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**Design and Development of a Surface Defect Detection System for Plate Heat**

**Exchanger Gaskets**

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**ABSTRACT**

Quality control is a crucial factor in the Plate Heat Exchanger (PHE) gasket manufacturing industry to sustain a competitive edge in the global market. The detection of gasket defects during the manufacturing process is essential to prevent costly material wastage, reduce rework, and improve productivity. However, traditional inspection methods are often time-consuming, prone to human errors, and may depend on the eyesight of labor. Therefore, there is a need to develop an efficient and accurate defect detection system to improve the quality of PHE gaskets. Image stacking technique was used to combine all the images from each point of the gasket to show output result image The proposed PHE gasket defect detection system was validated with 20 trials of which 10 trails for defect gaskets and another 10 trials for non-defect gaskets. Confusion matrix was used to calculate various performance metrics such as accuracy, precision, recall, and F1 score. The accuracy is 75%. The precision of the model is 77.78%. The recall of the model is 70%. The F1 score is 73.68%.

**Keywords**: Gaskets, Image Processing, Machine Learning, Motor Controlling

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