



NEURAL NETWORK BASED MULTISENSOR FUSION IN A NOVEL PERMANENT MAGNET MULTI-DOF ACTUATOR ORIENTATION DETECTION SYSTEM

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Abstract- The methods of multi-DOF actuator orientation detection based on machine vision and magnetic field sensor and neural network based multisensor fusion are presented in this paper. Special grid pattern is printed on the surface of rotor according to the pseudo-random encoder for the camera capturing the image of the rotor. The magnetic field sensors are adopted and properly placed circling the shaft of rotor for detection the orientation information. By analyzing the image of the rotor, the coordinates of characteristic points in the coordinate system fixed on the rotor are derived. Combined with the magnetic sensor scheme to reduce the measurement error and enhance the fault tolerant ability, a multisensor data fusion scheme using BP neural network is developed and validated by experiment. The results show that multisensor data fusion based on NN is superior to single measurement method with more accuracy and high reliability, which is more effective and practical for applications.

Index terms: Permanent magnet, multi-DOF, orientation detection, machine vision, magnetic sensor.