Colour and Visual Computing Symposium 2024 (CVCS 2024)

The Colourlab at the Norwegian University of Science and Technology (NTNU), Norway has organised the Colour and Visual Computing Symposium 2024 (CVCS 2024), which this year is taking place in Gjøvik, on September 5-6, 2024. Born in 2003 as the Gjøvik Colour Imaging Symposium (GCIS), the Colour and Visual Computing Symposium (CVCS) has attracted a growing number of participants and provided a platform for fruitful discussion and exploration of recent advances in the field of colour and visual computing.

These proceedings have been submitted for open-access publishing as a CEUR Workshop Proceedings volume, currently indexed by Google Scholar, DBLP, and Scopus. The CVCS 2024 symposium contains a rich programme including keynotes, and contributions by young researchers and well-known international experts in topics including colour imaging, appearance, vision, spectral imaging, visual computing, and medical imaging.

The CVCS 2024 Programme Committee received 22 submissions. All full papers went through a blind review process and each paper has been reviewed by three reviewers. The paper selection criteria were methodology used and scientific quality in terms of novelty and originality. Finally, 12 high-quality papers of scientific content were selected and presented at the symposium. Four keynote speakers contributed to the success of the event: Professor Theo Gevers, from the University of Amsterdam who is the director of the Computer Vision Lab and co-director of the Atlas Lab (UvA-TomTom) and Delta Lab (UvA-Bosch) in Amsterdam. Professor Ghassan AlRegib the John and Marilu McCarty Chair Professor in the School of Electrical and Computer Engineering at the Georgia Institute of Technology and the director of the Centre for Signal and Information Processing (CSIP). Dr. Sira Ferradans the AI director at DXOMARK. And, Dr. Charles Poynton imaging and colour scientist working on video/HD/UHD/4K/HDR/HDR/D-cinema.

Keynote: Professor Theo Gevers

Title: Coloring (generative) AI

Keynote: Professor Ghassan AlRegib

Title: Visual Explanations in AI

Visual explanations have traditionally acted as rationales used to justify the decisions made by machine learning systems. With the advent of large-scale neural networks, the role of visual explanations has been to shed interpretability on opaque models. We view this role as the process for the network to answer the question `Why P?', where P is a trained network's prediction. Recently however, with increasingly capable models, the role of explainability has expanded. Neural networks are asked to justify `What if?' counterfactual and `Why P, rather than Q?' contrastive question modalities that the network did not explicitly train to answer. This allows explanations to act as reasons to make further prediction. The talk provides a principled and rational overview of Explainability within machine learning and justifies them as reasons to make decisions. Such a reasoning framework allows for robust machine learning as well as trustworthy AI to be accepted in everyday lives. Applications like robust recognition, image quality assessment, visual saliency, anomaly detection, out-of-distribution detection, adversarial image detection, seismic interpretation, semantic segmentation, introspection, and machine teaching among others will be briefly discussed.

Keynote: Dr Sira Ferradans

Title: Studying user preferences for diverse skin tone portrait quality rendition

Portraits are the most common use case for smartphone photography, however, producing a realistic and pleasant skin tone in real scenarios is still challenging for all manufacturers, especially in common conditions such as night or low light scenes. However, producing non-homogeneous quality rendition across skin tones has become a sensitive issue, and its evaluation is crucial for the industry. In the scientific literature, we find mostly studies that evaluate synthetic modifications of laboratory portraits. In this talk, we will show the challenges of systematically evaluating diverse skin tones in the lab using realistic mannequins. However, we will also show that real setups are much more complex to evaluate, and user preferences depend on many factors.

We will go through the conclusions obtained during DXOMARK's last user studies, where we examine the performance of high-end smart-phone cameras in common every-day use cases. This study shows that around 20% of portraits are currently discarded due to quality problems, implying that contemporary smartphone cameras are far from solving the skin tone rendition problem.

These challenges are mostly because there is no clear target definition of user preferences regarding color skin tone rendering. The definition of this target could path the way to automatizing skin tone rendition evaluation with Machine Learning.

Keynote: Dr Charles Poynton

Title: Technological Natural Selection in Imaging Standards

Video signal decoding by a CRT's inherent power function ("gamma") very nearly inverts the perceptual uniformity of CIE L*. I used to consider this to be an amazing coincidence. In about 1992, I was chatting to Mike Schuster (of Adobe) about CRT gamma, and I commented to him about what I saw as the fluke by which halftone dot gain in printing also has nonlinear behaviour favourable to perception. Michael told me that he had thought about that for a long time. He said that he had reached the conclusion that it was a kind of technological natural selection – if not for optical dot gain, 8-bit CMYK halftoning would have failed, and some other scheme would have eventually been found.

In this talk, I'll describe several situations in digital colour imaging where suitable – even near-optimum – solutions to problems were found by processes involving mutation and selection pressure, rather than by explicit engineering. There are lessons for imaging system design.

The members of the programme committee are:

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