The Effect of Screen Orientation on Depth Perception and a Comparison Between Virtual Reality Systems

Cyril Vienne, Vincent Honnet, Stéphane Masfrand, Christophe Bourdin, Jean-Louis Vercher

PERCEPTION

41st European Conference on Visual Perception (ECVP) 2018 Trieste

Welcome Address

The 41st European Conference on Visual Perception (ECVP) took place in Trieste (Italy), from August 26 to 30, 2018. This edition was dedicated to the memory of our esteemed colleague and friend Tom Troscianko, with an emotional Memorial lecture in his honour held by Peter Thompson during the opening ceremony.

The conference saw the participation of over 900 fellow vision scientists coming from all around the world; the vast majority of them actively participated, allowing us to offer an outstanding scientific program. In particular, we hosted almost 300 oral presentations in 21 symposia and 21 talk sessions, and more than 500 posters during the innovative 'Poster day'. Among symposia, there were two special ones: the European Symposium on Perception and Action in Sport (ESPAS), gathering the most influential researchers in the field, and Perceptual Structures – A Festschrift for Michael Kubovy, celebrating his retirement. As concerns keynotes, the Perception lecture was held by Dejan Todorović, while the Rank Prize lecture was held by Branka Spehar; moreover, in the program we also included the Kanizsa lecture, held by Walter Gerbino. Finally, we respected the tradition of the Illusion night, this year entitled "Un mare di illusioni" as it took place by the sea.

To conclude, we sincerely thank all the volunteers, whose contribution was fundamental for the success of the conference.

The ECVP 2018 organising committee

Tiziano Agostini, Paolo Bernardis, Carlo Fantoni, Alessandra Galmonte, Mauro Murgia and Fabrizio Sors

Contents

viewed their first-person video and rated their frame-by-frame uncertainty with a specialised video viewer. Videos were annotated to delineate assembly steps. Using the survey, assembly annotation and eye-tracking records, we analyse the data for cues to predict frame-by-frame uncertainty ratings. We present several analyses of participant behaviour and preliminary results for predicting frame-by-frame uncertainty using eye-tracking features (e.g., fixation durations, saccade rate) by modelling the data set with support vector machines and neural networks.

Perceptual and Cognitive Load in Graph Reading

Isabella Fuchs-Leitner, Lisa Falschlunger and Heimo Losbichler
Campus Steyr, University of Applied Sciences Upper Austria, Austria

According to Lavie's load theory of selective attention and cognitive control, perceptual load and cognitive load have different effects on visual processing: While high perceptual load can interrupt distractor processing and consequently lead to better performance compared to conditions of low perceptual load, the reversed pattern is found for the different levels of cognitive load. In the current study, we tested these predictions in an applied setting of graph reading. We varied the levels of both, cognitive and perceptual load on the same trials. Additionally, in half of the trials, an irrelevant colour singleton distractor was present. Although response times, accuracy measures as well as various eye movement measures did reflect differences in load, we did not find any confirmation of the predictions of load theory on distractor processing. These findings are in line with previous studies in applied settings, and implications for future studies are discussed.

A Dynamic Approach of Searching Behaviour in Webpages

Alexandre Milisavljevic[1], Thomas Le Bras[1], Matei Mancas[2], Coralie Petermann[3], Bernard Gosselin[2] and Karine Doré-Mazars[1]
[1]VAC, Paris Descartes University, France
[2]Numediart Institute, University of Mons, Belgium
[3]R&D, Sublime Skinz, France

The visit of a webpage is driven by multiple bottom-up and top-down factors, such as the inner characteristics of the webpage, the goal or the user profile. In the present experiment, we studied the goal's effects on participants' visual behaviour while browsing 18 fully scrollable webpages. To achieve this, we asked them to carry out two kind of tasks: Free Viewing task and Target Finding task. Preliminary

results showed the influence of the task on the scanpath length, the horizontal spatial dispersion of the fixations and the amplitude of the saccades. However, scanpath's characteristics evolve during the navigation which highlight explore/exploit modes. Further analyses suggest that the dynamic of the scanpath is also influenced by the target detection.

Does Body Dissatisfaction Influence Our Ability to Accurately Identify Distorted Body Images?

Nicole Thomas, Alessia Mattia, Elizabeth Matthews and Ellie Aniulis
College of Healthcare Sciences, James Cook University, Australia

We are surrounded by social media, which contributes to our perception of the "ideal" body. Body image is influenced by perception; repeatedly viewing unrealistically thin bodies can shift our perception of average body size. We distorted images of female bodies, in increments of 5%, to determine whether participants are able to identify the extent to which images have been digitally altered. We also measured participants body shape dissatisfaction, ideal body shape, time spent on social media, and their BMI. We anticipate participants will underestimate the extent to which images have been distorted, indicating a tendency to perceive overly thin female bodies as average in size. We also expect that participants' feelings about their own bodies, and their perceived ideal body will influence their ability to correctly identify percentage of distortion. Our findings will clarify whether frequent exposure to thin body ideals and personal body dissatisfaction influence our perception.

The Effect of Screen Orientation on Depth Perception and a Comparison Between Virtual Reality Systems

Cyril Vienne[1], Vincent Honnet[2], Stéphane Masfrand[2], Christophe Bourdin[1] and Jean-Louis Vercher[1]
[1]ISM, Aix-Marseille Université, France
[2]MSRV, Groupe PSA, France

This study describes the effect of screen orientation when looking at virtual three-dimensional (3D) scenes. We took advantage of three Virtual Reality (VR) systems: two with front, ground and side screens (CAVE-like systems) and one with a single one (an HMD), to investigate the effect of screen orientation on perceived depth. This latter was varied relative to observers visual axes by asking them to judge depth for objects displayed at different elevations.

The angle between the visual axes and the screen surface normal was 0°, 35° or −35°. We tested the following conditions: near object versus far object, 3D object alone versus object displayed in a structured visual scene, and a VR system with back projection versus a VR system with direct projection to control for the effect of specular reflection. The results revealed that screen orientation affected perceived depth in CAVE-like VR systems. Screen distance was also revealed as a major predictor, revealing the importance of screen distance in such displays.

CAPTCHA Using Combined Stereo Vision and Amodal Completion

Toshiaki Yamanouchi and Kazuhisa Yanaka
Information Media, Kanagawa Institute of Technology, Japan

Completely Automated Public Turing test to tell Computers and Humans Apart (CAPTCHA) is commonly used to prevent bots from exploiting web services. Subsequently, the technique shifted toward a method requiring a high degree of judgment ability, such as selecting, from a group of images, one which is similar to a sample that shows a specific animal type. By contrast, approaches that utilize human visual capabilities are also available; examples of these are amodal completion and stereo vision. This is a new trend created in the fear that bots can overcome CAPTCHA by using artificial intelligence technology which has recently remarkably progressed. However, if you use fast computers or discover efficient algorithms, then the effect will be limited. For this reason, further increasing analysis cost by combining amodal completion and movies is necessary. We propose CAPTCHA with high analysis cost by combining amodal completion and stereo vision.

Experimental Approach to Motorcyclist Detection by a Car Driver

Vincent Boucher[1], Fabrice Fournela[1], Romain Dronneau[1], Nicolas Basily[2] and Mylène Besnier[2]
[1]DLAn, CEREMA, France
[2]DSMT, ESEO, France

Representing 3% of French road traffic, motorcyclists account for nearly 20% of total mortality. To reduce this hecatomb, the CEREMA tries to understand how a motorcycle is detected in the lateral perception field of a car driver during an overtaking. To do this, we installed a photometric camera and an acoustic antenna in a vehicle. The originality of our study lies in the analysis of visual contrasts perceived in the lateral field and in their association with auditory acuity. Results lead to two different areas in which first vision is predominant and then hearing becomes more important. This defines a "sensorial alert field" depending on motorcycle position.

Art

What Happens When You Perceive a Sun Eclipse?

Claus-Christian Carbon
Department of General Psychology and Methodology, University of Bamberg, Germany

Total sun eclipses (TSE) are amongst the rarest moments in life, accordingly there is a lack of systematic research on such perceptual phenomena. We conducted an empirical study in the United States on the occasion of TSE taking place 21 August, 2017. We asked for (a) expectations: Which perceptions (visual, acoustic, temperature, etc.) did they expect beforehands to have while witnessing the solar eclipse? (b) perception: Which perceptions did they actually had? (c) aha-insights: Have there been any kind of aha-insight moments while witnessing the solar eclipse? and (d) liked best: What did they liked best about experiencing the solar eclipse? On the basis of all fully completed reports ($N = 40$), we generated a categorization system for each of the questions revealing that participants often perceived strong emotional, social, and even spiritual experiences: strong signs for experiencing the sublime. Results make clear how strongly perception of TSE can impact social, cognitive, and emotional dimensions.

Exploring Artwork In Situ: Empirical Aesthetics Making Use of Mobile Eye Tracking

Doga Gulhan and Johannes Zanker
Department of Psychology, Royal Holloway, University of London, UK

Empirical aesthetics in laboratory settings controls experimental conditions and measurements but limits 'ecological validity' by restricting experience and using only reproductions of artworks. Mobile eye tracking is crucial to advance experimental work, allowing us to investigate aesthetic experience with original artwork in 'natural' setting. We investigated eye movements of 13 participants exploring an art installation—Salon Diagonale by L. Goetz—covering walls of an otherwise empty room in Compton Verney Art