INTERNSHIP OFFER

Deep Energy Aware images

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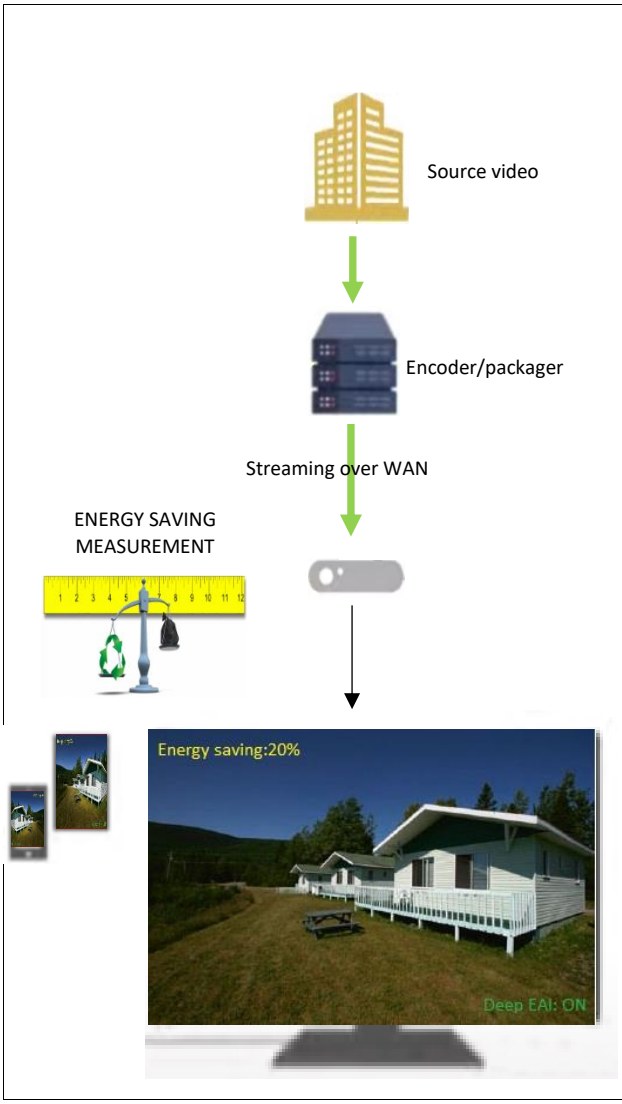
	Duration: 6 months, starting Feb. 2023



In the context of climate change, reducing the energy consumption of Video distribution from originator up to consumer electronic devices is a strong requirement. Some new Image & Video processing technologies are developed to save energy (keeping the best QoE for the end user) of consumer electronic devices (TV, Mobile Phone, Laptop) and thus, reduce carbon impact.
It is important to estimate the gain, in term of energy savings, that these technologies bring when applied on such devices during a Video service session.

This internship will be divided in the following steps:

1. Investigate existing models used to estimate the energy consumed by an activity on a device (System, Memory, GPU, Screen)
2. Set up the environment to:
   a. receive a Video from network, decode and render it on the screen of a device
   b. be able to measure the energy consumption linked to the tasks listed above
3. Experiment proprietary Deep Aware image processing technology on Image and thus on Video and estimate the gains in terms of energy savings.
4. Propose and implement improvements of the Deep Aware Image processing in terms of energy
5. Perform tests with several kinds of videos and create the energy saving model of the technology.

Skills: System, processor architecture, signal/image/video processing. Background in energy consumption estimation models and in deep learning would be appreciated (python. PyTorch).
Keywords: energy measurement, visual perception, energy reduction, computer vision, deep learning, processor, GPU.
Bibliography:

Yin, Jia-Li, et al. "Deep battery saver: End-to-end learning for power constrained contrast enhancement." *IEEE Transactions on Multimedia* 23 (2020): 1049-1059.
Shin, Yong-Goo, et al. "Unsupervised Deep Power Saving and Contrast Enhancement for OLED Displays." *arXiv preprint arXiv:1905.05916* (2019).