



Application of Semantic Segmentation

Computer Science, Oxford Brookes University
Supervised by Dr Grace Ugochi Nneji

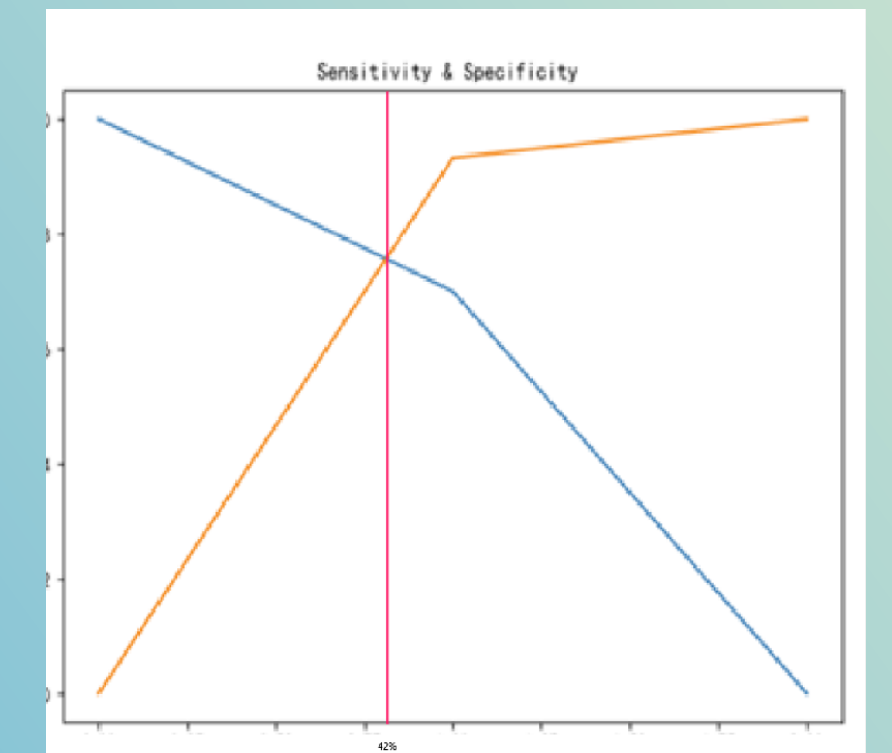
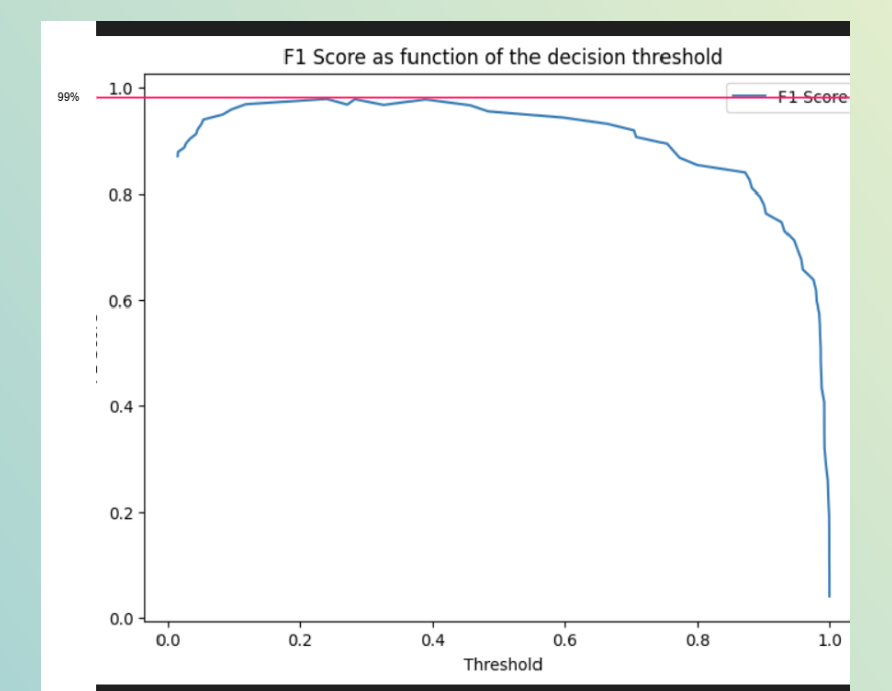
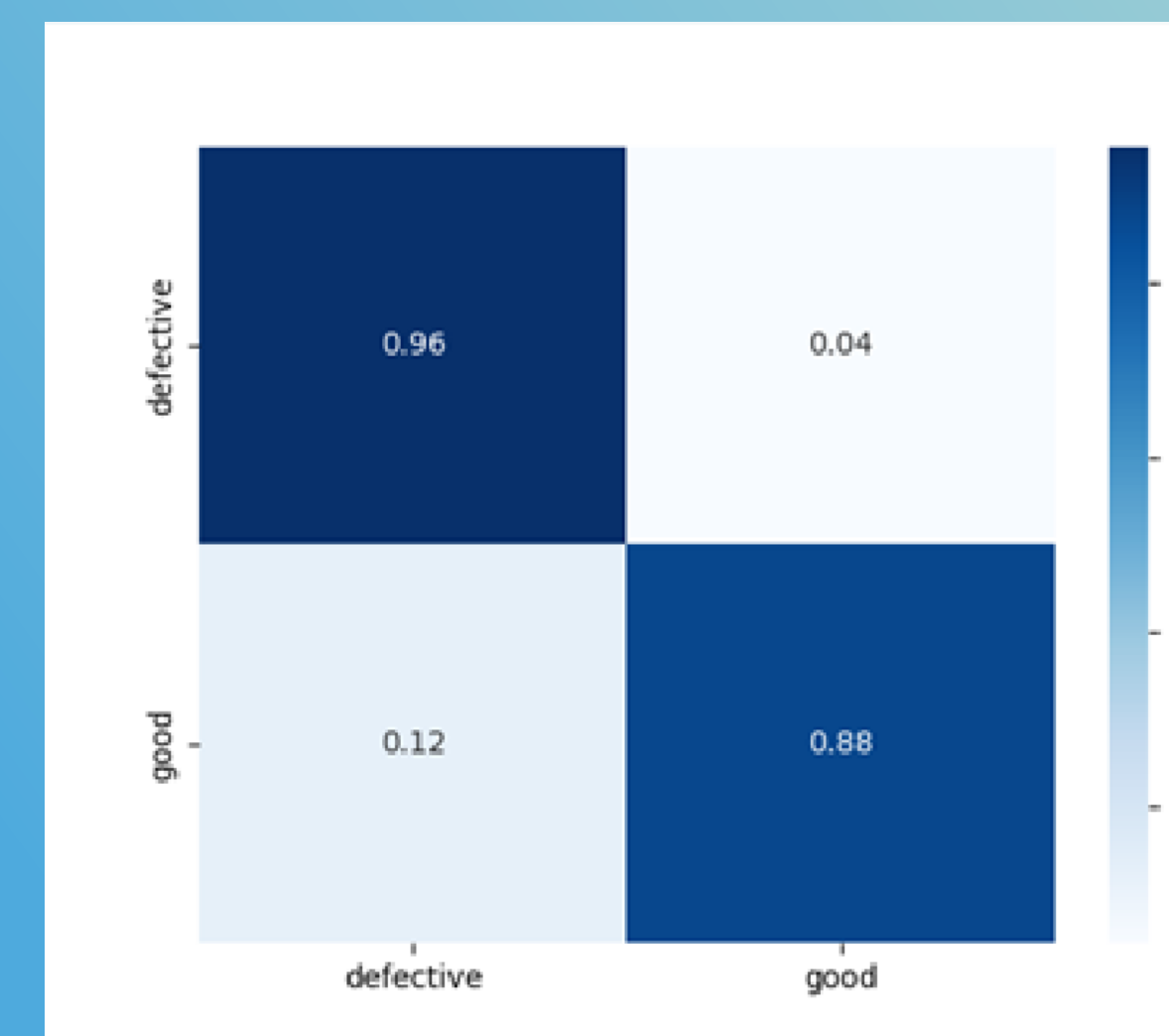
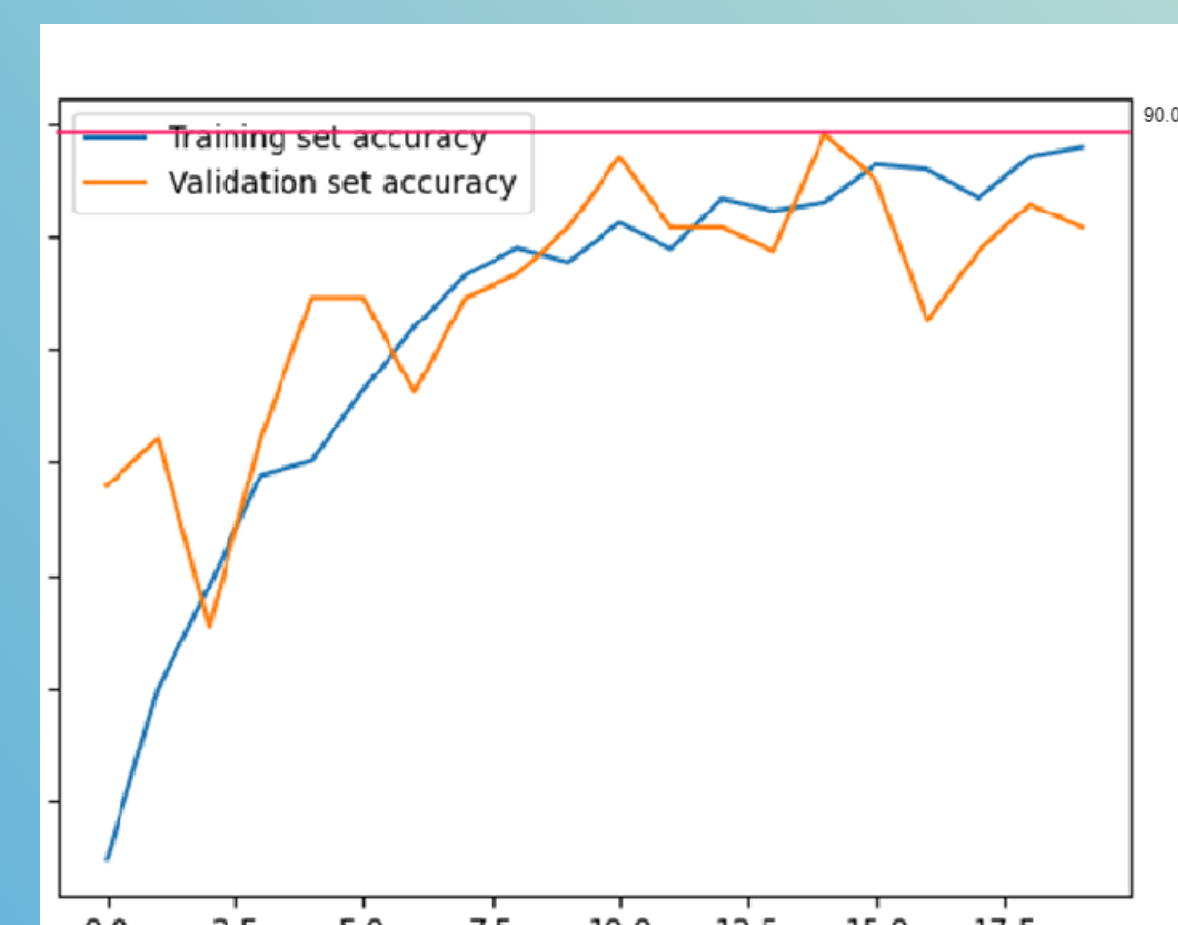
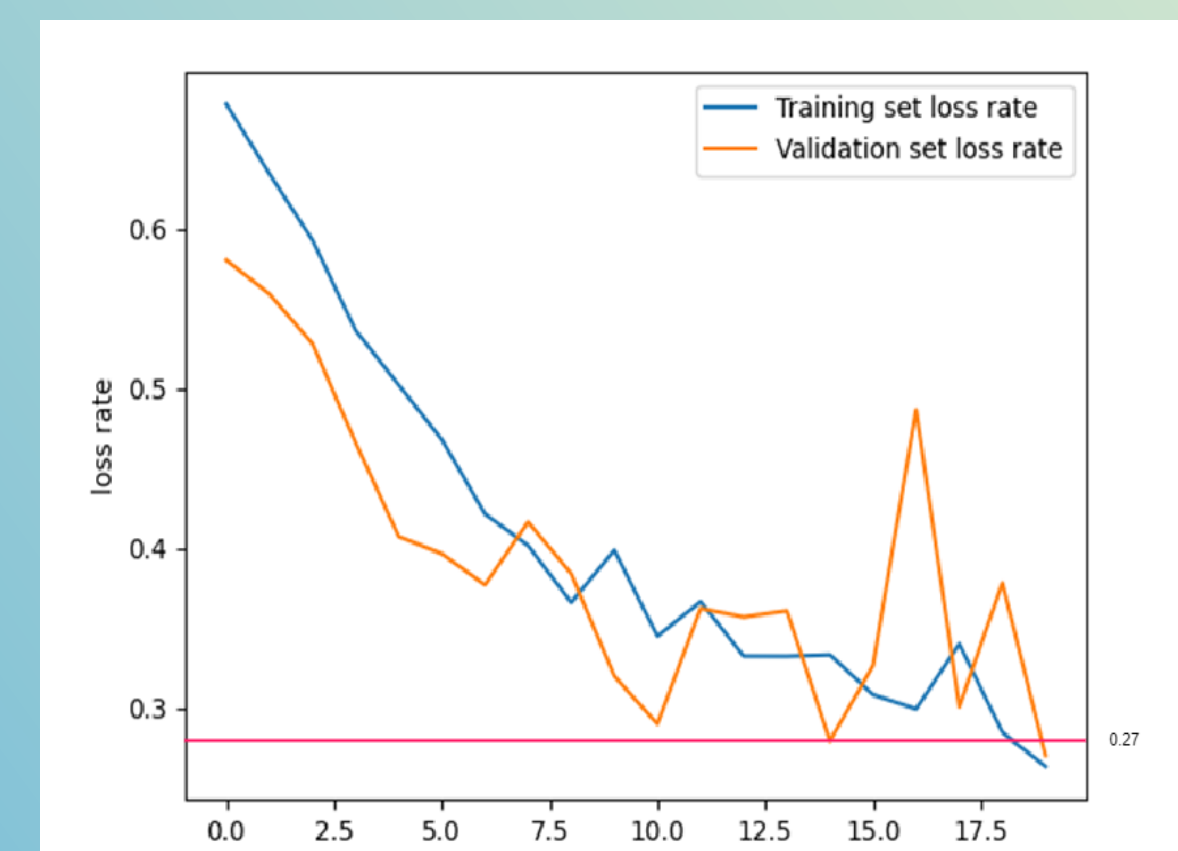
Introduction

This study aims to develop an automatic binary classification system for tyre quality to identify good tyres and negative tyres in a dataset containing various tyre images. In the PyTorch framework, this project designed network architectures adapted to tyre image features and evaluated them according to various performance metrics.

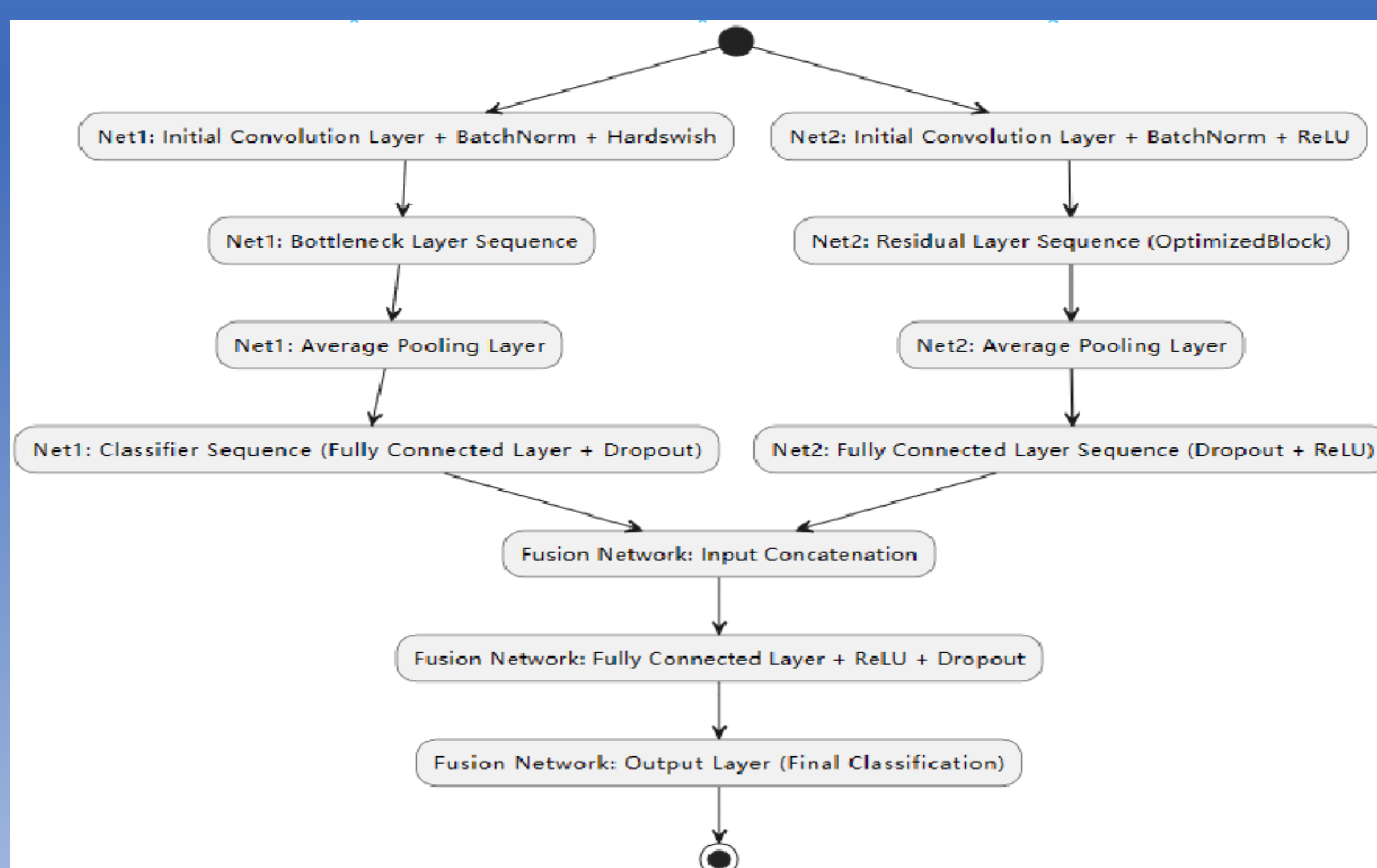
Aim

1. Realize the tire quality classification of the model.
2. Realize the innovation of the model: lightweight.
3. Make the evaluation metrics of the model reach high values.
4. Complete the GUI design to improve the usability of the project.

Result



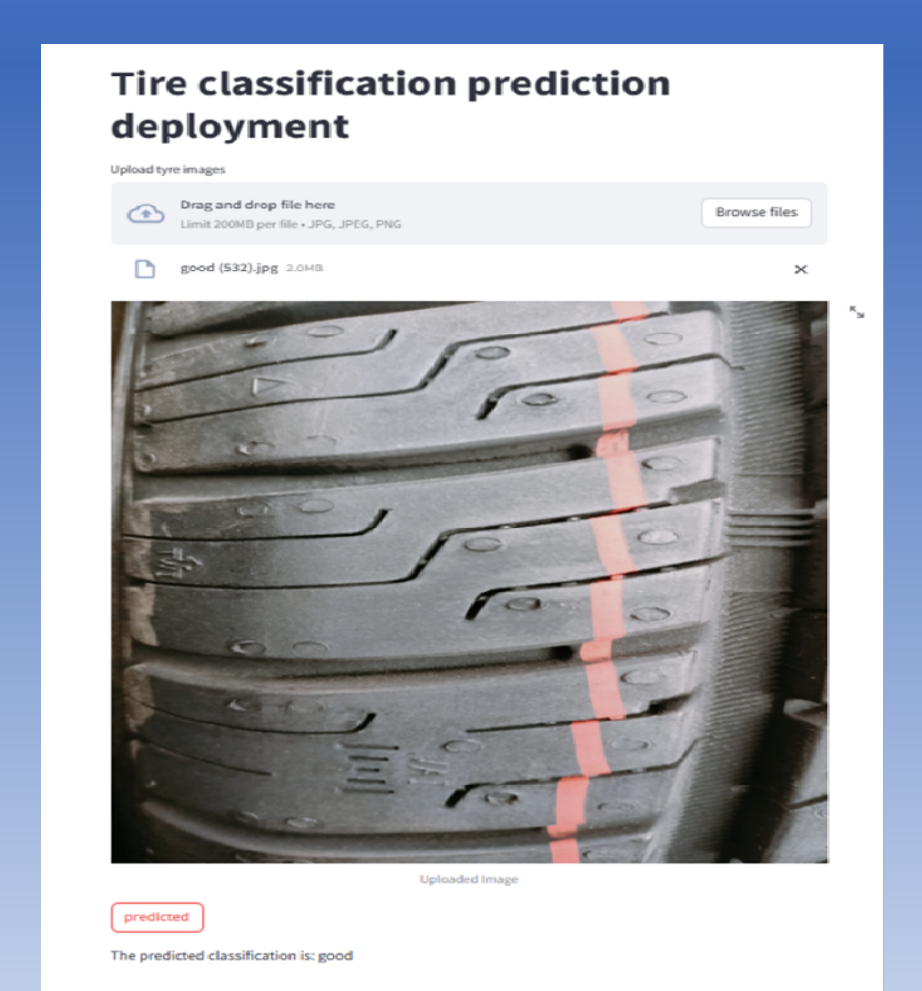
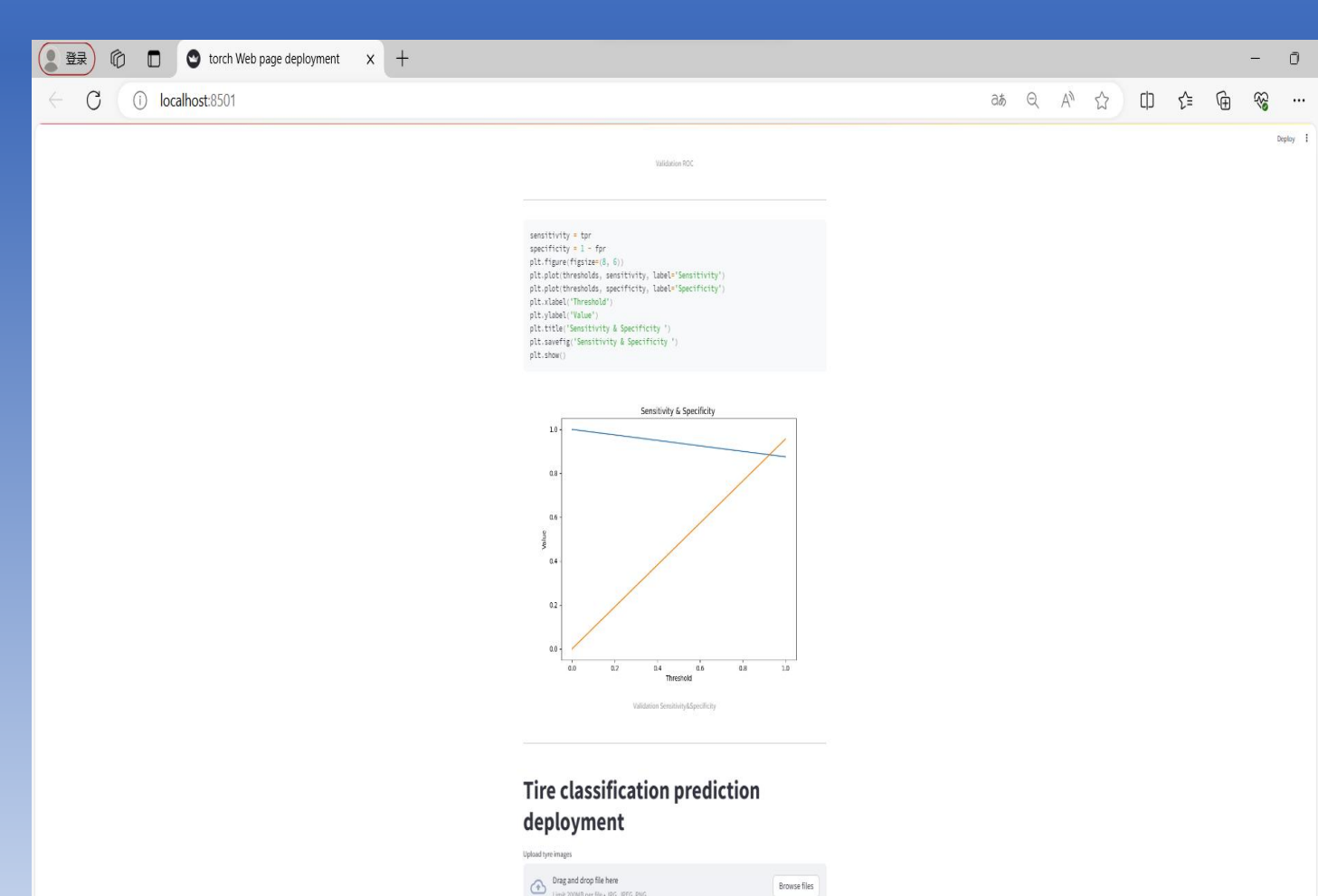
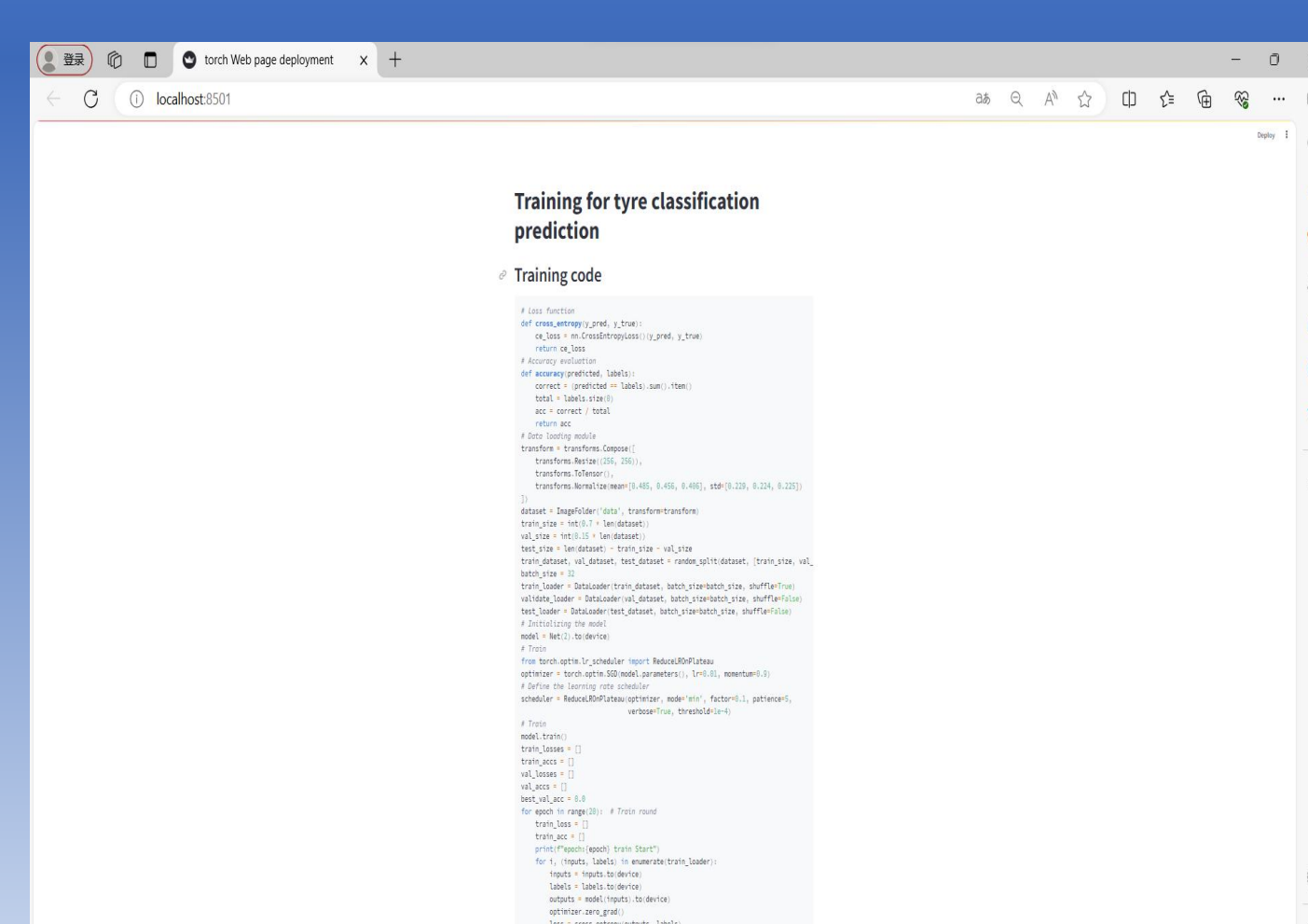
Integrating model



Model Architecture

1. Model structure based on MobileNetV3
2. Improved ResNet-based architecture
3. Model integration

Result GUI



Conclusion

This study proves that the tire quality classification system based on convolutional neural network (CNN) and attention mechanism can effectively distinguish good tires from defective tires. The experimental results show that compared with the traditional method, the key performance index of the proposed method is significantly improved, which provides a more reliable and efficient quality inspection solution for the tire manufacturing industry, and helps to improve product quality and safety.