ABSTRACT

The power window control is the mechanism to control the movement of the power window in vehicles automatically in upward, downward direction and control its motion using position, current and flexi force sensors along with multiple digital switches as the replacement of conventional or manual controlled hand based crank system. The research work focuses on the model-based development and testing of miniaturized scale controller for automotive smart power window, hardware in loop testing using dSPACE simulator. The controller is interfaced with physical power window setup to demonstrate, plant model which works ongoing recreation on ACE 1104 moderate size test system and estimate the hardware utilization on dSPACE controller kit.The experimental work is carried out for the same to provide the desired precision due to the testing limitation in real time vehicle. The Hardware in loop testing (HIL) set up is utilized to analyze the different manual and sensory input functionalities in Indian drive cycles. The DC motor is interfaced to the controller as the main building block of the power window system. For the effective development of anti-pinch detection algorithm, requires current and flexi force sensory data which helps to build an improved version of automotive smart power window system which will reduce the risk of safety. The fault identification algorithm requires pinch torque and valid obstacle during its operation in the design of anti-pinch detection algorithm. The motor movement is based on the decision tree algorithm and control actions are performed based on decision tree classifier. The system behavior is presented in based on the algorithm and testing environment to support the window function and its movements in upward and downward direction.