

(4) Preparing virtual streets for the investigation of mesopic vision

Cecília Sik Lányi, János Schanda

Department of Image Processing and Neurocomputing, University of Veszprém,
Veszprém, Hungary

Email: lanyi@almos.vein.hu, schanda@vision.vein.hu

Abstract

We investigate at the Colour and Multimedia Laboratory of the University of Veszprém the human vision under mesopic conditions.

If the luminance of the environment is above of a few cd/m^2 (daylight situation) our visual system is photopically adapted. Under such conditions we see details clearly and can also observe colours well. In darkness (night situation without clear moonlight) the luminance of the environment is below 10^{-3}cd/m^2 . In such situations our ability to see details is poor and we can not distinguish colours. Between the two extreme lighting situations, i.e. roughly between 3cd/m^2 and 10^{-3}cd/m^2 we loose gradually our colour vision and the visual acuity becomes poorer and poorer. This region is called mesopic vision. The metrology of visual stimuli under mesopic conditions is called mesopic photometry. There are several models describing brightness corresponding photometric attributes for mesopic photometry, but there is no good model for detail perception and of the wavelength sensitivity of the human eye under such mesopic conditions. Mesopic vision is, however, very important in nightly traffic situations, practically all street lighting produces mesopic vision. The investigation of visibility under such conditions is very important to achieve safer traffic situations.

The investigation of traffic situations (accident avoiding, etc.) is difficult in real environment. Virtual reality is a good candidate to investigate human reactions in dangerous circumstances. Therefore we have prepared animations of situations that might occur under mesopic driving conditions and have investigated how different test persons react e.g. on the observation of an obstacle appearing in front of the vehicle.

The animations have been produced by the help of a three-dimensional animation software, Maya 4.5 that enabled us to produce animations of high reality content where also the night-time appearance of the street with street-lightning could be produced.

Key-words: virtual reality, mesopic vision, animations