

Abstract

This work provides an insight into the possibility of using neural networks for yield estimation. A neural network model was designed, trained and tested on a large dataset of agricultural data features. The model showed very good results, since the accuracy in both the train and test sets was high. For this enhancement of the model, the further studies may include feature engineering, tuning of the hyperparameters and use of ensemble techniques. Also practical applicability of the model can be tested in order to determine what challenges the model can face in practice. This study forms an important basis for a follow up study of implementation strategies of the neural network in forecasting crop yield. By following the given suggestions, future research may offer more precise and reliable tools supporting sustainable agriculture and food security.

Conclusion

On the basis of the results, it can be concluded that the neural network model can be effective in assessing the potential for crop yield. Although the model was able to reach good accuracy on the training data set, one of the weaknesses of the model was overfitting, as shown by the poor performance on both the validation and test data sets. This indicates that the model is too dependent on the training data and therefore tends to perform poorly on new data. To solve this problem, the following steps might be undertaken in the subsequent studies, including some form of regularization like L1 / L2 to avoid coming up with further complex models assessing overfitting. Other options include increasing the number of training examples or high quality training data, and also utilization of hardware accelerators could improve the performance of the model better. Also investigation of hyperparameters and usage of ensemble methods might be done to improve performance of the model and accuracy in predictions. In conclusion, while the existing model is rather encouraging, further studies and modifications are required to produce a solid and dependable system for crop yield forecasting.