

Curation en masse: Exploration of the Quality of Digital Video

To understand the condition of their large-scale digital video collection, institutions can perform automatic quality assessment (QA) on open science High Performance Computing (HPC) resources

Automatic QA

Modern QA algorithms are capable of predicting the visual quality of images and videos with remarkable correlation to human judgment.

The **Blind/Referencless Image Spatial Quality Evaluator (BRISQUE)**, uses scene statistics of locally normalized luminance coefficient to quantify possible losses of "naturalness" in each video frame due to distortions.

BRISQUE scores for one video can provide digital curators with a measure of quality condition while pointing to localized distortions.

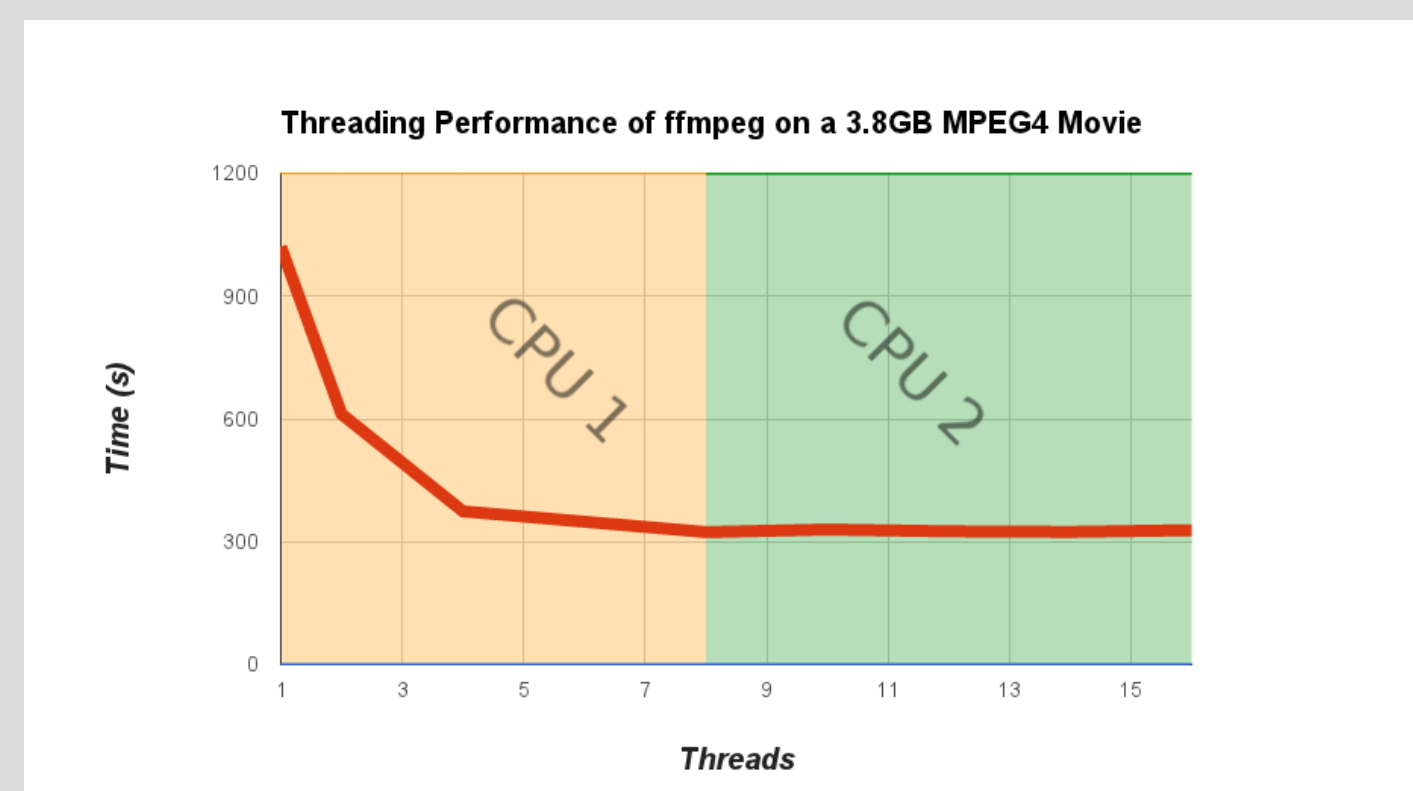
Implementing a large-scale QA workflow is computationally intensive, requiring the use of HPC resources that run analysis jobs in parallel.

1. John A. Lockman III (presenter), Maria Esteva
Texas Advanced Computing Center,
Alan Bovik, Department of Electrical and
Computing Engineering
University of Texas at Austin

HPC Optimization



We studied the efficiency of BRISQUE in the **Stampede** supercomputer. We found that an optimal run uses 8 cores per node. In our QA workflow implementation, each compute node works on two videos at once and when finished starts again. Each node can analyze ~40 high definition frames per second



A QA Workflow

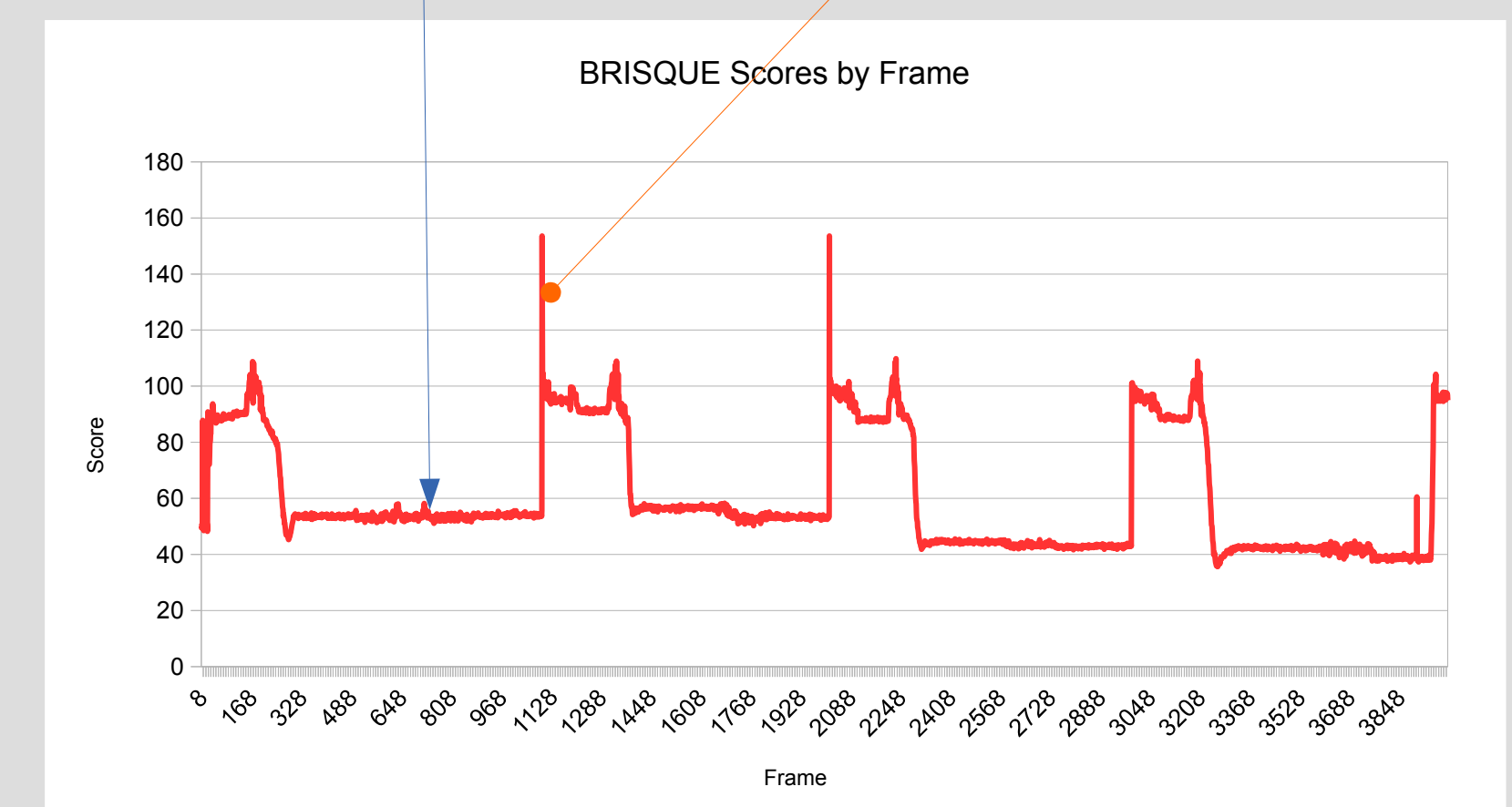
We developed **Curation en masse (CEM)**, a custom-made script that executes the workflow tasks.

All the software used is open-source. BRISQUE can be retrieved from:
<http://live.ece.utexas.edu/research/Quality/Index.html>

1. Upload the video collection to Stampede (5TB)
2. Run CEM to:
 - a) Set-up the run
 - b) Execute the Parametric Job Launcher to run all tasks in parallel
 - c) Extract all frames using FFMPEG
 - d) Extract video header and metadata using EXIFtool
 - e) Run BRISQUE analysis on every frame
 - f) Plot BRISQUE scores and statistics



Results



Mean 60.338
Median 53.446
Min 35.620
Max 153.591
Dev 17.345
RMS 20.450
Pop RMS 20.453

Results for one video point to less (left) to more (right) distorted frame due to compression artifacts in this case.

The overall quality of the video is mediocre. This indicates that BRISQUE performs well by identifying bad frames in an overall low quality video. Scores for video collections can be grouped to show classes of conditions.