THREAD COUNT REPORT

Étretat: The Beach and the Falaise d'Amont
Claude Monet
1885
(W1012 / 1964.204)

from the Art Institute of Chicago

Presented by the
Thread Count Automation Project

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Summary

This report provides the canvas weave densities and local thread angle variations of *Étretat: The Beach and the Falaise d'Amont* (W1012 / 1964.204) by Claude Monet held in the collection of the Art Institute of Chicago. Automatic counts were made from high resolution digital scans of x-rays (600 dpi, 1:1 with painting surface; 8-bit greyscale). These x-rays, at sufficient enlargement, expose the canvas weave to be in the "plain" category. Software automates the process of determining, across the entire scanned x-ray, the thread count of the canvas weave pattern in two directions (nearly vertical and nearly horizontal in the x-ray) and the angles of these threads referenced to true vertical and horizontal respectively. The thread-count processing software revealed the average (avg) and standard deviation (σ) of the thread counts and angles for the horizontal and vertical threads for the entire painting to be

W1012	avg	σ
horizontal thread density (th/cm)	**28.6**	0.7
vertical thread density (th/cm)	**27.1**	0.7
horizontal thread angle (degrees)	**0.1**	0.9
vertical thread angle (degrees)	**0.1**	1.2

The warp threads were determined by visual examination of the weave and angle maps to correspond to the horizontal threads.

This report provides a horizontal thread count deviation map, a vertical thread count deviation map, a horizontal thread angle map, a vertical thread angle map, and histograms of horizontal and vertical thread counts. A table of contents occurs on page 3.

Introduction

This report provides a series of figures representing visualizations of various thread count and angle data for *Étretat: The Beach and the Falaise d'Amont*. All x-ray scans used in this report were provided at 600 dpi. From these x-rays, the weave was determined to be a plain (rectilinear) pattern. The scans were then cropped in Photoshop by Professor Don Johnson (Rice University) to exclude portions of the x-ray outside the canvas. When scans included a portion of the canvas's front edge, it was used to align the corresponding edge of the cropped image, thereby enabling a consistent orientation of the cropped images with respect to the painting. A composite x-ray of the entire painting was computed from individual scans by Professor Robert Erdmann (University of Arizona). Using this composite as the input, the thread count calculations employed the following protocol.

- The DENSITY MAPS record the average thread densities (in threads/cm) computed in overlapping 1 cm squares on 0.5 cm centers for each x-ray. The density at each location is indicated by a color. Separate maps are provided for (near) horizontal and (near) vertical threads. X-rays of canvas taken from the same roll should have a very close (within tenths of a thread/cm) match of average densities of threads in the warp direction and a close match (within ±1 thread/cm) in the weft direction. The warp- and weft-thread directions were determined subjectively. Warp-direction weave patterns have thread counts that tend to have a smaller variance, to change little in the thread direction and to change much more in the perpendicular direction. Weft-direction weave patterns are less consistent in the thread direction and tend to have thread counts that change slowly in the perpendicular direction.

- The THREAD ANGLE MAPS indicate with color the values of the average thread angle (relative to horizontal and vertical alignment of the x-ray) in the 1 cm squares examined to compose the weave maps. Separate maps are provided for the (near) horizontal and (near) vertical threads. These angle maps vividly display cusping when present by a succesion of color patterns alternating gracefully between the extremes of the colorbar (between red and blue then back again).
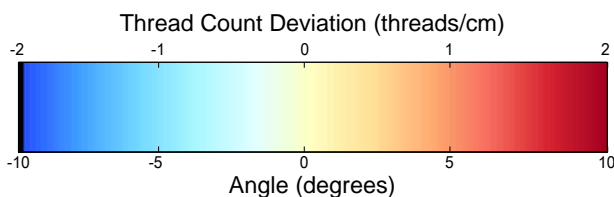

Illustration of the calibrated colorbar for both the weave deviation maps and the weave angle maps.

- The HISTOGRAM plots the number of evaluation squares having average densities within each range increment (of 0.1 th/cm) along the *x*-axis. This plot is useful for visualizing the distribution of the thread densities. Canvases from the same roll should have quite similar histograms in both directions. Often, the threads in the warp direction show less variability, i.e. a narrower distribution, in their count than the weft threads.

Table of Figures

Étretat: The Beach and the Falaise d'Amont (W1012 / 1964.204)

[69.3 × 66.1 cm, 01.01.1885-31.12.1885, Art Institute of Chicago]

X-Ray Layout

The following diagram depicts x-ray locations with respect to the painting and what rotations/translations were used in creating a composite x-ray. The dots represent features used in creating the composite; lines join x-rays sharing features. X-ray size is to scale, as is the outline of the painting.
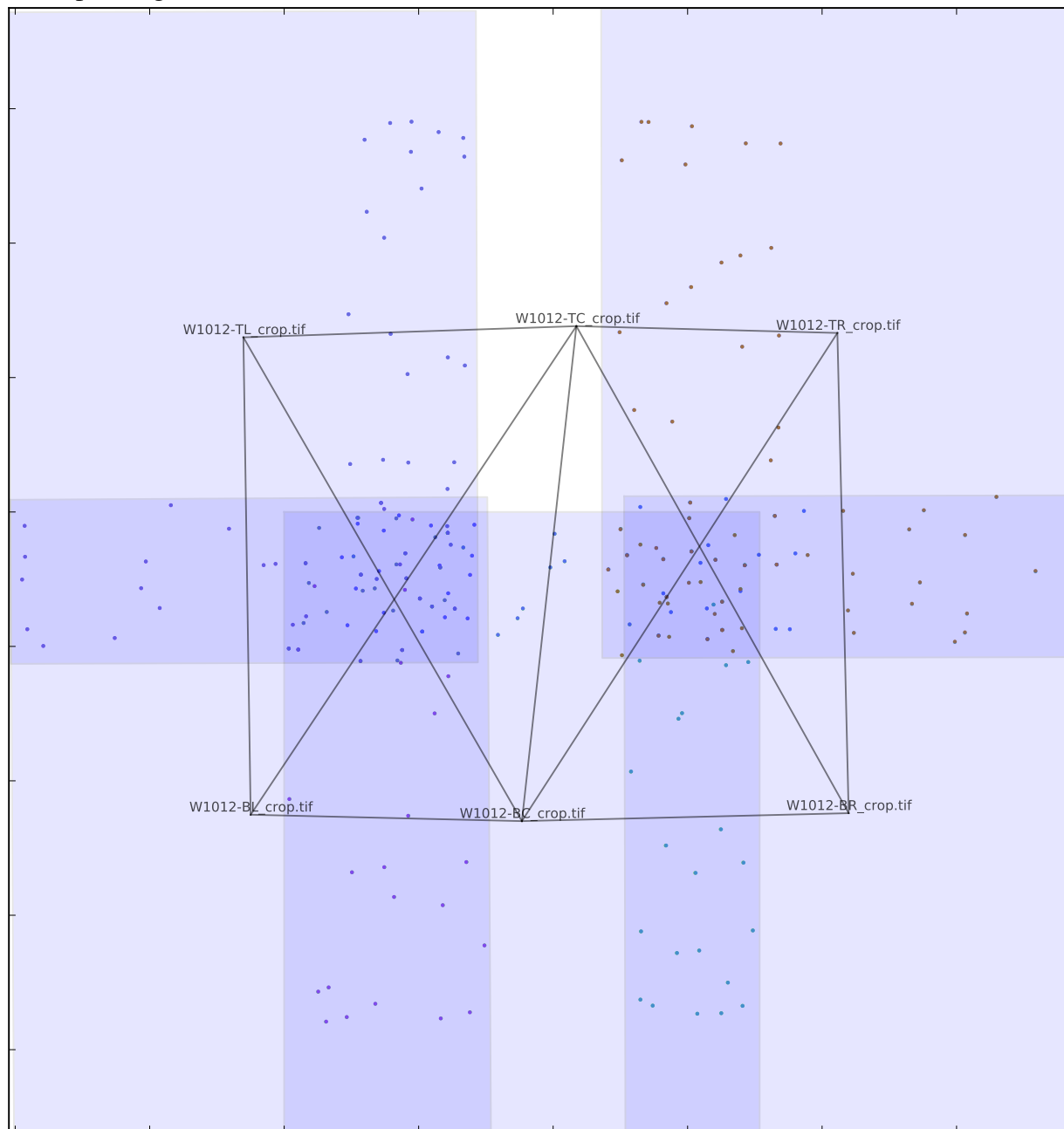
Figure 1: Composite x-ray created by Professor Erdmann's stitching software for the entire painting.
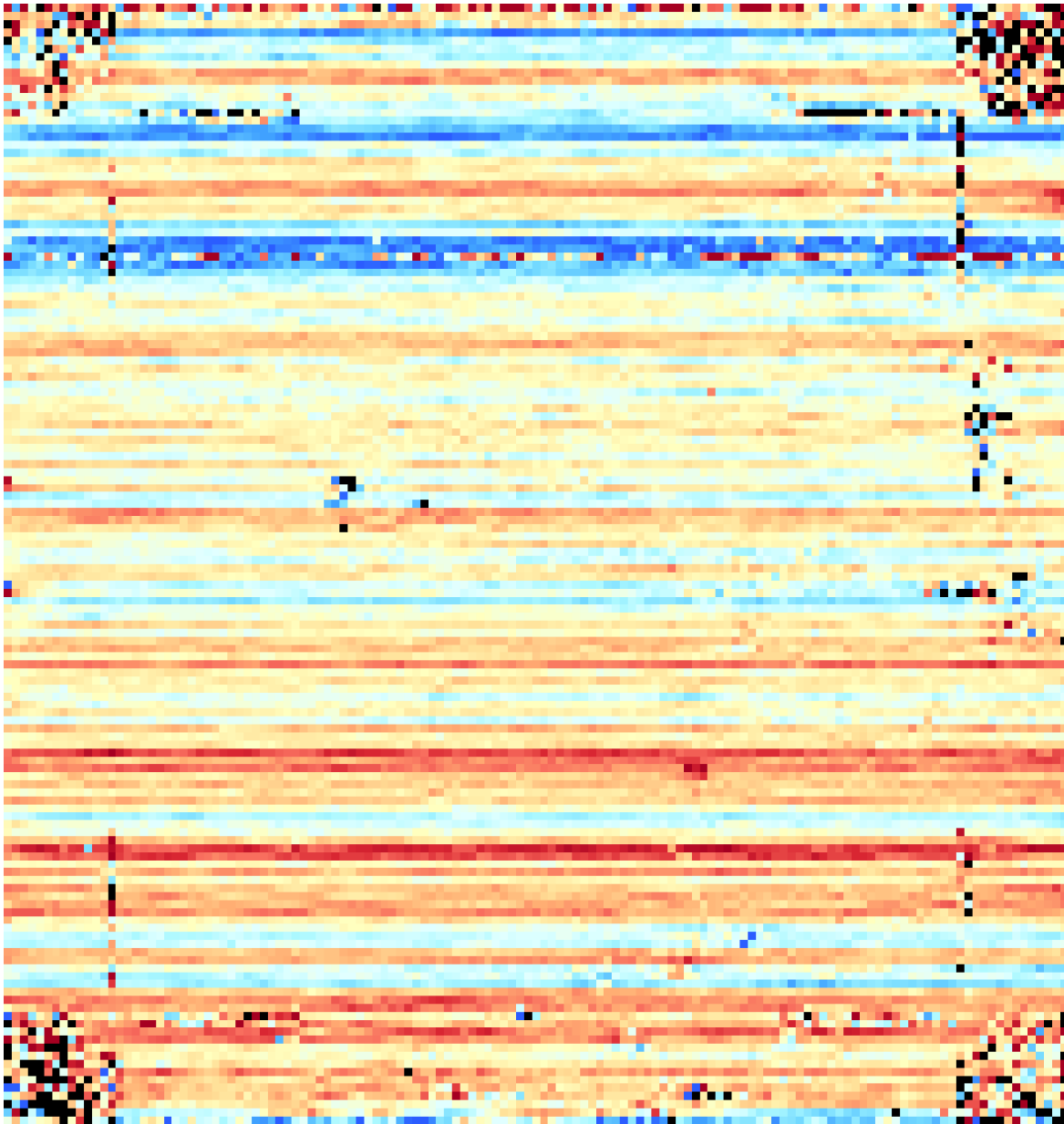
Figure 2: Horizontal (presumed warp) thread count deviation map for the entire painting.
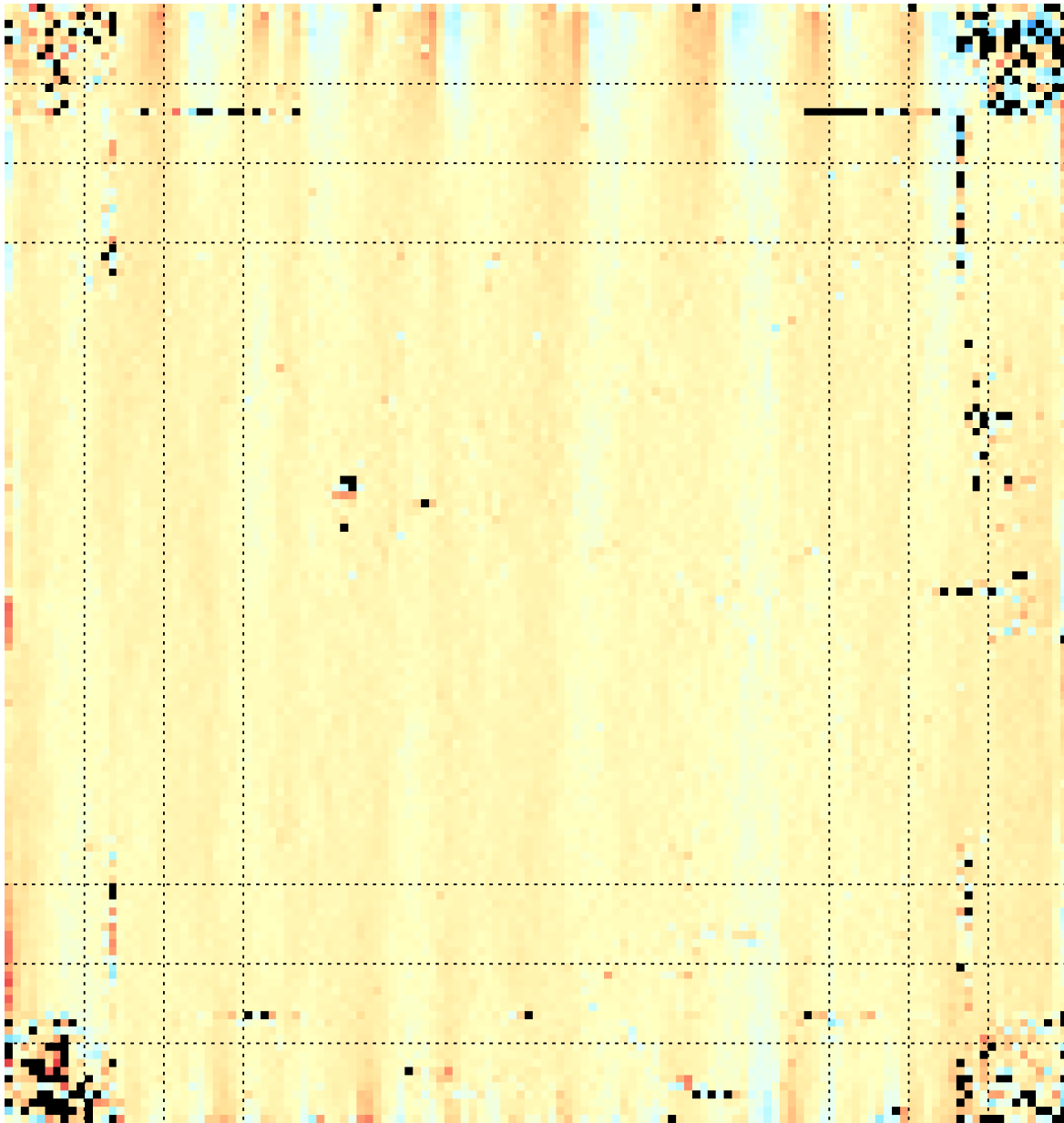
Figure 3: Horizontal (presumed warp) thread angle map for the entire painting. Horizontal and vertical dashed lines are separated by 5 cm and can be used to judge cusping depth and separation.
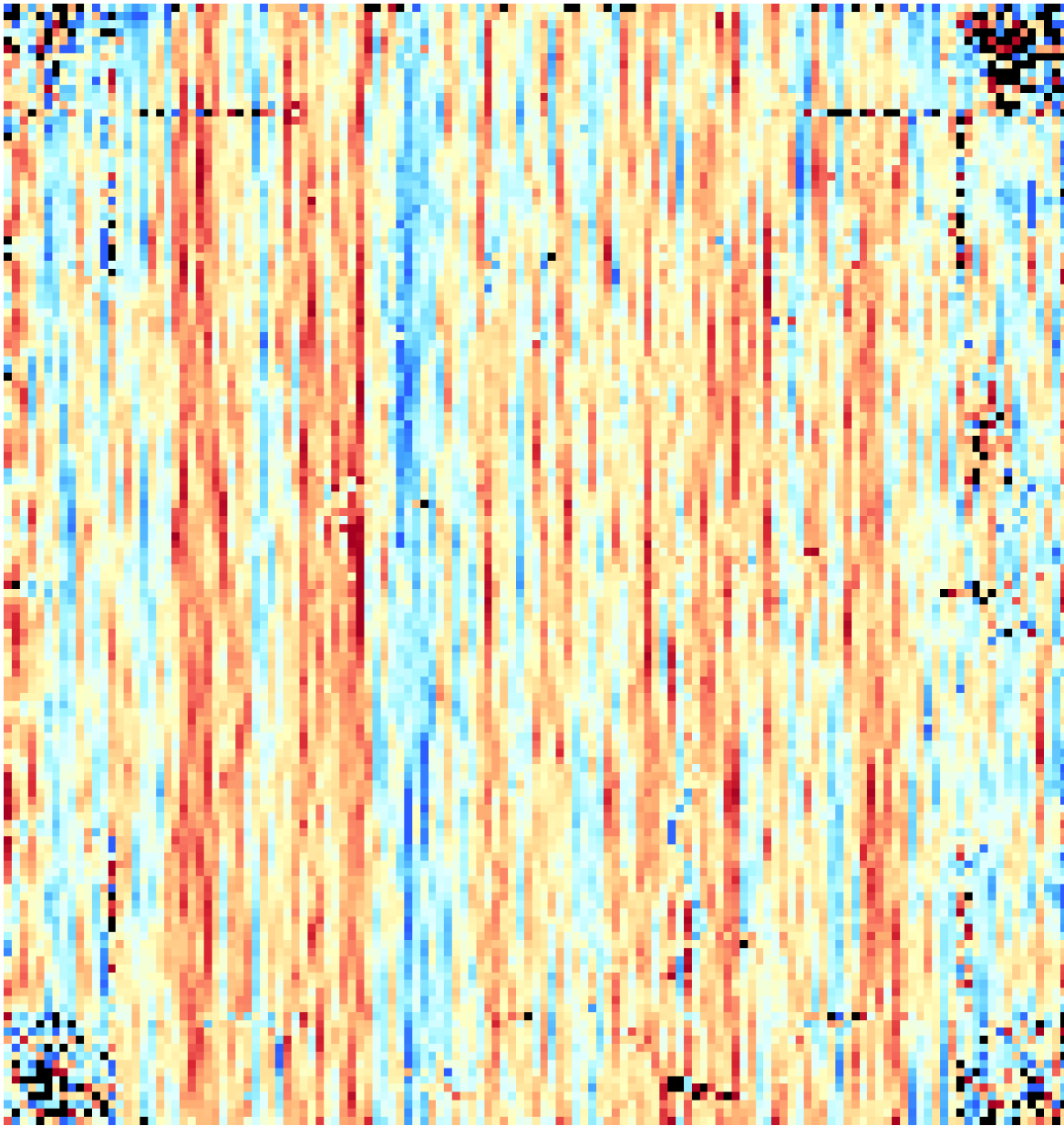
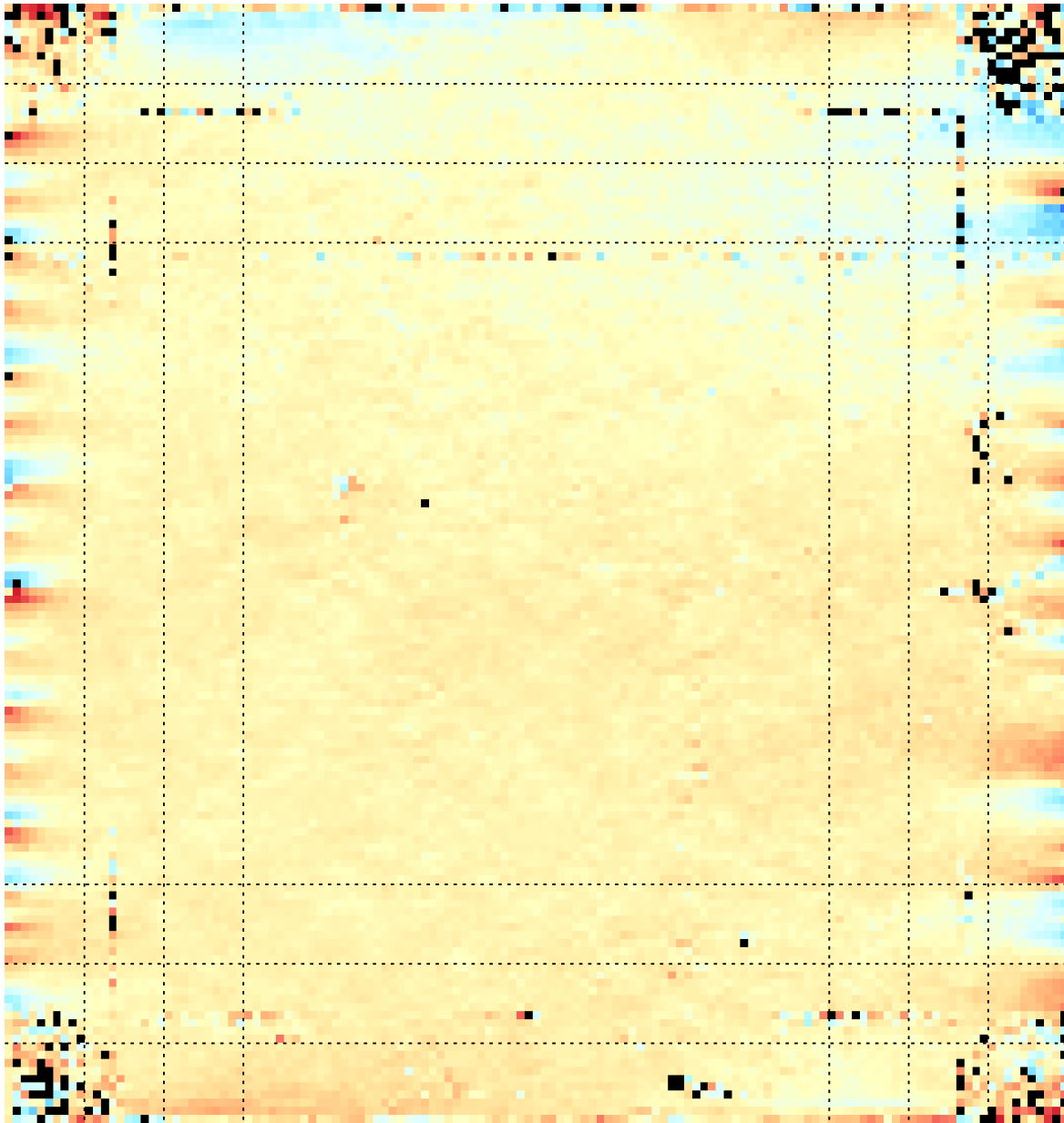Figure 4: Vertical (presumed weft) thread count deviation map for the entire painting.

Figure 5: Vertical (presumed weft) thread angle map for the entire painting. Horizontal and vertical dashed lines are separated by 5 cm and can be used to judge cusping depth and separation.
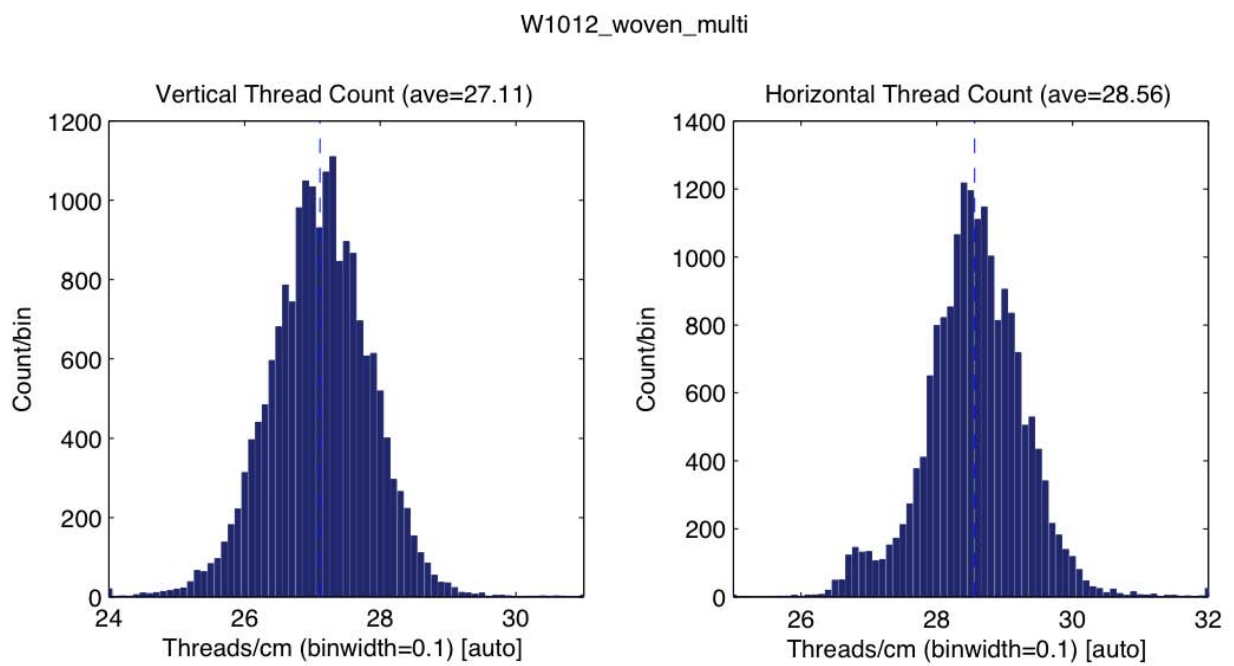
Figure 6: Thread count histograms for the entire painting.