iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 9 **Issue:** VI **Month of publication:** June 2021

DOI: https://doi.org/10.22214/ijraset.2021.35407

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 9 Issue VI Jun 2021- Available at www.ijraset.com

Steel Quality Prediction using Machine Learning

Bhavesh Chaudhari[1], Bhushan Patil[2], Mayur Ingale[3], Ratnesh Sarode[4], Dr Prakash Kadam[5]
[1, 2, 3, 4, 5]*Mechanical Engineering, JSCOE, Pune*

Abstract: ***These days, just like other industries mechanical industries are also shifting towards the automation by using various techniques like machine learning, nano technology, 3D printing, etc. From 19th century steel has been widely used for construction purposes especially TMT rod(thermo mechanically treated rod).In steel industries conventional methods have been widely used for predicting the quality of steel.These conventional methods are not so accurate as well as some times they are unable to identify the errors along with this they consume a large amount of time. we have proposed a machine learning technique by which microstructures of steel are compared from any dataset of images, in order to find the differences and from the obtained differences ,the component which have less amount of defects can be obtained.***

I. INTRODUCTION

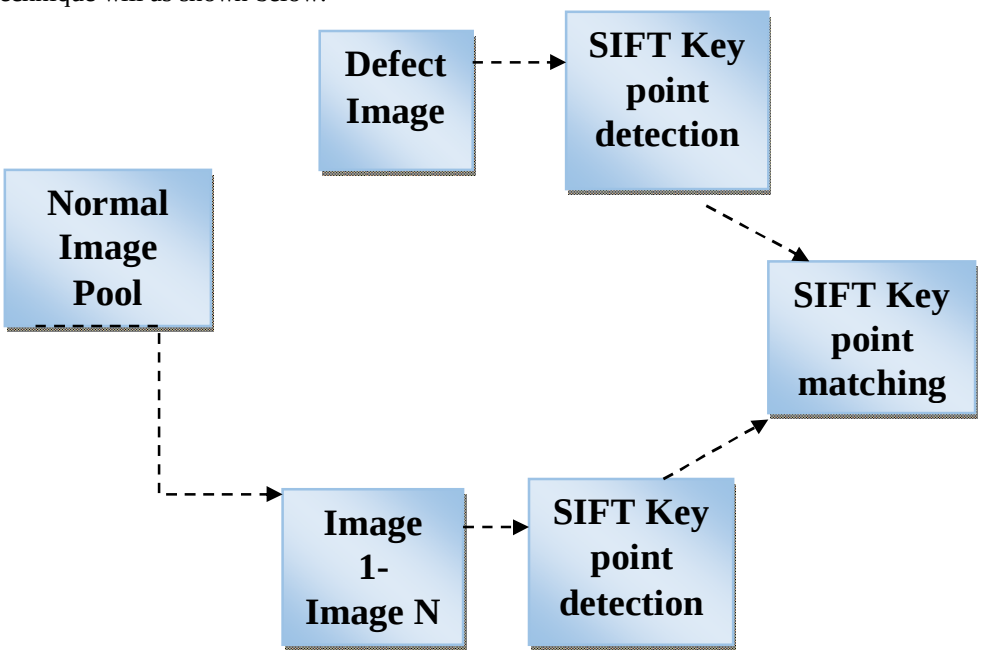
The aim of the project is to help Quality Testing Department for testing the quality of steel by just using the Machine Learning technique and image dataset of steel microstructures to pretend which of the component is most suitable for construction purpose. We have selected component as TMT rod which is backbone for all type of constructions.TMT rod is an alloy of carbon(C),sulphur(S),phosphorus(Ph)and main constituent is iron (Fe).We have selected grade of iron as Fe500.We have used SIFT (scale invariant feature transform) Technique. It a 2D coordinate Machine Learning technique which analyse the differences between two images by comparing them with each other. Out of these two images one image is the image of perfect component and another image is of component having defects, these two images are compared with each other to find differences. More differences indicated more defects so the image which will show less number of differences can be selected as optimum and the component can be selected for the desired use.

II. PROPOSED SYSTEM

To implement the SIFT algorithm following are the requirements:

1] Data set of images
2] In data set there must be one image of perfect component(as we have to compare other images with respect to it.)
3] Computer system with IDE tool. (Integrated development environment)

We have used Visual Studio Code as IDE to compare images.
The algorithm of the proposed technique will as shown below:



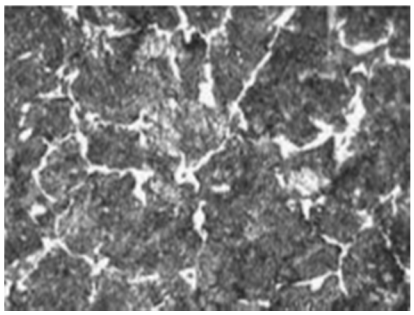
©IJRASET: All Rights are Reserved

III. IMPLEMENTATION OF TECHNIQUE

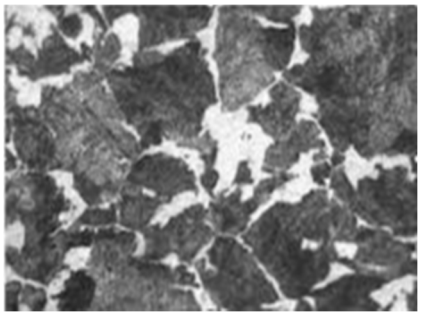
We have selected a data set of 4 images out of which Img no. 1 is the microstructure image of perfect steel component(TMT rod) while we have to compare remaining images with respect to Img no. 1 in order to find the results. Other 3 images have minor defects so it will be analysed.

The data set selected by us is

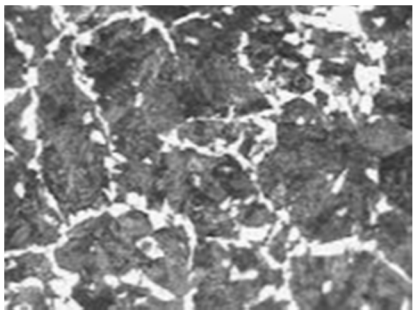
Img 1 :



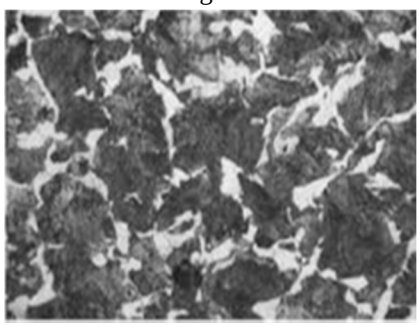
Img 2 :



Img 3 :



Img 4 :

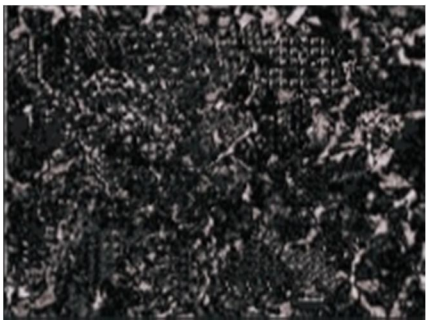


©IJRASET: All Rights are Reserved

IV. RESULT AND DISCUSSIONS

After comparing this images with respect to Img no. 1 we got the differences as below:

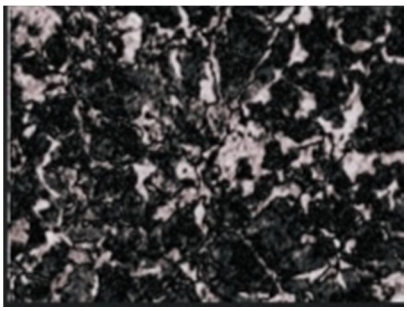
Diff between Img 1 & Img 2 :



Diff between Img 1 & Img 3 :



Diff between Img 1 & Img 4 :



Our Proposed System Works as: It eliminates all the similarities during comparing and it only shows the differences between microstructures. The white spots indicates the differences while the blackness indicates the similarities which are omitted. "**So we can see that the difference between Img 1 & Img 3 are less.So Img 3 can be used as an alternative to Img 1 as it is the only perfect image of microstructure amongst the dataset."**

V. CONCLUSIONS

In the proposed system, we have implemented the SIFT technique that would help Steel Quality Testing department in order to select the right component for desired use.This method will save a lot of time as well as it will reduce workload of human.

©IJRASET: All Rights are Reserved

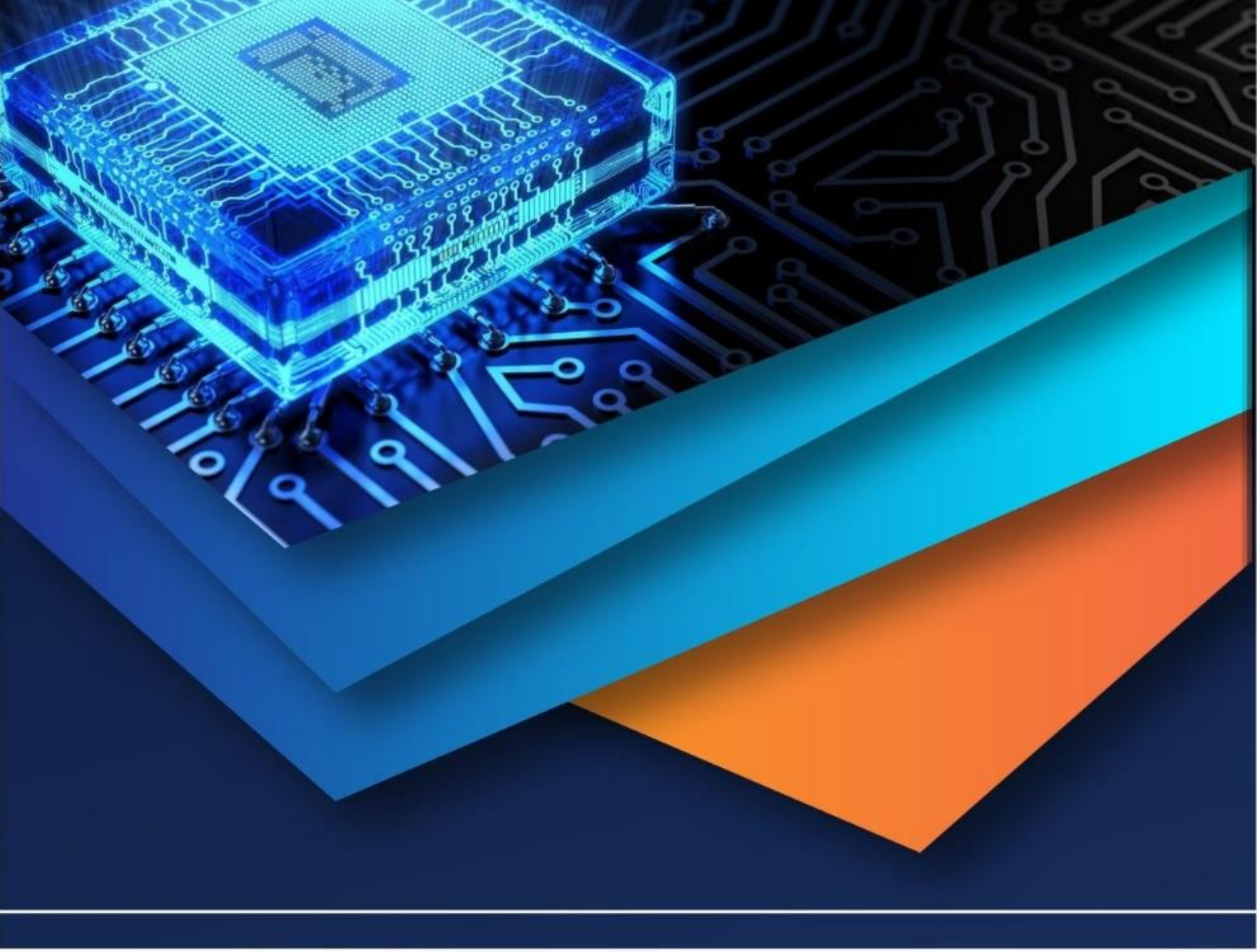
VI. ACKNOWLEDGEMENTS

This research work is the cumulative result of efforts put in by each team member. we would like to thank our guide, Dr Prakash Kadam (Associate Professor, Mechanical Engineering at Jayawantrao Sawant College Of Engineering Pune) for guiding us throughout the project and helping us throughout the research work.

REFERENCES

[1] Shun Gao, Jinxin Yu, Xingjun Liu, Cuiping Wang :Computational Material Science:- A Predicting model for inspecting properties of steel using industrial big data using machine learning: 160 (2019) 95-104
[2] Sriram Vaikundam, Tzu-Yi Hung, Liang Ten Chia: "Anomaly region detection and localization in metal surface inspection", Nanyang Technological University Lab, Singapore, ICIP 2016.
[3] David G. Lowe, "A detailed guide to powerful SIFT technique for image matching.", University of British Columbia, Vancouver B.C., Canada
[4] B. Suvdha, J. Ahn, J. Ko: Steel surface defects detection and classification using SIFT, International Journal of Software Engg. , Vol. 6 No. 2, 2012.
[5] Rapidminer Co., "Product Quality Prediction and Optimization in Steel Manufacturing." https://1xltkxylmzx3z8gd647akcdvov-wpengine.netdna-ssl.com/wp-content/uploads/2018/11/steel-manufacturing-optimization.pdf

©IJRASET: All Rights are Reserved



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)