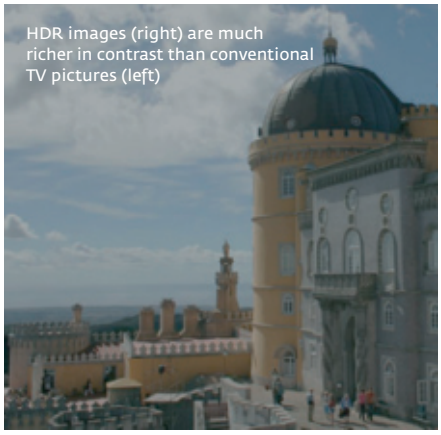
Light and Dark Crowded Together

Max Planck researchers have developed a compression method to store videos that are particularly rich in contrast



HDR images (right) are much richer in contrast than conventional TV pictures (left)

STANDARD COMPUTER SCREENS make too few demands on the human eye, as the eye can perceive substantially greater differences in brightness than an LCD screen can display. This is about to change: future displays will show a moonless night as convincingly as a scene in glaring sunlight – thanks to High Dynamic Range technology (HDR).

However, the large number of brightness levels in HDR videos requires an enormous amount of storage capacity. Researchers at the Max Planck Institute for Informatics in Saarbrücken are now compressing the data to a usable size without the eye detecting the slightest difference.

To save on storage space, the researchers in Karol Myszkowski's group are making use of the fact that, when darkness increases, the eyes detect weak contrasts with increasing difficulty. This is noticeable, for instance, when reading in the fading light of dusk. The researchers in Saarbrücken are thus reducing the many levels of brightness with which HDR cameras also shoot scenes at night or in the shade. And fewer levels mean less space needed for storage.

This enabled the scientists to compress HDR images into a format that uses hardly any more storage capacity than the usual MPEG-4 format. "It certainly stores pictures as well as the eye sees, and is therefore suitable for all future HDR displays," stresses Myszkowski. The computer scientist sees further possible applications for the new format in computer graphics and digital cinema, as well as for telemedicine and surveillance technology.

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A Step Ahead of the Spammers

A filter anticipates junk mail strategies

THE FORCES battling spam e-mails, phishing and computer viruses are going on the offensive. New software created by computer scientist Tobias Scheffer at the University of Potsdam could soon be added to their arsenal. This tool automatically detects the spammers' strategy and identifies their tricks before they have the chance to attack. Scheffer developed the basic principles of his spam filter in cooperation with Internet service provider STRATO while he was still working at the Max Planck Institute for Informatics in Saarbrücken.

Currently, spam filters come into play after the attack has already been launched. They use recurring patterns in spam e-mails to create a model that distinguishes spam from legitimate messages. However, these models are based on data from the past, and the spammers' tricks vary from day to day. Scheffer's software, on the other hand, uses game theory to stay a step ahead of the spammers. Like a chess player, the program calculates the moves that spammers will make. But whereas in chess the number of possible moves is limited, the destructive creativity of these Internet villains knows no bounds.

"With an infinite number of spam possibilities to choose from, the software selects those that appear to be the most promising," says Scheffer. The program even takes into account the fact that the attackers may try to predict the defenses used against them. The next step is to implement the software as a scalable product that STRATO can deploy on behalf of its millions of customers.

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Photos: Fotolia (bottom), MPI for Informatics – Karol Myszkowski (2, top)