This thesis presents three improvements in the UCF MANUS Assistive Robotic Manipulator's grasping abilities. Firstly, the robot can now grasp objects that are deformable, heavy and have uneven contact surfaces without undergoing slippage during robotic operations, e.g. paper cup, filled water bottle. This is achieved by installing a high precision non-contacting laser sensor that runs with an algorithm that processes raw-input data from the sensor, registers smallest variation in the relative position of the object with respect to the gripper. Secondly, the robot can grasp objects that are as light and small as packing peanuts without deforming the object. To achieve this a MEMS Barometer based tactile sensor array device that can measure force that are as small as 1 gram equivalent is embedded into the gripper to enhance pressure sensing capabilities. Thirdly, the robot gripper gloves are designed aesthetically and conveniently to accommodate existing and newly added sensors using a 3D printing technology that uses ABS plastic as a fabrication material. The newly designed system was experimented and found that a high degree of adaptability for different kinds of objects can be attained with a better performance than the previous system.

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The public is welcome to attend.