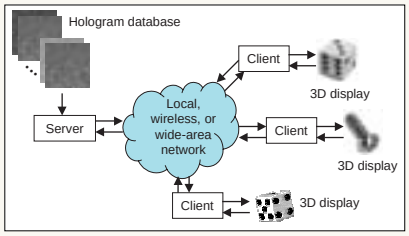
3D-Image Transmission and the Internet

Digital holography has seen an upsurge in interest thanks to the recent development of megapixel digital sensors with high spatial resolution and dynamic range. A new application that pairs digital holography with the Internet is discussed in an article published in the August issue of *Applied Optics–Information Processing* (AO-IP).

The authors of the AO-IP article compress phase-shift digital holograms (whole Fresnel fields) for the transmission over the Internet of three-dimensional (3D) images. Since the holograms are digital in nature, they are in a suitable form for processing and transmission.



The authors record inline digital holograms and recover the whole Fresnel field by means of phase-shift interferometry before proceeding to digital compression and decompression. They define a speed-up metric that combines compression-generated space gains with temporal overheads caused by compression routine and transmission serialization.

Using a special Internet-based networking application, they then empirically verify the benefits compression has conferred on transmission speed. The client-server application and associated compression algorithms were written with Java, which allowed the authors to develop a platform-independent environment.

Applications could include 3D video transmission, 3D display, 3D computer graphics and distributed virtual reality.

— *"Efficient compression of Fresnel fields for Internet transmission of three-dimensional images," Thomas J. Naughton (tom.naughton@may.ie), John. B. McDonald and Bahram Javidi,* Applied Optics—Information Processing, *August 2003.*

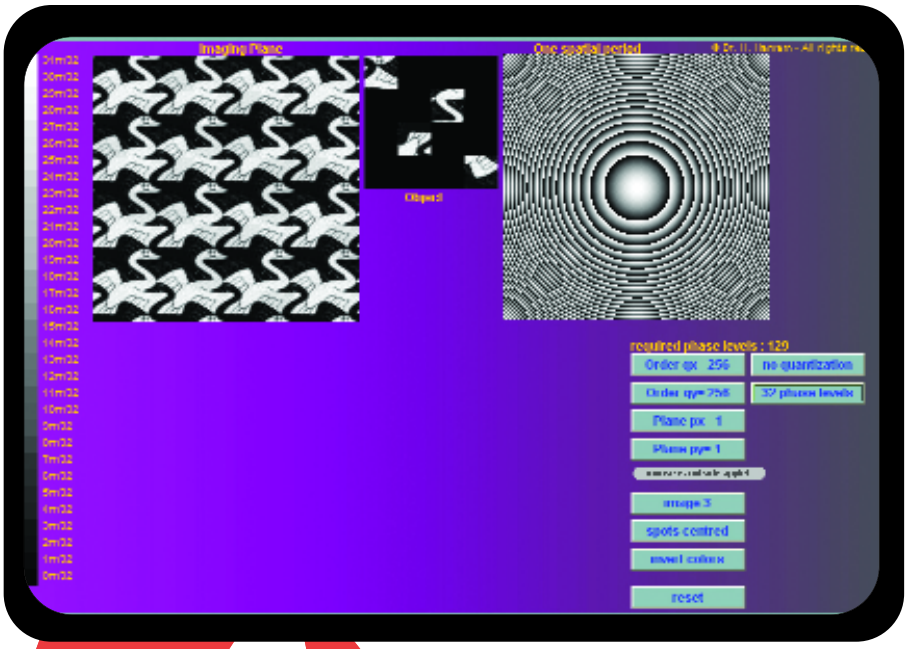


Figure 5. Talbot imaging: interactive applet that simulates an imaging system which uses a Talbot array illuminator. An Escher-like figure is obtained from four image segments.

www.umoncton.ca/genie/electrique/Cours/Hamam/Optics/Aber/Illustrations.htm.[13]

Discussion

Multimedia provides powerful visual reinforcement of teaching about optics phenomena and the functioning of optical systems. Animation allows users to track the behavior of an optical signal from input to output. Interactivity is highly desirable. Because optics touches on complex phenomena such as diffraction and aberrations, multimedia tools have a lot to offer, despite the fact that they are often time consuming to construct and require fast Internet connections and computers to be used efficiently.

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