Calibration and Testing of Channel-Type Positive Pressure Leaks in Leak Testing

Wujin Huang, Bo Wang| CorrespondinCheng LI[Corresponding Author, Cheng LI, CGN Inspection Technology Co.,Ltd. ,Suzhou 215021, China; Email: 794875396@qq.com], Zhonghua LIU，Haimin SU

School of Artificial Intelligence and Smart Manufacturing, Hechi University, Yizhou 546300, China ;

Introduction

Planting mulberry and raising silkworm has a profound historical background in China, and has always been a traditional strength in the field of agriculture in China.

Research objectives

1. ■ The basic composition of deep learning target detection model

2. ■ Data sets and experimental configuration

3. Silk cocoon, Image processing, YOLOv5 model, Real-time fabric defect

Methods

The training process related index curves of YOLOv5s model and YOLOv5m model on the self-made cocoon defect data set in this paper are shown in Fig.1 and Fig.2.
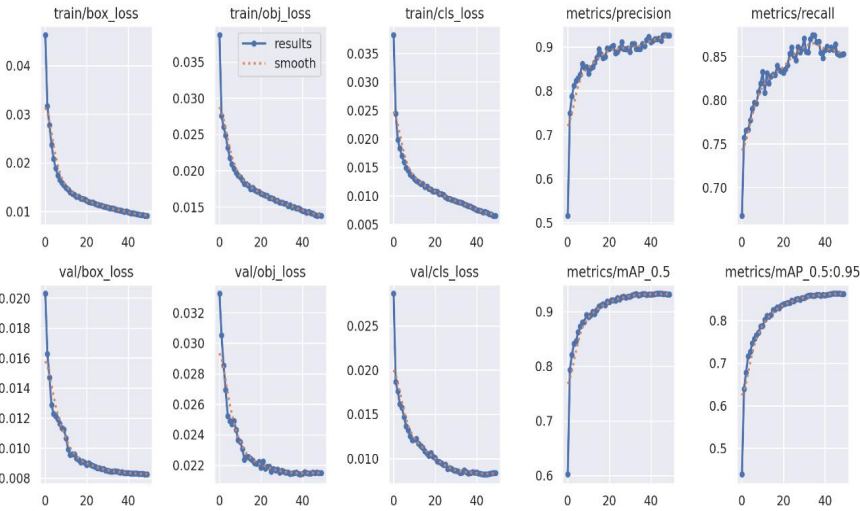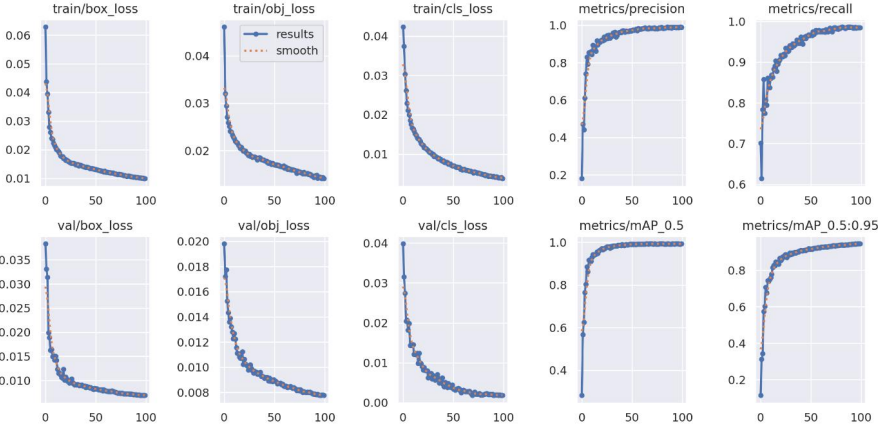

Figure 1. YOLOv5s model loss function curve

Figure 2. YOLOv5m model loss function curve

Conclusions

At present, cocoon defect detection mainly depends on manual sorting, and the experience and subjective judgment of workers will affect the classification results. Different workers may have different classification standards, resulting in inconsistency and inaccuracy of classification results. In this paper, thin cocoon, double cocoon, yellow spot cocoon and on-car cocoon are taken as the research objects, and YOLOv5 m model and YOLOv5 s model are selected as the basic models to carry out comparative experimental research. A deep learning model suitable for cocoon defect detection is built to meet the needs of defect detection tasks in cocoon processing.

References

[1]   Mo Liujing, Liu Xuebin, Mo Lujian, etc..The problems and strategies faced by the integrated development of agriculture and tourism under the background of rural revitalization ——Taking Guangxi sericulture industry as an example[J].guangxi sericulture,2023,60(04):52-56.
[2]   Li Shijie, Sun Weihong, Liang Man, et al. Cocoon species identification based on CD-YOLO algorithm[J].Journal of China Jiliang University,2021,32(03):398-405.
[3]   Zheng Zuofu. Research on online identification and defect separation system of silkworm cocoon based on machine vision [D].Guangxi University of Science and Technology, 2023.
[4]   Prasobhkumar P.P, Francis C.R, Gorthi S.S. Automated quality assessment of cocoons using a smart camera based system[J]. Engineering in Agriculture, Environment and Food, 2018, 11(04): 202-210.
[5]   Raj J N A ,Sundaram R ,Mahesh G V , et al.A Multi-Sensor System for Silkworm Cocoon Gender Classification via Image Processing and Support Vector Machine[J].Sensors,2019,19(12):2656- 2656.
[6]   [22]Li S, Sun W, Liang M, et al. Research on the Identification Method of Silkworm Cocoon Species Based on Improved YOLOv3[C]//2020 5th International Conference on Mechanical, Control and Computer Engineering (ICMCCE). IEEE, 2020: 1119-1123.
[7]   Tang Hao, Huang Weipeng, Li Zheyuan, etc. Negative expression recognition method based on improved convolutional neural network[J].Journal of Huazhong University of Science and Technology (Natural Science Edition),2015,43(S1):457-460.
[8]   Xie Chunhui, Wu Jinming, Xu Huaiyu. Improved YOLOv5 small target detection algorithm for UAV images[J].Computer Engineering and Applications,2023,59(09):198-206.
[9]   Zhang Haoyang, He Shirong, Meng Dongping. Identification and application of YOLOv5 improved algorithm in mechanical parts[Z].Software Engineering and Applications,2022,11(6):1446-1455.
[10] Zhu Lei, Wang Qianqian, Yao Lina, etc. Improved YOLOv5 fabric defect detection method[J/OL].Computer Engineering and Applications,1-12[2024-05-02].
[11] Tan Xiaoxuan. Research on wearing detection of protective equipment for employees in LCD panel cutting production line based on improved YOLOv5s[D].nanchang university,2023.
[12] Wu Fandi. Research on the influence of light environment on spatial environment perception[D].tianjin university,2019.