PERFORMANCE EVALUATION OF TERAPIXEL RENDERING IN CLOUD (SUPER) COMPUTING

Abstract with Key Images

Context

Cloud computing has allowed the businesses and researchers to scale up or scale down the computing resources as per the needs without requiring investing capital upfront for physical infrastructure. This has helped in leveraging the pay as you use model. By allocating and optimizing the cloud architecture resources we can further reduce the cost.

Objective

The aim of the analysis is to extract information from the terapixel image generated data from the application and system metrics and pinpoint where the resource optimization should be focused. So that right resources can be allocated to appropriate task so and in turn the cost of operation can be reduced.

Method

To execute this project, we have followed CRISP-DM approach for data mining and exploratory analysis. We have used Python as programming language in Jupyter notebook with some of the packages like matplotlib and seaborn for graphical analysis. Git was used for version control.

Results

From the analysis we observe that Rendering event consumes most of the GPU resource than any other event (tiling, uploading, saving configuration). High-end GPUs can be allocated to rendering events as most of the computation time is being taken by them and mid to lower tier GPUs can handle other events this way, we can reduce cost of GPU resource. Memory utilization and task assignment were not quite optimal and there is a scope for further analysis.

Novelty

This project provides insight into key performance metrics around task assignments, GPU characteristics for terapixel rendering using numerical and exploratory data analysis. This analysis can be served as basis for future cloud scalability architectures.

Key Images:

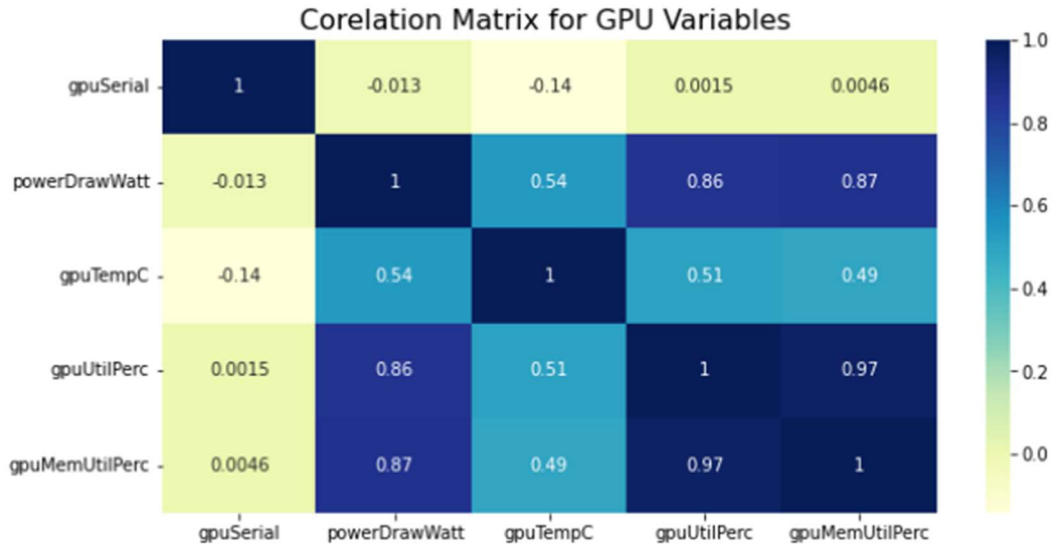

Fig1: Correlation matrix between GPU Variables

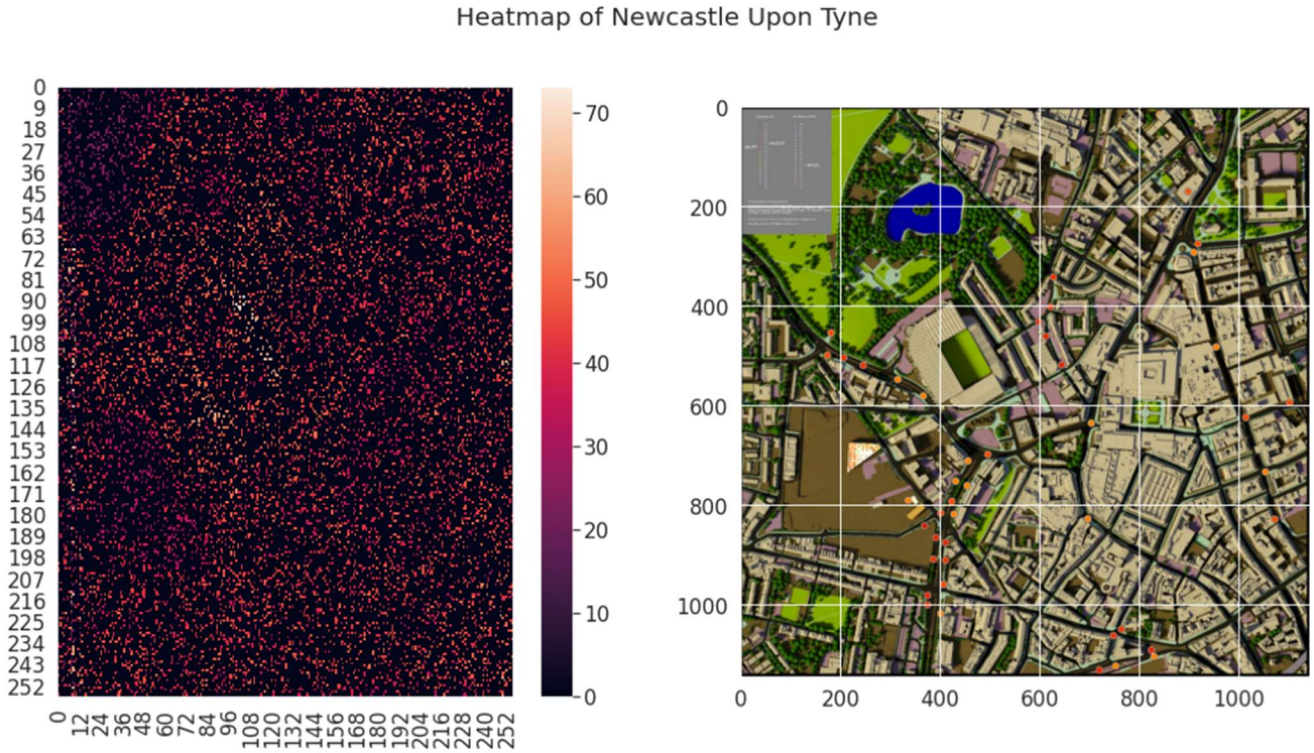

Fig2: Heat map of different tiles of Newcastle upon Tyne