基于视觉的触觉传感器信号处理电路设计

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摘 要：基于视觉的传感器由图像传感器和内部有标记点的透明弹性胶体构成，当传感器受力时弹性体发生形变，标记点发生位移，图像传感器获取标记点位移信息，再利用弹性原理由标记点位移计算出传感器的受力情况. 信号处理电路以小型 FPGA 芯片 EP4CGX30 为数据处理器，实现高速图像采集、标记点位置识别、标记点位移计算及传感器受力直接输出，其尺寸满足放置在机械手的第二指节中的要求.

关键词：触觉传感器；基于视觉；信号处理电路；小型化
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Signal Processing Circuit for Vision-Based Tactile Sensor

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Abstract: A vision-based tactile sensor is made of a camera and a transparent elastic body with markers inside. When a force is applied to the sensor, the elastic body deforms and the markers move. The camera captures the movements of the markers. Then the force applied on the sensor is calculated by elastic theory and the movements of the markers. The signal processing circuit is a circuit with a small size FPGA EP4CGX30 served as data process unit and can catch pictures with a high speed, identify the location of markers and calculate the movements of markers and the force applied on the sensor. The size of the circuit is small enough to be put into the second part of the mechanical finger.

Key words: tactile sensor, vision-based, signal processing circuit, small-sized

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