**What if Your PC Does Not Have an NPU?**

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**If you don’t have an NPU, your AI tasks will fall back to the GPU first, then the CPU. That’s why NPUs are being added — they’re more power-efficient than GPUs for continuous, lightweight AI tasks (like live video filters, speech recognition, or background AI assistants).**

**GPU vs. NPU Performance on Laptops**

**1. Raw AI Power**

**GPU - Much higher peak throughput (teraflops). Can handle big models (LLMs, Stable Diffusion, video upscaling). Example: Nvidia RTX 4070 Laptop GPU → ~100–150 TOPS (AI ops).**

**NPU Lower raw power (~10–45 TOPS today on Intel Core Ultra or AMD Ryzen AI). Designed for specific AI inference tasks (image filters, noise suppression).**

**2. Efficiency (Performance per Watt)**

**GPU- Power-hungry — running AI inference can pull 30–80W+ on a laptop. Drains battery quickly if used for continuous background tasks.**

**NPU - Very efficient — usually 1–5W for AI tasks. Ideal for always-on features like live captions, background blur, or voice isolation without killing battery life.**

**3. Task Suitability**

**GPU Best For: - Training or running large AI models locally (LLMs, Stable Diffusion). Heavy workloads (video rendering, 3D, scientific compute).**

**NPU Best For: - Lightweight, constant AI tasks (real-time transcription, camera effects, personal assistant inference). Offloading from GPU/CPU so battery lasts longer.**

**4. Integration in Laptops**

**GPU - Discrete GPUs (Nvidia RTX, AMD Radeon) are still required for high-end creative/AI workloads.Integrated GPUs (Intel Xe, AMD Radeon iGPU) can also run AI, but less powerful.**

**NPU - Integrated into CPUs (Intel Core Ultra, AMD Ryzen AI, Apple M-series). Works alongside GPU/CPU, automatically chosen by Windows or macOS for certain tasks.**

**5. Real-World Examples**

* **Adobe Photoshop (Generative Fill): GPU preferred (big models).**
* **Zoom Background Blur: NPU preferred (low-power continuous AI).**
* **Stable Diffusion image generation: GPU required (too heavy for NPU).**
* **Windows Studio Effects (eye contact, noise canceling): NPU handles it efficiently.**

**Recap**

* **GPU = muscle → raw AI power, big models, creative workloads.**
* **NPU = brainstem → small, efficient, always-on AI tasks that run in the background.**
* **On modern laptops, they complement each other: the OS decides which processor to use depending on the workload.**