

# Geekbench 6 GPU Compute Workloads



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# Introduction

Geekbench 6 GPU Compute Benchmark scores are used to evaluate and optimize GPU Compute performance using workloads that include image processing, computational photography, computer vision, and machine learning.

Performance in these workloads is important for a wide variety of applications including cameras, image editors, and real-time renderers.

## GPU Compute Benchmark

### GPU API Support

API	Minimum Version	Comments
Metal	3.0	
OpenCL	1.2	
Vulkan	1.2	

### Scores

Geekbench 6 scores are calibrated against a baseline score of 2,500 (which is the score of a Dell Precision 3460 with a Core i7-12700 processor). Higher scores are better, with double the score indicating double the performance.

## Machine Learning Workloads

Machine Learning workloads measure how well your GPU runs machine learning algorithms to perform inference tasks such as identifying objects and blurring backgrounds in photos.

### Background Blur

The Background Blur workload separates the background from the foreground in a video stream and blurs the background. It models background blurring features in video conferencing apps (such as Zoom, Slack Huddles, and Microsoft Teams).

This workload uses DeepLabV3+ as its network and blurs a frame from a 1080p video stream.

## **Face Detection**

Face detection is used to locate faces in photos. Face detection is used in applications such as photography or video conferencing for autofocusing.

The Face Detection workload uses a machine learning model. It returns the coordinates, along with a confidence score, for each face in an image. The workload uses RetinaFace as its network.

## **Image Editing**

Image editing workloads measure how well your GPU handles making simple and complex image edits.

### **Horizon Detection**

The Horizon Detection workload detects and straightens uneven or crooked horizon lines in photos to make the photos look more realistic. It models horizon line correctors in photo editing apps (such as Adobe Lightroom, Google Gallery, and Apple Photos).

The Horizon Detection workload uses the Hough transform to identify straight lines in a 24 MP image and decide which of these lines is the horizon line. It then rotates the image so the horizon line is horizontal.

### **Edge Detection**

Edge detection is used in image processing and computer vision applications to identify edges in an image. Edge detection produces a sketch-like representation of the image and is often used as the first stage of more complicated computer vision applications including feature detection and pattern recognition.

The Edge Detection workload applies the Canny edge detector operator to a 24 MP photo.

### **Gaussian Blur**

Gaussian blur is an image filter used to soften and blur images. It is used in image editing programs to improve the appearance of photos, and to remove fine details before applying other imaging processes and techniques. It is also used in modern user interfaces (for example, to blur background windows to focus user attention).

This workload applies a Gaussian Blur filter that uses a filter diameter of 25 pixels by 25 pixels to a 24 MP photo.

## **Image Synthesis**

Image synthesis workloads measure how well your GPU handles content creation tasks, including image rendering and image processing.

### **Feature Matching**

Feature matching takes two photos and identifies points that are the same in both. It is often used as part of other processes to identify objects in photos and to make 3D reconstructions. For example, Structure From Motion uses Feature Matching to find the initial points to reconstruct into a 3D scene.

The Feature Matching workload uses the Oriented FAST and Rotated BRIEF (ORB) algorithm to match features (or keypoints) between two 6MP images.

### **Stereo Matching**

Stereo matching is used to generate 3D depth maps from two 2D images of the same scene. Camera applications on multi-sensor smartphones use stereo matching to produce depth maps, which in turn are used to power photo filters, to create 3D images, and to improve the quality of augmented reality (AR) applications

The Stereo Matching workload uses a block-matching algorithm to compute the difference in position of each pixel and to create a depth map. This algorithm compares small groups of pixels in one image to the closest match in the other image, using the Sum of Absolute Differences (SAD) as a measure of similarity.

## **Simulation Workload**

Simulation workloads measure how well your GPU handles physics simulation tasks.

### **Particle Physics**

Particle Physics is a technique commonly used in games to simulate fluids and smoke. The Particle Physics workload implements a simulation where particles interact with one another and their environment via elastic collisions. Other particle-particle forces are ignored. The Particle Physics workload uses 4,096 particles in its simulation.