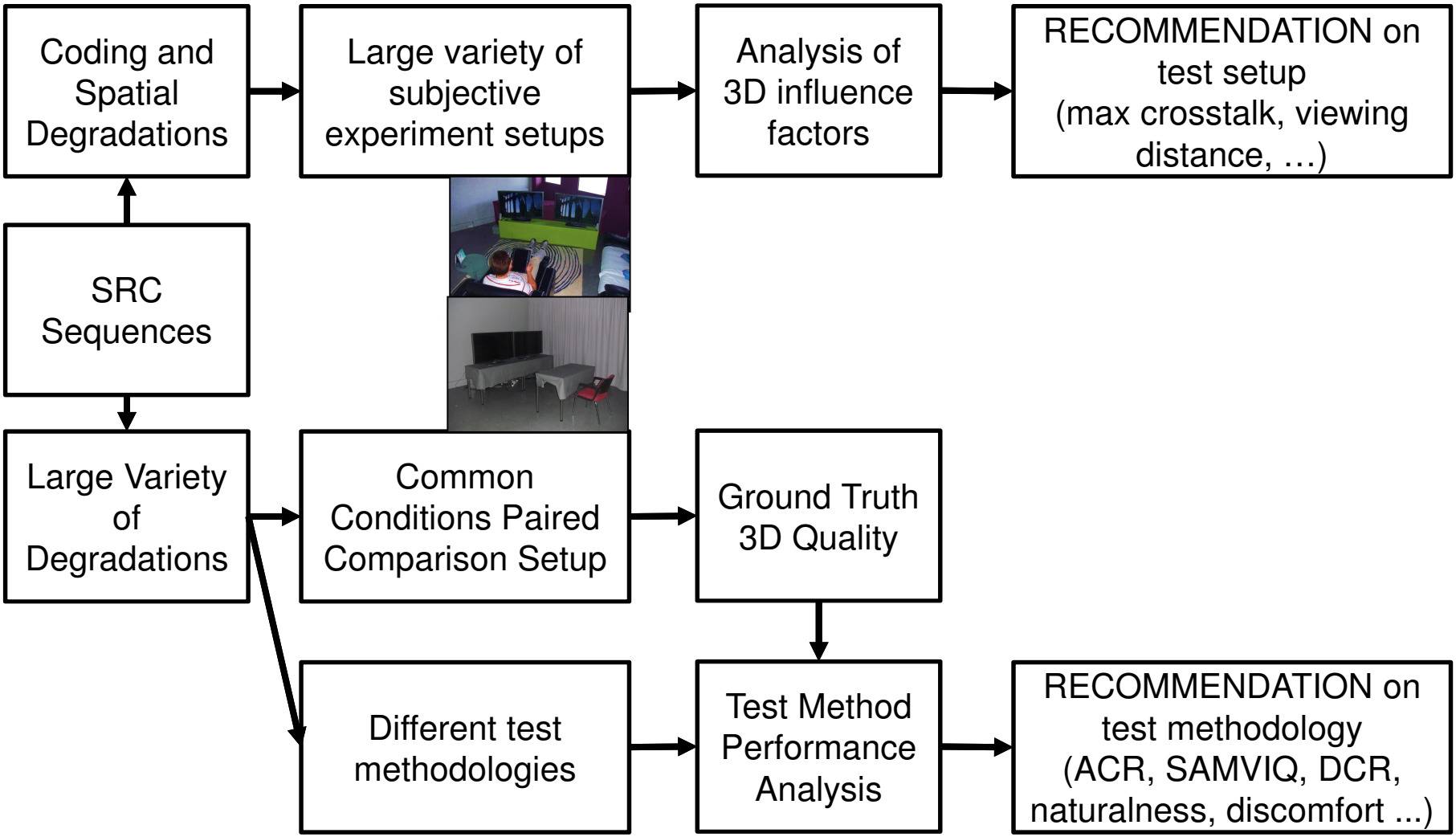
Joint experiments on databases

Overview

- Source Sequences:
  - Nantes-Madrid 3D Stereoscopic Sequences Part 1
    → NAMA3DS1
  - Supplemental sequences: Gaming, Pop-out effects, longer sequences
- For evaluation of the environment setup (displays, observer position, …) using the scale « Video Quality » only:
  - Database Coding and Spatial Degradations 1
    → NAMA3DS1-COSPAD1
- For evaluation of methodologies:
  - Ground Truth Quality in 3D
    → NAMA3DS1-GROTRUQ3D

Graphical overview



Details on NAMA3DS1

- High quality source sequences: 1920x1080p25
- Most sequences uncompressed
- Some sequences compressed in 20Mbps per view in H.264 on the camera
- Generated depth maps available


a) Barrier gate - frame #245


b) Basket - frame #285


c) Boxers - frame #189


d) Hall - frame #200


e) Lab - frame #390


f) News report - frame #150


g) Phone call - frame #181


h) Soccer - frame #193


i) Tree branches - frame #200


j) Umbrella - frame #230

Details on NAMA3DS1-COSPAD

- Sequences are ready and have been distributed during this meeting
- Individual votes are available
- Degradations:
  - Coding in H.264 (blockbased) with QP32, 38, 44
  - Still image coding with JPEG2000 (wavelet) in 2, 8, 16, 32 Mbps
  - Reduction of the resolution by 4
  - Image sharpening as an « enhancement » step
  - Reduction of the resolution by 4 followed by image sharpening

More details in Urvoy, M., Barkowsky, M., Gutiérrez, J., Cousseau, R., Koudota, Y., Ricordel, V., et al. (2012). NAMA3DS1-COSPAD1: Subjective video quality assessment database on coding conditions introducing freely available high quality 3D stereoscopic sequences. IEEE Fourth International Workshop on Quality of Multimedia Experience QoMEX

Usage of NAMA3DS1-COSPAD1 in VQEG workgroups

- Influence of the environment
  - Influence of viewer position: several viewers, distance, height, …
  - Influence of room setup: Illumination, colors
  - Influence of display settings: Polarized/shutter, color calibration
  - Influence of the amount of training of observer
  - Polarized display viewing distance: 3H, 6H?
  - Influence of observer population (same observers, different observers)
  - Observer information: Accommodation time of observers, Vergence facility
- Recommendations:
  - Observer information: Age, Snellen, Randot, Ishihara

Ground Truth Quality 3D Database

- Problem: How to evaluate the performance of a SUBJECTIVE ASSESSMENT METHODOLOGY IN 3D?

- Various scales of 3D perception are known:
  - Video Quality
  - Visual Discomfort
  - Depth effect
  - Naturalness
  - etc…

Conditions

- Currently evaluated conditions:
  - H.264 and JPEG2000 coding (4QP, 4Bitrates)
  - Zero Disparity – 2D (1 condition)
  - Spatial Resolution reduction (2 conditions)
  - Frame Rate Reduction (2 conditions)
  - Noise reduction (3 conditions)
  - Edge enhancement (8 conditions)
  - Horizontal Disparity offset (6 conditions)
  - Vertical Disparity offset (6 conditions)
  - Asymmetric conditions
    - Brightness (6 conditions)
    - Gamma (4 conditions)
    - Stirmark geometrical distortion (4 conditions)
    - 2D to 3D conversion (4 conditions)

Results

- Understanding the interaction of the different degradations and their scales
- Establishing a Ground Truth data set for knowing exactly which sequences are preferred to one another, using his own combination of judgement on each and every « internal/personal » scale
- Comparison of different subjective assessment methods with all involved scales (maybe evaluated separately):
  - Paired comparison
  - SAMVIQ
  - ACR
  - DSCQS
  - DCR
  - …

Status

1. Sequences have been generated and distributed
   (about 20 free source sequences may be made available with all degradations)
2. Pre-judged by about 5 people on percentage scale
   - Video Quality
   - Depth
   - Visual Comfort
3. Next step: Selection of subjective experiment set
   - About 16 HRC from the 54 HRC
   - Inclusion of other HRCs necessary ?
4. Division into subsets with a number of common sequences selected from the Optimized Square Design method
5. Running the subjective evaluation in labs with as close conditions as possible
   → input from the previous evaluation on influence factors exploited in order to know which factors are important?

Work items

- Orange Labs proposes to analyse all the SRC (and PVS) sequences with their tool for identifying the quality of the capturing of these sequences regarding:
  - Visual Discomfort Zone
  - Geometrical reproduction quality on different screen sizes
  - Etc.

Questions

- Who wants to participate in the evaluation of the viewing environment (displays, distance, angle, illumination, training)
- Who wants to participate in the choice of the degradations for the Ground Truth Quality 3D database?
- Do we aim for a Full-Matrix approach with evaluating each SRC separately with all possible HRCs?

Questions

- What do we want to test with the Coding and Spatial Degradations dataset that was distributed during this meeting?
  - IRCCyN:
    - Already done: Standardized room setup with 42'' Shutter glasses screen (consumer type Philips 3D)
    - Planned: Living Lab (larger viewing distance, colors in the room, non-standard illumination)

Questions

- What do we want to test with the Coding and Spatial Degradations dataset that was distributed during this meeting?
  - Lab:
    - Main difference (wrt BT.500):
    - Illumination:
    - Display (type, size):
    - Viewing distance:
    - Viewing angle (number of observers):
    - Observer screening methods:
    - Display measurement/calibration methods:

Questions

- What do we want to test with the Coding and Spatial Degradations dataset that was distributed during this meeting?
  - IRCCyN1:
    - Main difference: consumer display 42'' Philips Shutter glasses
    - Illumination: Standard D65 measured through glasses
    - Display (type, size): Philips 46PFL9705H 46" Shutter
    - Viewing distance: 3H (172cm)
    - Viewing angle (number of observers): 90 deg, 1 obs.
    - Observer screening methods: Randot, Snellen, (far, near), Ishihara, no thresholds applied
    - Display measurement/calibration methods: Display standard settings + EyeOneDisplay, 56cd/m2 through glasses, gamma 2.2, white point 6600K

Questions

- What do we want to test with the Coding and Spatial Degradations dataset that was distributed during this meeting?
  - IRCCyN2:
    - Main difference: Non standard environment
    - Illumination: Daylight, changing room illumination,
    - Display (type, size): Philips 46PFL9705H 46” Shutter
    - Viewing distance: larger than 3H (172cm)
    - Viewing angle (number of observers): 90 deg, 1 obs.
    - Observer screening methods: Randot, Snellen, (far, near), Ishihara, no thresholds applied
    - Display measurement/calibration methods: Display standard settings + EyeOneDisplay, 56cd/m2 through glasses, gamma 2.2, white point 6600K (same as IRCCyN1)

Questions

- What do we want to test with the Coding and Spatial Degradations dataset that was distributed during this meeting?
  - NTT:
    - Main difference: using different assessment methodologies, using different displays (polarized broadcast professional, shutter consumer display, 40'')
    - Illumination:
    - Display (type, size):
    - Viewing distance:
    - Viewing angle (number of observers):
    - Observer screening methods:
    - Display measurement/calibration methods:

Questions

- What do we want to test with the Coding and Spatial Degradations dataset that was distributed during this meeting?
  - Yonsei:
    - Main difference: 46'' polarized screen vs. 26'' polarized screen, 1 viewer per test, 2 viewers per test
    - Illumination:
    - Display (type, size):
    - Viewing distance:
    - Viewing angle (number of observers):
    - Observer screening methods:
    - Display measurement/calibration methods:

Questions

- What do we want to test with the Coding and Spatial Degradations dataset that was distributed during this meeting?
  - AGH:
    - Main difference: 42'' polarized 3D, autostereoscopic 4'' display, outdoor environment, poor quality shutter glasses (crosstalk), room illumination control (reflection on polarized glasses)
    - Illumination:
    - Display (type, size):
    - Viewing distance:
    - Viewing angle (number of observers):
    - Observer screening methods:
    - Display measurement/calibration methods:

Questions

- What do we want to test with the Coding and Spatial Degradations dataset that was distributed during this meeting?
  - NTIA:
    - Main difference: Living room vs. ITU BT.500 sound isolation room, Laptop display and ~50'' 3D display
    - Illumination:
    - Display (type, size):
    - Viewing distance:
    - Viewing angle (number of observers):
    - Observer screening methods:
    - Display measurement/calibration methods:

Questions

- What do we want to test with the Coding and Spatial Degradations dataset that was distributed during this meeting?
  - Acreo:
    - Main difference: active consumer grade vs. passive consumer grade TV 55'' displays
    - Illumination:
    - Display (type, size):
    - Viewing distance:
    - Viewing angle (number of observers):
    - Observer screening methods:
    - Display measurement/calibration methods:

Questions

- What do we want to test with the Coding and Spatial Degradations dataset that was distributed during this meeting?
  - Orange Labs: (Characterisation of video sequences)
    - Main difference: Viewing distance, Display technology, room illumination
    - Illumination:
    - Display (type, size):
    - Viewing distance:
    - Viewing angle (number of observers):
    - Observer screening methods:
    - Display measurement/calibration methods:

Questions

- What do we want to test with the Coding and Spatial Degradations dataset that was distributed during this meeting?
  - Deutsche Telekom:
    - Main difference: home environment, standardized environment, 52'' display with 23'' display shutter, eventually passive display
    - Illumination:
    - Display (type, size):
    - Viewing distance:
    - Viewing angle (number of observers):
    - Observer screening methods:
    - Display measurement/calibration methods:

Questions

- What do we want to test with the Coding and Spatial Degradations dataset that was distributed during this meeting?
  - Lab:
    - Main difference:
    - Illumination:
    - Display (type, size):
    - Viewing distance:
    - Viewing angle (number of observers):
    - Observer screening methods:
    - Display measurement/calibration methods:

Questions

- What do we want to test with the Coding and Spatial Degradations dataset that was distributed during this meeting?
  - Lab:
    - Main difference:
    - Illumination:
    - Display (type, size):
    - Viewing distance:
    - Viewing angle (number of observers):
    - Observer screening methods:
    - Display measurement/calibration methods:

Questions

- What do we want to test with the Coding and Spatial Degradations dataset that was distributed during this meeting?
  - Technicolor:
    - Main difference: viewing distance, viewing angle, screening methods
    - Illumination:
    - Display (type, size):
    - Viewing distance:
    - Viewing angle (number of observers):
    - Observer screening methods:
    - Display measurement/calibration methods: