Using Clusters in Undergraduate Research: Distributed Animation Rendering, Photo Processing, and Image Transcoding

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Abstract—With distributed and parallel processing becoming increasingly popular in both industrial and scientific endeavors, it is imperative that students are introduced to the challenges and methods of utilizing HPC clusters. In this paper, we present three undergraduate research projects that utilize HPC clusters for their projects. Each project involves the use of distributed computing to solve complex problems. We describe the challenges faced in each project, the solutions developed, and evaluate the performance of each system. Furthermore, we reflect on our experience using clusters in undergraduate research and offer general guidelines for mentoring distributed computing research projects with undergraduates.

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Cluster Computing (CLUSTER)

With high performance computing becoming increasingly important in both industrial and scientific endeavors, it is imperative that students are introduced to the challenges and methods of utilizing HPC clusters. In this paper, we present three undergraduate research projects that utilize such HPC clusters, describe the challenges faced in each project, examine the solutions developed, and evaluate the performance of each system. Furthermore, we reflect on our experience using clusters in undergraduate research and offer general guidelines for mentoring distributed computing research projects with undergraduates.