Colorization of B/W images using Deep learning

Abstract

Given a grayscale (black and white) image as input, we shall attack the problem of hallucinating a plausible color version of the photograph.The problem we want to solve is a fully automatic approach to colorization devoid of any human interference.

Pre-Requisites

Good coding Background in any language (preferably python).

Basic linear algebra and calculus.

Our project will involve reading research papers. So you should be able to go through papers, understand the important points mentioned in those papers. We also have to write timely reports on our progress.

Knowledge of neural networks is a bonus but not necessary.

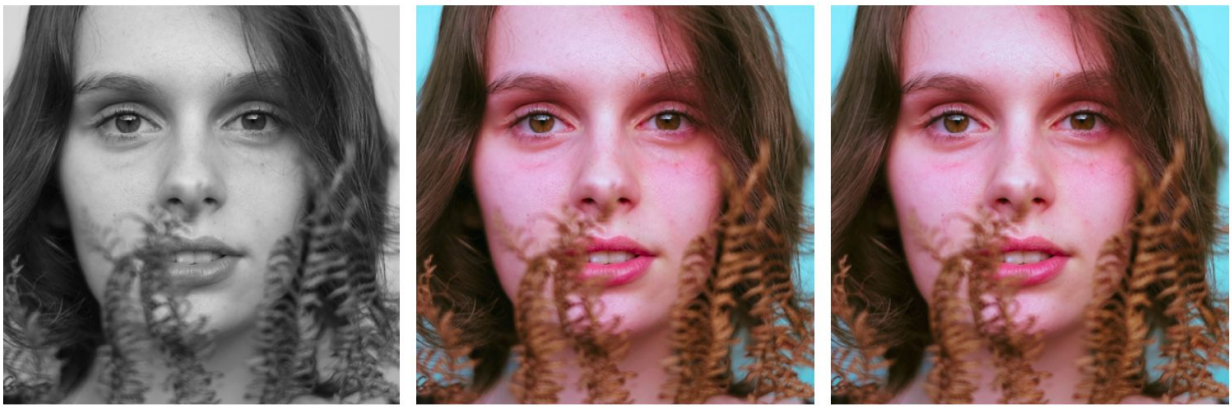
Resources will be shared along the way.

About the project

Earlier this year, a reddit user used neural networks to troll the subreddit /r/Colorization - a community where people colorize historical black and white images manually using Photoshop. People on the subreddit were surprised by the performance of the model. What was done manually in 1-2 months could be finished in minutes by the model.

Our approach will be to start from a simple model which will involve a basic neural network. We will then progressively build upon the model to improve performance. We will explore a CNN model , auto encoder model and an encoder-decoder classifier. In the end we will be able to compare performances of different models and analyse the results.

Along the way, we will also be learning about how to render an image, the basics of digital colors, and different methods of representing images in a computer.



If time permits, we can try to discuss and implement our own model and analyze the results obtained by it.

Expected Outcomes

By the end of the project we should have a good understanding of neural networks, Convolutional neural networks (CNN) and Auto-encoders and other related models.

Ability to read, understand and implement research papers.

Hopefully this project should inspire you enough to explore the field of machine learning and deep learning :).

Tentative Schedule

Phase 1 (September - October 15th)

Basics of machine learning and deep learning. Resources will be provided and regular discussions will be held to clear doubts.

Phase 2 (October 15th - Nov 31st)

Learning Tensorflow/Keras and implementing our basic models.

Phase 3 (Dec 15th - Dec 30th)

Read a few research papers on implementing advanced models and exploring other ideas.

Phase 4 (Jan 15th -)

Implementing our advanced models. We will also be documenting our progress. If possible try out our own models.

Intake - 4-5 members.

Group members

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References

https://arxiv.org/abs/1712.03400

https://medium.freecodecamp.org/colorize-b-w-photos-with-a-100-line-neural-network-53d9b4449f8d