

JPEG

The reports of its death are greatly exaggerated.....

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Honorary Webmaster, editor, UK HoD and Historical Archive chair, JPEG



JPEG – past, present and future

Original motivation

- ❖ Market research for videotex indicated consumer (and advertiser!) need
- ❖ Emergence of personal computers
- ❖ ISDN communications
- ❖ TV like quality expected
- ❖ Thought of as extension to character (text) coding

*To be good is noble, but to teach others how to be good is nobler--
and less trouble*

Original JPEG

Still the de facto standard, 25 years after 'PEG' was first conceived

- ❖ JPEG formally created in 1986 with input from CCITT
- ❖ Most technical activity took place from 1986 to 1989
- ❖ Standard effectively in place by 1990, and really a major forerunner to open source movement with the independent JPEG Group
- ❖ Is it the world's best known standard (or does MP3 beat it....)?

If you tell the truth you don't have to remember anything

Original JPEG

Based on experimentation and mutual efforts

- ❖ Established a methodology for detailed comparison of compression techniques
- ❖ High levels of collaborative working
- ❖ Accurate drafting and error checking, helped by need to translate CCITT versions
- ❖ Formed basis for future standards work

It is wiser to find out than suppose

Original test images....



You can't depend on your judgment when your imagination is out of focus

Original JPEG

Compromise in the standards process

- ❖ Patent issues
- ❖ National industry and pride (inherited from videotex process)
- ❖ Toolkit, with the idea of a patent fee free baseline
- ❖ Technical performance versus practicality
- ❖ Firmware versus software
- ❖ Field of usage
 - Internet
 - Digital photography
 - Pre-press
 - Surveillance, medical, remote imaging etc.

My kind of loyalty was loyalty to one's country, not to its institutions or its officeholders.

JPEG 2000

Some of the motivation.....

- ❖ Original JPEG standard limited – intent only as a part of other standards
- ❖ Concern over quality loss in multiple iterations
- ❖ Emergence of 'RAW' format in digital photography
- ❖ Limitations (primarily in baseline only, but perceived as whole)
- ❖ Simplistic (and non-standard) file format
- ❖ Obvious artefacts – blocking and ringing
- ❖ No automatic trade-off between resolution and quality

Very few things happen at the right time, and the rest do not happen at all: The conscientious historian will correct these defects.

JPEG 2000

Where we are now

Positives

- Widespread specialist usage (e.g. archiving, satellite)
- Digital Cinema
- Architecture allows for many variants – motion, 3D, secure apps, large images, wireless etc
- Extensive file format support (e.g. GIS, XMP etc)
- Patents

Negatives

- No take-up in digital photography or Internet browsing
- Low public awareness and interest
- Patents....

The fact is the human race is not only slow about borrowing valuable ideas--it sometimes persists in not borrowing them at all

Patent issues....

JPEG 2000

- ❖ Difficulty in getting all parties to agree
- ❖ Problems with fee free license admin
- ❖ Mass market as a target for 'trolls'
- ❖ Declaration and process

JPEG

- ❖ Claims emerge 10 years after publication
- ❖ Minor aspect, with low effectiveness – however multi 100m\$ revenues and court cases
- ❖ Clearly different views on morality and 'rights'

What to do?

I have, as you say, been interested in patents and patentees.

Patent issues in standardisation

Impact of patents in open standards processes

- ❖ Works against active proposers of technology
- ❖ Difficulty in agreeing common approach
- ❖ Danger of anti-trust and other issues
- ❖ Lack of support from standards bodies
- ❖ Cost
- ❖ Difficulty in assessing value / applicability

Is this the death of pro-active collaborative standardisation in high tech arena?

If you pick up a starving dog and make him prosperous, he will not bite you. This is the principal difference between a dog and a man.

Proposals for JPEG XR

Microsoft arrived with HD Photo. JPEG considered needs/claims including

- ❖ Higher dynamic range
- ❖ Improved graphical handling in browser
- ❖ Known patent position
- ❖ Comparative performance to JPEG 2000
- ❖ Already core codec in Vista
- ❖ Ease of computation (between JPEG and J2K)

We keep on turning and making new combinations indefinitely; but they are the same old pieces of colored glass that have been in use through all the ages.

HDR - rationale



For all the talk you hear about knowledge being such a wonderful thing, instinct is worth forty of it for real unerringness.

HDR - rationale



Thunder is good, thunder is impressive; but it is lightning that does the work

Impact of JPEG XR standards process

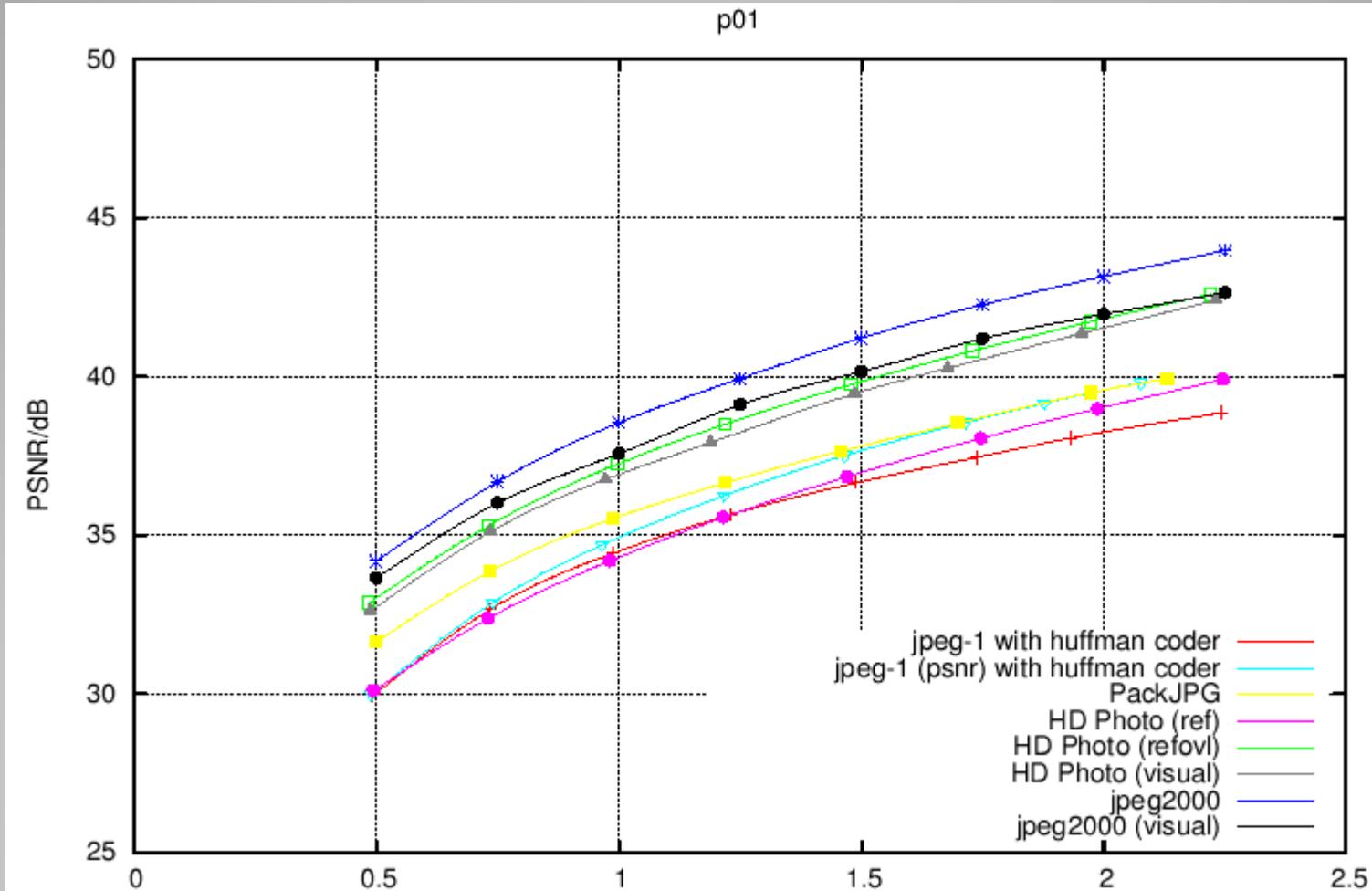
For Microsoft

- ❖ Acceptance of MS technology
- ❖ Needed for XML paper spec
- ❖ Can build into printers/cameras
- ❖ Offers ease of use extensions
- ❖ Feedback and improvement

For JPEG

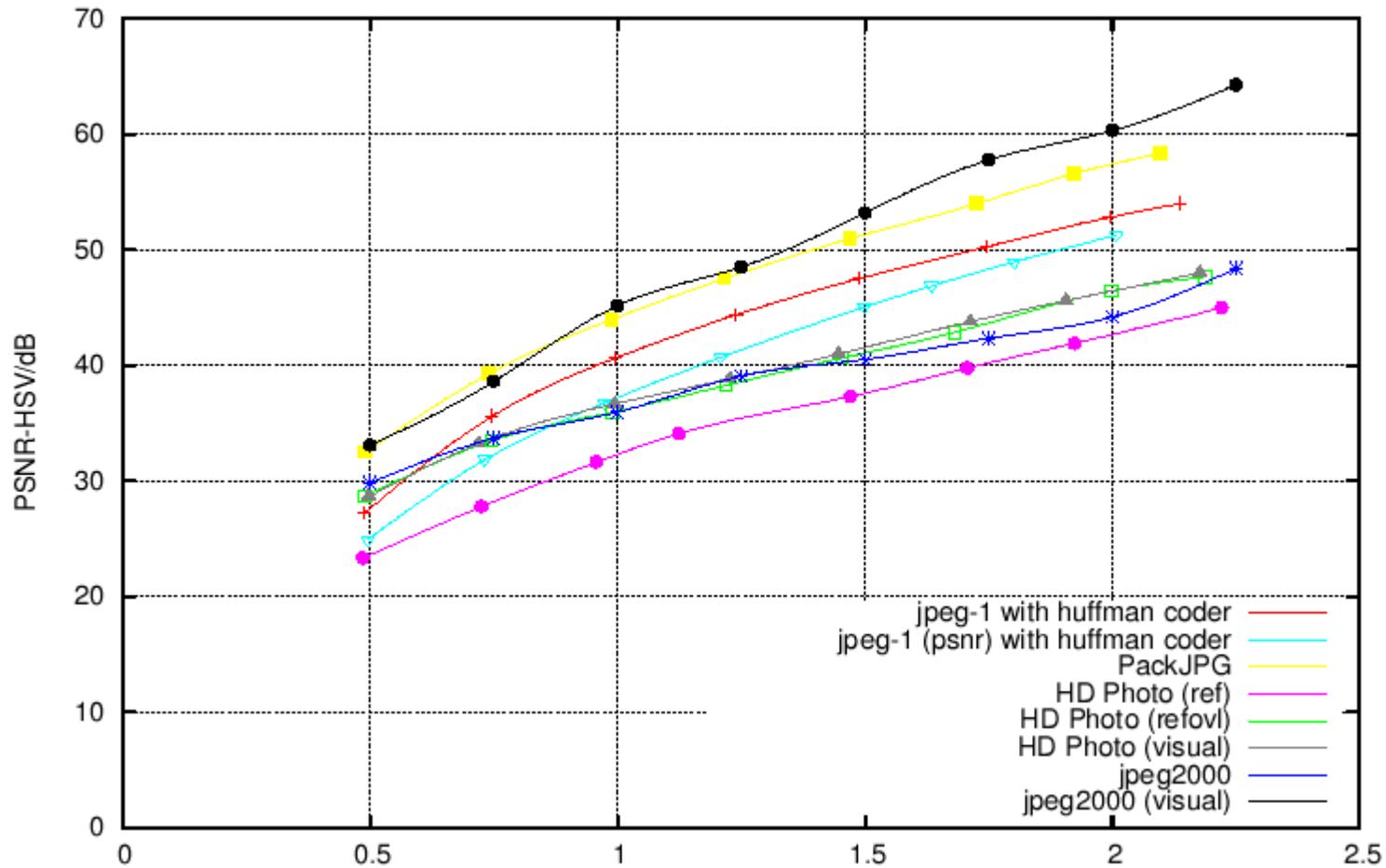
- ❖ Marketing / tech backup (esp. To digital cameras)
- ❖ Development of evaluation suites
- ❖ Integration of J2K ideas and standards
- ❖ Opportunity in browsers and as SDK

Do right and you will be conspicuous



With gracious thanks to Thomas Richter...

honolulu_zoo



Hybrid of DCT-PSNR, DCTune, VDP (wg1n4688)
With gracious thanks to Thomas Richter...

JPEG 2000, XR and the future?

- ❖ Have JPEG over-reached and muddied the waters?
- ❖ Will the patent situation ever be resolved?
- ❖ What will market reaction be to JPEG XR – FCD out for ballot?
- ❖ Should JPEG retrofit HDR imaging into J2K and even JPEG?
- ❖ Does the backing of a major player make a difference, and is it all positive?

The man with a new idea is a Crank until the idea succeeds.

The future...

- ❖ Testing and evaluating digital compression
 - Ineffectiveness of PSNR
 - MSSIM and other evaluation methodologies
- ❖ JPSearch
 - New methods for categorising and searching large image collections
 - Ideas for new methods for recognising or using images
 - Collaborative with MPEG
- ❖ And of course JPEG, 2000, and XR....

Apparently there is nothing that cannot happen

JPEG

With thanks to many friends and colleagues
over the last 30 years.....

When I was younger, I could remember anything, whether it had happened or not; but my faculties are decaying now and soon I shall be so I cannot remember any but the things that never happened.

There is no sadder sight than a young pessimist, except an old optimist.