

Using AI for Economic Upliftment of Handicraft Industry

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Current State of Indian Handicrafts Industry

- The handicraft industry is a strong pillar of Indian economy.
- It provides large-scale employment opportunities to millions of artisans in rural and underprivileged sections of society.
- However, this industry has suffered severe economic decline in recent years due to continued usage of age-old motifs, shapes, and color schemes by local artisans.

How can AI help?

We use AI to create contemporary designs at scale for manufacturing handcrafted products.

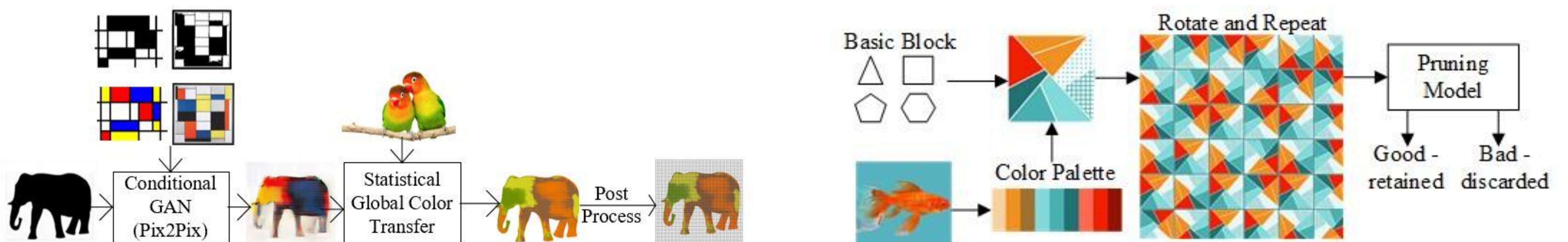
We target two ancient handicrafts of India, namely Ikat and Block Print.

Ikat

- We color a black motif using pix2pix, a Conditional Adversarial Network, trained on a set of 1000 Piet Mondrian paintings.
- The motif is then recolored with colors of an inspiration image using a statistical approach of global color transformation. The inspiration's mean and standard deviation are imposed on a motif across the three channels of the LAB color space.
- Finally, the design is post-processed to a 128*128 grid that can be readily used for dyeing, as each cell is of a single color.

Block Print

- We generate several geometric patterns using a predefined rule-set.
- These patterns are colored using color-palettes extracted from inspiration photographs.
- The patterns are filtered using a pruning model which predicts the likeability score, based on features derived using color theory and statistics. The pruning model is a Gradient Boosted Tree model trained on a set of 1100 patterns.



Architectural overview of our approach to create (a) Ikat designs (b) Block Print patterns

Results and Analysis



Designs generated for Ikat: (a) Good; (b) Bad



Designs generated for Block Print: (a) Good; (b) Bad

The designs generated using this approach are evaluated to be significantly more likeable than the conventional ones and were used by weavers of Telangana and Block Print communities of Rajasthan to manufacture and sell beautiful handicrafts.

IKAT		BLOCK PRINT	
Traditional designs	28	Traditional designs	41
Designs using Cycle GAN	49	Designs using generation approach	50
Designs using Pix2pix	67	Designs using generation approach + pruning	63

Likeability index for Ikat and Block Print



Artisans manufacturing handicraft products using our designs