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A study of a fingertip imitating robot manipulator

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Hand gesture controlled robot manipulator for medical applications is a novel methodology of developing a medical robot. This project evaluated the effectiveness of master designs in bilateral systems for an epidemic environment and then identified the hand gesture vision attentive to be more effective. Therefore a system was designed to track and extract the position, orientation and the velocity of a fingertip using LMC (Leap Motion Controller) and then imitate in a 3DOF (Degree of Freedom) robot. The mathematical model was developed for tracked fingertip position, robots kinematics (forward kinematics, inverse kinematics and joint space velocities), robot dynamics (joint torques by considering zero friction) and trajectory generation (considering 5th order trajectory polynomial). The mathematical model was verified and analyzed using Mathematica 10 for all three joints for a particular case by plotting graphs of angle vs time, velocity vs time and acceleration vs time

Keywords: Medical robots, hand gesture controlling, leap motion controller, augmented reality, interactive programming