A GPU-Based Medical Image Segmentation

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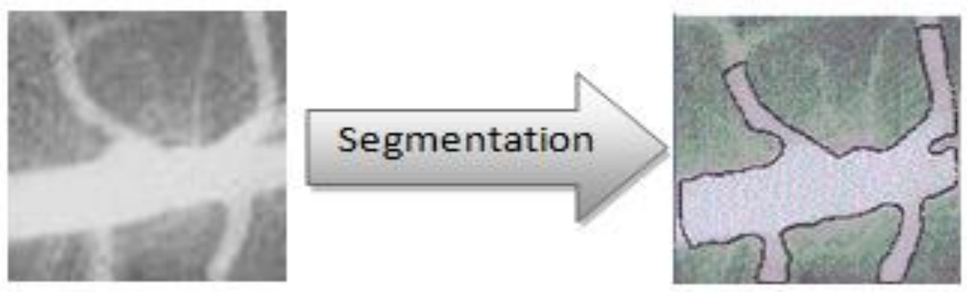
Abstract & Objectives

•Medical imaging has a significant role in the detection and treatment of a variety of diseases

•Image segmentation can be used to classify different tissues according to their normality, which is very useful in diagnosing tumors and other abnormalities in various types of tissues



•Currently, these computations take their place at the traditional CPU system which takes longer time to complete

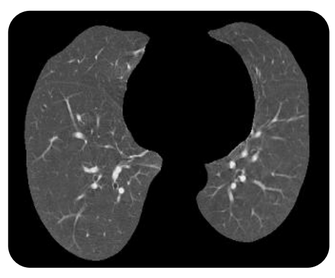
•To accelerate this process offloading the computations to the GPU is very appealing

Materials & Methods

•We implement brFCM algorithm, a fuzzy clustering algorithm for image segmentation, on Tesla K20m GPU

•We compare this implementation with its serial version and with the classic FCM by their execution time

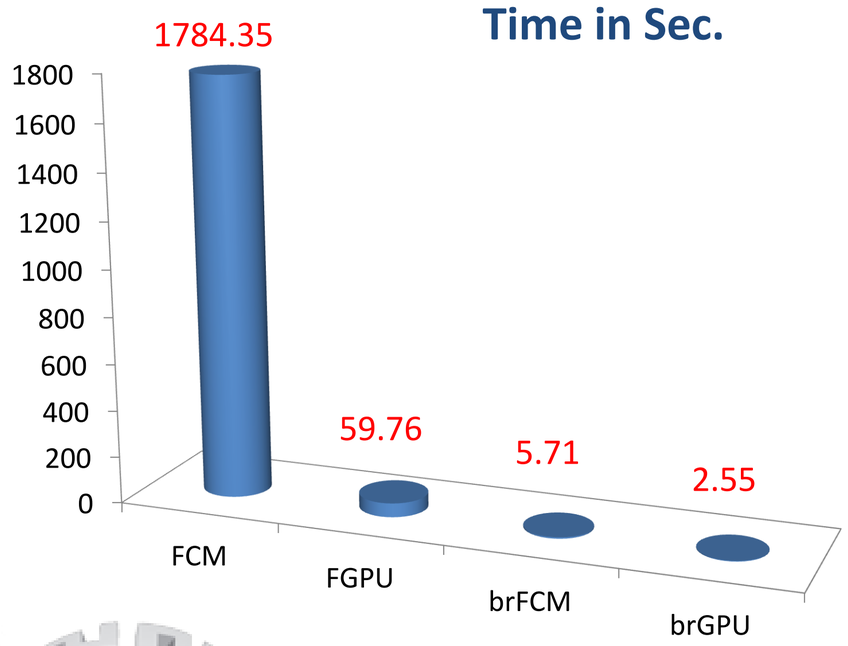
•All tests refer to CT lung and knee MRI images



Results

•Experiment results show that our implementation has a superior improvement over the traditional serial implementation on time and accuracy

•We reduce the time from 30 min to 3 sec



Conclusion

- **We investigate the use of GPU to accelerate the brFCM algorithm**
- **What this research tells us is that the GPU is a suitable processor to implement the clustering algorithm and improve the performance and efficiency of them**
- **The proposed scheme can be also successfully applied to other fields that require rapid clustering and classification**

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IMAN1: Jordan's National Supercomputing Center