ENCODING ALGORITHMS: NETFLIX CHOOSES CAPACITÉS AND LS2N

#sensorial perception #video compression #user experience #algorithm #artificial intelligence

Accessibility has driven the success of streaming video on demand (SVOD), and so have algorithms for recommendation and image compression. Netflix, a pioneer in the field, bet early on these algorithmic innovations and invested in state-of-the-art encoding techniques. This Californian SVOD giant noticed the research that Capacités and the LS2N (Digital Sciences Laboratory of Nantes) had conducted in AI and visual perception modeling and asked them to work on optimizing its algorithms. The goal was to compress the images without reducing the users' perceived quality.

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VISUAL PERCEPTION TESTING AND MODELING TO OPTIMIZE VIDEO ENCODING ALGORITHMS

Expertises:
- Data science
- Artificial intelligence

Netflix wanted to improve its encoding algorithms in order to reduce video size further and increase speed. The company asked experts from Capacités and LS2N in Nantes to research how to decrease file sizes without altering the image quality perceived by the human eye.

The expert analysts of human image perception began by conducting a large-scale, subjective testing campaign. They developed a procedure in which several hundred participants viewed miscellaneous videos and rated their image quality. The experts then altered the videos' appearance based on these ratings before submitting them to the next testers. This sequence was repeated multiple times, and each rating determined the following modifications.

In this type of visual perception study, experts can equip testers with an eye-tracking system that records their eye movement as they watch videos. They can then pinpoint image areas that capture attention and retain them during compression. The results of the tests and analyses were modeled. Then they were used to optimize the encoding algorithms and to help Netflix teams choose the ideal compression format.

Incidentally, this research led to developing innovative algorithms that optimize data collection in subjective testing.

To successfully complete this project, the Capacités' experts benefited from support and technical equipment from the LS2N laboratory (Digital Sciences Laboratory), joint research unit of Université de Nantes, Centrale Nantes engineering school, Inria, IMT Atlantique and CNRS (The French National Centre for Scientific Research). ∎

CAPACITÉS

Created in 2005, Capacités is the private engineering and research valorisation subsidiary of the University of Nantes. It employs 90 employees, mainly engineers and PhDs, who work directly with scientists in the research laboratories.

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