assignment # 1 Report**

## Input-Output Pairs



## Results and Important Findings

### 1. Segmentation of Medical Image 1

Input Image: A MRI of a human brain you can visualize the distinction in the gray and white. Also the folds of the brain.

Segmentation Outcome: The folds and areas which are dense are made into one cluster and the latter to another

Observations: If there had been an anomaly it would have been detected easier due to the segmentation.

### 2. Segmentation of Medical Image 2

Input Image: A X-ray of a human spine from two different angles.

Segmentation Outcome: The segmented image clearly shows the vertebrae's positioning.

Observations: If any of the vertebrae had been dislocated or had been subjected to an anomaly it would have been detected easily.

### 3. Segmentation of Medical Image 3

Input Image: A X-ray of a human chest region.

Segmentation Outcome: The lungs and an air pocket is segmented out.

Observations: If any anomaly would have been present in the lungs it would have been detected.

## Discussion

Accurate image segmentation is crucial in medical imaging for a wide range of applications, including disease diagnosis, treatment planning, and research. The ability to distinguish between foreground (e.g., anatomical structures of interest) and background is fundamental for quantitative analysis and computer-aided diagnosis.

### Improvements

1. To enhance the performance of the segmentation process, the following improvements can be considered:
2. Advanced Initialization: Investigate more advanced methods for initializing centroids, such as k-means++ initialization, to reduce sensitivity to the initial choice of centroids.
3. Feature Engineering: Explore the use of additional image features, such as texture, intensity, or gradient information, in addition to RGB values to improve segmentation accuracy.
4. Post-processing: Apply post-processing techniques, such as morphological operations or region growing, to refine the segmented regions and remove small artifacts.