عنوان مقاله:

An integrated fuzzy-Image Processing approach based Infrared Thermography for Failure Detection and Classification of the steam Traps

محل انتشار:

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خلاصه مقاله:

Temperature is one of the most common indicators for the structural health of equipment and components. Nowadays, infrared thermography (IRT) is widely used as a condition- monitoring tool using measurement of the temperature in real time in a non -invasive and non-contact manner to reducing system down time, catastrophic breakdown, and maintenance cost. In this paper, IRT is used for inspection of Steam traps in steam transporting processes using image processing technique and classification of failure intensity in an intelligent model. In the intelligent model, an infrared camera is initially used to capture the thermal image, which is imported as input. The failure detection is performed in two stages. In the first stage, the image processing provides the relative frequencies and their calculated Mode ratio to have the suitable input for the fuzzy model as second stage. The results from first stage are imported to the fuzzy model to classify the steam trap failures. The fuzzy inference system (FIS) based Sugeno approach is designed with a simple structure and lowest rule numbers. The proposed model is simulated by Matlab Software for healthy and faulty steam traps. In order to show the superiority the performance of the proposed intelligent model is also compared with the infrared thermography camera software (ULIRvision Model TI160). The results show that the proposed model is able to condition monitoring of the Steam traps using IRT without temperature measuring, unlike the infrared thermography camera. In addition, the proposed model is able to classify of failure intensity for the Steam traps, unlike the infrared thermography camera software, which must be evaluated by the relative expert.

کلمات کلیدی:

Temperature, Condition Monitoring, Infrared thermography, Steam trap, Image processing, Fuzzy inference system