Tyre Inspection and Analysis Using Deep Learning

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First Project Review, 2019

Outline

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Introduction

In this project, we create a mobile application which is able to predict the durability of tyre and the damages occured to it.

Objectives

- Collect Data
- Design neural network architecture
- Train network
- Validate the trained network
- Optimize network
- Deploy in a mobile platform

Proposed Plan

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- Use the prototype to obtain valid data-sets.

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- Use the valid data-set to make corresponding changes to the architecture.

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- Recreate the neural network and train it.

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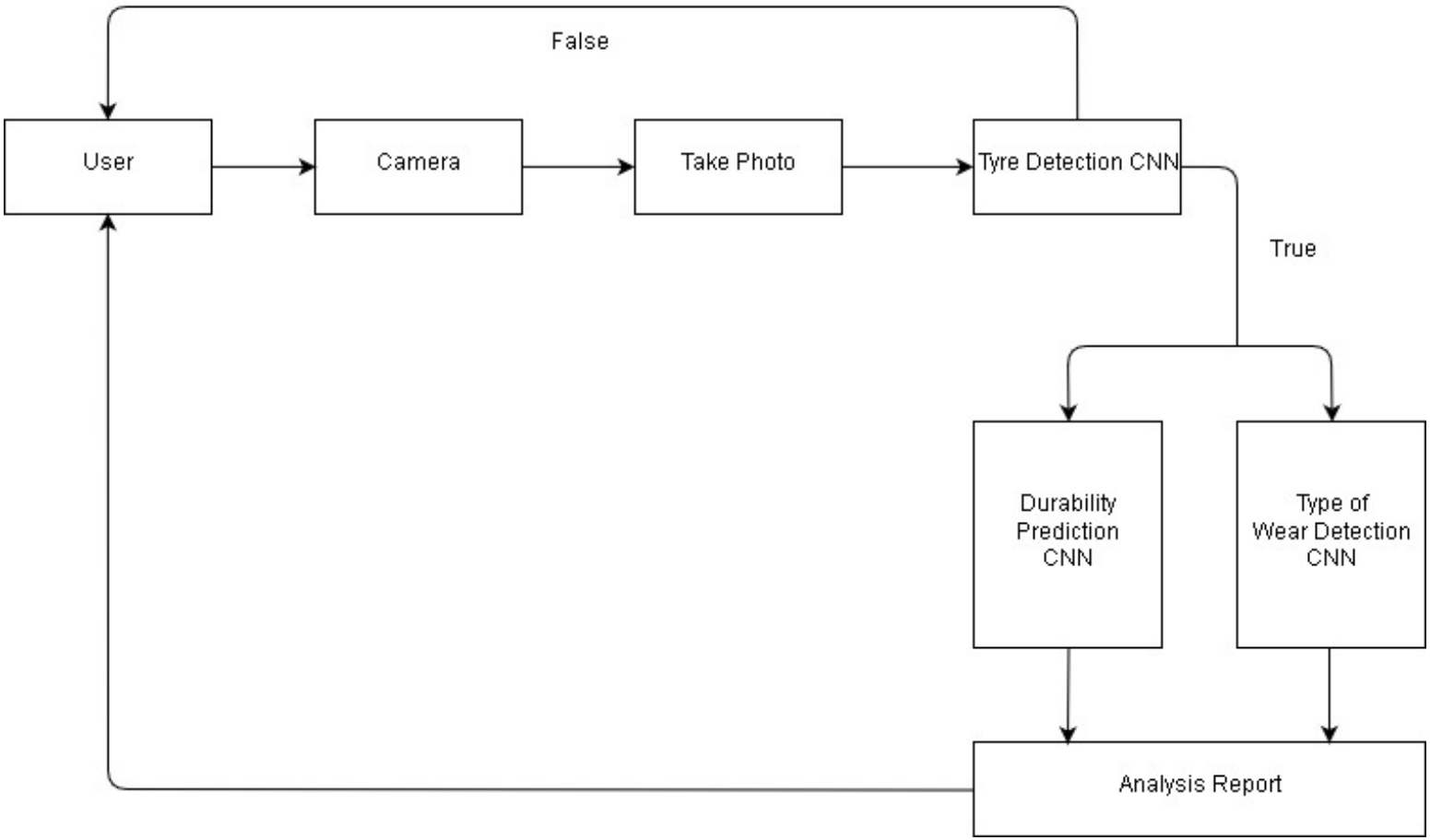
- Recreate the neural network and train it.
- Validate and optimize the network.
- Deploy to Android.

Outline

Flow Diagram



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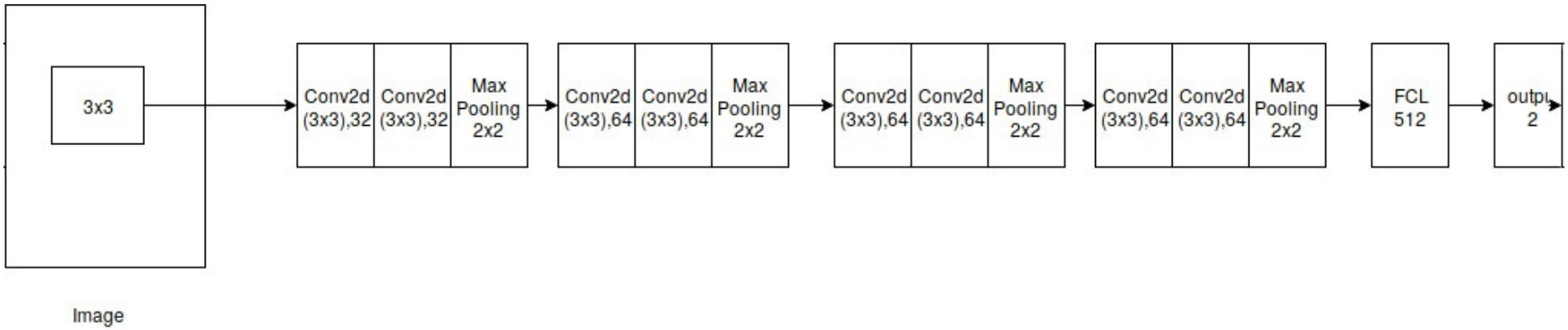
Neural Network Architectures



Algorithm

Algorithm: Forward Propagation

for k = 1 to L -1

$$a_k = b_k + W_k H_{k-1}$$

$$h_k = g(a_k)$$

end

$$a_L = b_L + W_L H_{L-1}$$

$$\hat{y} = O(a_L)$$

L = number of layers

a_k = vector of total sum of k^{th} layer , b_k = vector of biases of k^{th} layer ,

W_k = vector of weights of k^{th} layer , h_k = vector of outputs of k^{th} layer ,

g = activation function , H_{k-1} = vector of Outputs of $(k-1)^{th}$ layer ,

$\hat{y}$ = output of network , O = activation function of output layer.

Present Status

- Designed system architecture
- Implemented the First neural network
- Old trained model was lost due to version change
- Deployed application on local network
- Attempting to train on Google Colab

Conclusion

- More powerful machine is needed for training with larger datasets.
- Due to size limits on free hosting sites, we have temporarily hosted on local network.

Future Plans

- Use RNN.
- Sequential detection.
- Multiple network for multiple classes.
- Place backend as REST API.

Conference Attended

- Attended conference ICITIST 2018 in SIST on Nov 27th 2018

References

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