AUTOMATED CAST QUALITY INSPECTION USING DEEP LEARNING

KARTHIK J[1], SK. SABEER AHMED[2], MEGHANA K [3] & SATHEESH KUMAR REDDY P[4]

[1,2,3] Student, Department of Mechanical Engineering, V. R. Siddhartha Engineering College, Andhra Pradesh, India

[4] Sr. Assistant Professor, Department of Mechanical Engineering, V. R. Siddhartha Engineering College, Andhra Pradesh, India

ABSTRACT

Casting is a manufacturing process that produces the desired final product. These casting components are required to have high dimensional and geometrical accuracies. Thus, there is a need to inspect and detect the defects in the cast product. The quality inspection methods have been developing in various ways, and one of them is through Image Processing, Computer Vision and Deep Learning. As this is a repetitive task, human intervention can be eliminated and make our purpose automated. In this project, we collected the data of the cast component (Pump impellor) and did imagery analysis. Detection is primarily a binary classification problem where the Convolutional Neural Network model predicts whether the cast component is defective or not. If the cast component is a defected one, then the Multi-classifier CNN model predicts the type of defect that the cast component possesses. A specialized arm mechanism separates the defective cast component from the production line. The data relating to each component gets entered into the logbook automatically. The production house gets alerted based on the data in the logbook. Implementation of this technology will significantly improve productivity and reduce the human force for visual inspection.

KEYWORDS: Cast Quality, Image Processing, Computer Vision, Deep Learning, Convolutional Neural Network (CNN), Binary Classification, Multi-Classification & Inspection

Original Article