An Analog VLSI Chip for Thin-Plate Surface Interpolation

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Abstract: Reconstructing a surface from sparse sensory data is a well-known problem ili computer vision. This paper describes an experimental analog VLSI chip for smooth surface interpolation from sparse depth data. An eight-node ID network was designed in 3J.lm CMOS and successfully tested. The network minimizes a second-order or "thin(cid:173) plate" energy of the surface. The circuit directly implements the cou(cid:173) pled depth/slope model of surface reconstruction (Harris, 1987). In addition, this chip can provide Gaussian-like smoothing of images.