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Graphics Processing Unit (GPU) - Market Share Analysis, Industry Trends & Statistics, Growth Forecasts (2024 - 2029)

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Abstracts

The Graphics Processing Unit Market size is estimated at USD 65.27 billion in 2024, and is expected to reach USD 274.21 billion by 2029, growing at a CAGR of 33.20% during the forecast period (2024-2029).

The graphics processing unit market is primarily driven by the growing demand for specialized processors to manage complex mathematical calculations related to 2D and 3D graphics. The augmenting use of processors to support graphics applications and 3D content in several industry verticals, including manufacturing, automotive, real estate, and healthcare, is also increasing the market’s growth.

•The demand for high-end personal computing devices and gaming consoles has surged in recent years, driving the studied market. Hence, investing in a graphics add-in board is helpful for micro-processing companies, as GPU forms a vital component of the finished product.

•Moreover, the high adoption of computing products, such as personal computers (PCs) or laptops, and the increasing investment in the gaming industry have been significant factors driving the studied market's growth in recent years. The growing demand for high graphics and computing applications and the expansion of technologies, like AI, along with the trend of real-time analysis, are mainly expanding the scope of GPU technology over the forecast period.

•In addition, GPUaaS may be utilized for various purposes, including training multilingual AI speech engines and identifying early indicators of diabetes-related blindness. Modern GPUaaS, which provides a compelling alternative to traditional

general-purpose processors with variable pricing and no CAPEX, is one way to achieve the speed required for machine learning systems.

•However, the lack of a skilled workforce has been a significant challenge for companies adopting the technology. Several manufacturing companies cite a shortage of experienced engineers and developers; it becomes challenging to keep up with the complex and rapidly evolving technology and switch to automation, thereby increasing costs and restricting the market's growth.

•Owing to the ongoing US-China dispute, other countries, including India and some Southeast Asian countries, have started to witness a higher inflow of investments in the manufacturing and industrial sector as companies in China look to diversify their manufacturing base. Such trends, in turn, are expected to drive further opportunities in the market studied.

Graphics Processing Unit (GPU) Market Trends

Mobile Devices to Witness Major Growth

The Graphics Processing Unit (GPU) is a vital component of smartphones, accountable for rendering graphics and managing complex visual tasks, including rendering animations, playing video games, and displaying high-resolution images. The CPU can remain idle and conserve battery power using the GPU to handle intensive graphical tasks. This is especially important for demanding applications like video games, which can consume a lot of battery life if not optimized.

The mobile devices industry evolved rapidly in the past decade, and the integration of 3D graphics on mobile phones accelerated with the technological evolution. The GPU plays a key role in mobile devices and PCs, providing better graphics performance, enhanced battery life, and offloading CPU tasks. Mobile devices can render high-quality animations, graphics, and special effects with more ease and faster speed with a dedicated GPU, resulting in a better user experience, specifically for consumers who regularly use demanding apps and play video games.

The recent advancement in smartphone technologies and rising demand for 5G smartphones drive the segment’s growth. Efforts by smartphone makers such as Samsung, Apple, Xiaomi, Oppo, and Vivo to innovate their products are also driving up demand for Mobile GPUs.

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As per Ericsson, 5G subscriptions are forecast to increase drastically worldwide from 2019 to 2028, from over 12 million to over 4.5 billion subscriptions respectively. India, Nepal, and Bhutan are expected to have the most subscriptions by region. Smartphone OEMs are ramping up Artificial intelligence-enabled smartphones in 2024, with an additional storage capacity, boosting the demand for smartphones in coming years.

Furthermore, continuous development in camera and picture quality attracts new consumers. Rapid AI and machine learning technology integration in mobile phones and laptops drives demand for faster GPUs.

Asia-Pacific to Witness Significant Growth

The Asia-Pacific region is anticipated to remain among the prominent contributors to the growth of the market studied, considering the changing dynamics of various industries in the region. Over the years, the adoption of digital technologies has grown significantly outside significant countries such as China, Japan, and South Korea, creating opportunities in the market studied. For instance, the “Digital India” mission is one such initiative that had a notable impact on the uptake of digital technologies in India, driving the demand for GPUs across various end-user verticals in the country.

In the last few decades, China has become the primary producer and consumer of semiconductors and related products. The demand for semiconductor chips in China is driven primarily by the expanding digital ecosystem.

Government initiatives also support the growth in the uptake of digital technologies in China. For example, “Made in China 2025” is an initiative by the Chinese government to promote the adoption of advanced technologies, such as robotics, IoT, automation, and advanced ICT solutions, such as AI, AR/VR, ML, etc., in the industrial sector.

Furthermore, China has also emerged among the leaders in the Asia-Pacific region in adopting digital technologies in the public sector to improve the efficiency of public services. As a result, the adoption of cloud and related services has been increasing in the country, creating a favorable ecosystem for demand and becoming a vital component of data center infrastructure.

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Graphics Processing Unit (GPU) Industry Overview

The graphics processing unit market is fragmented with the presence of major players like Intel Corporation, Advanced Micro Devices Inc., Nvidia Corporation, Imagination Technologies Group, and Samsung Electronics Co. Ltd. Players in the market are adopting strategies such as partnerships and acquisitions to enhance their product offerings and gain sustainable competitive advantage.

•In January 2024, NVIDIA announced the GeForce RTX 40 SUPER Series family of GPUs, including the GeForce RTX 4080 SUPER, GeForce RTX 4070 Ti SUPER, and GeForce RTX 4070 SUPER, which supercharges the latest games and forms the core of AI-powered PCs. This newest iteration of NVIDIA Ada Lovelace architecture-based GPUs delivers up to 52 shader TFLOPS, 121 RT TFLOPS, and 836 AI TOPS to supercharge gaming and provide the power to develop new entertainment worlds and experiences.

•In November 2023, VMware Inc. announced a partnership with Intel Corporation to extend their innovation by enabling private AI across data centers, public clouds, or Edge environments to help customers accelerate the adoption of AI in data centers, public clouds, and edge environments. The combination of VMware Cloud Foundation and Intel’s AI software suite, Intel Xeon processors with built-in AI accelerators, and Intel Max Series GPUs will deliver a validated and benchmarked AI stack for data preparation, model training, fine-tuning and inferencing to accelerate scientific discovery and enrich business and consumer services.

Additional Benefits:

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