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# ADVANCES IN COMPUTATIONAL MORPHOMETRY FOR INTENSIVE DATA ANALYSIS IN ASTROPHYSICS AND COSMOLOGY

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Morphometric analysis in the context of Data Science must be performed through the application of flexible algorithms and low complexity, most often in large digital images (generally square matrices and larger than 64x64 pixels) belonging to data warehousing containing over a million of files. Therefore, among the main challenges of this application we highlight the following: (i) Finding solutions to parallelize morphometric algorithms within the new paradigms and platforms of heterogeneous computing (MIC and GPGPU technologies). (ii) optimizing the application of heterogeneous algorithms considering the application in non-concurrent setup and simple, stable and economic architecture to overcome the processing time constraints, data storage and power consumption. In this context, we present a list of the main morphometric techniques that are relevant for astrophysics and show the results of these techniques for HPC applications for SDSS galaxies classification and large scale structure formation.