# CHAPTER 4: RESULTS AND ANALYSIS

## 4.1.0 Introduction

In this chapter the results that were obtained from the implementation of the system will be analyzed. The data will be shown in tabular form as well as graphs.

## 4.2.0 Model Summary

At first, we have summary of what the model does as well as the parameters --------- shown in the table below.

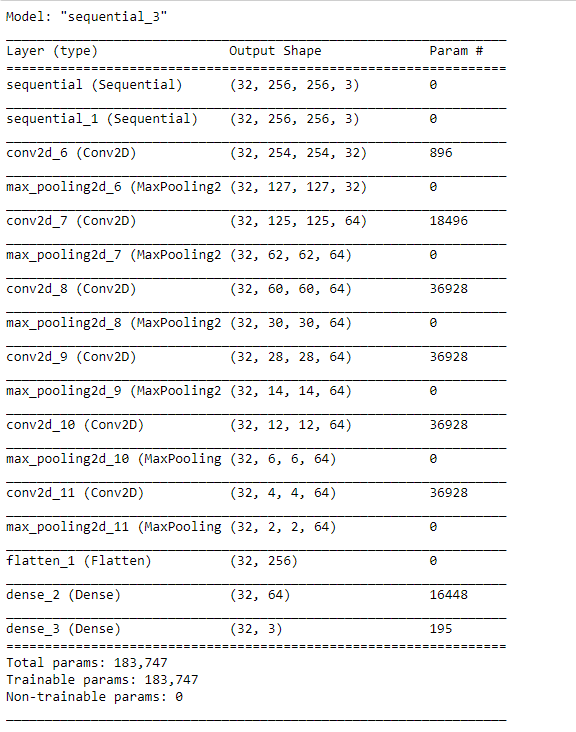


Figure 21

## 4.3.0 Model Training Results

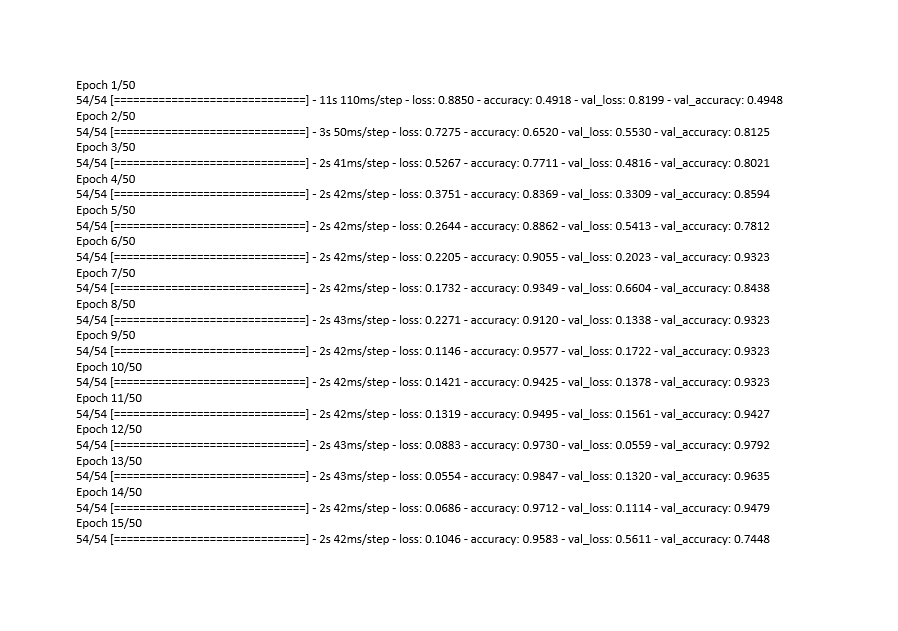


Figure 22

Table

Description automatically generated

Figure 23

Table

Description automatically generated

Figure 24

Text, letter

Description automatically generated

Figure 25

Figure 22, 23, 24 and 25 show the accuracy, loss as well as validation accuracy of the model that were obtained during training. During training the model iterated through the training dataset and accuracy improved significantly from 0.4918 to 0.9859 for the last image. The loss, however fluctuated but generally decreased from an initial value of 0.8850 to a lower final value of 0.0353. These trends are shown in graph form below on figure 26.

Chart, histogram

Description automatically generated

Figure 26

## 4.4.0 Model Test Results

After training, the model was then trained on the designated test dataset. The test dataset had to be unique to avoid testing the model on the exact images on which the model had been trained on. The model had an overall accuracy of 98% as shown in figure 27 below.

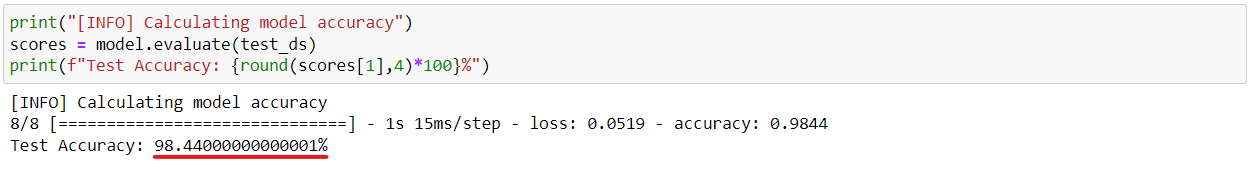


Figure 27

## 4.5.0 Summary

The Convolutional Neural Network based model performed well and was able to classify the tomato plant leaves with a high degree of accuracy (confidence).

# CHAPTER 5: CONCLUSION AND FUTURE RECOMMENDATIONS

## 5.1.0 Introduction

The plant leaf disease detector system was a success thereby integrating and implementing artificial intelligence in the farming sector. Based on the results obtained and the analysis carried out the disease detection system can be implemented on a small to medium sized plantation or farm.

## 5.2.0 Recommendations

* The system can be trained on a variety of other diseases.
* The model can also be tweaked or modified such that it can work on several different crops to increase its scope of applicability.
* Hardware components can also be coupled with the system so that images are automatically uploaded periodically and the model scans through the images.
* Both the hardware and the software can be modified to add components that help pin-point the exact location on which a diseased leaf has been detected.

## 5.3.0 Conclusion

The system's intended goals and objectives were accomplished, and the model performed exactly as predicted. We now know that this system can successfully be implemented at any small farmed land in a farming plot or plantation and that it will increase output yield that farmers can harvest as a result of its success in securing crops from diseases and assisting with the early detection of the various plant diseases.

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