

Title: A review article: investigations on soft materials for soft robot manipulations

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Abstract: In recent years, exploratory research on soft materials and their mechanism has been gaining in popularity. The investigations on soft materials are mostly done for two reasons: (a) to develop an anthropomorphic/prosthetic hand or soft hand with human skin-like material to perform soft manipulations and (b) to develop soft actuators. This paper presented a comprehensive investigation into researches on soft materials for robotic applications. The primary interest of using soft materials is not to leave any marks or damage to objects during the manipulation. The other advantage would be stable grasping due to an area contact. Natural rubber, synthetic rubber, elastomer, polymer composite and nanoparticulated polymer composite are some existing soft materials. Extensive research is required to prepare a highstrength but lighter soft material for robotic soft manipulation. Human skin and its mechanical properties are initially discussed. In addition, the need of soft material for soft manipulations and observations from previous researches over the past few decades, modelling of non-linear hyperelastic/ viscoelastic materials and characterization are discussed. Finally, various soft materials including the polymer-matrix composites, available fillers and their advantages, processing methods and nanoparticulated polymer matrix and its significance in robotic application are presented.