

Information Processing and Three-dimensional Display

FEATURE EDITOR

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INTRODUCTION

This special Feature of the Journal of the Optical Society of Korea contains five papers on information processing and three-dimensional(3-D) display. All of these papers are the result of presentations at the 6th International Workshop on three-dimensional Imaging Media Technology and the 5th photonic information processing conference, held July 20-21, 2000 at Seoul National University, Korea. The meetings were co-sponsored by the Optical Society of Korea and the Korean Physical Society so that specialists working on photonic information processing and 3-D display from domestic and foreign industry, research institutes and academia present their research results and exchange their ideas. This special issue is the second to be published annually under the current title. The purpose of publishing this special issue is to attract more participants, to level up the meetings, and to provide more researchers with the opportunity to contact these important areas of research. Considering the number of excellent presentations at the meetings, it is regrettable that only a fraction could be published in this feature.

Photonic information processing, which is a major area of optical technology that will continue to receive much attention as a key technology of the 21-st century, involves the recognition, classification, storage, and processing of various informations optically. In Korea, it is maturing to the level of developed countries. Especially advances in the areas related to photonics and 3-D display are notable. It is desired that papers in this important area of research could be included in this feature. 3-D display involves various disciplines such as display devices, optical elements, high-speed electronics, visual psychology, etc., as well as photonic information processing. In this age of information, the importance of 3-D display has ever been increasing in many areas, such as virtual reality, tele-operation, medical imaging, games and entertainment, scientific visualization, to mention a few. The most active area of 3-D imaging research is the development of autostereoscopic 3-D TV which does away with the need to wear special eye-glasses. Although it is likely that 3-D display techniques which can provide all of 3-D cues, such as holographic video, volumetric display, and integral photography will be restricted to research topics for a while, there have been much effort to increase the number of views in order to provide viewers with better and more comfortable 3-D feelings. All papers in this feature are related to 3-D displays. The first paper by H. Yamanoue, *et al.* reports the development of a compact 3-D HDTV camera based on orthostereoscopic conditions, while shooting con-

ditions of 3D program production for natural 3D images have been investigated at NHK. They show that orthostereoscopic conditions bring about no inconsistency between depth information from perspective of the lenses and that from binocular parallax. The camera is compact, has a zooming function and is valuable in many ways. They also report the results of subjective evaluation tests on psychological effects of the images shot by the camera. J. Y. Son, *et al.* report the experimental investigations of the big size holographic screen in the autostereoscopic displays. In order to extend the capabilities of the big size holographic screen, they achieved the reflection mode of operation by attaching the mirror behind the screen, increased the screen size by mosaicking the sub-screens, and realized the eye-tracking capability by moving the viewing zone. They also considered methods of increasing vertical size of the viewing zone. Sungyong Jung, *et al.* propose an autostereoscopic 3-D display system based on integral photography(IP) where elemental images of imaginary objects are computer-generated instead of the pickup process in conventional IP. They observed 3-D images in full color and full parallax, and studied the lateral and depth resolutions of the integrated images. Gruts Yu.N., *et al.* report stereoscopic operators which install a one-to-one correspondence between 3-D coordinates of any point in space and the stereo coordinates which can be displayed on the screen under given conditions. The operators can be applied to the analysis of distortions in stereoscopic image when the stereo vision base and the position of viewer change. Do Hyeon Baek, *et al.* report a new method of switching mode in antiferroelectric liquid crystal cell. In this mode they observed faster switching time and higher contrast ratio than in the conventional mode, and showed the possibility of achieving gray scale.

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