



DATA FUSION ALGORITHM OF FAULT DIAGNOSIS CONSIDERING SENSOR MEASUREMENT UNCERTAINTY

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Abstract- This paper presents data fusion algorithm of fault diagnosis considering sensor measurement uncertainty. Random-fuzzy variables (RFV) are used to model testing patterns (TPs) and fault template patterns (FTP) respectively according to on-line sensor monitoring data and typical historical sensor data reflecting every fault mode. A similarity measure is given to calculate matching degree between a TP and each FTP in fault database such that Basic Probability Assignment (BPA) can be obtained by normalizing matching degree. Several BPAs provided by many sensor sources are fused by Dempster's rule of combination. A diagnosis decision-making can be done according to the fusion results. Finally, the diagnosis examples of machine rotor system with vibration sensors show that the proposed method can enhance accuracy and reliability of data fusion-based diagnosis system.

Index terms: sensor data fusion, fault diagnosis, random-fuzzy variable, similarity measure, Dempster-Shafer evidence theory.