

CUBIST-STYLE IMAGE EFFECTS WITH OBLIQUE DECISION TREES

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<https://edric-chan.github.io/cubist-TAO/>

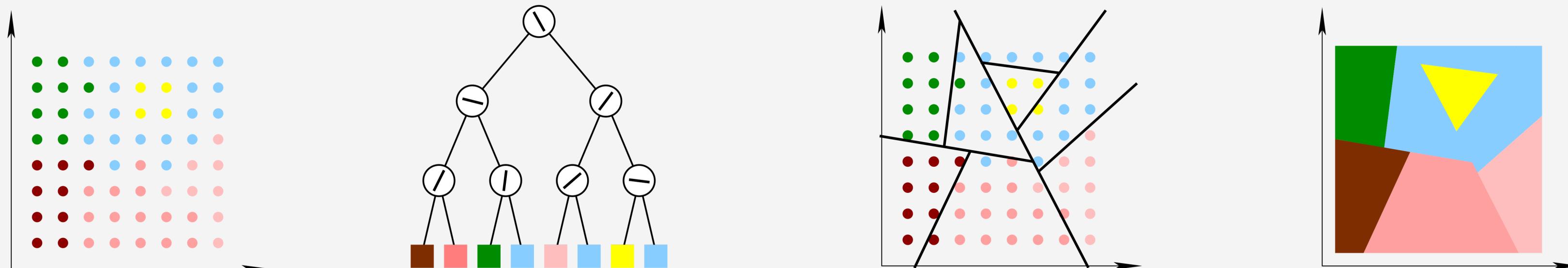


Figure 1: Learning an oblique regression tree using the Tree Alternating Optimization (TAO) algorithm to represent an image (in general, we can use T trees). *Plot 1*: an input image, as a grid of points $x_n \in \mathbb{R}^2$ (input features) each with a color $y_n \in \mathbb{R}^3$ (output labels). *Plot 2*: an oblique regression tree of depth 3 learned on this dataset. *Plot 3*: the partition of the 2D space induced by the tree. *Plot 4*: the partition with each leaf polygon colored by the leaf label.



Figure 2: *Images 1, 2*: actual paintings. *Rest*: tree outputs for image 1.

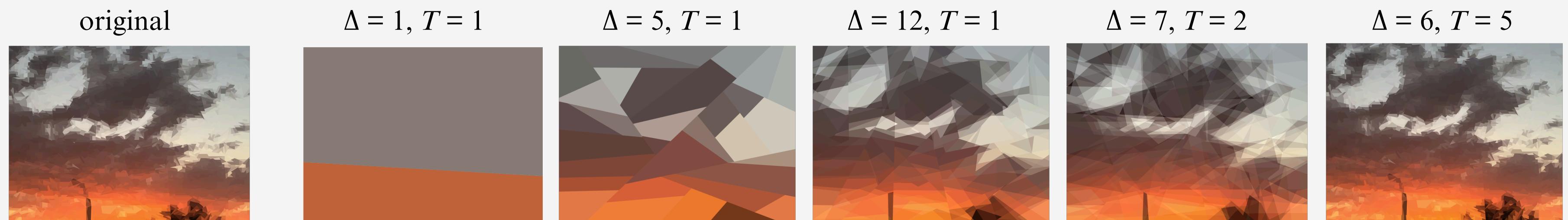


Figure 3: *Left*: photograph. *Rest*: tree outputs using different depths Δ and number of trees T .



Figure 4: Tree outputs over training TAO iteration (*left*: $\Delta = 5$, $T = 1$; *right*: $\Delta = 6$, $T = 1$).

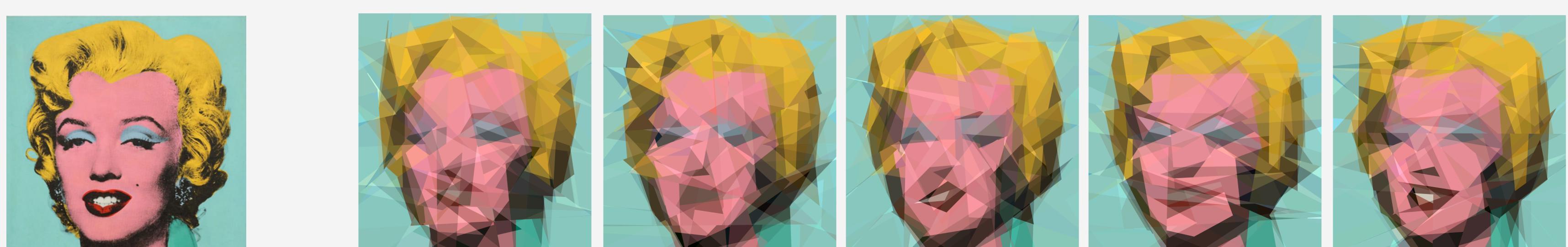


Figure 5: *Left*: original image. *Rest*: tree outputs using different seeds (for $\Delta = 6$, $T = 3$). Combining these images into a video produces a jittery effect reminiscent of rotoscopic animation. See https://youtube.be/TXPM0mw4a_A

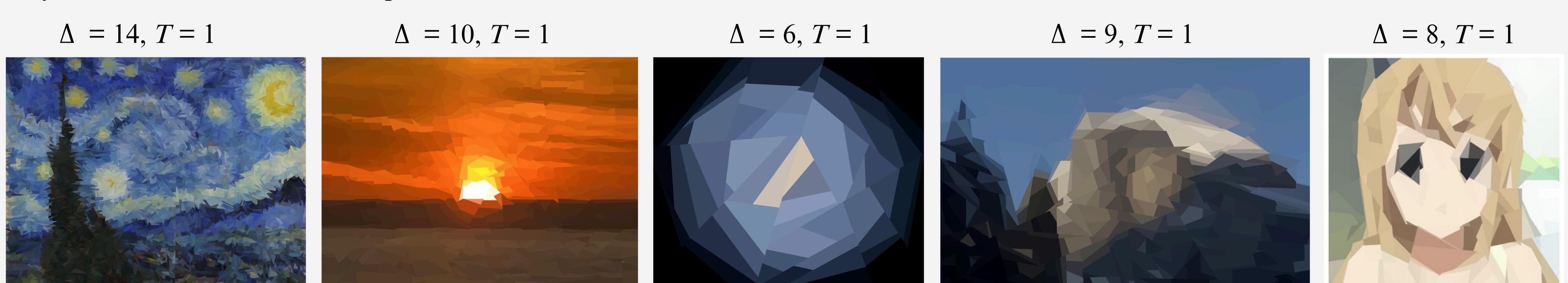


Figure 6: Can you guess the original paintings, drawings or photographs?