

What is GPU? Function and how to distinguish between GPU and CPU

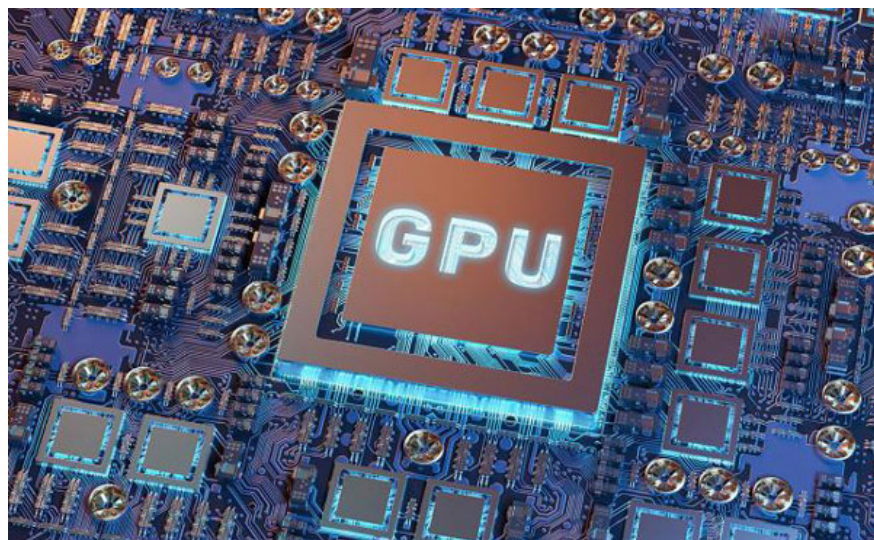
GPU (Graphics Processing Unit) is a type of microprocessor specially designed to enhance image and video processing capabilities.

GPUs play an important role in image and video processing, from video games to artificial intelligence applications. To better understand GPUs and the differences between GPUs and CPUs, let's learn about them through the article below from *TipsMake* .

What is GPU?

GPU (Graphics Processing Unit) is a type of microprocessor specifically designed to enhance image and video processing capabilities. Unlike CPU (Central Processing Unit), GPU is capable of processing millions of mathematical operations in parallel, which helps it perform complex graphics tasks faster and more efficiently.

Introduced in the early 1990s, GPUs have undergone major technological advances. Today, GPUs are used not only for gaming but also for many other fields such as artificial intelligence, machine learning, and even big data analysis. The development of GPUs has created a revolution in information technology, changing the way people interact with computers.



GPU is indispensable for those working in the field of graphic design.

Main functions of GPU

The GPU is primarily designed to process and display graphics, but its functionality doesn't stop there.

Image processing: The GPU is capable of performing multiple operations at once, which speeds up image loading and rendering. This is especially important in video games, where image quality and frame rate are both important.

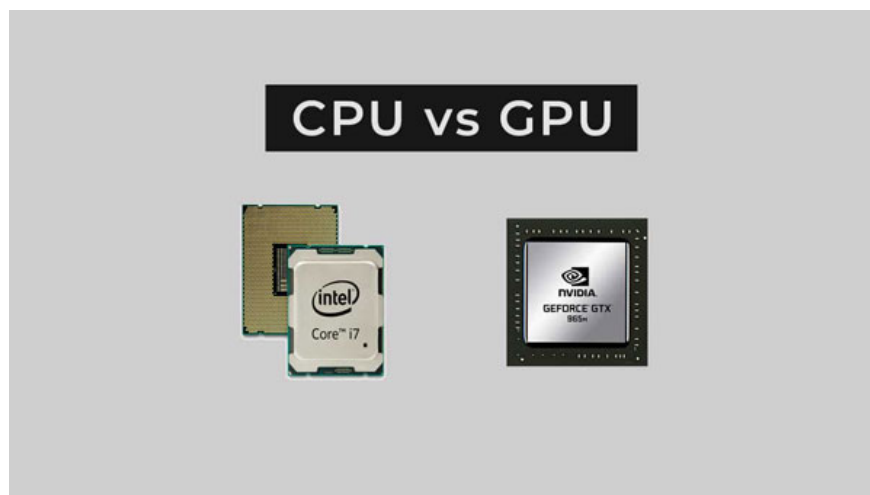
Transforming and Rendering 3D Objects: GPUs are not just about image processing. They can also transform and render 3D objects, creating lifelike scenes. This requires a lot of complex math, which GPUs do very well thanks to their parallel processing capabilities.

Artificial intelligence and machine learning: Thanks to parallel processing capabilities, GPUs can process large amounts of data quickly, reducing model training time.

Big Data Analytics: With the ability to process millions of operations simultaneously, GPUs assist data scientists in analyzing and visualizing data efficiently.

Difference between GPU and CPU

Although GPUs and CPUs are both important components in a computer system, they have completely different functions and ways of working.



GPU is responsible for processing data blocks, images and video related tasks.

How GPU works

Here are the main steps in the GPU graphics processing pipeline:

Data acquisition: Graphics data is transferred from the CPU to the GPU's memory, including information about the position, size, and color of objects.

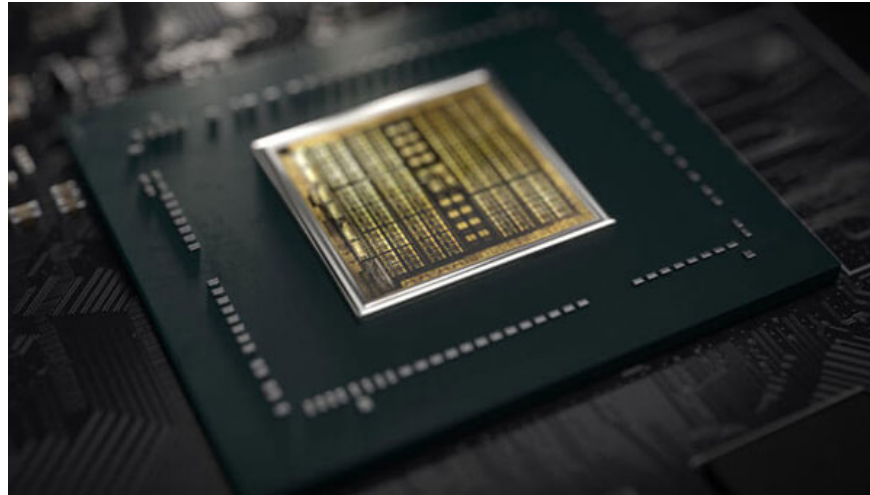
Vertex processing: The GPU applies mathematical transformations to the vertices of geometric objects to determine their position and orientation in 3D space.

Polygon mesh generation: Vertices are connected to form a polygon mesh of objects, which helps form the basic structure of the image.

Rasterization Conversion: The polygon mesh is converted to pixels on the screen, with colors determined based on material, lighting, and effects information.

Apply pixel effects: Additional calculations such as lighting, shadows, and textures are applied to each pixel to create the final image.

Image Output: The final results are compiled and output to the screen for display to the user.



GPU was born with the main task of supporting and minimizing the workload for CPU.

Practical applications of GPU in each field

GPUs have a strong presence in a variety of fields, from gaming to computer science. Here are some notable applications:

Game

In the gaming industry, GPUs play a key role in delivering immersive graphical experiences. Most modern games require powerful GPUs to process 3D images and special effects.

Graphic and video design

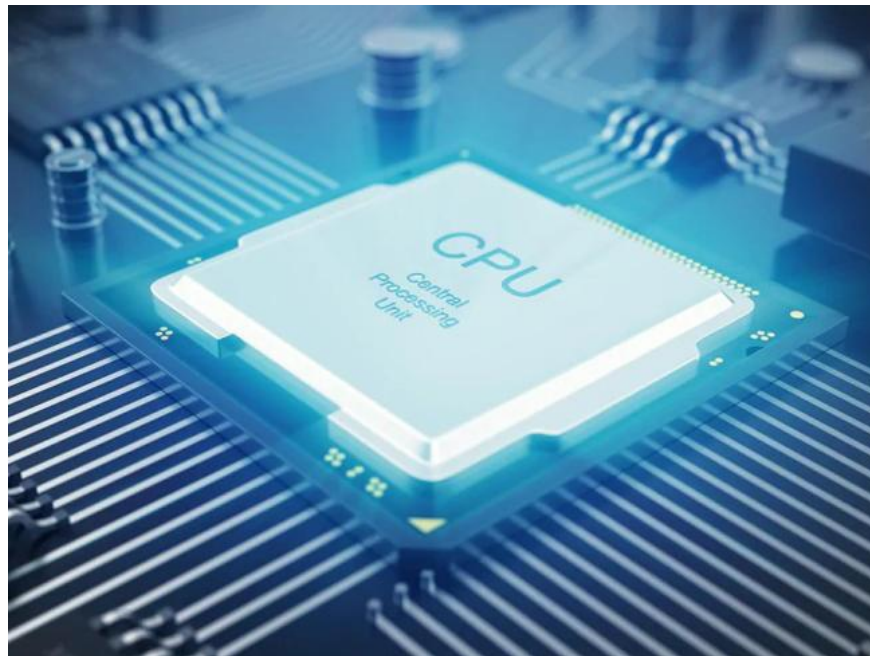
Graphic designers and video editors also rely heavily on GPUs. With their fast processing capabilities, GPUs help them create and edit multimedia content efficiently.

Research Science

GPUs are increasingly being used for complex simulations and calculations. Data scientists use GPUs to process large amounts of data in a short amount of time.

Artificial Intelligence

GPUs have also become an indispensable tool in developing machine learning models. With parallel processing capabilities, GPUs help shorten the training time of complex models.



GPU still has a lot of potential that humans can exploit and apply.

Types of GPUs on the market

Below are some popular types of GPUs on the market today:

- Gaming GPUs: Gaming graphics cards typically offer the highest performance and are capable of handling complex graphics. Products like: NVIDIA GeForce RTX and AMD Radeon RX.
- Workstation GPUs: Specifically designed for professional tasks such as CAD design, video editing, and scientific applications.
- Integrated GPU: Integrated GPUs are often used in laptops or desktops that do not require high graphics performance.
- GPUs for servers: In server environments, GPUs are often used to handle complex tasks such as big data computing and deep learning.

How to choose the right GPU for your computer

Choosing the right GPU for your computer depends on a number of factors. Here are some things to consider:

Intended use

If you just need your computer for basic work, an integrated GPU might be enough. But if you're a gamer or work in graphic design, a powerful discrete GPU is a better choice.

Budget

Graphics cards can range in price from a few hundred dollars to tens of millions of dollars. Look for a graphics card that offers good performance within your price range.

Compatible with motherboard

Make sure the GPU you choose is compatible with the other components in your computer, including your motherboard and power supply. Some graphics cards require larger power supplies, so make sure your power supply can handle that.

Brand and reliability

Consider the brand and reliability of the GPU. Choose based on performance needs, price, and special features to get a high-quality product.

The role of GPU in computer and phone systems

GPU is not just a component in a computer but also plays an important role in many different devices.

- Computer: GPU affects the ability to process and display graphics. It helps improve the user experience in graphics-heavy applications, from games to graphic design.
- Phones: GPUs also play an important role in processing graphics and videos. Modern smartphones are often equipped with powerful GPUs to ensure smooth gaming and graphics application performance.

Conclude

GPUs have become an important part of computer systems and mobile devices. With superior parallel processing capabilities, GPUs help improve performance in many fields from gaming to science and research. Distinguishing between GPUs and CPUs is also important, helping users better understand the functions and applications of each type of processor in their system.

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