

PixelMind AI: Automatic Image Colour Enhancement Challenge - Master Doc

Introduction:

Welcome to the PixelMind AI Hackathon! In this challenge, you will be working on the exciting task of developing an AI-driven algorithm to automatically enhance the colour of images taken straight from a DSLR camera, replicating the results achieved by professionals using Adobe Lightroom and/or Adobe Photoshop.

Pre-requisites:

1. Join the WhatsApp Group:
<https://chat.whatsapp.com/GzSaG6UKbBCCBg2gJ0NfRv>
2. Join the Discord Server: <https://discord.gg/eHjDrCCbsE>
3. Register on the Paradox Website: <https://iitmparadox.org/e/pixelmindai>
4. **MOST IMPORTANT:** Registration form:
<https://forms.gle/6eNehQ4FYc7dB5Dc8>

Importing Dataset & Setting up the Google Colaboratory Notebook:

1. Head to <https://colab.research.google.com/> & create a New Notebook
2. To import the dataset via wget:
 - a. `!wget -r -np -nH --cut-dirs=3 -R index.html`
http://drive.fotografik.in/training_data_3og0 use this command in the code section to download the dataset from the server.
 - b. You can extract the rar with `!unrar x -pfoto@para10 train_in_4.rar`. The password for the rar files are "foto@para10". Please change the rar name in the above command to extract that specific rar.
 - c. You can choose to keep some part of the training data as a test dataset to test your trained model.
3. To import the dataset via Google Drive (easier method):
 - a. Go to this folder, click on the folder & "Add shortcut to drive" (this won't take up any of your storage space.

<https://drive.google.com/drive/folders/1izv8bi1yQvm9lDBs9Si9mH0lZ8TkXFI6>

- b. Open your Colab notebook, and add the following code.

```
from google.colab import drive
drive.mount('/content/drive')
```

- c. On the left side, click on files. You should be able to see your drive attached to the notebook, with the dataset folder inside.

Problem Statement:

Photography is an art form that can capture the beauty of the world around us. However, sometimes the raw images taken by a DSLR camera may not accurately represent the vibrancy and colours of the original scene. Professional photographers often rely on tools like Adobe Lightroom and/or Adobe Photoshop to manually adjust and enhance the colours of their images. Still, this process can be time-consuming and requires specialised knowledge.

Your task is to create a model or algorithm that can automatically perform colour enhancement on raw images, producing results similar to those achieved by professionals using Adobe Lightroom and/or Adobe Photoshop. The goal is to develop a solution that is efficient, accurate, and capable of generalising to a wide range of image types and scenarios.

Data:

The training image dataset provided consists of pairs of images: 'before' images, which are raw images straight out of a DSLR camera, and 'after' images, which are the same images colour-corrected by a professional using Adobe Lightroom and/or Adobe Photoshop. The test image dataset contains only 'before' images, and your model's performance will be evaluated based on how well it can enhance the colours in these images.

Schema:

There are three datasets:

in - indoors

wh - white background

ot - outdoors

Indoors is the biggest hence multiple zips of it; all zips have Raw and Done folders. File names will be the same for corresponding files .jpg and .JPG might be the only difference.

You can merge all 3 train datasets into one.

Rewards:

The following rewards will be offered to students:

- First Prize: INR75,000
- Second Prize: INR50,000
- Third Prize: INR25,000

Along with this, Select students will also receive goodies & internship opportunities! Please note that the selection of interns is not limited to only the winners; any candidate showing promise will be considered. Therefore, it is important not to sacrifice quality in pursuit of competition.

Evaluation Criteria:

Submissions will be evaluated based on the following criteria:

Accuracy: The model's output images should closely resemble the professional colour enhancements typically achieved with Adobe Lightroom and/or Adobe Photoshop.

Generalisation: The model should be able to effectively enhance the colour of a wide range of image types and scenarios.

Computational Efficiency: The model should be able to process images in a reasonable amount of time without consuming excessive computational resources.

Submission Guidelines:

Participants are required to submit the following:

- A Google Colab Notebook.
- A detailed report explaining the approach, techniques used, and any additional insights gained during the development process. (via a Google form)
- The enhanced images generated by the model for the provided test image dataset.

We encourage participants to think creatively and explore a variety of techniques, including but not limited to deep learning, image processing algorithms, and computer vision techniques.

Additional Guidelines and Requirements:

We have additional inputs from Fotografik Enterprises Pvt. Ltd., which can help participants better understand the requirements and design their solutions accordingly. Please consider the following guidelines and requirements while developing your solution:

True to Life: The enhanced images should look natural, with accurate skin tones, hair tones, and other features. This can serve as a good indication of the model's ability to replicate professional colour enhancement techniques.

Consistency: If a set of images features the same subject, the model should ensure consistent colour enhancement across all images to maintain standardisation in the subject's appearance.

Adaptability: Some clients may have specific requirements for colour enhancement. A desirable solution should be able to adapt to these needs based on the given examples from the client.

True Whites and Blacks: The model should not alter true whites and true blacks in the images.

File formats: The training and test data contain only jpg/jpeg as input images' format but in real-life scenarios, input images could sometimes be of different formats such as png, cr2, cr3, tiff, psd etc. A desirable model should be able to handle such formats too.

Resolution: Similarly, the training and test data contain images of the same resolution; however, in practice, the model is sure to encounter images of varying resolutions.

Continuous Improvement: A desirable model is one that, after being deployed, improves with the feedback it receives and with new training data.

Non-negotiable Requirements:

Image Quality: The enhanced images must retain their sharpness, resolution, and DPI.

Structural Integrity: No modifications should be made to the structural integrity of the images.

Colour Space: The images should be in the sRGB colour space.

Final Note:

While we understand that achieving all of the above criteria in a hackathon may be challenging, we expect participants to show promise and provide proof of concept for their solutions. The company is planning to hire interns who demonstrate competence and the potential to achieve the AI vision of the company, even if their hackathon submissions do not fulfil all the criteria. Your solution should, at the very least, show potential for future development and improvement in line with the company's vision.

We encourage you to think creatively and leverage cutting-edge techniques to develop a professional and authentic solution for this hackathon. Good luck, and we look forward to reviewing your innovative approaches to automatic image colour enhancement!

Image Dataset Usage Agreement and Disclaimer:

This Image Dataset Usage Agreement and Disclaimer ("Agreement") sets forth the terms and conditions under which the training image dataset ("Image Dataset") is provided to participants ("Participant" or "You") in the PixelMind AI Hackathon ("Hackathon") by Fotografik Enterprises Pvt. Ltd., an ISO-certified company ("Company").

Purpose and Scope: The Image Dataset is provided exclusively for the purpose of participating in the Hackathon. The Participant is prohibited from using the Image Dataset for any commercial purposes, activities outside the scope of the Hackathon, or any purposes other than those explicitly outlined in the Hackathon rules.

Ownership and Intellectual Property: The Image Dataset is the sole property of the Company and is protected under applicable copyright, trademark, and

intellectual property laws. Any unauthorised use of the Image Dataset may constitute a violation of such laws.

Confidentiality: The Participant agrees to maintain the confidentiality of the Image Dataset and not to share, disclose, or distribute the Image Dataset to any third parties or unauthorised individuals.

Compliance: The Participant agrees to comply with all applicable laws, regulations, and industry best practices while using the Image Dataset.

Consequences of Misuse: Any misuse of the Image Dataset, breach of this Agreement, or unauthorised use of the Image Dataset may result in immediate disqualification from the Hackathon and may expose the Participant to legal action by the Company.

By accessing, downloading, or using the Image Dataset provided for the Hackathon, You acknowledge that You have read, understood, and agree to be bound by the terms and conditions set forth in this Agreement. Failure to comply with these terms may result in the consequences outlined herein.