

MEMS Based Tactile Sensors for Robotic Surgery

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Abstract

In this work, a piezoelectric tactile sensor will be designed and simulated using COMSOL Multiphysics®. The sensor is designed in order to assess the pressure exerted on the human body while the robotic surgery is performed. The sensor consists of a rigid and compliant cylindrical element. A circular PDMS (Polydimethylsiloxane) film is sandwiched between the rigid cylinder and the base plate to measure the force applied on cylindrical elements. The total force applied on the sensor is measured using a rectangular PDMS film that is sandwiched between two base plates. The piezoelectric material, PDMS is biocompatible and optically transparent. This sensor can be integrated with the commercial graspers that are used in minimally invasive surgery (MIS) and also in robotic surgery.

Keywords: Tactile Sensor, PDMS, Robotic surgery