

LASERTECH '94

Paper Abstract

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Gov't Agency/Lab The Subject Technology Was Developed By/For:

Advanced Research Project Agency

Contract No. (if applicable): 218-3 AA81-0-3470

Paper Title:

A Bifurcating Self-amplified Optical Associative Retrieval and
Pattern Recognition Technique

Category:

Robotics (Robotic Vision)

Description (use additional sheet if necessary):

The principle and experimental results of a novel spatially bifurcating optical associative retrieval and pattern recognition technique are presented. In this technique, it can be shown that a single 2-D input image is associated with two output images through holographic photorefractive diffraction. Self-amplification occurs due to the two-wave beam coupling energy process naturally existing in the crystal in certain specific geometric configurations. A theoretical analysis showed that the degree of the recognition of the input image is proportional to the output of one of the bifurcating ports and that an unrecognized image will appear in the other port thus enable one to discriminate and classify the inputs. The photorefractive amplification is analyzed based on the experimental system parameters. In the experimental demonstration utilizing BaTiO₃, interesting optical edge enhancement, pattern recognition, and auto-associative retrieval phenomena have been observed. Finally, applications of the technique will be discussed.

* Q. B. He is a NASA sponsored National Research Council Fellow