Fractal Image Compression Technology

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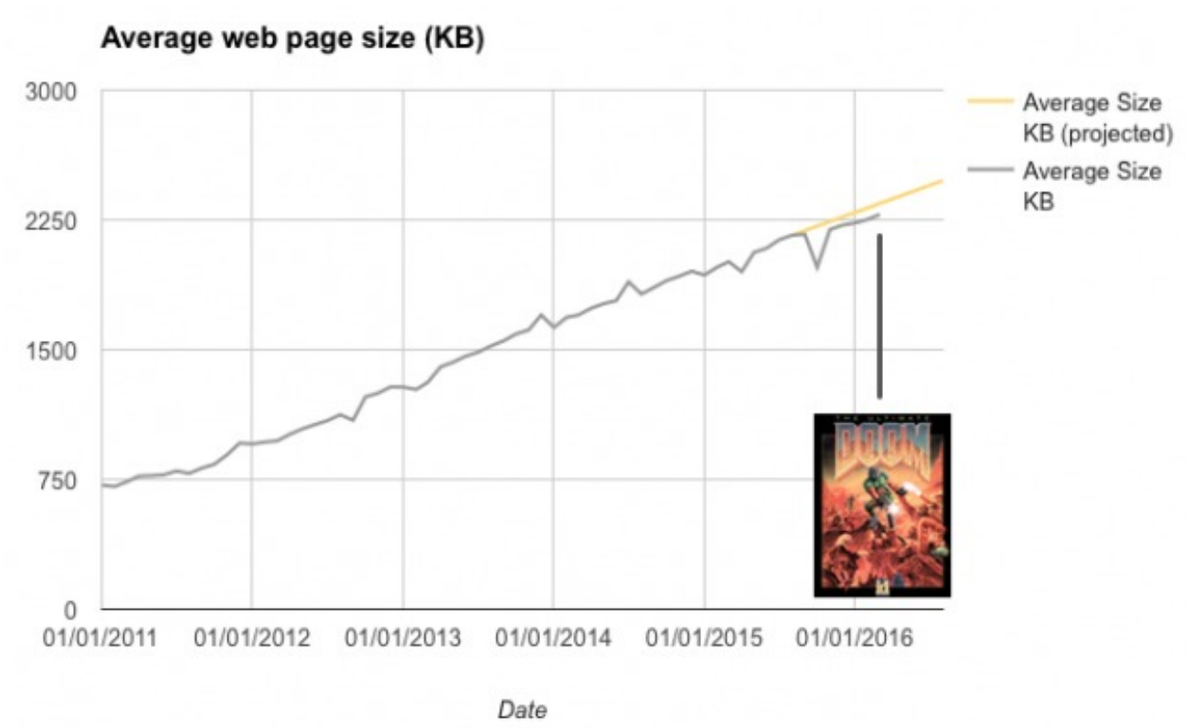
Introduction

Fractal image compression had not fortune in the past but it may have a new revamp especially for websites cloud driven and for UHD (Ultra High Definition) image and video processing.

The average size of a web page is as bigger as an old days challenging videogame mostly because the size of images that they contains.



Fractal image compression, fractal audio compression and thus fractal video compression may change the way in which we access to the media. An old idea that could found its own revamping time, nowadays.

The FIC point of strength

Here below a not exhaustive list of FIC technologies points of strength:

- Computational power are nowadays really really higher than in the past and GPU are going to be cheaper and cheaper.
- The need of higher resolution images are stronger than ever.
- Bandwidth technology exponentially grown but not everywhere and its availability is jeopardized.
- Mobile devices have HD screens and 4G/5G connectivity but the real available bandwidth may vary due to multiple conditions and areas.
- Fractal images could be progressively transferred and displayed. This is very good for any mix of resolution and bandwidth.
- Fractal images are never blurry or poorly grained, at the worst they contains fake but plausible details.

The FIC for UHD photocameras

Two more FIC points of strength are

- As bigger is the image as better FIC works.
- As deeper the color range is as better FIC works.

This means that developing a chip for photocamera that convert a UHD CMOS output in a progressive fractal image could be patent and became renumerable in the near future.

The first prototype could use a FPGA with a GPU on board because the FPGA is a programmable electronic while the GPU architecture is particularly performant in many multiple parallel operations on images.

Floating point operations for GPU would not be a big problem for nowadays GPU.

On decoding side the most important features are that the size, color deep and image format could be decided on the fly, progressively.

FIC encoded at once, multistage deconded

For example, the save FIC has a footprint of 1MB. The output image could be as big as need and its details-lossy level will depend by the size of the part/portion of the file read.

Considering a FIC 1024kb image: the 64÷128kb will contains the main image structure, then the next 128kb a layer of improving details, then a block of 256kb and another 512kb further.

The main idea is not to encode the image in a differential ways because at higher level details are very similar to random noise and they could not be efficiently encoded in any way. They could not be encoded efficiently.

The main idea is that interactive data/functions are encoded all-in-once and then separated by low/high frequencies/footprint.

FIC high frequencies separation in video

The idea to separate encoded high frequencies from the lower helps video streaming to keep the lower and update the higher on a small range of time.

In this case the encoding should be taken in a increase dimension including time. Lower frequencys pattern evolution will constitute the base of a video small stream timepiece.

The following blocks will enanche the resolution of the further frames.

Differently the image, FIC videos will requires a dedicated decoding hardware in order to maximize the performance for both the protocol and software simplicity.