Fuzzy image processing scheme for autonomous navigation of human blind

Abstract

The main objective of this work is to develop an electronic travel aid to assist the blinds for obstacle identification in their navigation. This navigation assistance for visually impaired (NAVI) system presented in this paper consists of a single board processing system (SBPS), a vision sensor mounted headgear and a pair of stereo earphones. The image environment in front of the blind is captured by the vision sensor. The image is processed by a new real time image processing scheme using fuzzy clustering algorithms. The processed image is mapped onto a specially structured stereo acoustic patterns and transferred to the stereo earphones in the system. Blind individuals were trained with NAVI system and tested for obstacle identification. Suggestions from the blind volunteers regarding pleasantness and discrimination of sound pattern were also incorporated in the prototype. The proposed processing methodology is found to be effective for object identification and for producing stereo sound patterns in the NAVI system.