Black and White to Color

Project Proposal Report

CS 663 (Digital Image Processing)
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Overview

The problem we are trying to solve is a general conversion of black and white images to colored. For this, we will be using **Conditional GANs** [Generative Adversarial Networks] to implement and extend the *pix2pix* network, which is a general neural network model to learn a mapping from one set of images to another, which, in our case will be from the set of black and white images to colored images.

Our project can be easily extended to other tasks such as day to night, labels to street scene, deblurring images etc. as the basic *pix2pix* network is shared among all such applications. If time permits, we will try to apply our network to one of the other tasks as well. We will be using the PyTorch framework in Python to implement the network.

Research Paper

- ### Image-to-Image Translation with Conditional Adversarial Networks [1]

  This is the original Research Paper written on the pix2pix network written at the Berkeley AI Research (BAIR) Laboratory, UC Berkeley. This is the research paper that we are trying to replicate and apply to the task of colorizing Black and White images.

Datasets

- ### CIFAR-10 [2]

  The CIFAR-10 dataset consists of 60000 32x32 colour images in 10 classes, with 6000 images per class.

- ### Places365 [3]

  In total, the Places dataset contains more than 10 million images comprising 400+ unique scene categories. The dataset features 5000 to 30,000 training images per class, consistent with real-world frequencies of occurrence.

- ### Microsoft COCO Dataset [4]

  It is a publicly available dataset of images with their captions. We canl use a subset of those images to train and test the images.

Evaluation Metrics

For evaluation we are using the same metrics as used in the original paper (stated below). We will be comparing our results with that of the original research paper.

  I.   Per-pixel accuracy

  II. Per-class accuracy

  III. Class IOU

References

1. Research Paper [pix2pix]: https://arxiv.org/pdf/1611.07004.pdf
2. CIFAR-10: https://www.cs.toronto.edu/~kriz/cifar.html
3. Places365: http://places2.csail.mit.edu/
4. Microsoft COCO: http://cocodataset.org/