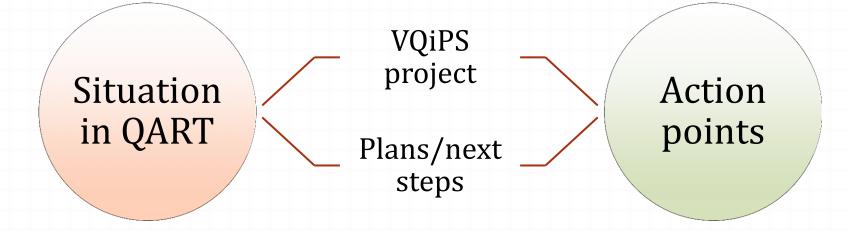
QART (Quality Assessment for Recognition Tasks)

Mikołaj Leszczuk, AGH (Poland) Margaret Pinson, ITS-NTIA (USA)





Situation in QART

QART motivation or why do we have different QoE for entertainment vs. recognition tasks?







240p, 24 BPP, low bitrate:

- MOS: good
- LPR: **bad**

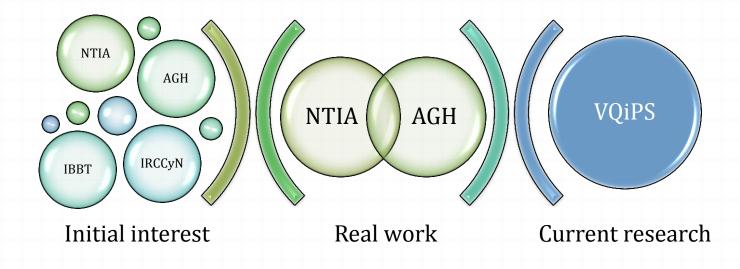
1080p HD, 24 BPP, high bitrate:

- MOS: excellent
- LPR: excellent

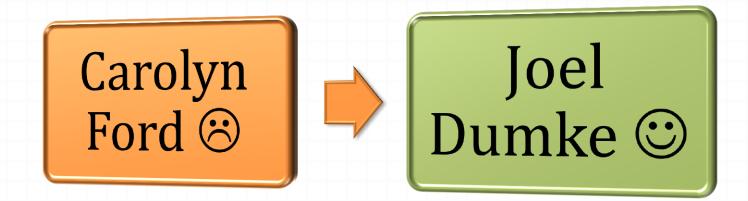
1080p HD, 1 BPP, low bitrate:

- MOS: **bad**
- LPR: excellent

Organizations



Changes in QART cochairmanship at ITS-NTIA



VQiPS project

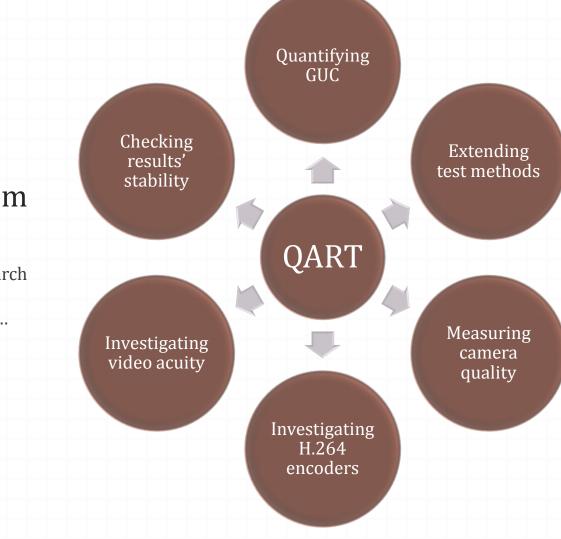
Video Quality in Public Safety (VQiPS) Project

Office for Interoperability and Compatibility



Where do we go from here?

Plans and proposals of joint research topics within the area of quality assessment for recognition tasks...





- Publications
- VQEG Reports
- Standardization

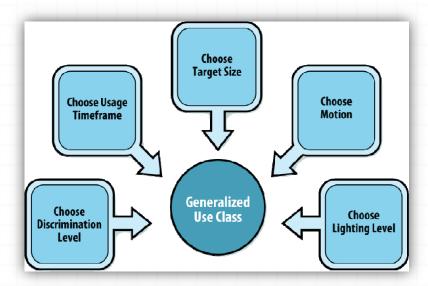
What we can achieve by this?

As usual in VQEG... $\ensuremath{\textcircled{}}$

Quantifying GUC

Quantifying GUC (Generalized Use Classes)

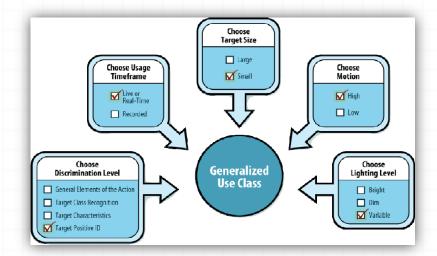
Use Characteristics:
Discrimination Level
Usage Timeframe
Scene content:
Target Size
Motion
Lighting Level



Quantifying GUC (Generalized Use Classes)

Ø Use Characteristics:
 Ø Discrimination Level
 Ø Usage Timeframe
 Ø Scene content:
 Ø <u>Target Size</u>
 Ø <u>Motion</u>

Lighting Level

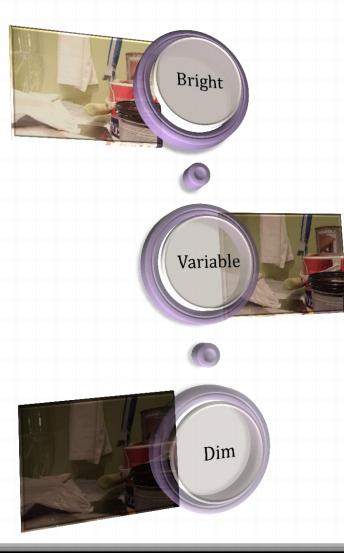


Main goals in quantifying GUC (Generalized Use Classes)

- Research on efficient algorithms that classify video sequences upon target size and lighting level
- Implementation of these algorithms
 Tests



Lighting levels measurement



30/05/2011

Motion levels measurement

Partly resolved (e.g. by Temporal Complexity models)

High Motion

Low Motion

Target size measurement

- Levels:
 - Large
 - Small
- Problems:
 - Target discrimination





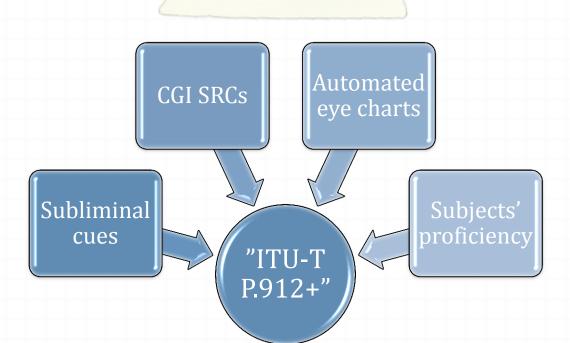
Extending test methods

Standardization of test methods and experimental designs

- ITU-T P.912: "QART-tish" for ITU-T P.910 ☺
- Some basics already defined there...
- ...but there is still some large space for extension

Scenes and **Real-Time** Multiple Single Timed vs. Viewer-SGS Choice Answer Task Controlled (Scenario Method Method Method Viewing Groups)

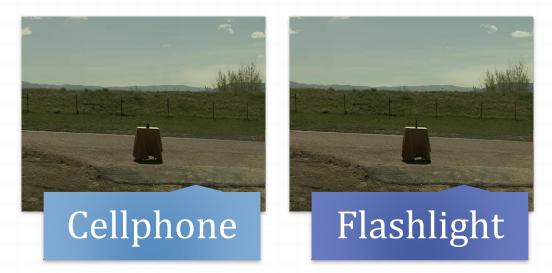
ITU-T P.912



Plans/next steps for extending test methods and experimental designs

Verifying requirements and refining methods/designs

• Making experiments both more accurate and feasible



What is the impact of **subliminal cues**?

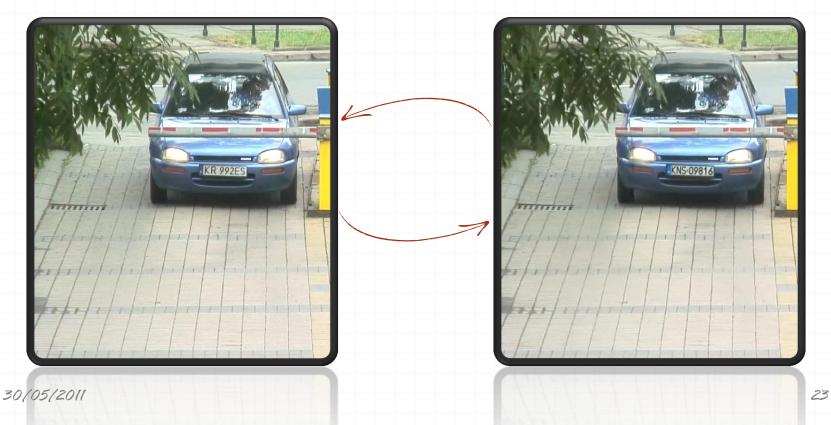
"Spot the difference ☺"! Recognizing objects... ...or just a different layouts of clouds?

30/05/2011

Are <u>CGI (Computer Generated</u> <u>Imagery) SRCs</u> valid?

Shooting various SRCs is very tedious...

...so why not give overlaying realistic CGI a try?



Can <u>automated eye charts</u> be used?

Considering passive e-ink to avoid print?

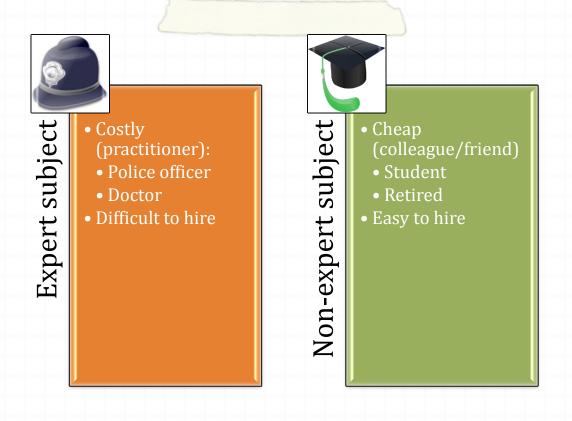
Could easily get ca. 10" passive e-ink display...



amazonkindle

Greenland or right-whale, he is the best existing authority But Scoresby knew nothing and says nothing of the great sperm whale, compared with which the Greenland whale is almost unworthy mentioning. And here be it said, that the Greenland whale is an usurper upon the throne of the seas. He is not even by any means the largest of the whales. Yet, owing to the long priority of his claims, and the profound ignorance which, till some seventy years back, invested the then fabulous or utterly unknown sperm-whale, and which ignorance to this present day still reigns in all but some few scientific retreats and whale-ports; this usurpation has been every way complete Reference to nearly all the leviathanic allusions in the great poets of past days, will satisfy you that the Greenland whale, without one rival, was to them the monarch of the seas. But the time has at last come for a new proclamation. This is Charing Cross; hear ye! good people all,-the Greenland whale is deposed,-the great sperm whale now reigneth!

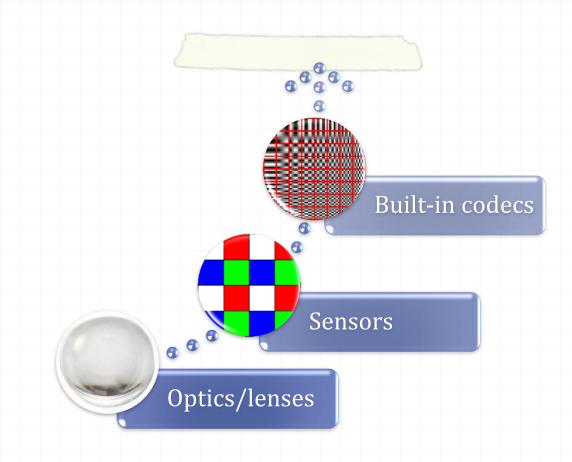
There are only two books in being which at all pretend to put the living sperm whale before you, and at the same time, in the remotest degree succeed in the attempt. Those books are Beale's and Bennetty, both in their time surgeons to English South-Sea whale-ships, and both exact and reliable man. The original matter touching the sperm whale to be found in their volumes is necessarily small; but so far as it goes, it is of excellent quality, though



Is **subjects' proficiency** necessary?

Do I really need to be a security officer in order to participate in a test checking my ability to read license plate numbers in compressed video?

Measuring camera quality



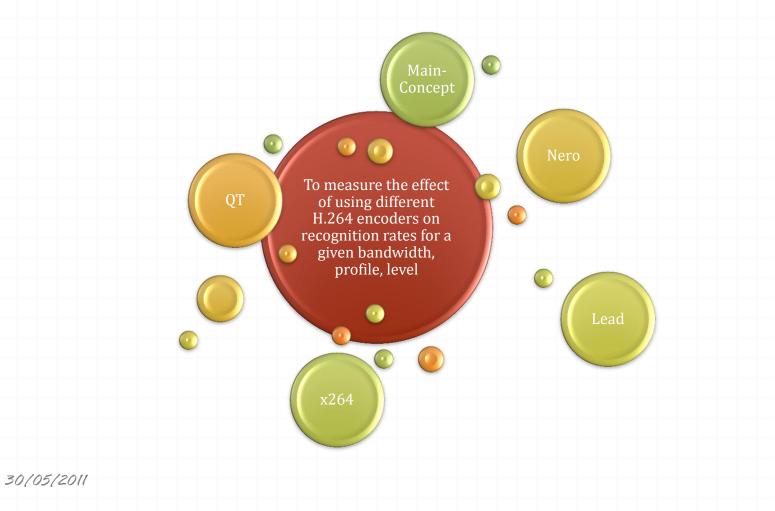
Measuring **source camera quality**

Major loss of video quality happening before leaving camera

• Research useful for non-QART projects as well

Investigating H.264 encoders

Investigating H.264 encoders



Investigating video acuity

Investigating video acuity

Ø Metric to quantify effective E performance of video systems O By Andrew Watson, NASA ΓP Ames Research Center, USA TOZ Ø Based on eye charts O Attempting to correlate LPED acuity data to other PECFD EDFCZP metrics and results: FELOPZD **O** PSNR DEFPOTEC **O** SSIM O VQM

20/200

20/100

20/70

20/50

20/40

20/30

20/25

20/20

2

3

4

5

6

7

8

9 10 11

Checking results'stability

Checking results stability

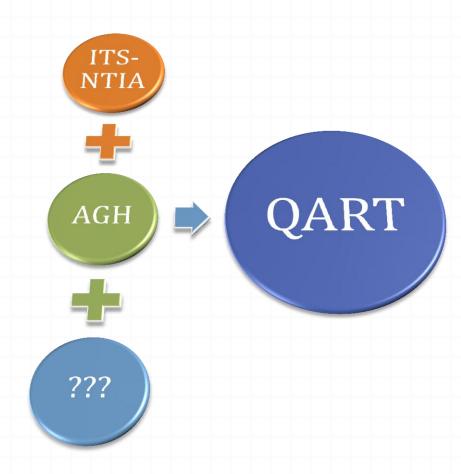
- Checking across different laboratories
- Regular for other VQEG projects, not yet in QART
- Ohecking with different:
 - O Cameras
 - O User interfaces
 - Objects to be recognized
- Results within Generalized Used Class should be identical



Action points

Stakeholders – who is in?

- Sharing ideas
- Joint experiments
- Joint papers
- Joint VQEG reports
- Joint standardization contributions



Discussion

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- ITS-NTIA: The Public Safety Video Quality (PSVQ) project is undertaken by the Public Safety Communications Research (PSCR) program, sponsored by the U.S. Department of Homeland Security's Office of Interoperability and Compatibility
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