THE APPLICATION DEVELOPMENT "CANECHECKCHAT" TO DIAGNOSE SUGARCANE DISEASE AND ABNORMAL SYMPTOMS OF SUGARCANE PLANTS

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PROBLEM

Farmers aren't aware of the disease that occurs.

We'll use AI to solve the problems

We'll find the diseases

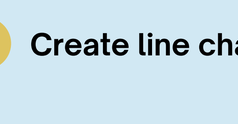
We'll collect information on sugarcane diseases

We'll create application

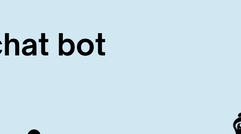
FRAMEWORK

Scope of Study

- Sugarcane diseases



Healthy



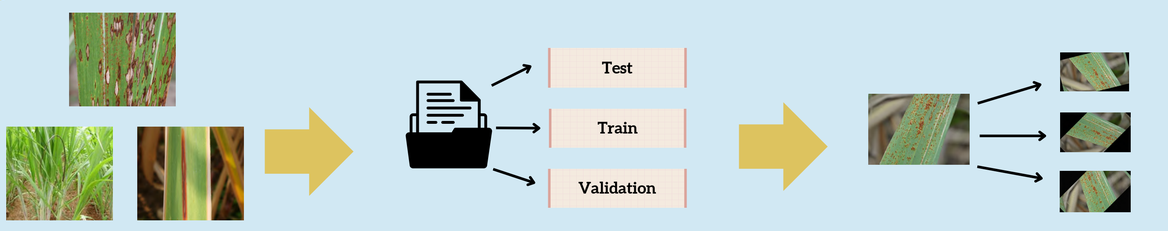
Red rot

Smut

Ring spot

Rust

1 Model training with convolutional nearual network



Collecting a dataset of sugarcane diseases

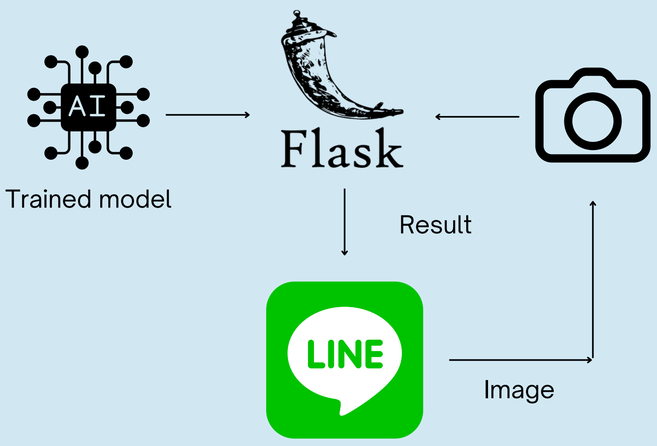
Spliting the dataset into train, test, and validation sets

Preparing and customizing the dataset

Training Model

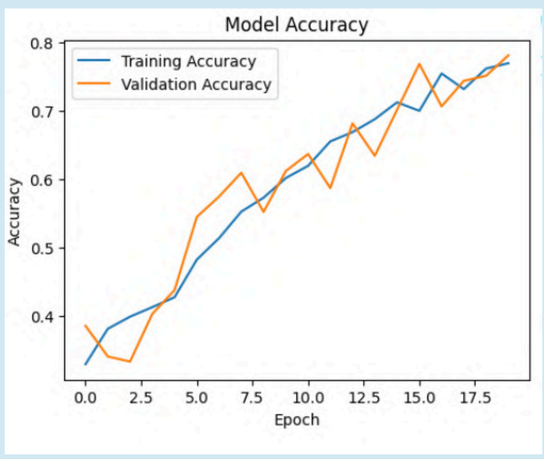
Testing and evaluating accuracy

2 Create line chat bot



FINDING

Graph 1 Shows the accuracy during training and testing of the model Convolutional neural network.

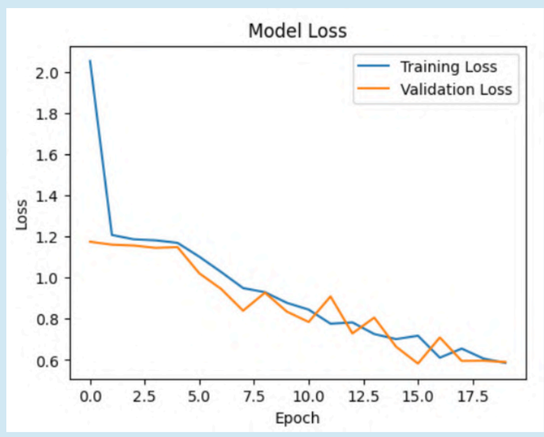


From the graph,

- it can be observed that the model's training accuracy increased steadily from 30% at the beginning and continued to rise, reaching over 75% by the end of the training.
- The validation accuracy also improved in line with the training process, and its value became close to the training accuracy towards the later epochs. This indicates that the model is capable of effectively generalizing to new data.

Therefore, it can be concluded that the model's accuracy improved continuously throughout the training process.

Graph 2 shows the loss of accuracy between training and testing for the Convolutional Neural Network model.



From the graph,

- it can be observed that the model's training loss starts at 100% (2.0) and decreases continuously throughout the training, reaching around 30% (0.6) towards the end. This indicates a reduction in the model's learning error.
- The model's validation loss starts at 60% (1.2) and also decreases steadily, similar to the training loss, reaching around 30% (0.6), although with some fluctuations at certain points. However, it still shows an overall downward trend.

Therefore, it can be concluded that the model has clearly improved, as the loss has decreased from a high of 100% to approximately 30%, reflecting a reduction in the prediction error of the model.

The table shows the evaluation results of the accuracy in diagnosing diseases or abnormalities in sugarcane plants.

	precision	recall	f1-score	support
healthy	0.86	0.83	0.84	81.0
redrot	0.69	0.57	0.62	88.0
ringspot	0.86	0.95	0.9	83.0
rust	0.65	0.79	0.71	81.0
smut	0.97	0.86	0.91	69.0
accuracy			0.79	402.0
macro avg	0.81	0.8	0.8	402.0
weighted avg	0.8	0.79	0.79	402.0

From the table showing the accuracy in diagnosing sugarcane diseases using the F1-score, it was found that the accuracy for diagnosing sugarcane with no disease is 0.84, for red rot disease is 0.62, for leaf spot disease is 0.90, for rust disease is 0.71, and for top shoot borer disease is 0.79

REFERENCE

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[2] Nattakit Pitak and colleagues. (2004). Sugarcane pests and their control. Sugarcane Technical Document, Department of Agriculture, Ministry of Agriculture and Cooperatives, Bangkok.

[3] Anocha Onkaeo, Wachira Sornpha1, Patcharin Songsri and Nakorn Jongrungklang. (2020) .Growth rate of sugarcanes under early season drought in Northeastern Thailand late rainy season growing system. Khon Kaen.

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CONCLUSION

The developed application has the ability to diagnose sugarcane diseases and abnormalities at different levels of accuracy. The diagnostic accuracy for each disease type is summarized as follows:

- Accuracy for diagnosing disease-free sugarcane is 84%.
- Accuracy for diagnosing top shoot borer disease is 91%.
- Accuracy for diagnosing red rot disease is 62%.
- Accuracy for diagnosing leaf spot disease is 90%.
- Accuracy for diagnosing rust disease is 71%.

The test results show that red rot and rust diseases have lower diagnostic accuracy compared to others. The main factor contributing to this is the insufficient dataset. A small dataset may prevent the model from fully learning the specific characteristics of these diseases, leading to lower prediction accuracy. Therefore, increasing the dataset for these diseases with lower accuracy will be an important step for improving the model in the future.