Zhang, Isola, A. Efros. Colorful Image Colorization

What is the problem?

The task is to transform a grayscale photograph into a plausible color version.

What has been done earlier?

- Earlier techniques often relied on user interactions or resulted in colorizations that lacked vibrancy and realism.

- Many existing methods used regression techniques that favored conservative predictions, leading to less saturated outputs.

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What are the remaining challenges?

- The inherent ambiguity in colorization due to multiple plausible color choices for objects.
- Balancing between producing vibrant colors while maintaining spatial coherence

What novel solution proposed by the authors to solve the problem?

- The authors introduce a fully automatic approach that generates vibrant and realistic colorizations.
- They frame the problem as a classification task, predicting a distribution of colors for each pixel.
- Key Innovations:
  - **Class Rebalancing**: Adjusts training to emphasize less common colors, enhancing diversity in predictions.
  - **Feed-Forward CNN**: A convolutional neural network trained on over a million color images.
  - **Colorization Turing Test**: Evaluates the algorithm's effectiveness by measuring how often generated images are indistinguishable from real ones, achieving a success rate of 32%.

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