عنوان مقاله:

DESIGN AND MODELING OF A NEW TYPE OF TACTILE SENSOR BASED ON THE DEFORMATION OF AN ELASTIC MEMBRANE

محل انتشار:

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خلاصه مقاله:

This paper presents the design and modeling of a flexible tactile sensor, capable of measuring contactforce and softness of a contact soft tissue/sensed object. The sensor is made of polymer materials. This sensor can detect the 2D surface texture image, contact-force estimation and softness of the sensed object. It consists of a chamber for pneumatic actuation and a membrane with a mesa structure. Inner radius of the sensor element is 5mm and its outer radius is 7mm. The sensing mechanism is based on the novel contact deformation effect of a membrane. Determination of the contactforce and softness of sensed object is based on the amount and variations of out of plane deflection at the center of a circular membrane as a result of applied force or pressure on it. Furthermore, the size and shape can be easily tailored to the applications' requirements. This versatility facilitates the use of the sensor in smart applications where tactile information is used to create system intelligence. The proposed sensor with the potential for further miniaturization is suitable for using in medical applications, especially in minimally invasive surgery (MIS).

کلمات کلیدی:

Tactile Sensor، Softness، Contact Force، Membrane