In the present study, the control of a bilateral teleoperation system using a fuzzy logic system which operates based on the sliding mode control theory has been considered. Because of intrinsic time delay and uncertainties of this system we choose sliding mode control theory as a robust controller to avoid mentioned side effects. Furthermore, the utilization of some fuzzy rules on the sliding manifold helps to overcome chattering problems which may appear in sliding mode control signals. The rule base controller is derived which results in an admissible outcome in the tracking of master by slave, precisely. The proposed approach is simulated on one of the most commonly used types of robots in industry namely SCARA. Moreover, in the free and contact motion, the stability and transparency of bilateral teleoperation system which is of a great significance is guaranteed in the presence of time delay, parameter uncertainties and system disturbances with a high synchronization performance.