YOLO Network-Based for Detection of Rice Leaf Disease

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ABSTRACT

In recent times, rice production in the agricultural sector has become increasingly susceptible to crop failure due to various factors such as climate change, floods, droughts, pests, and plant illnesses. Sometimes, farmers may not be aware of the presence of diseases in rice leaves. This research paper introduces an enhanced YOLO (You Only Look Once) network to effectively classify rice leaf diseases, enabling farmers to address these issues by using suitable insecticides. The identification of rice leaf diseases is based on analyzing the presence of spots and discoloration on the leaves. The experiments conducted in this study focus on object identification and bounding box determination using the enhanced YOLO network by modifying anchors, examine depth multiple value, and learning rate values in Convolutional Neural Networks. The experiments utilize a public dataset of Indonesian rice leaves. The proposed scheme is also compared with Inception-ResNet-V2, SSD and Yolov5 to evaluate the accuracy performance. The results of the experiments demonstrate that the proposed method achieves a significantly higher accuracy rate of 94% compared to other approaches. Furthermore, the proposed scheme can classify rice leaf diseases in a time frame of 40 seconds.

REFERENCES

[1] N. E. Budiyanta, C. O. Sereati, and F. R. G. Manalu, "Processing time increasement of none-rice object detection based on YOLOv3-tiny using Movidius NCS 2 on Raspberry Pi," Bull. Electr. Eng. Informatics, vol. 11, no. 2, pp. 1056–1061, 2022.

[2] A. E. Asibi, Q. Chai, and J. A. Coulter, "Rice blast: A disease withimplications for global food security," Agronomy, vol. 9, no. 8, pp. 1–14, 2019.

[3] M. A. Azim, M. K. Islam, M. M. Rahman, and F. Jahan, "An effective feature extraction method for rice leaf disease classification," Telkomnika (Telecommunication Comput. Electron. Control., vol. 19, no. 2, pp. 463-470, 2021.

[4] M. E. Haque, A. Rahman, I. Junaeid, S.U. Hoque, and M. Paul, "Rice Leaf Disease Classification and Detection Using Yolov5," Sukkur IBA Journal of Computing and Mathematical Sciences, vol. 6, no. 1, pp. 49-61, 2022.