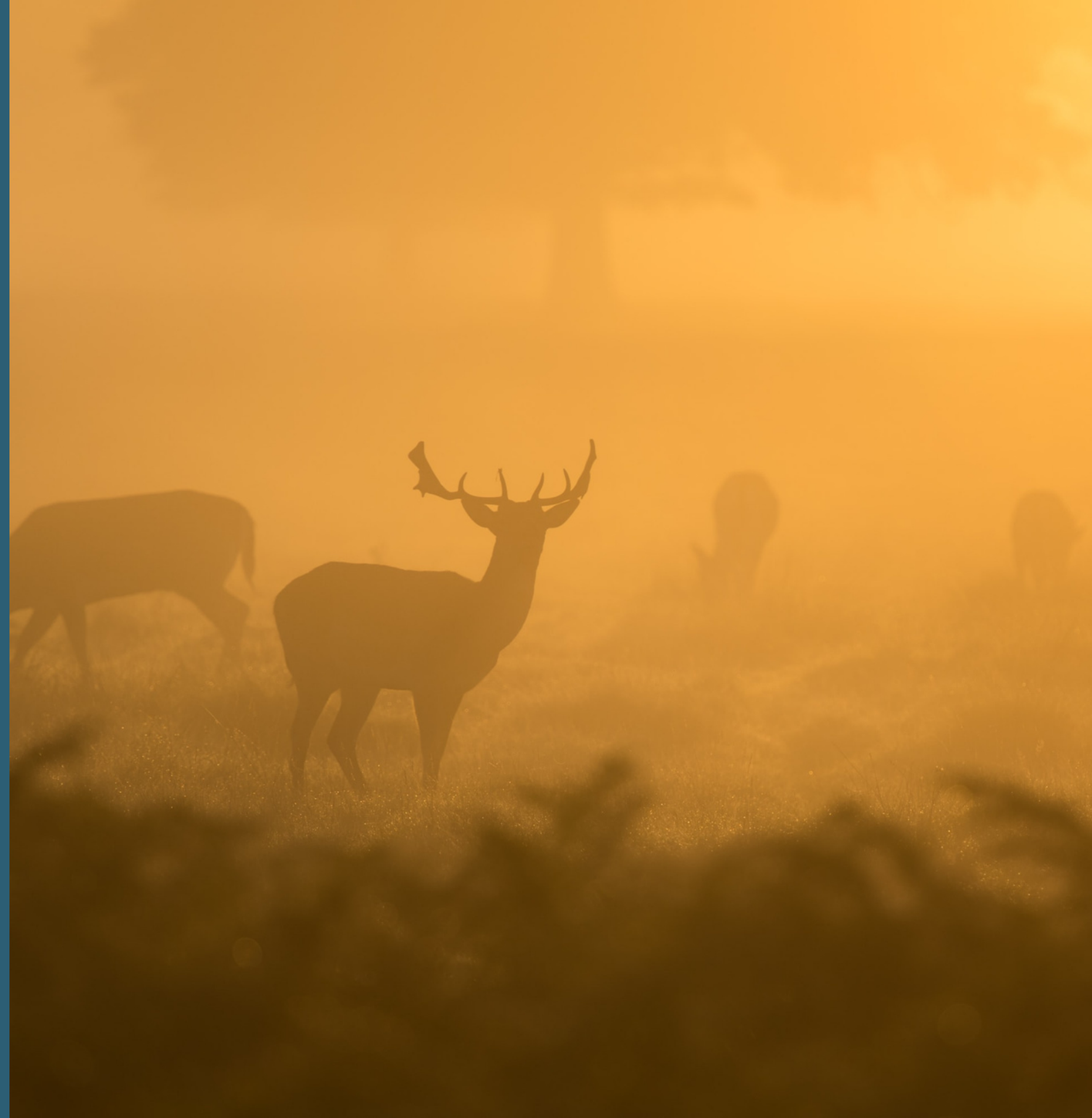
ज्ञानेन प्रकाशते जगत्
INDUS UNIVERSITY

Image Dehazing using Deep Learning

LCA Net

By :
Pratham Shah - IU1941230155
Manit Shah - IU1941230150

Mentor :
Dr. Kaushal Jani



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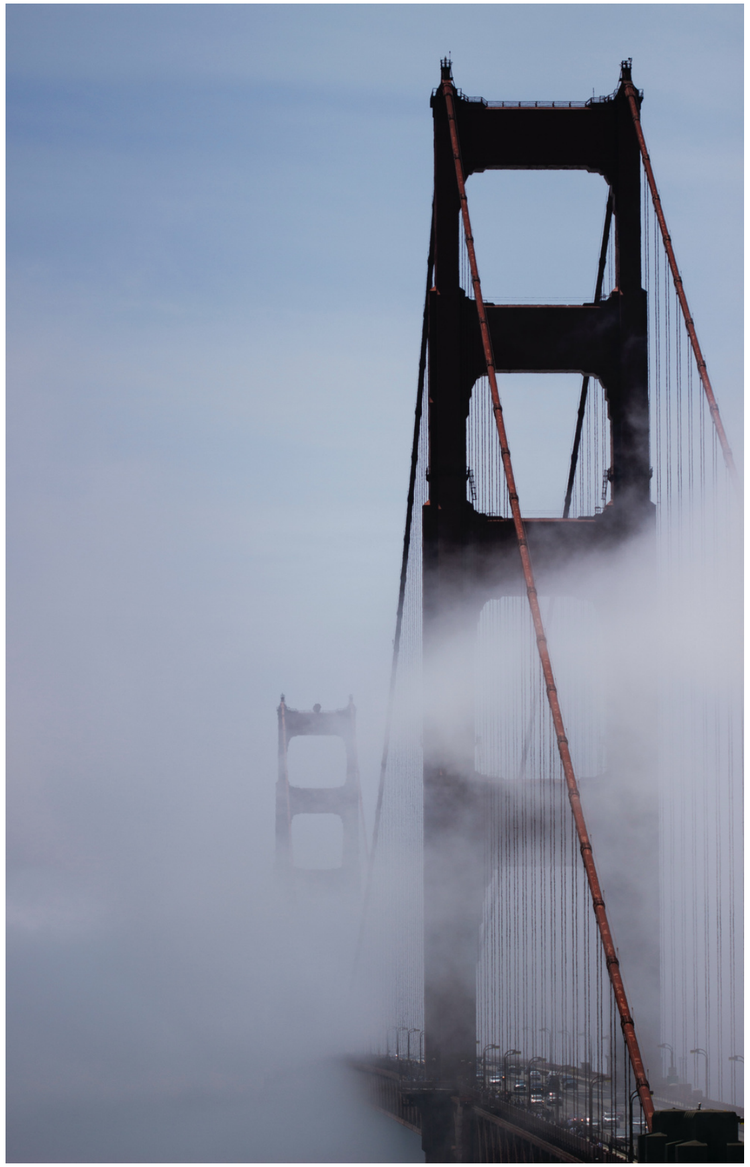


Aim

Image Dehazing

The aim of our project is to dehaze hazy images. Image dehazing is a crucial image pre-processing task aimed at removing the incoherent noise generated by haze to improve the visual appeal of the image.

1. We input a hazy image

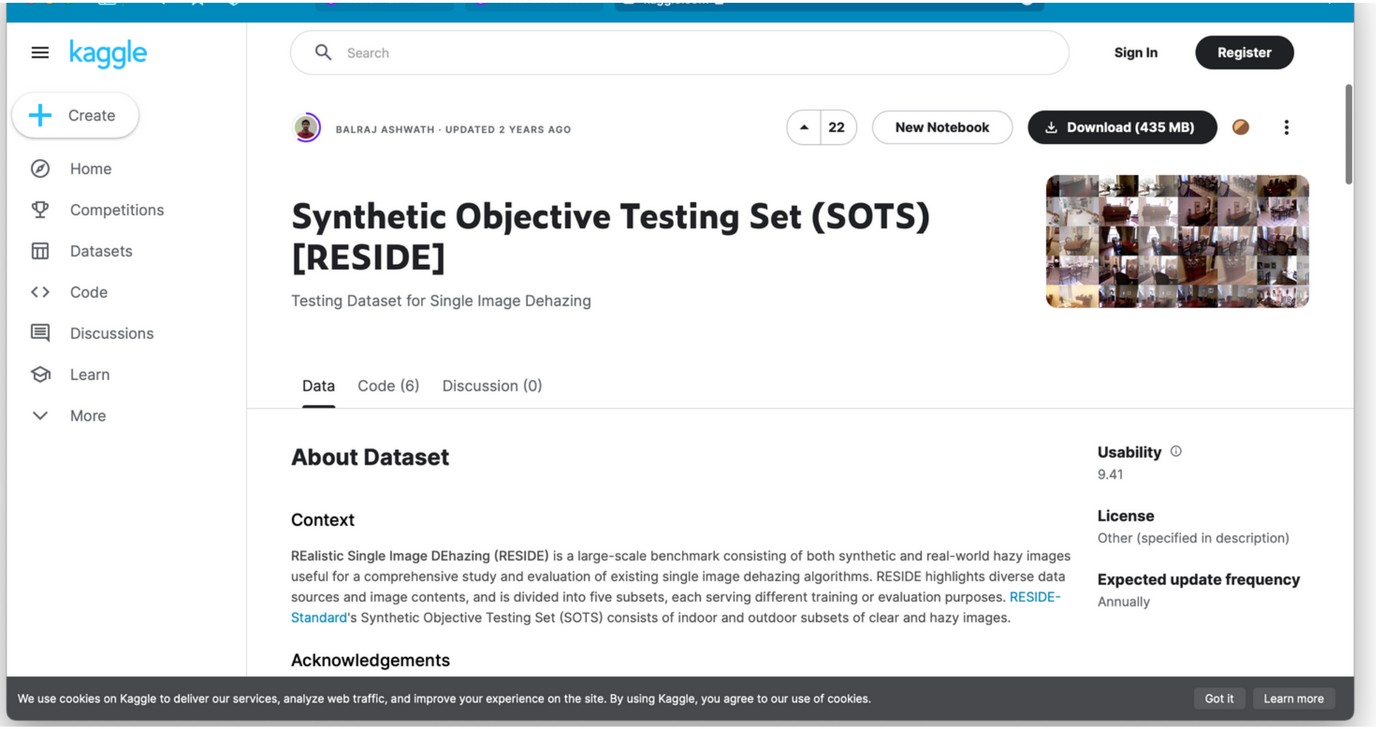
2. We expect to produce a clear (dehazed) image

Dataset

Synthetic Objective Testing Set (SOTS) [RESIDE]

REalistic Single Image DEhazing (RESIDE) is a large-scale benchmark consisting of both synthetic and real-world hazy images useful for a comprehensive study and evaluation of existing single image dehazing algorithms. RESIDE highlights diverse data sources and image contents, and is divided into five subsets, each serving different training or evaluation purposes. RESIDE-Standard's Synthetic Objective Testing Set (SOTS) consists of indoor and outdoor subsets of clear and hazy images.

The dataset is available at: https://www.kaggle.com/datasets/balraj98/synthetic-objective-testing-set-sots-reside



Model

LC Net
Light Convolutional Network

- Light Convolutional Network uses a very light convolutional encoder-decoder network which does not depend on any atmospheric models.

- The existing models use sophisticated networks and custom loss functions which are computationally inefficient and requires heavy hardware to run.
- LC network achieves optimum dehazing performance at a much faster rate, on several standard datasets, comparable to the state-of-the-art methods in terms of image quality.

Architecture

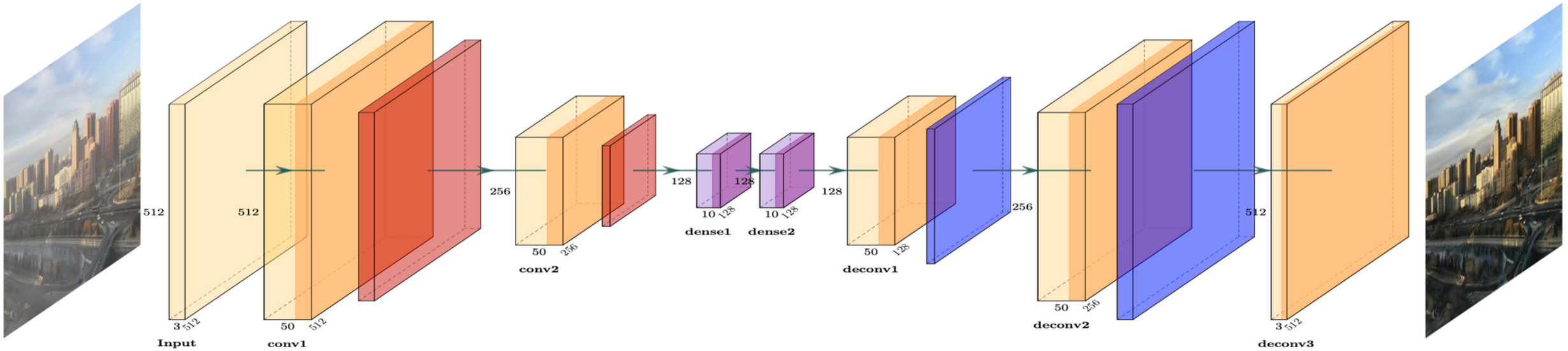


Fig. 1: The architecture of LCA-Net

This neural network consists of an encoder-decoder type of architecture.

Architecture

- The input layer takes an image which is padded and pushed to the first ReLU activated convolutional layer. It has 50 filters of size 3.
- This layer returns an output of original dimensions which acts as input for the average pooling layer for downsampling with a factor of 2, followed by the next convolutional layer where the cycle is repeated.
- This results in an encoded input which is then passed through 2 completely connected ReLU activated dense layers, with 10 neurons each.
- This output is passed to the decoder which consists of 2 pairs of deconvolutional and upsampling layers (scale factor of 2).
- The final output layer is a deconvolutional layer consisting of 3 filters of size 3. It produces a dehazed image of the same size as the input image.

Pacakages & Libraries

1. TensorFlow
2. Pillow
3. Streamlit
4. Matplotlib
5. Numpy

Steps

1. Gathering Data
2. Preprocessing data
3. Training the model
4. Applying model to predict output
5. Developing UI and connecting it with the model

Output

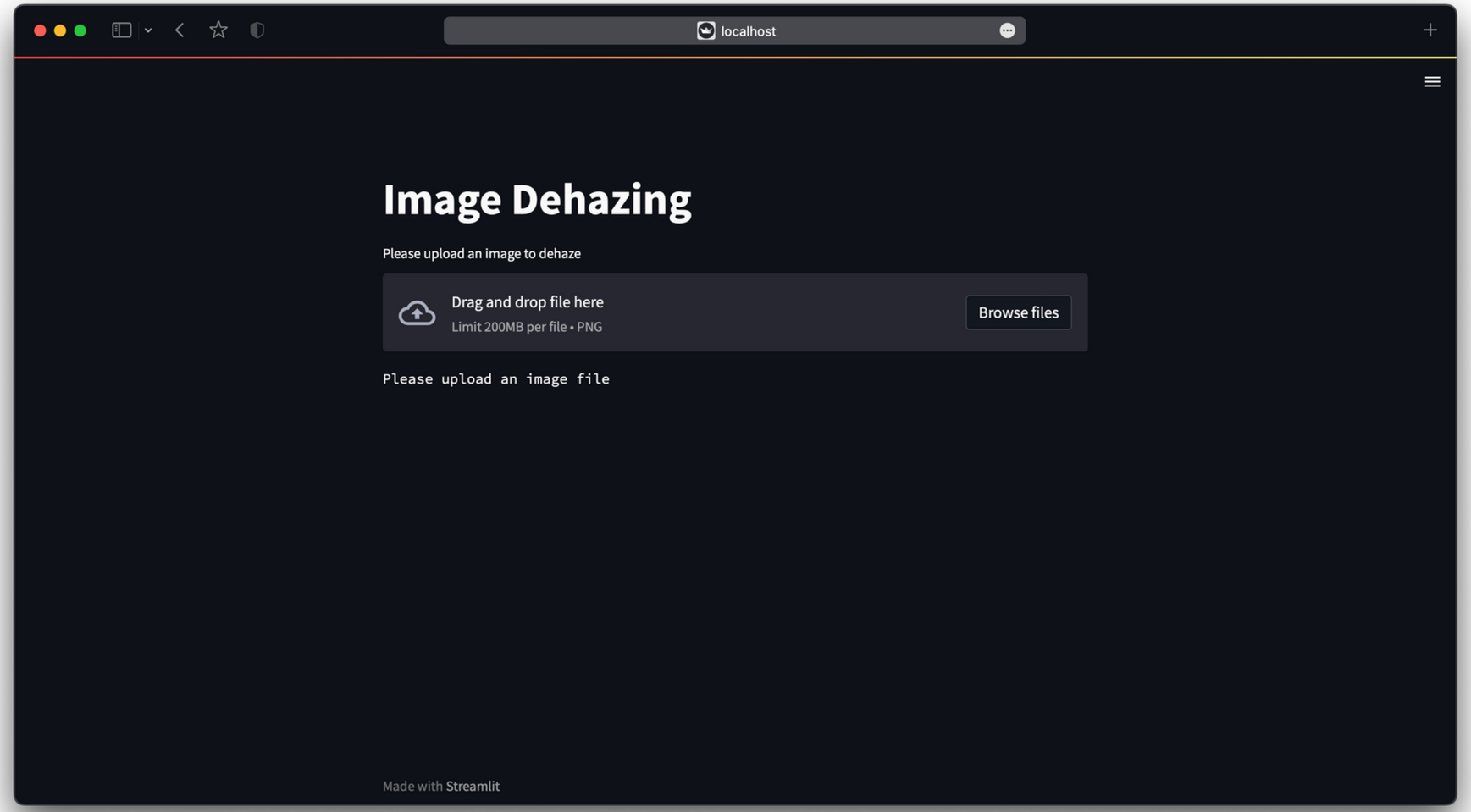

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Image Dehazing
Please upload an image to dehaze
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Limit 200MB per file • PNG
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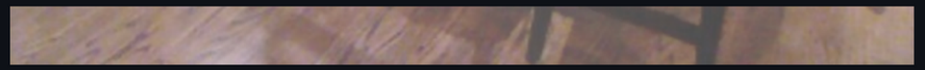
1402_2.png 281.7KB

Before

after



After

THANK YOU