Object Surface Properties Identification during Finger Sliding Motion

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Object surface properties are among the most important parameters for intelligent robotic grasping. This talk presents the work for developing novel algorithms for surface properties identification during a fingertip interaction with objects. We first studied the rigid finger-rigid object sliding contact dynamics and modelled the sliding contact interaction between the contact using the Stribeck friction model. A generalized Newton Raphson method was applied to identify the unknown parameters in the model. It was found that different material surfaces can be distinguished from the parameter identification. We also studied the rigid finger-soft object interaction and modeled the soft object using the combination of elastic-half space theory and nonlinear viscoelastic modelling. It was found that the elasticity and viscosity of the soft object surface can be determined through the parameter identification. It is expected that the identification of the object surface properties can be used to facility the control of stable grasping as well intelligent object in-hand manipulation.