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George Giakos *Editors*

# Machine Vision and Augmented Intelligence— Theory and Applications

Select Proceedings of MAI 2021

Manish Kumar Bajpai · Koushendra Kumar Singh ·  
George Giakos  
Editors

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 Springer

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# Histogram-Based Image Enhancement and Analysis for Steel Surface and Defects Images



Ranjeet Kumar, Anil Kumar Soni, Aradhana Soni, and Saurav Gupta

## 1 Introduction

Product quality, it indicates the strength of the product that serves to the customer/consumer in all the field. In industrial production like steel plates and rods that essential for the infrastructure strength; here, quality assurance is a key aspect for the steel sheets or rods. To ensure quality and strength, different methods or systems are followed by industries like visual inspection [1, 2] and non-destructive testing [3–6], etc. Nowadays, visual inspection of surface and defect are in practice for steel sheets and rods due to its effectiveness and cost-effective process [7]. However, the quality of video or images also plays a key role in visual inspection. During the visual inspection, exposure of light or surrounding luminance can affect image quality. therefore, a robust image or video processing tools/image enhancement technique is needed to retain the image quality [7, 8].

In the production of steel at a larger scale, the rolling affects the surface microstructure of the steel sheets or rods [8, 9], which in turn impacts the mechanical properties in terms of quality and strength. Visual inspection methods or technology based on image processing has been widely used in various fields, such as electronics

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