

# Transfer Learning based Evolutionary Algorithm for Face Sketch Recognition

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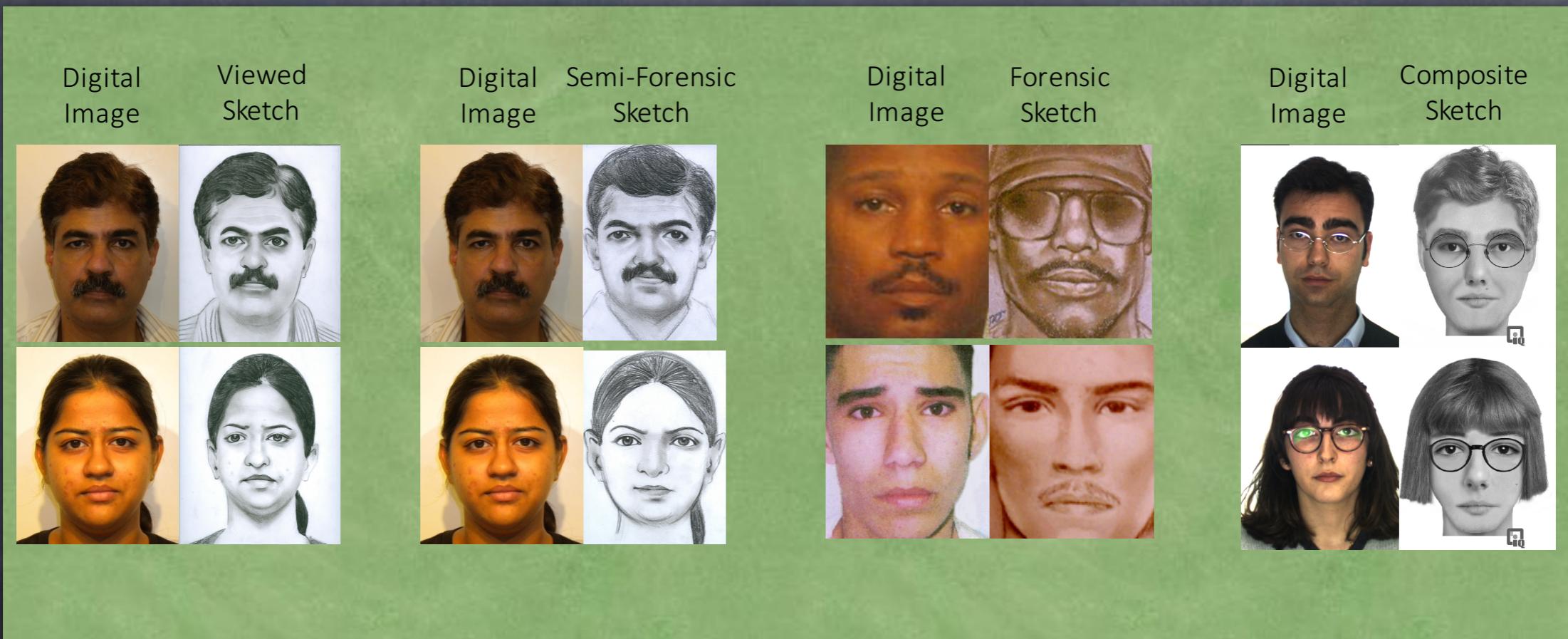


# Sketch to Digital Photo Matching

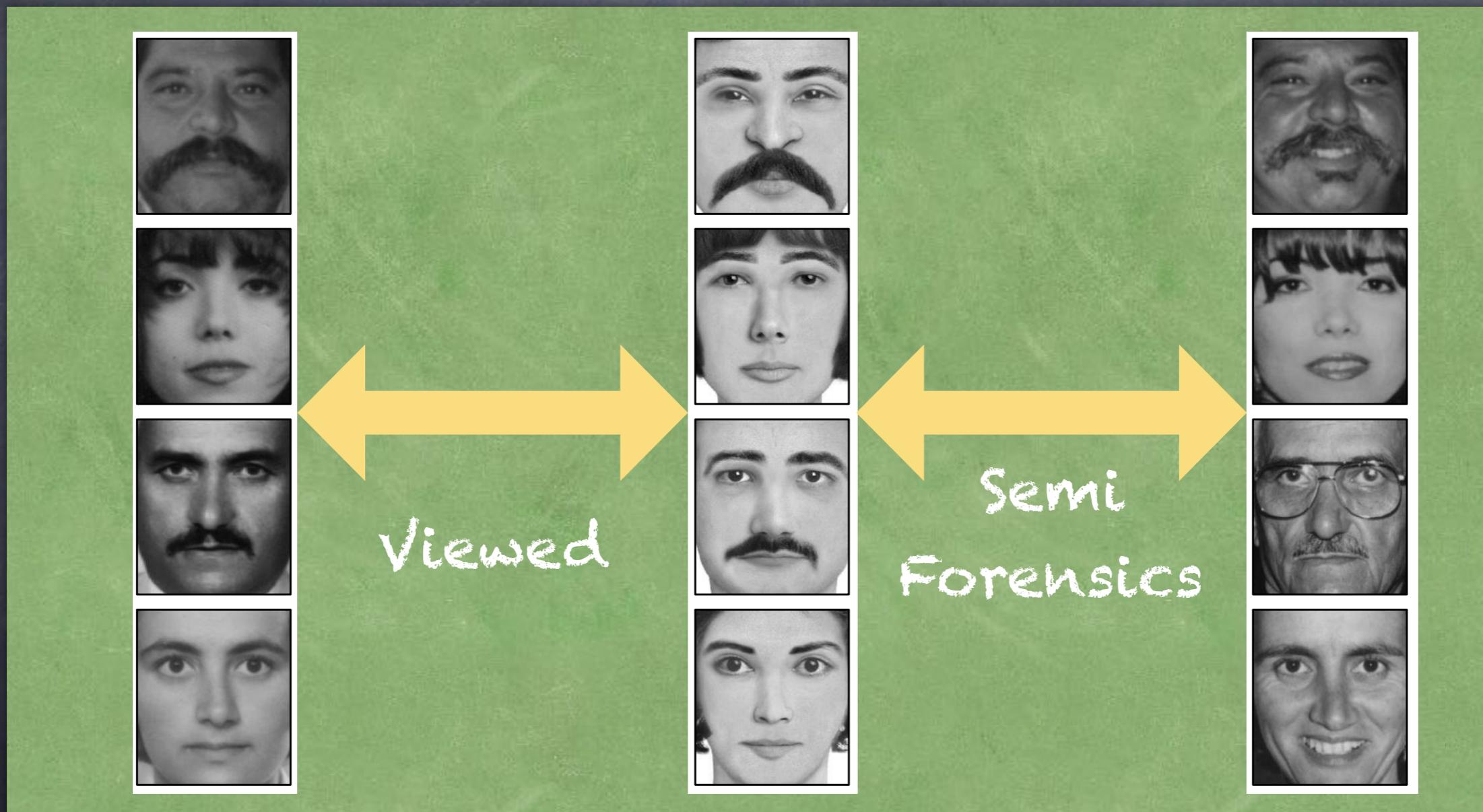


- Sketches are important in Law enforcement applications

# Different Types of Sketches

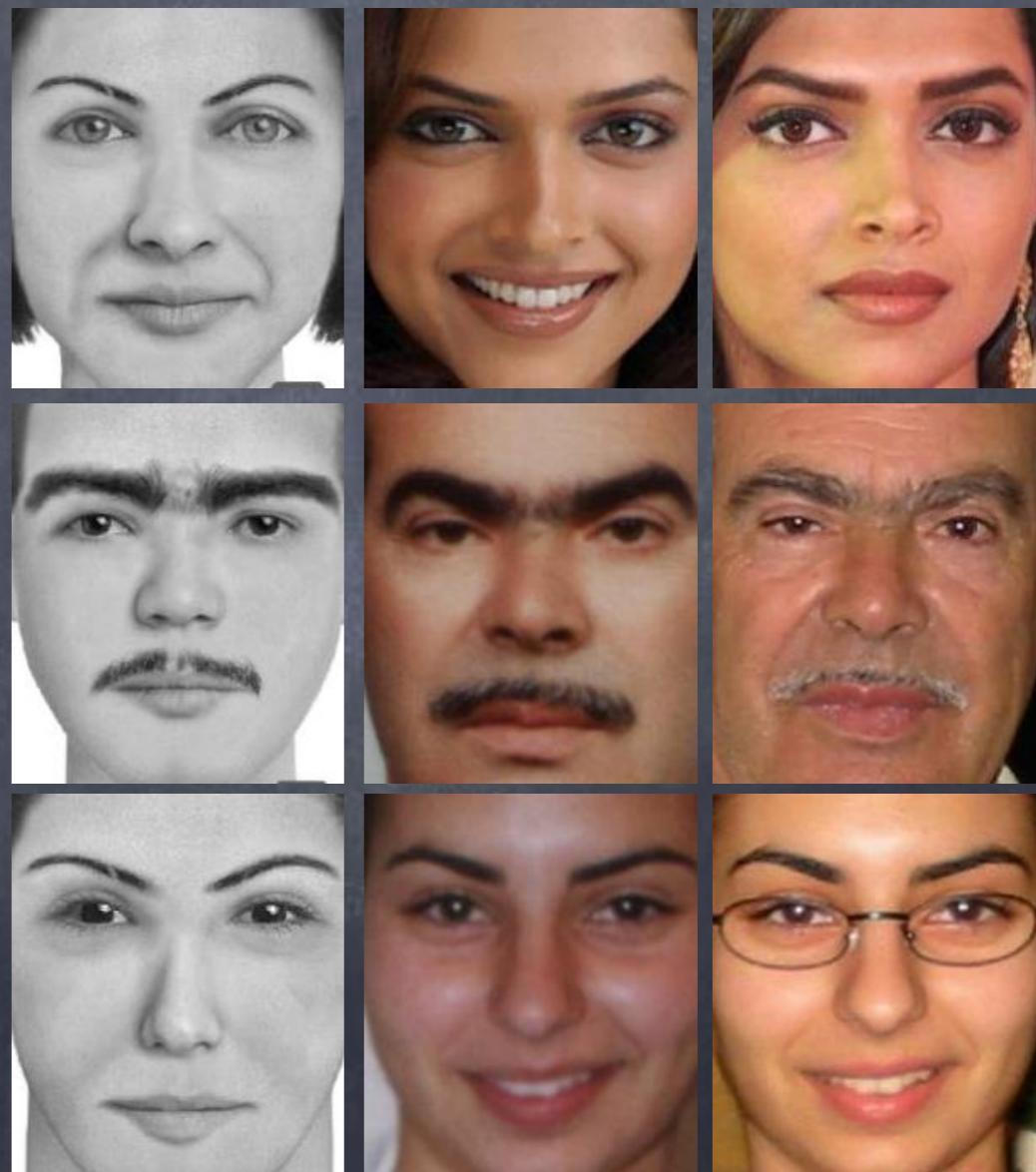


# Viewed vs Semi-Forensics Matching Scenario

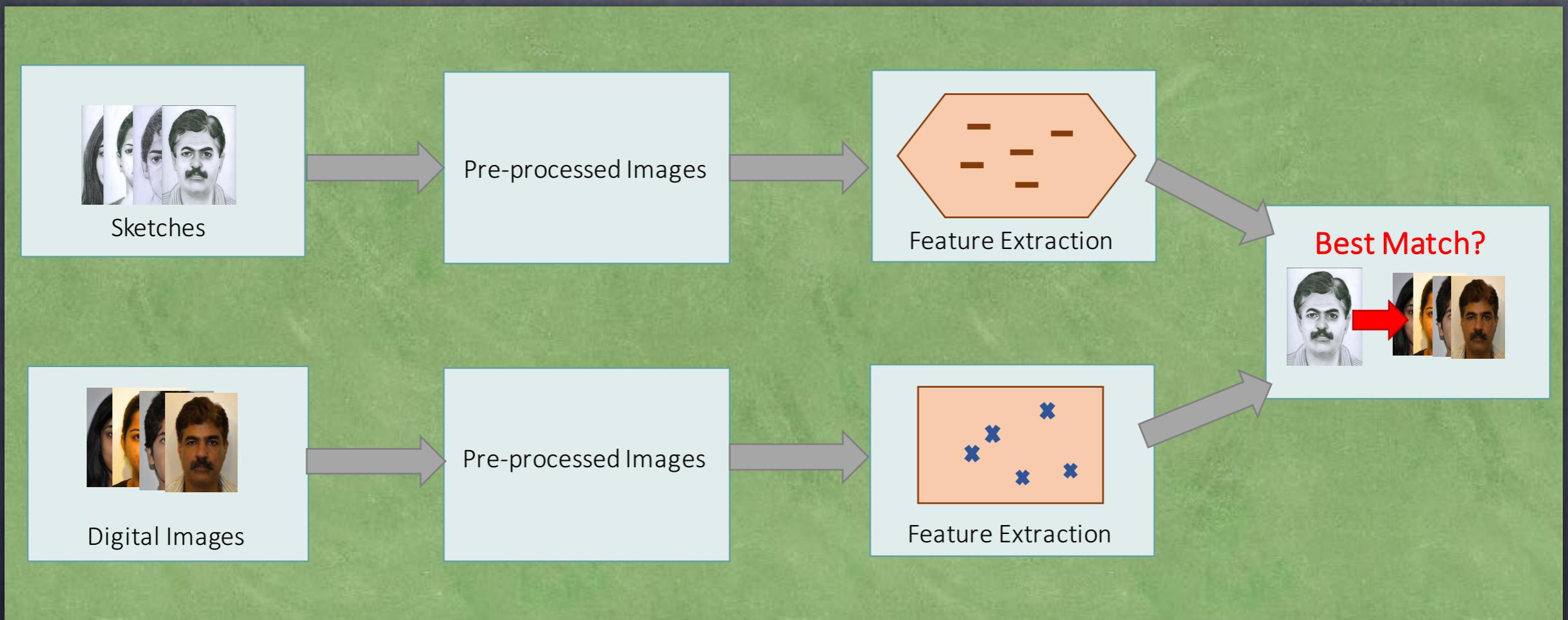


# IIITD Composite Face Sketch Dataset

- over 150 subjects
- 150 composite sketches and 300 digital face images
- One image used to create sketch image, the other used for matching
- Sketches are created using FACES software
- Dataset will be made publicly available for research



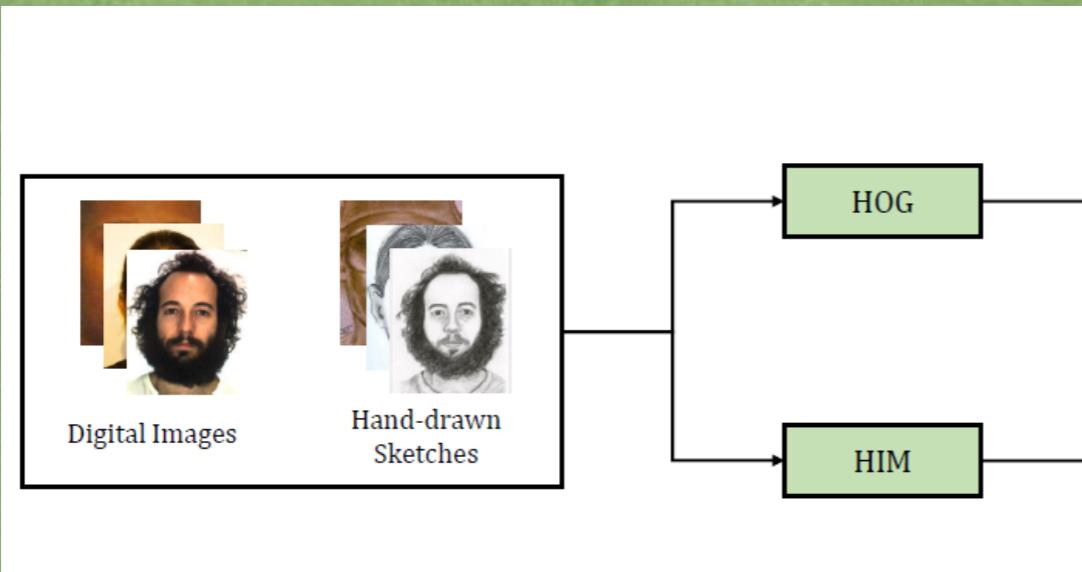
# Transfer Learning based Evolutionary Algorithm



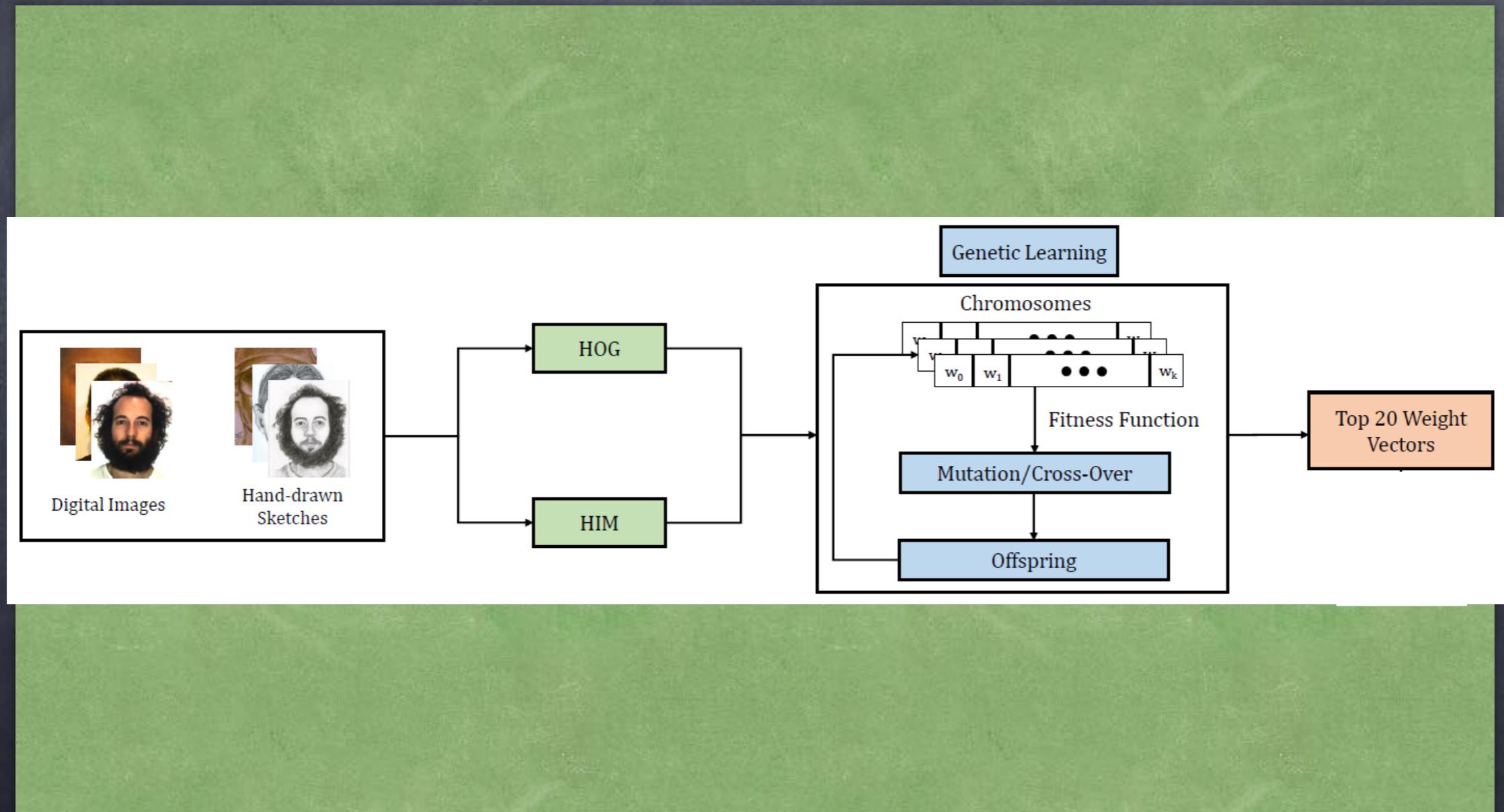
# Transfer Learning based Evolutionary Algorithm



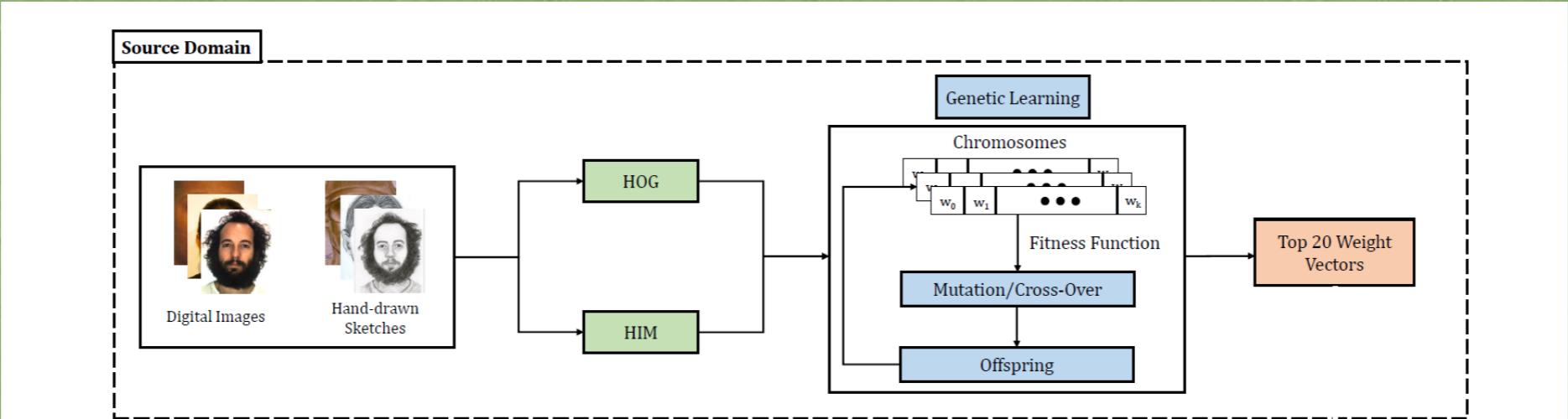
# Transfer Learning based Evolutionary Algorithm



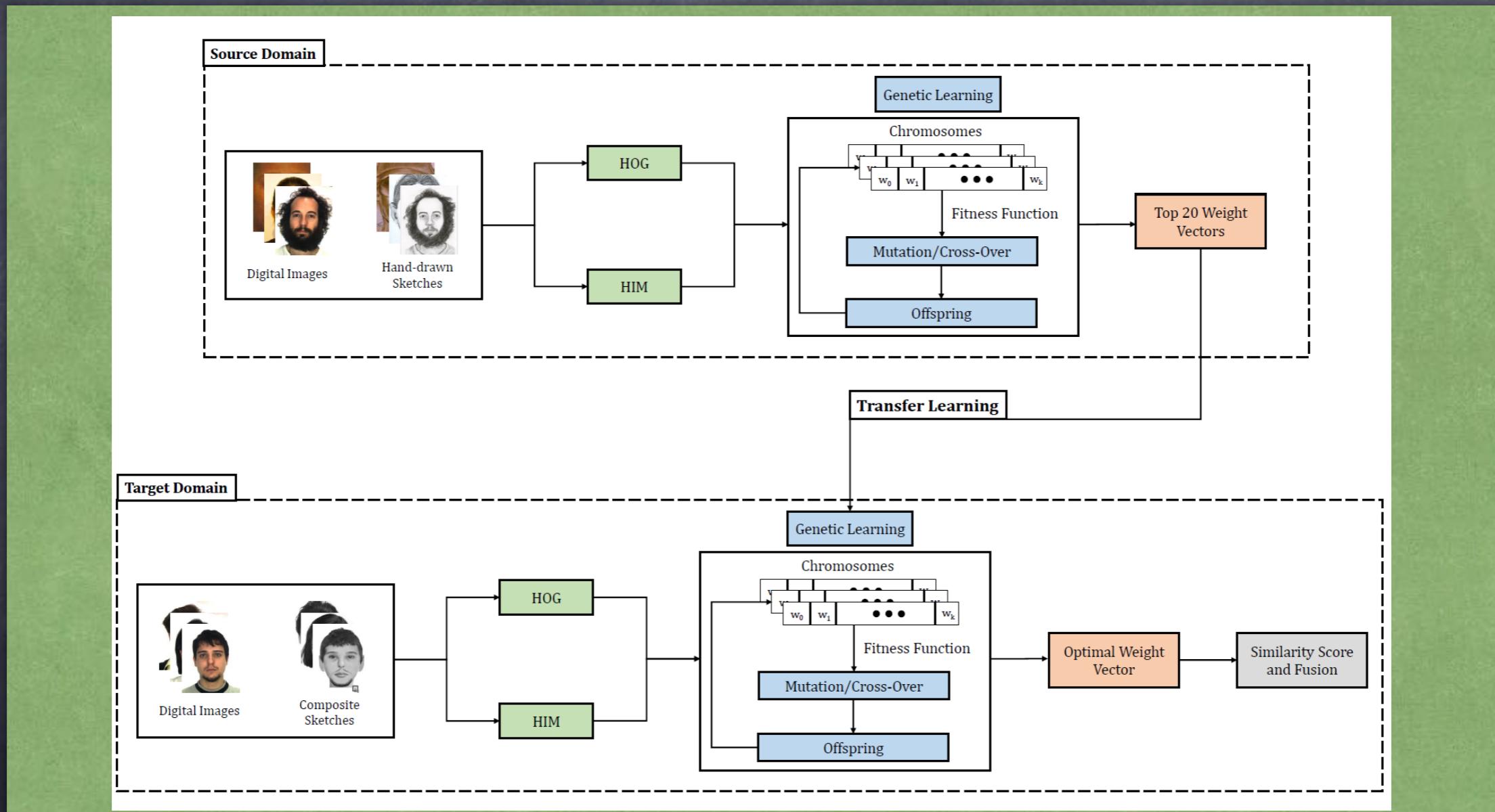
# Transfer Learning based Evolutionary Algorithm



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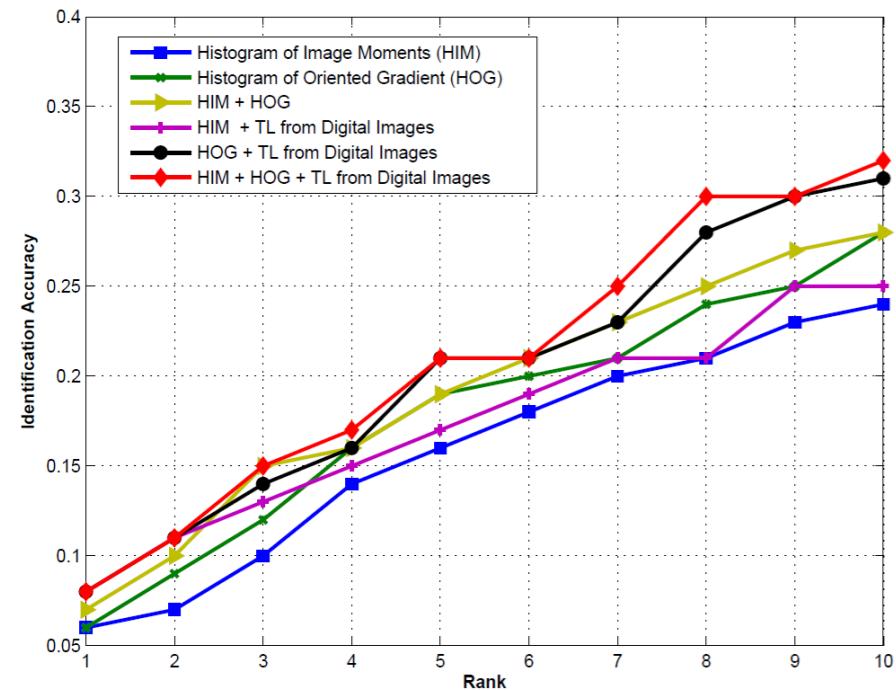


# Experimental Protocol

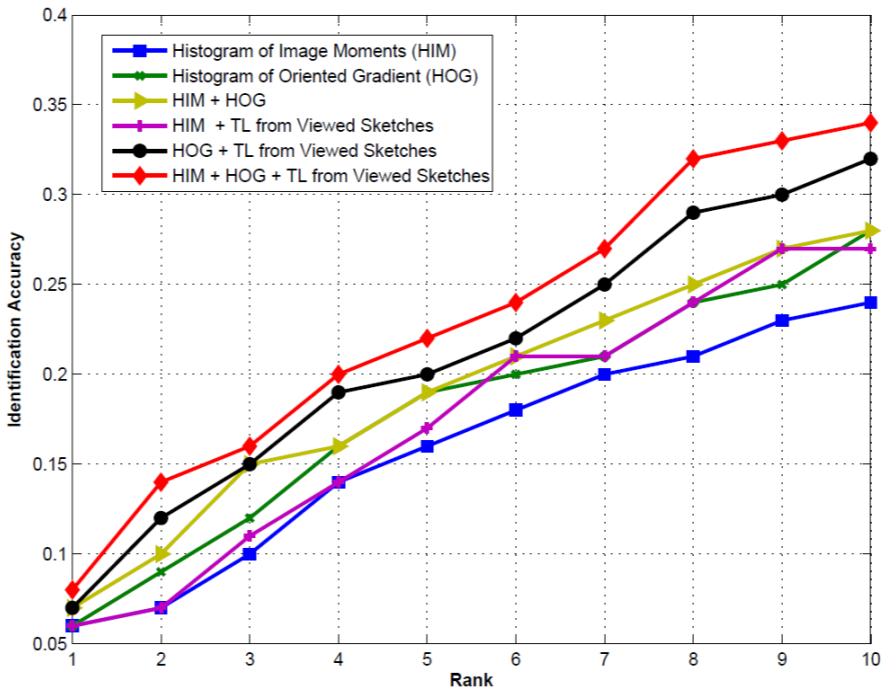
Experiment	Source Domain	Pairs in Training	Target Domain
1	Digital Image	250	
2	Viewed Hand Drawn Sketch	482	Composite Sketch
3	Semi-Forensic Hand-Drawn Sketch	106	Images (Proposed IIITD Composite Face Sketch Database)
4	Forensic Hand-Drawn Sketch	190	
5	Composite Sketch	25	

Proposed IIITD Composite Face Sketch  
CMU Multi-PIE (Gross et al.)  
IIIT-Delhi Sketch (Bhatt et al.)

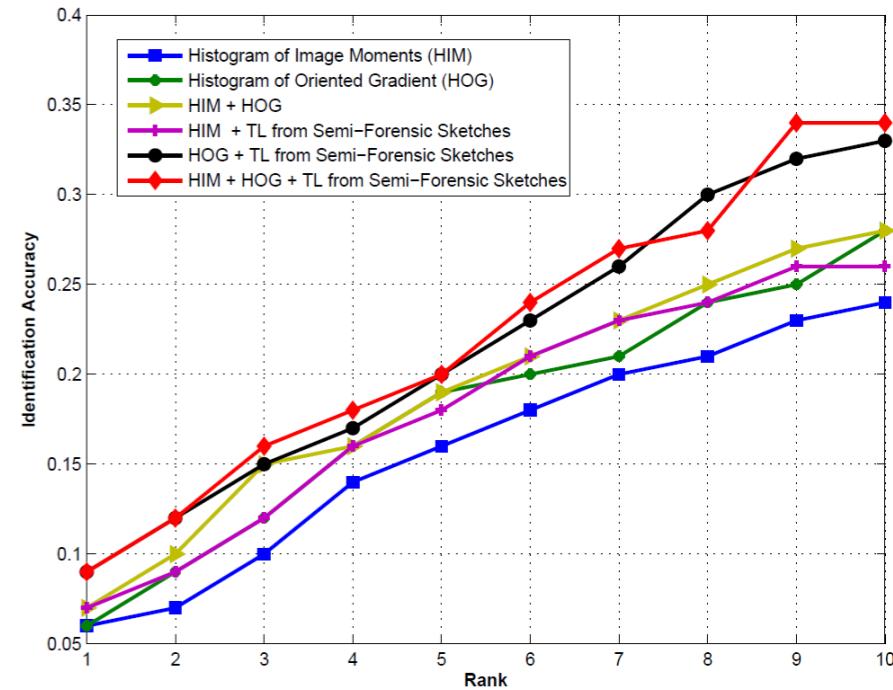
# Results



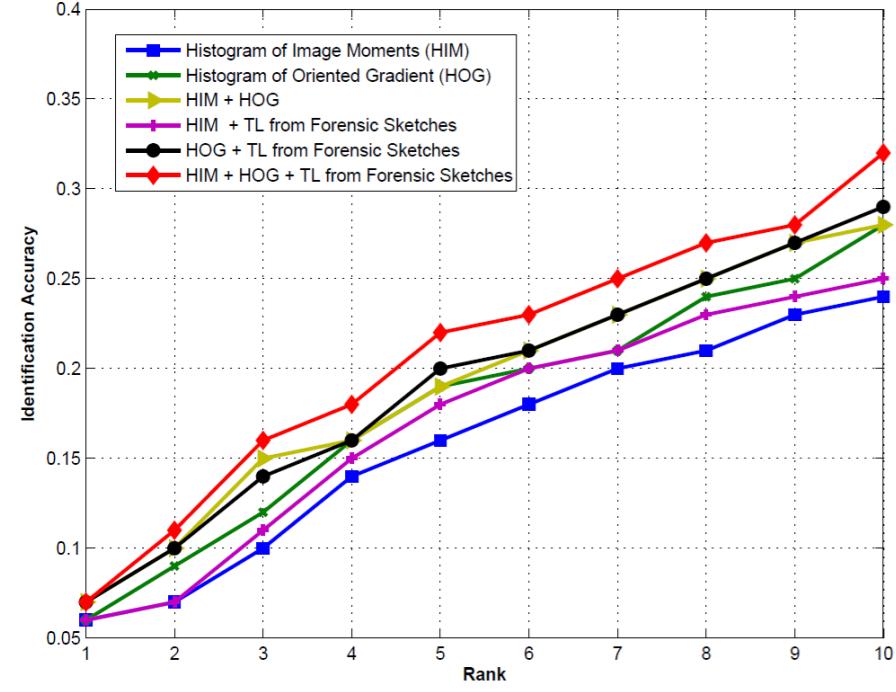
(a) Experiment 1: Digital Image



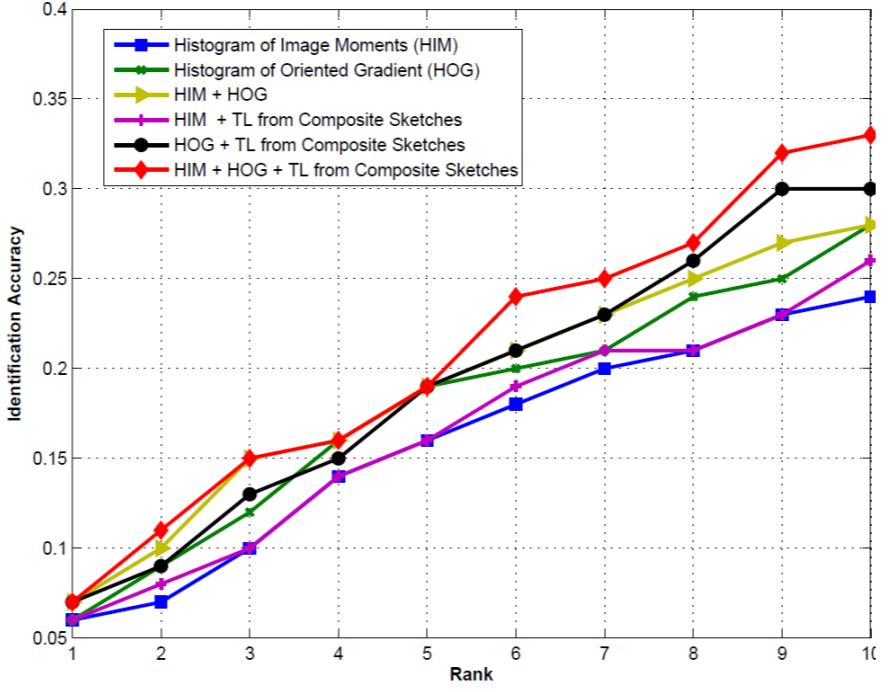
(b) Experiment 2: Viewed Image



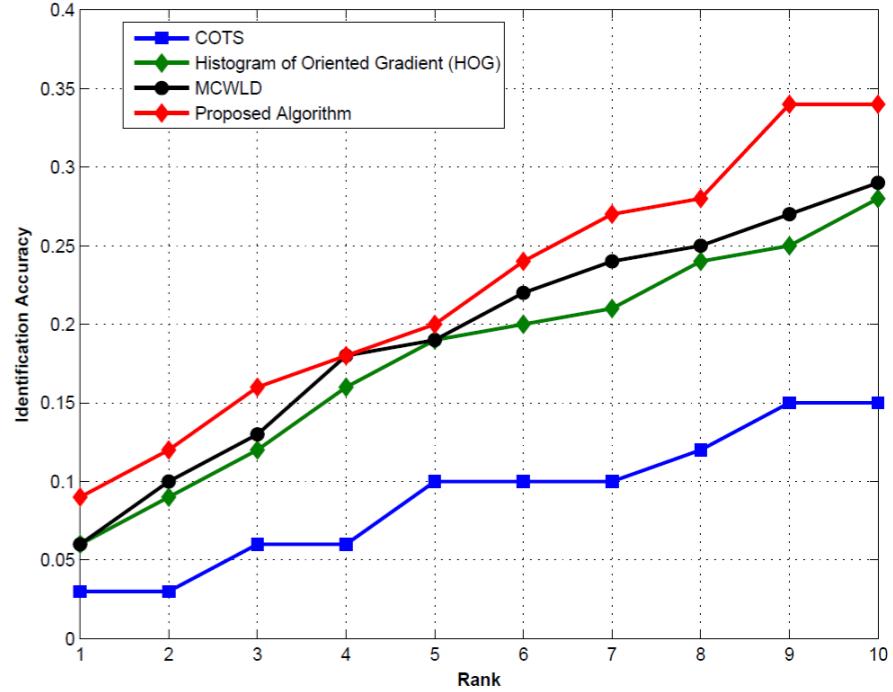
(c) Experiment 3: Semi-Forensic Image



(d) Experiment 4: Forensic Image

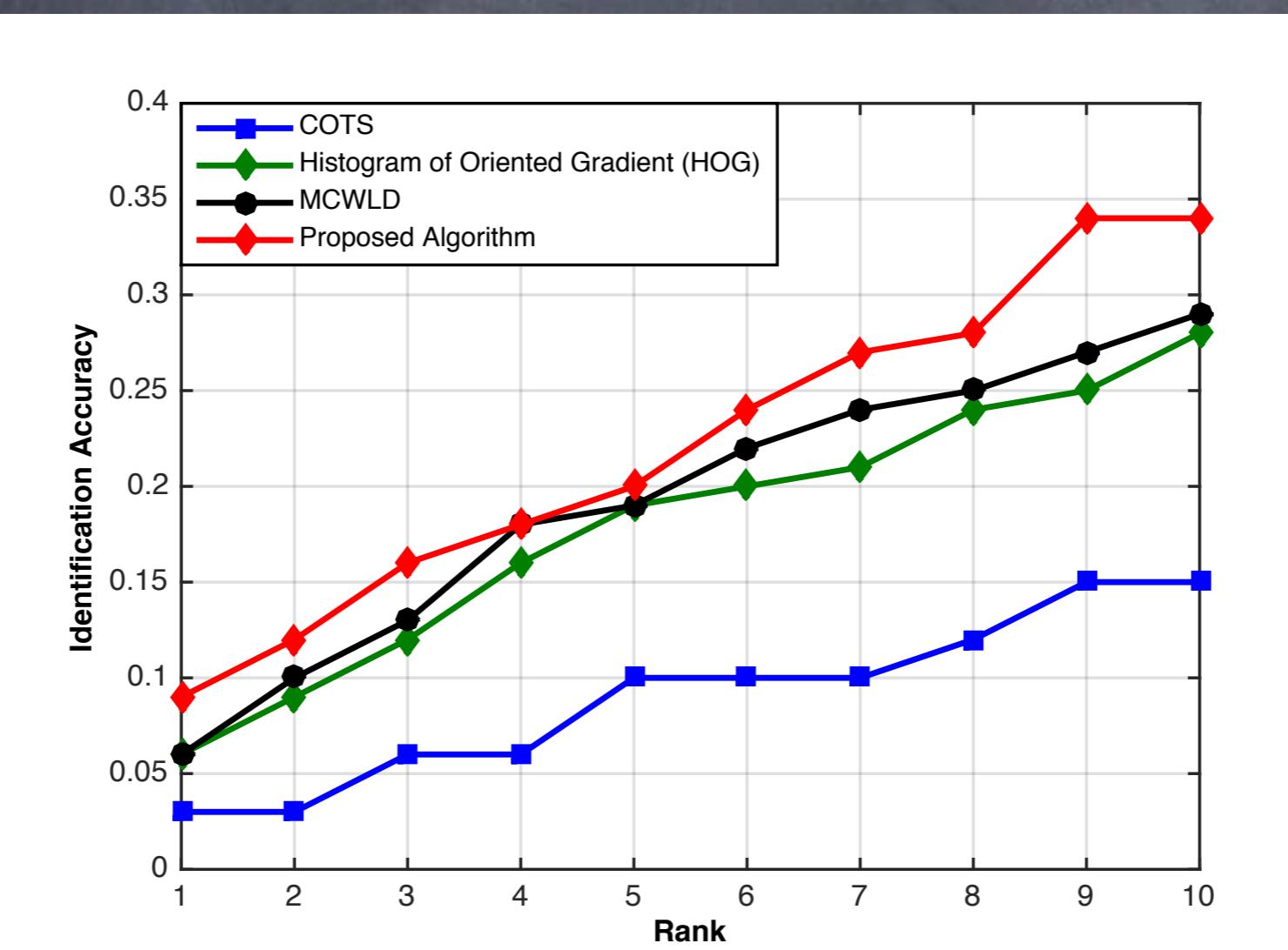


(e) Experiment 5: Composite Image



(f) Comparison with Existing Algorithms

# Results



# Key Observations

- Rank-10 identification accuracy improves by 5-10% after applying the transfer learning technique
- Training with forensic sketches yields lower accuracy than semi-forensic sketches
- However, Rank-1 (even Rank-10) accuracy is very low

# Next (Future) Step

- Try deep-learning with domain adaptation (transfer learning) for very small sample size

Thank You!!!