PARALLEL IMPLEMENTATION OF CONNECTED COMPONENT LABELLING IN NVIDIA CUDA

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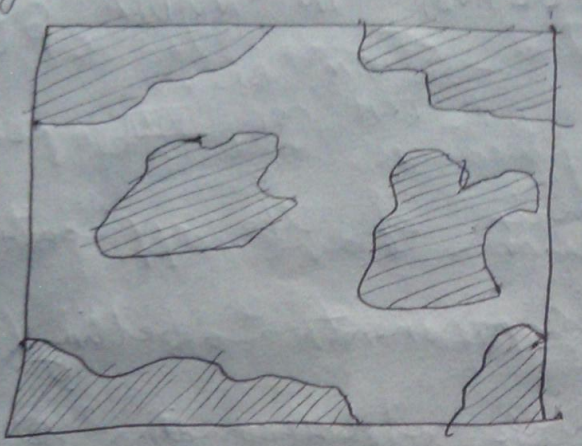
The domain of the applications of Connected Component Labelling spans across a large number of domains ranging from biological imaging to analysis of pictures of the Universe. The basic problem statement pertaining to Connected Component Labelling involves counting the number of regions in an image where a "region" is defined as a set of pixels which conform to a given spatial distribution rule.

P.T.O

For example, if we have the following ~~study~~ image -



corrected Component Labelling (CCL) algorithms aims to count the number of blobs in the image.

The project involves developing an application using NVIDIA CUDA C ~~for~~ which takes an image as an input, performs ~~smooth~~ enhancement and thresholding operations and subsequently implements the CCL algorithm to return the number of blobs in the image.

Usually, serial implementations of CCL do not yield much performance, as they are executed on the CPU.

In this application, all the processes and algorithms have been parallelized and implemented on an NVIDIA GPU, thereby yielding a significant performance gain with speedups ranging upto 3.2.