Accepted Manuscript

End-to-end recognition of slab identification numbers using a deep convolutional neural network

Sang Jun Lee, Jong Pil Yun, Gyogwon Koo, Sang Woo Kim

 PII:
 S0950-7051(17)30291-5

 DOI:
 10.1016/j.knosys.2017.06.017

 Reference:
 KNOSYS 3945

To appear in: Knowledge-Based Systems

Received date:10 February 2017Revised date:7 June 2017Accepted date:9 June 2017

Please cite this article as: Sang Jun Lee, Jong Pil Yun, Gyogwon Koo, Sang Woo Kim, End-to-end recognition of slab identification numbers using a deep convolutional neural network, *Knowledge-Based Systems* (2017), doi: 10.1016/j.knosys.2017.06.017

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



End-to-end recognition of slab identification numbers using a deep convolutional neural network

Sang Jun Lee^a, Jong Pil Yun^b, Gyogwon Koo^a, Sang Woo Kim^{a,*}

^aDepartment of Electrical Engineering, POSTECH, Pohang, 37673, Korea ^bKorea Institute of Industrial Technology (KITECH), Daegu, Korea

Abstract

This paper proposes a novel algorithm for the end-to-end recognition of slab identification numbers (SINs). In the steel industry, automatic recognition of an individual product information is important for production management. The recognition of SINs in actual factory scenes is a challenging problem due to the complicated background and low-quality characters in SINs. Conventional rule-based algorithms were developed to extract information of SINs, but these methods require engineering knowledge and tedious work for parameter tuning. The proposed algorithm employs a data-driven method to overcome these limitations and to handle the challenges for the recognition of SINs. This paper proposes accumulated response map and model-based score function to effectively use the outputs of a deep convolutional neural network. Experiments were thoroughly conducted for industrial data collected from an actual steelworks to verify the effectiveness of the proposed algorithm. Experiment results demonstrate that the simultaneous recognition of entire characters in a SIN by optimizing the model-based score function is more effective for the robust performance compared to the separated recognition of individual characters.

Keywords: industrial application, steel industry, slab identification number, deep convolutional neural network, text recognition

1. Introduction

The steel industry is one of the fundamental industries in the world. Nowadays, most steelworks equip an integrated production line that contains a furnace, continuous casting process, and rolling mills. The smelting and refining processes are conducted in the furnace to produce

Preprint submitted to Journal of PATEX Templates

^{*}Corresponding author

Email addresses: lsj4u0208@postech.ac.kr (Sang Jun Lee), rebirth@kitech.re.kr (Jong Pil Yun), ggkoo99@postech.ac.kr (Gyogwon Koo), swkim@postech.ac.kr (Sang Woo Kim)

Download English Version:

https://daneshyari.com/en/article/4946119

Download Persian Version:

https://daneshyari.com/article/4946119

Daneshyari.com