Project Title: Neural Style Transfer

By
Tridibesh Debnath
Email id: tridibeshdebnath@gmail.com
Brainware University

Objective

Stylize a content image using the style of another image

Tools Used

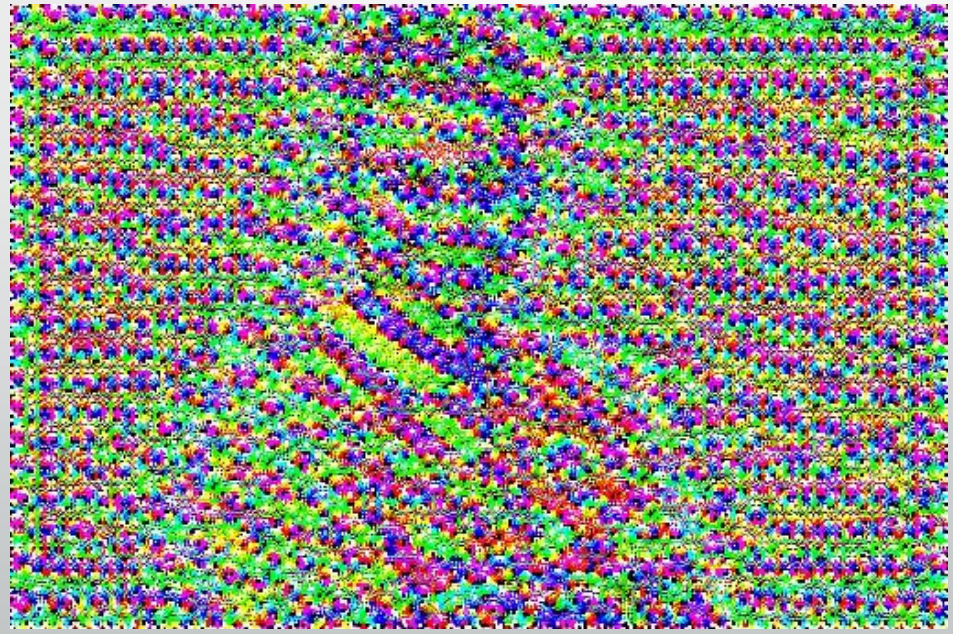
Python, TensorFlow, Keras, VGG19, Matplotlib, PIL

Applications

Art generation, creative filters, and photo editing

Method 1 – Basic Style Transfer

- **Approach:** Use VGG19 to extract features and optimize output image
- **Steps:**
- 1. Load and preprocess content & style images
- 2. Extract features from VGG19 layers
- 3. Compute content and style losses
- 4. Optimize image using gradient descent
- Pros: High quality output
- Cons: Slow (1000+ steps)



Method 2 – Fast Style Transfer

Approach: Train a feed-forward CNN for one specific style

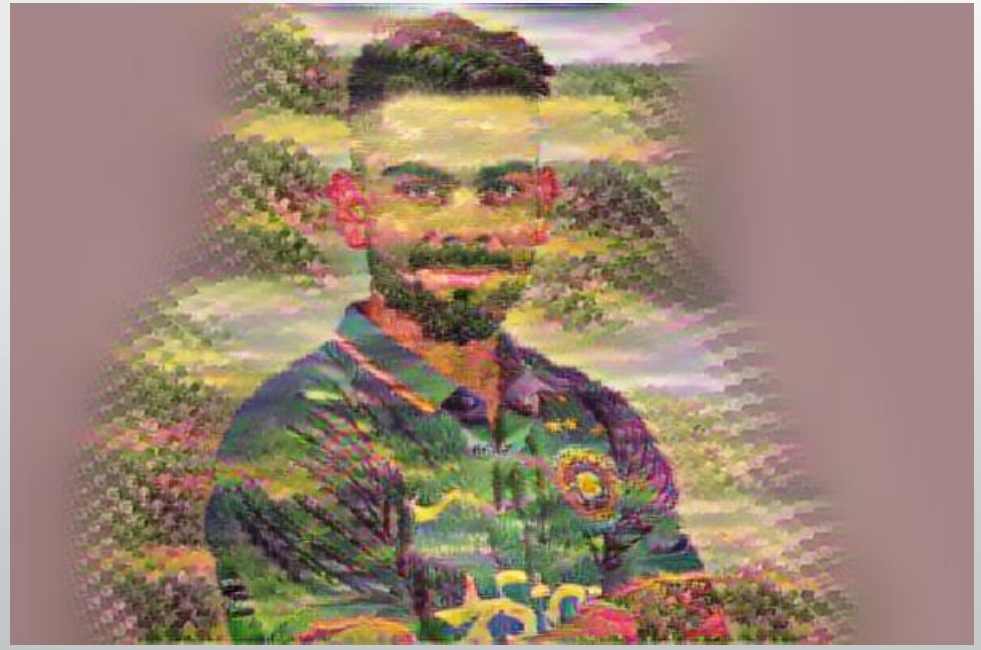
Differences:

- Trains once, then fast inference

- Uses VGG19 only for computing loss during training

Pros: Real-time results after training

Cons: One model per style



Results & Learnings

Output: Stylized image of Virat Kohli using landscape style

Experiments: Various content-style combinations

Challenges:

- Color distortion due to incorrect preprocessing

- Display issues in Kaggle

Learnings:

- How style is encoded via Gram matrices

- Difference between optimization and feed-forward methods