MULTI-SCALE DEFECT DETECTION NETWORK FOR TIRE X-RAY IMAGES

Ren Wang[1,2]*, Qiang Guo*[1,2]*, Shanmei Lu*[1,2]*, Caiming Zhang*[3]

[1]School of Computer Science and Technology,
Shandong University of Finance and Economics, Jinan, China
[2]Shandong Provincial Key Laboratory of Digital Media Technology, Jinan, China
[3]Software College, Shandong University, Jinan, China

ABSTRACT

Though automatic detection method has been tremendous improved, with the gradual penetration of deep learning. Defect detection in many industrial processes is one of the remaining challenging tasks due to the diversity of its products. In this work, we focus on detection tasks in tire industry and develop a *Multi-scale Defect Detection Network (MDDN)*, which contains two parallel sub-networks to capture multi-scale defect features. Specifically, high-abstracted semantic features containing defect shapes and locations are mined via a *Semantic-aware sub-network*, simplified by an off-the-shelf fully convolutional network. Furthermore, to complement the details filtered by the deep network, a novel *Texture-aware Sub-network* is used to exploit the small size of the cover edge features and small defects as much as possible. Finally, the pixel-wised detection results are obtained by fusing features with semantic and texture information. Extensive experiments demonstrate that *MDDN* can produce comparable results and achieve significantly performance improvement in small defects detection.

***Index Terms*—** Defect detection, Fully convolutional network, Semantic segmentation, Multi-scale context

1. INTRODUCTION

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3. EXPERIMENTS

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4. CONCLUSION

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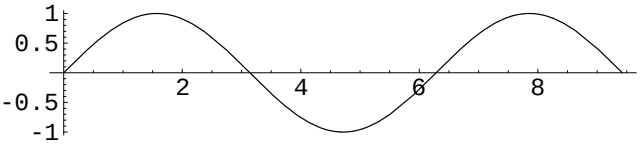
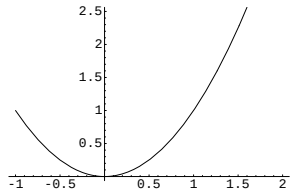
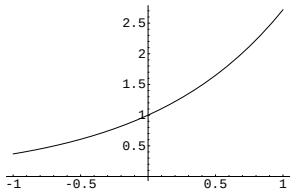


(a) Result 1



(b) Results 3



(c) Result 4

Fig. 1. Example of placing a figure with experimental results.

5. REFERENCES

[1] A.B. Smith, C.D. Jones, and E.F. Roberts, "Article title," *Journal*, vol. 62, pp. 291–294, January 1920.

[2] C.D. Jones, A.B. Smith, and E.F. Roberts, "Article title," in *Proceedings Title*. IEEE, 2003, vol. II, pp. 803–806.