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The role of new codecs and AI in video processing evolution

Alcím: A MI és az új kódolási eljárások szerepe a videófeldolgozás fejlődésében

The compression efficiency improvements achieved by each new generation of video codecs relies mainly in an increasingly varied and complex set of encoding tools. This places great pressure on the encoder computational footprint, which due to economic and environmental factors, tend to remain under strict constraints for real-time and large-scale systems.
Encoder design traditionally relies on codec experts developing heuristics and algorithms to shortlist and tune the encoding tools for each application, according to pre-defined encoding efficiency or computational footprint targets. Although this approach may provide predictable and consistent dimensioning, understanding how each tool impacts compression efficiency for each type of content and how the tools interact with each other makes it hard to scale, especially since the relationship between encoder complexity and compression efficiency is distinctly non-linear.
We have been leveraging the use of machine-learning to generate real-time models that can dynamically map how the encoder uses its resources, depending on the input video characteristics. This guarantees computational constraints are always met with no resources being wasted accounting for worst-case scenarios or used on tools unlikely to bring benefits for that specific content, allowing a far more efficient resource allocation than possible though traditional methods.