

CHROMATIC ECHOES

A COLOR-BASED QUANTITATIVE
ANALYSIS OF ART HISTORY

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DISCIPLINA DE MINERAÇÃO DE DADOS APLICADA 2025.1



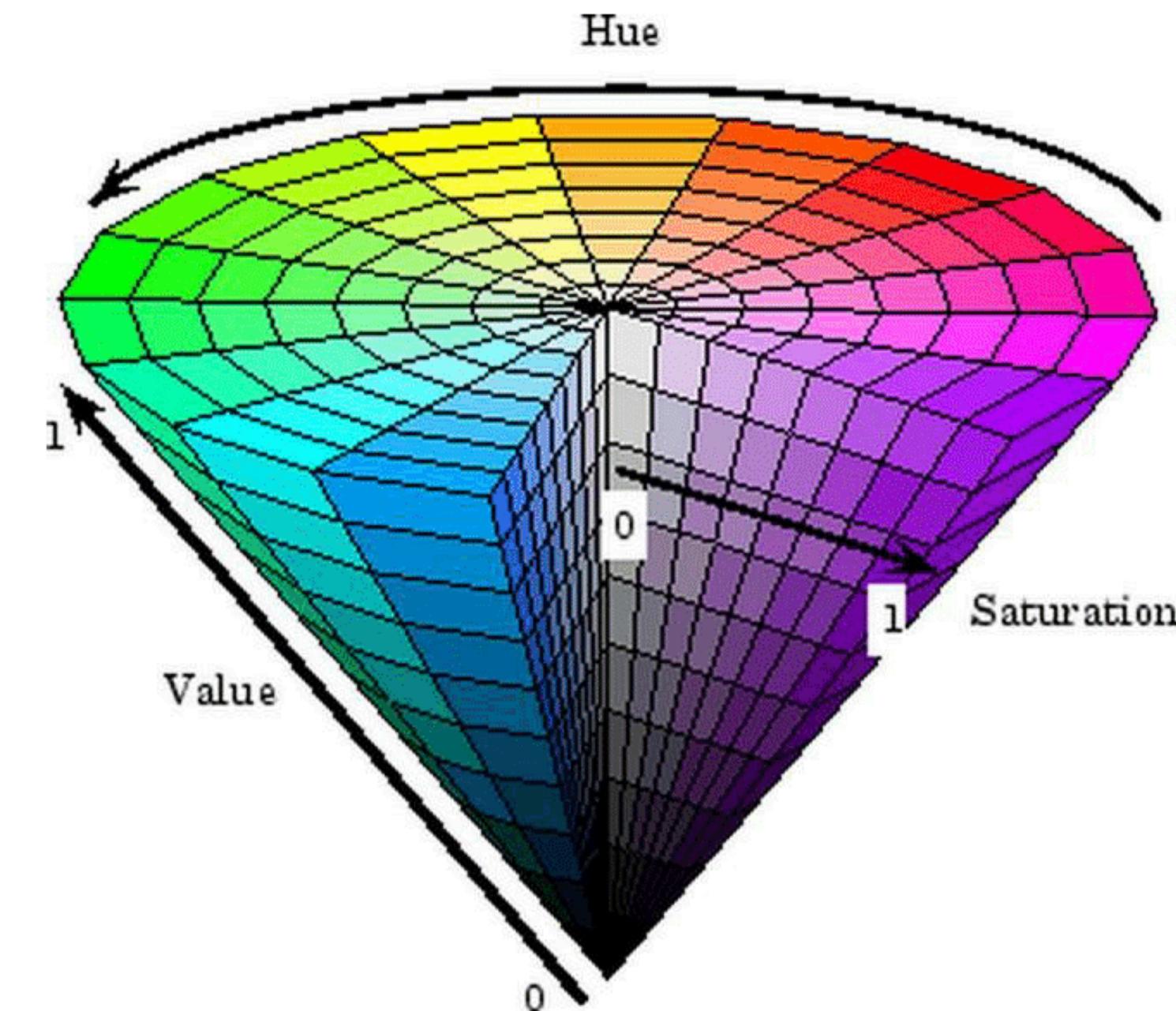
COLOR MODEL

HUE, SATURATION, VALUE (HSV)

HUE: ANGLE

SATURATION: [0,1]

VALUE (BRIGHTNESS): [0,1]



COLOR CLUSTERING

COLOR CLUSTERING

WEIGHTED

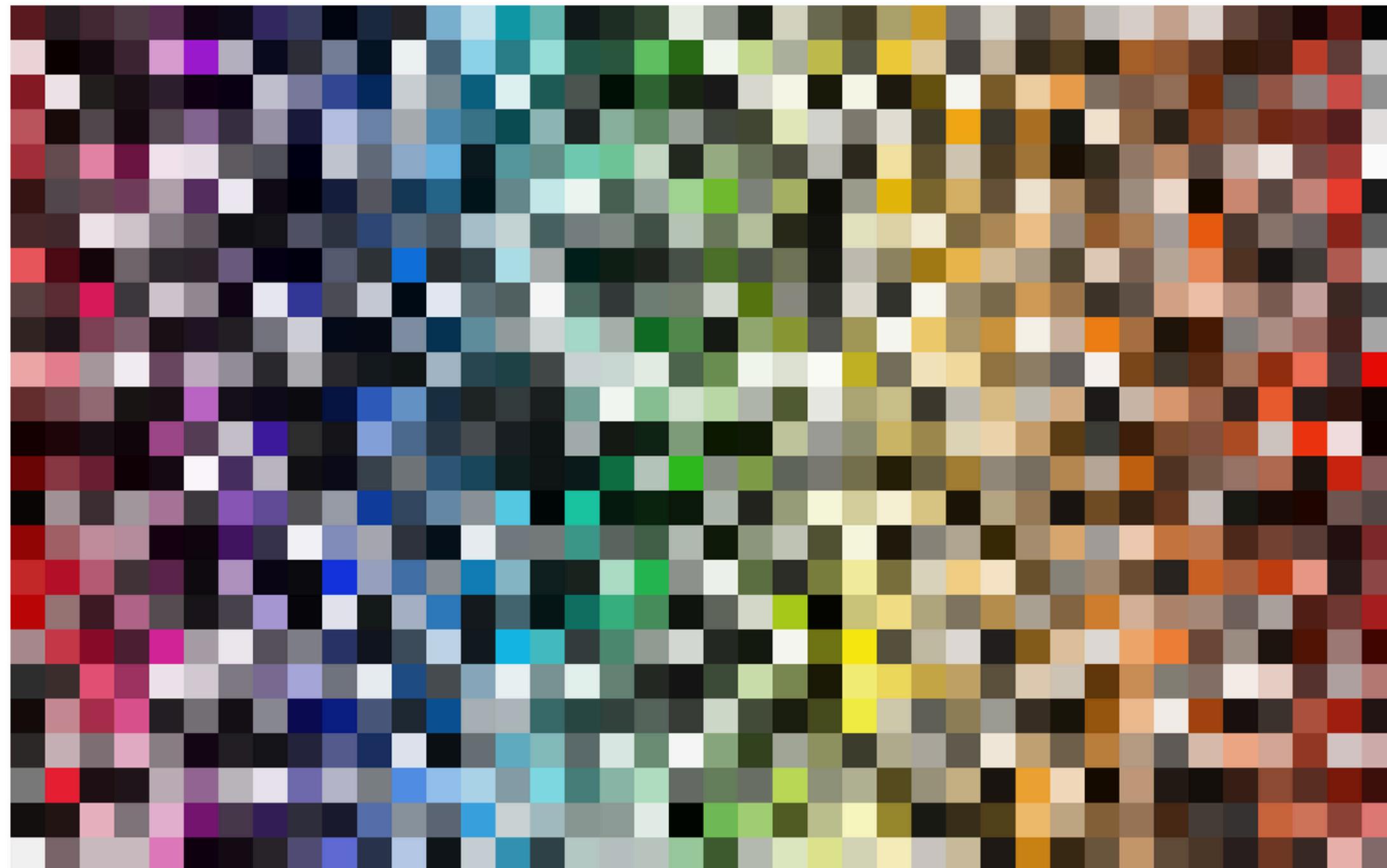
KMEANS

K = 100

SILLOUETTE SCORE: 0.212

CALINSKI-HARABASZ SCRE: 189733.403

DAVIE-BOULDIN INDEX: 0.977



Clusters color Grid ordered by hue

ARTWORK CLUSTERING

ARTWORK CLUSTERING

WEIGHTED

KMEANS

K = 100

SILLOUETTE SCORE: 0.018

CALINSKI-HARABASZ SCRE: 2377.760

DAVIE-BOULDIN INDEX: 2.766

HUE: MONOCHROMATIC & ANALOGOUS



VAN GOGH, THE OLIVE TREES

33
ANALOGOUS
CLUSTERS

21

MONOCHROMATIC
CLUSTERS



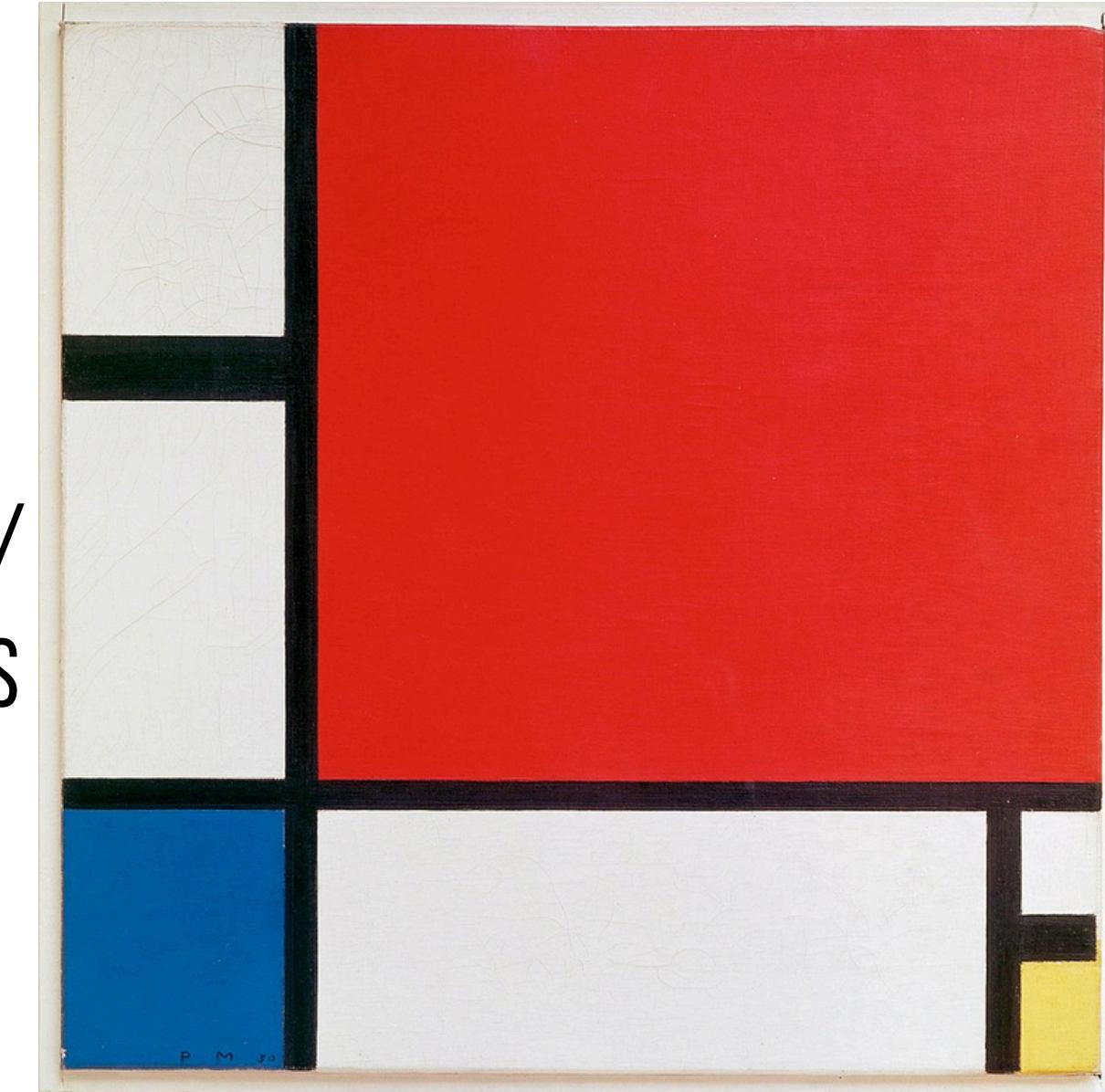
PICASSO, CELESTINA

HUE: TRIADIC & COMPLIMENTARY



VAN GOGH, THE BEDROOM AT ARLES

46
COMPLIMENTARY /
TRIADIC CLUSTERS



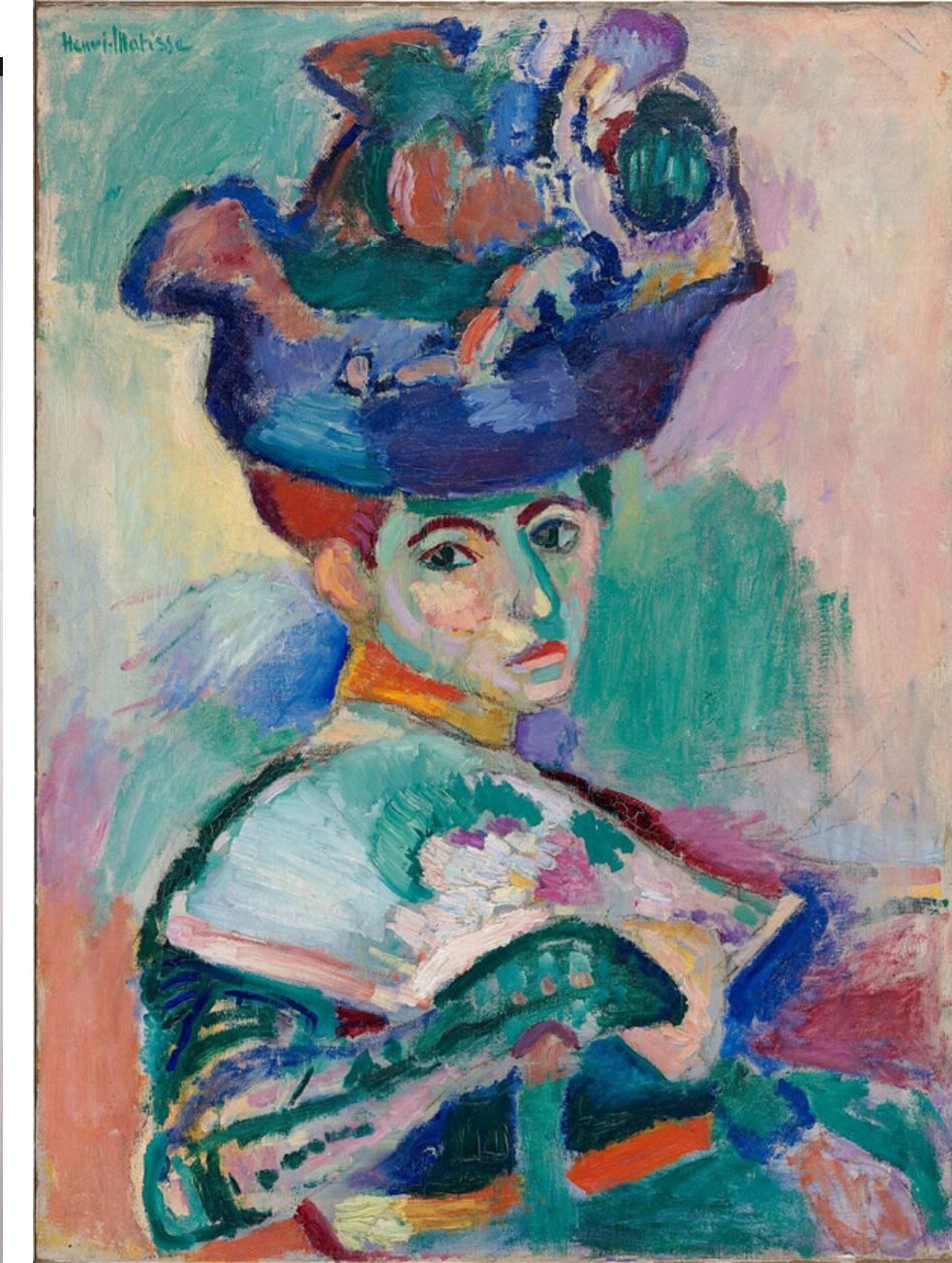
MONDRIAN, COMPOSITION WITH RED, BLUE AND YELLOW

SATURATION: HARMONY

88 HOMOGENEOUSLY SATURATED /
HARMONIOUS CLUSTERS



VERROCCHIO AND DA VINCI, THE BAPTISM OF CHRIST



MATISSE, WOMAN WITH A HAT

BRIGHTNESS: CONTRAST

69 HETEROGENEOUSLY BRIGHT /
CONTRASTING CLUSTERS



CARAVAGGIO, THE CALLING OF SAINT MATTHEW

ITEMSET MINING & ASSOCIATION RULES

ITEMSET MINING & ASSOCIATION RULES

TIME AXIS

FP-GROWTH

SUPPORT: 0.005

LIFT: 5

ZHANG'S METRIC: 0.853 (AVG)

XVI AND XVII CENTURIES



AVERAGE LIFT: 6.03



LORENZO LOTTO, COMMUNIONE DI CRISTO DALLA MADRE

XVIII AND XIX CENTURIES



AVERAGE LIFT: 5.61



JEAN-BAPTISTE PERRONNEAU, PORTRAIT OF OLIVIER JOURNU

ITEMSET MINING & ASSOCIATION RULES

FP-GROWTH

GEOGRAPHIC AXIS

SUPPORT: 0.005

LIFT: 5

ZHANG'S METRIC: 0.848 (AVG)

SPAIN

Spain

cluster_93



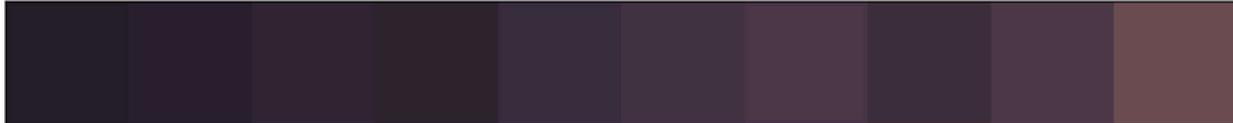
cluster_88



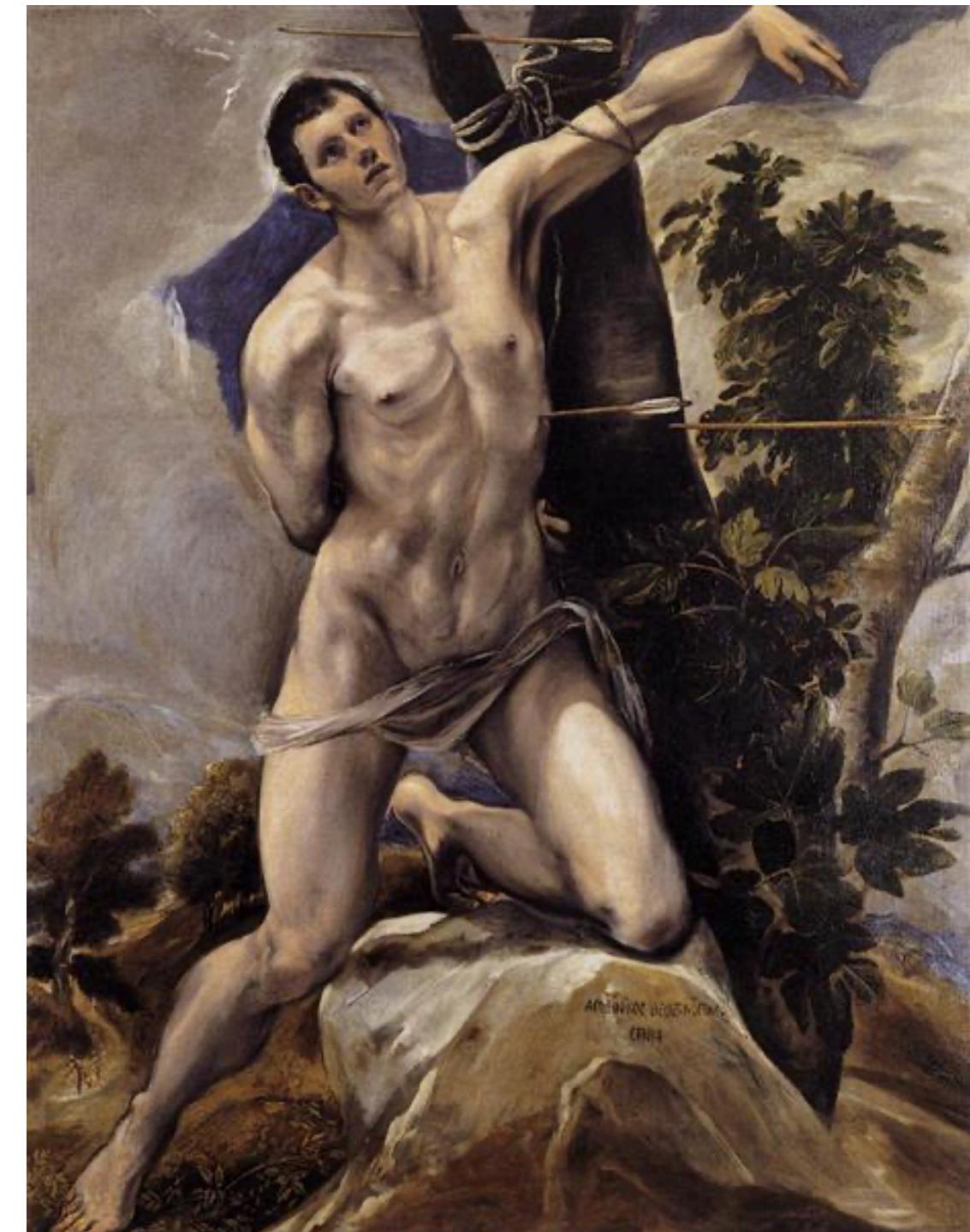
cluster_94



cluster_8

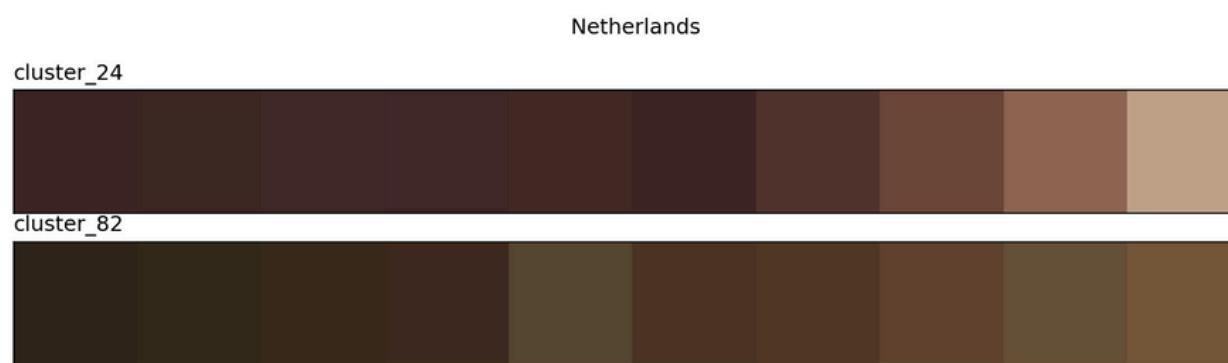


AVERAGE LIFT: 5.75

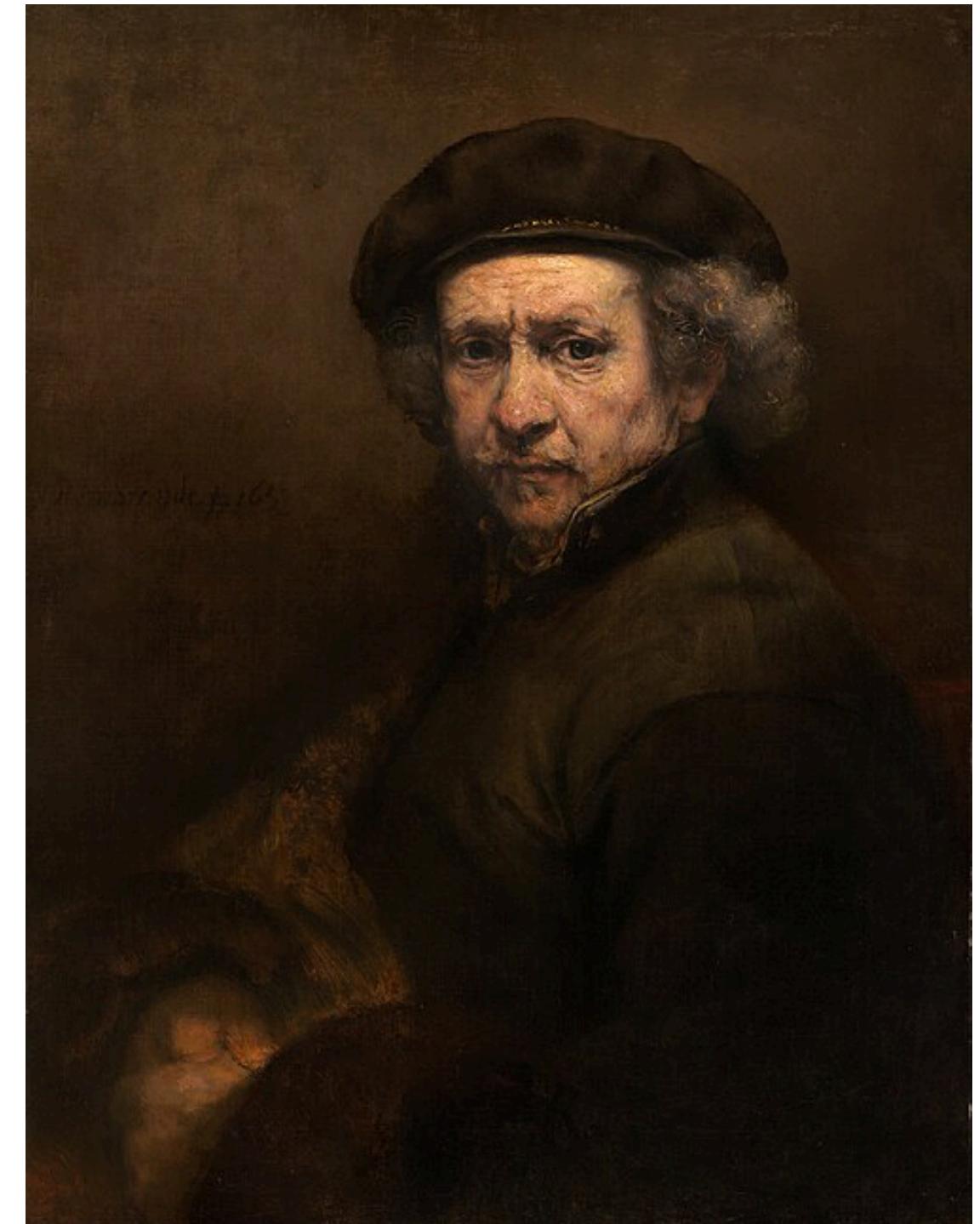


EL GRECO, ST. SEBASTIAN

NETHERLANDS



AVERAGE LIFT: 5.10



REMBRANT, SELF-PORTRAIT WITH BERET AND TURNED-UP COLLAR

AUSTRIA

Austria

cluster_24



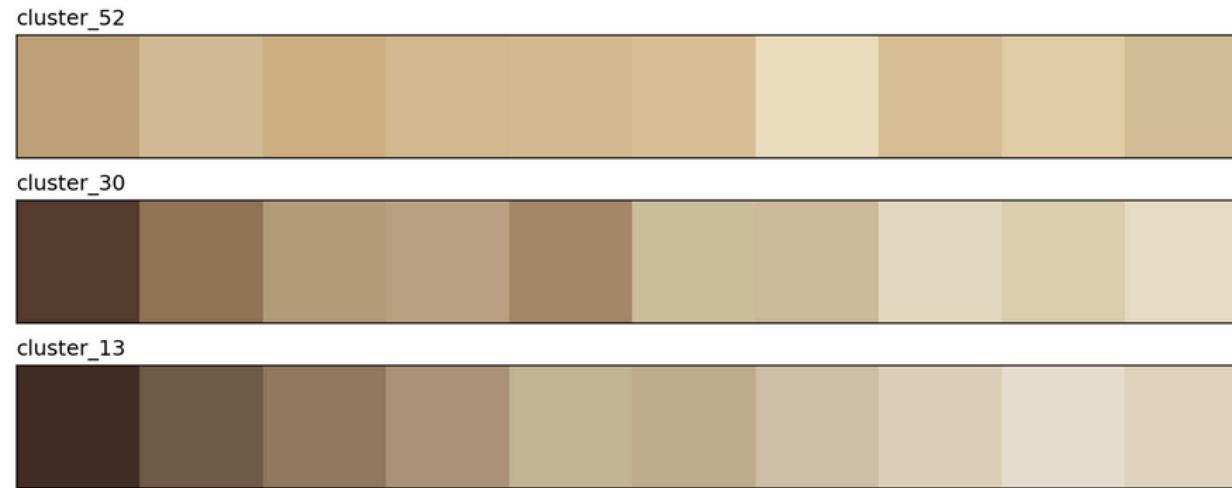
AVERAGE LIFT: 5.80



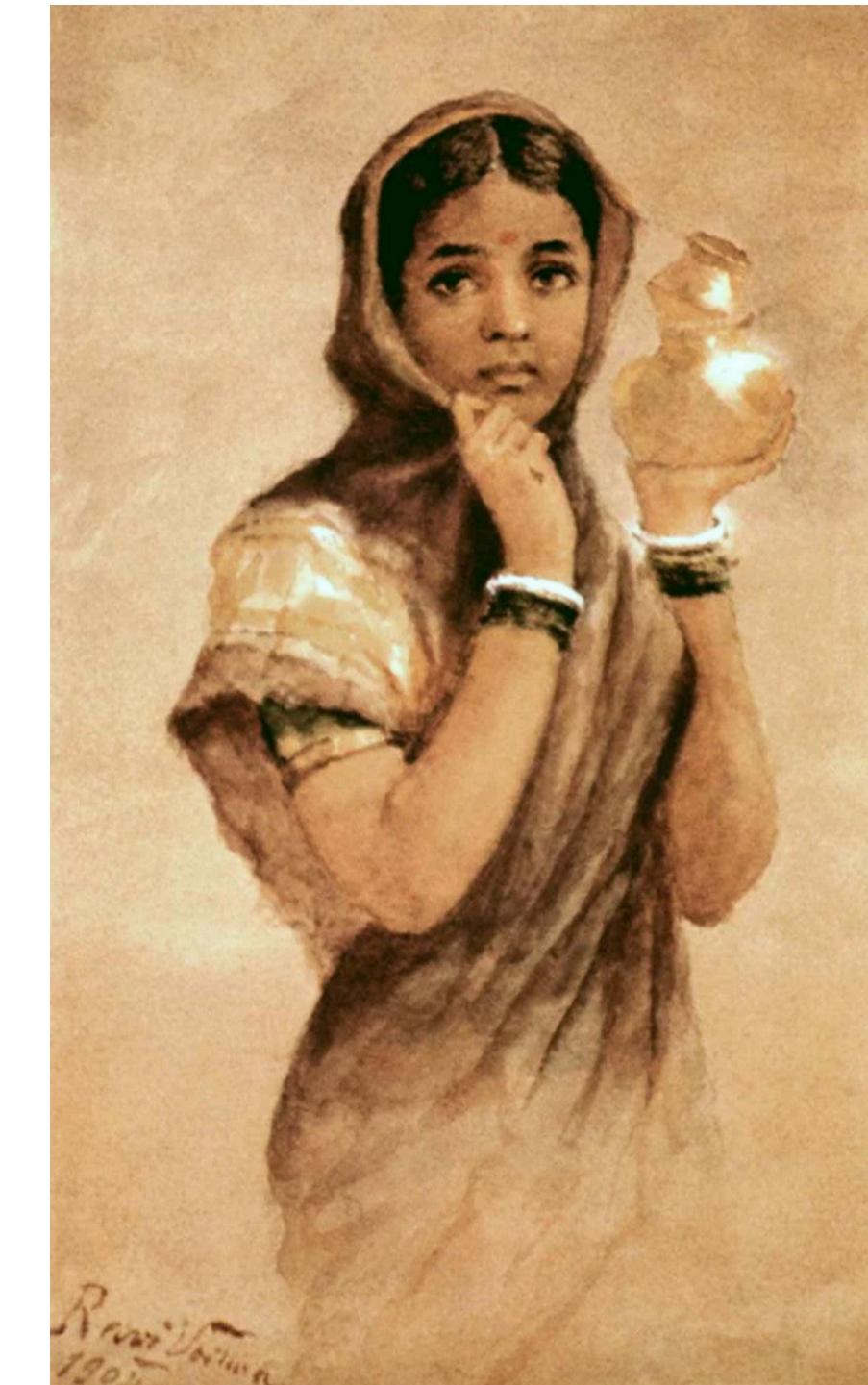
ERNST KLIMT, KNABENBILDNIS

INDIA

India



AVERAGE LIFT: 7.22

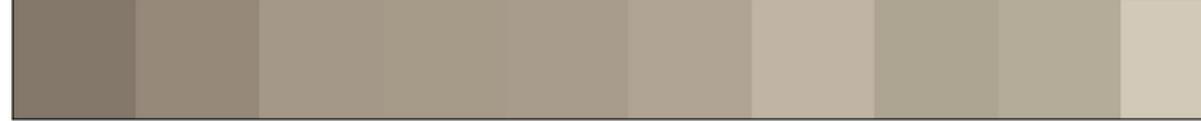


RAJA RAVI VARMA, THE MILKMAID

CHINA

China

cluster_59



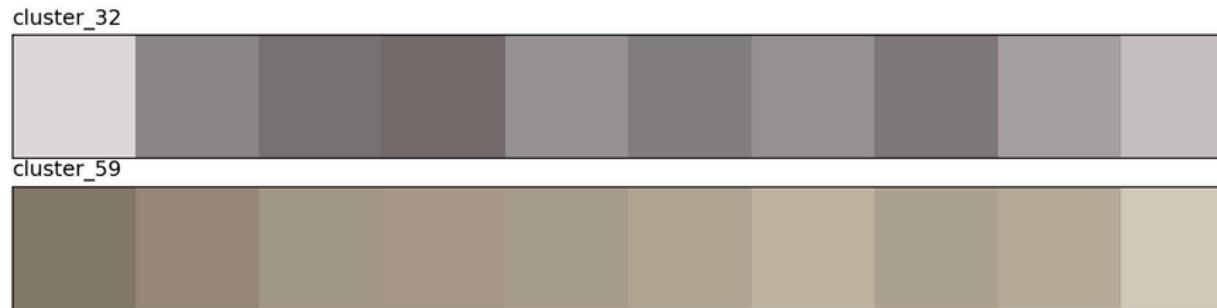
AVERAGE LIFT: 8.17



WANG JIAN, LANDSCAPES IN THE STYLES OF OLD MASTERS

JAPÃO

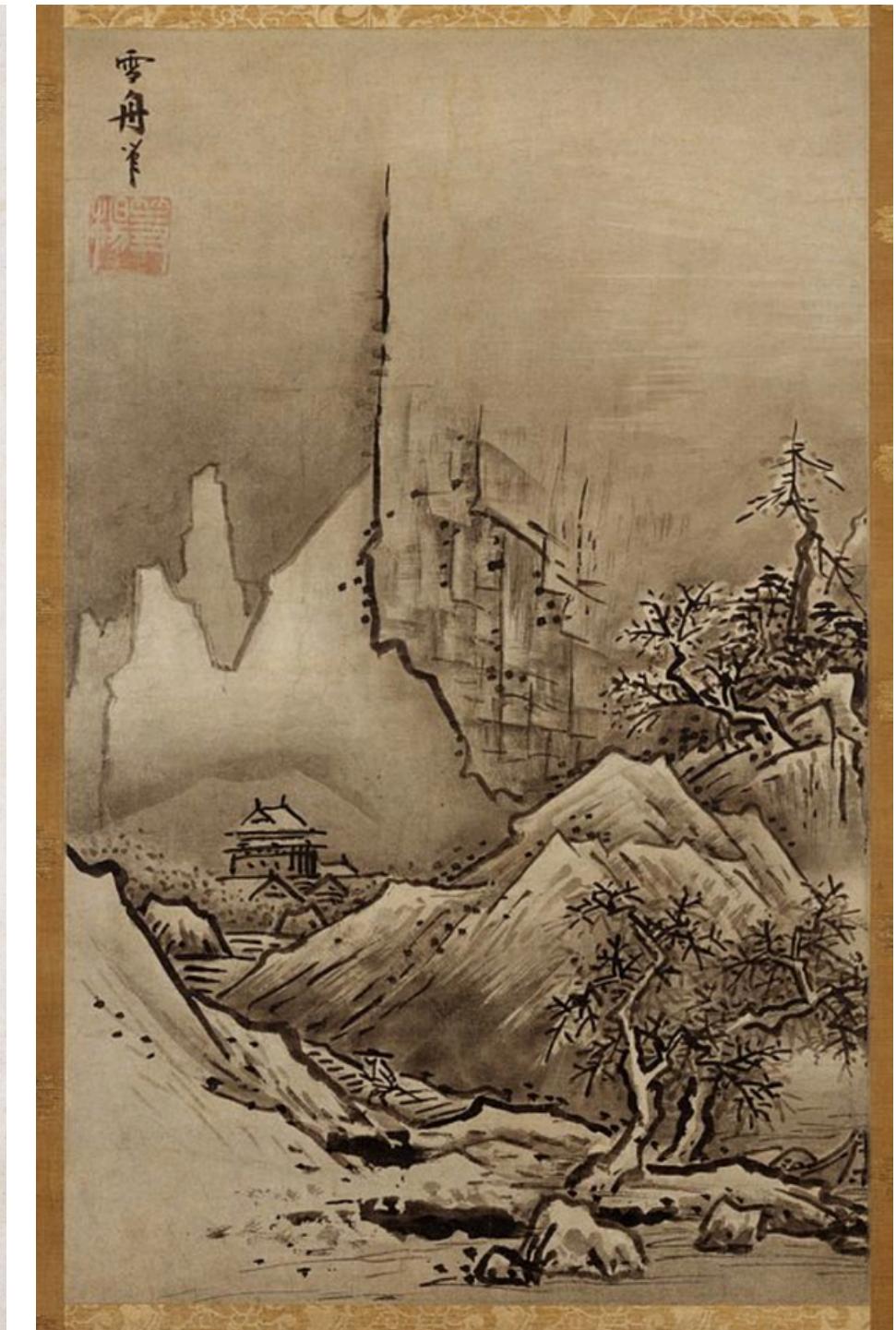
Japan



AVERAGE LIFT: 8.03



SESSHŪ TŌYŌ. "HABOKU SANSUI." SUMI-E INK



SESSHŪ TŌYŌ. "WINTER LANDSCAPE." SUMI-E INK.

CLASSIFICATION

CLASSIFICATION

DECADE PREDICTION

RANDOM FORREST

ACCURACY: 52.45%

**ACCURACY WITHOUT
21TH CENTURY: 9.10%**

CLASSIFICATION

LOCATION PREDICTION

RANDOM FORREST

ACCURACY: 84.72%

**ACCURACY WITHOUT
MODERN: 39.68%**

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