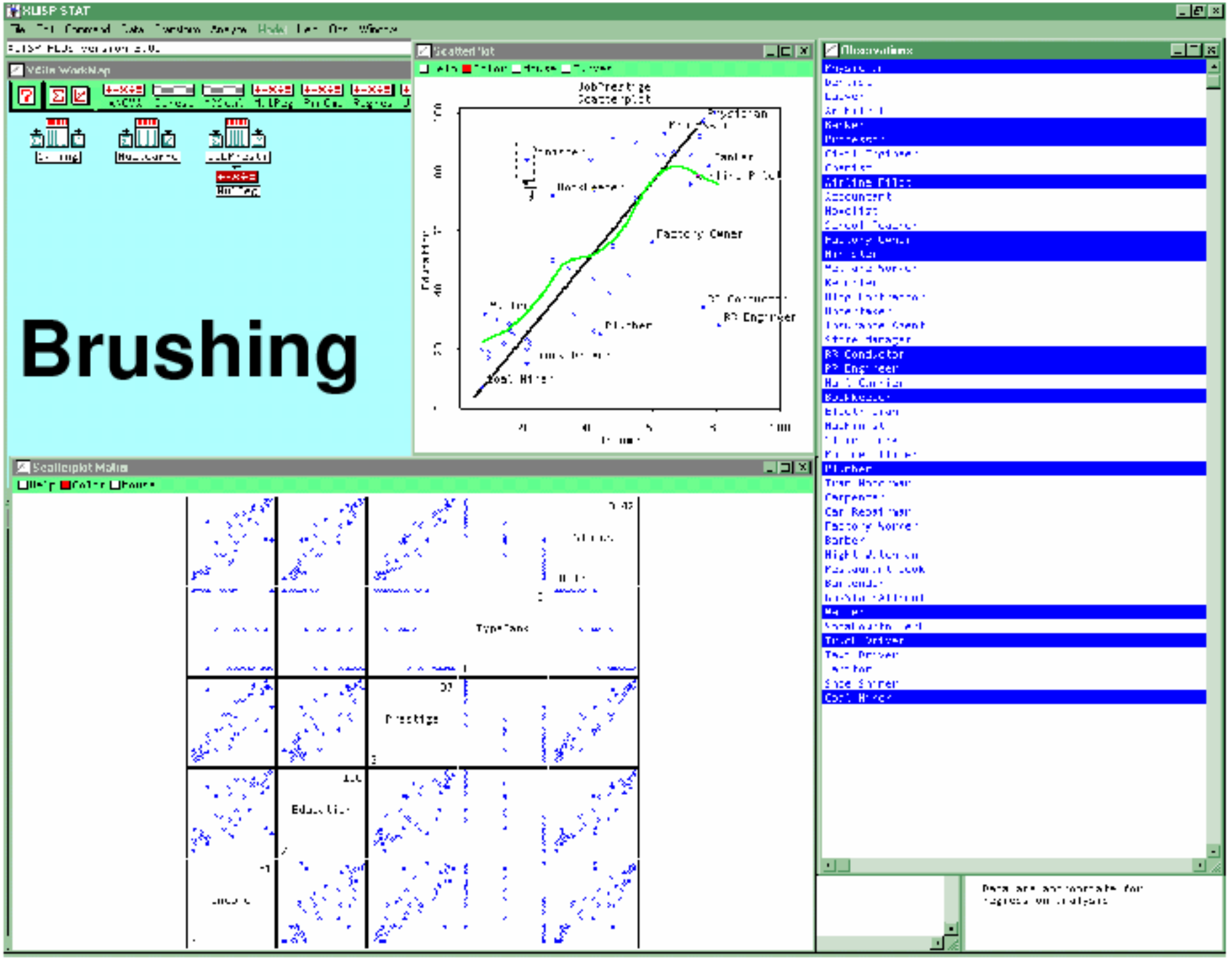
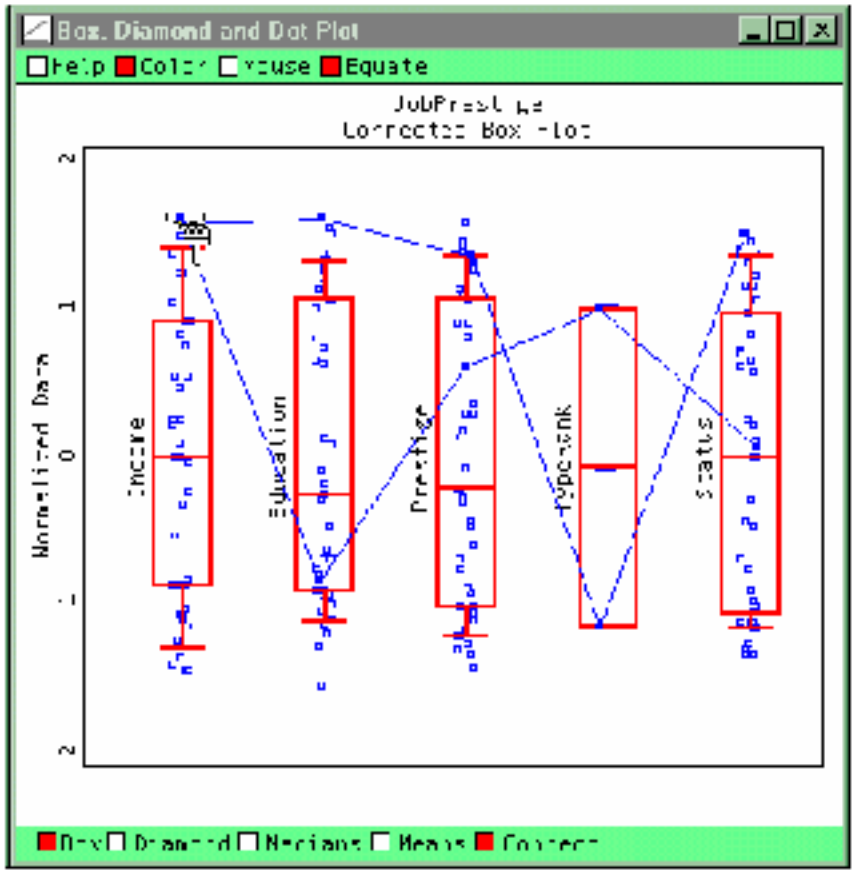
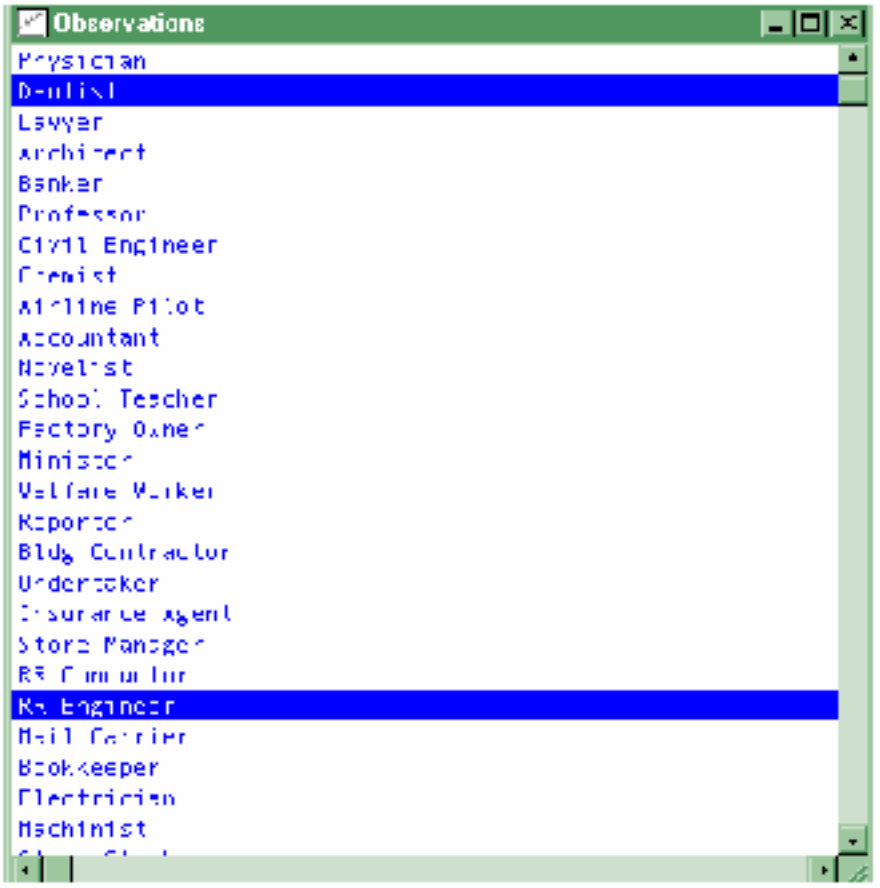
Interaction & Color

Aleks Jakulin

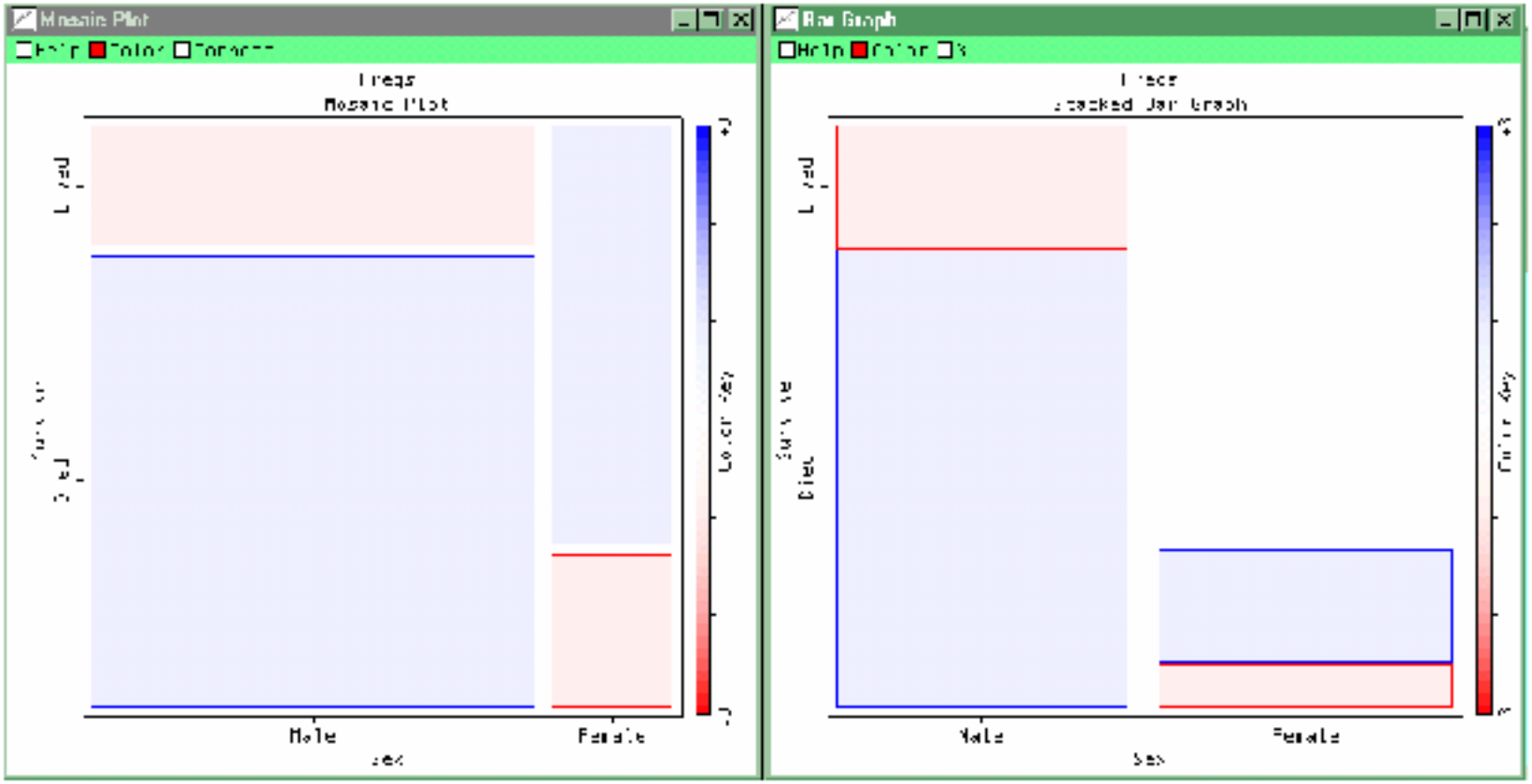

XLISP STAT
Brushing
Scatterplot
Observations
Scatterplot Matrix
Typefans
Prestige
Education
Factory Owner
Plumber
Coal Miner
Airline Pilot
Accountant
Bookkeeper
Carpenter
Car Repairman
Factory Worker
Barber
Truck Driver
Coal Miner

Brushing 2


Box, Diamond and Dot Plot
Help
Color
Mouse
Equate
Normalized Data
2
1
0
-1
-2
Income
Education
Prestige
Typerank
Status


Observations
Physician
Dentist
Lawyer
Architect
Banker
Professor
Civil Engineer
Chemist
Airline Pilot
Accountant
Novelist
School Teacher
Factory Owner
Minister
Welfare Worker
Reporter
Bldg Contractor
Undertaker
Insurance Agent
Store Manager
RR Conductor
Rr Engineer
Mail Carrier
Bookkeeper
Electrician
Machinist

Mosaic Plots

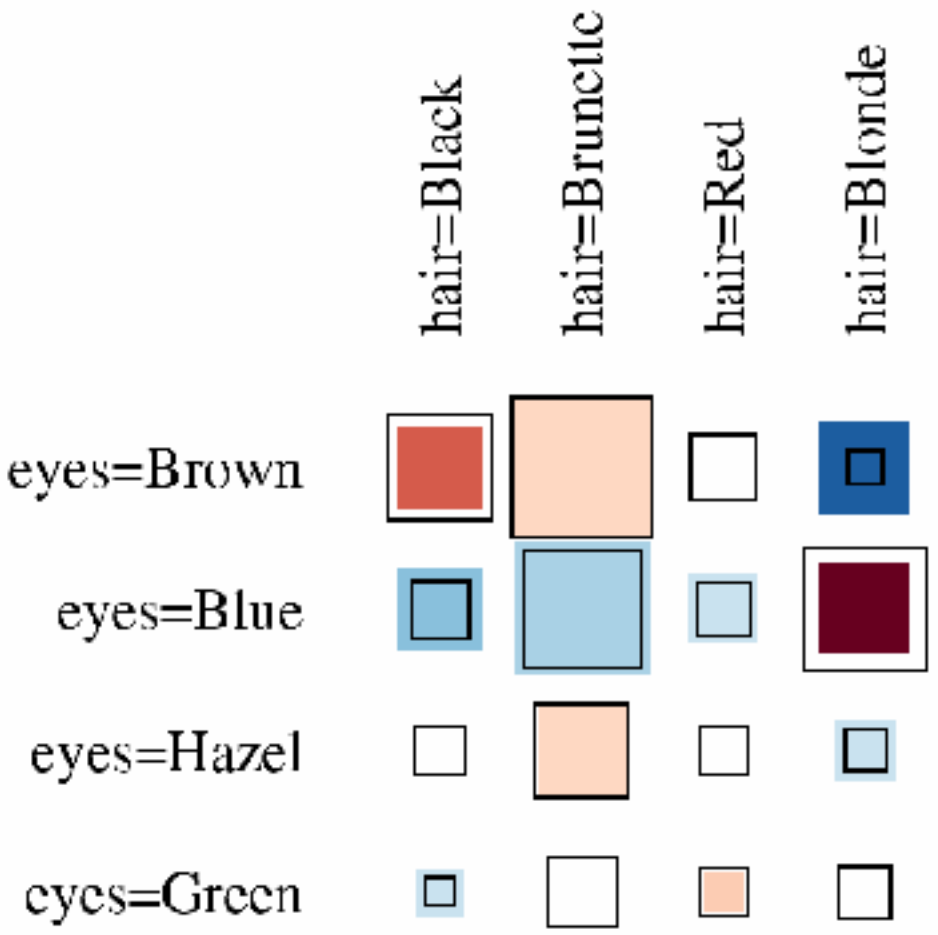


Graphical Model Comparison

Two models:

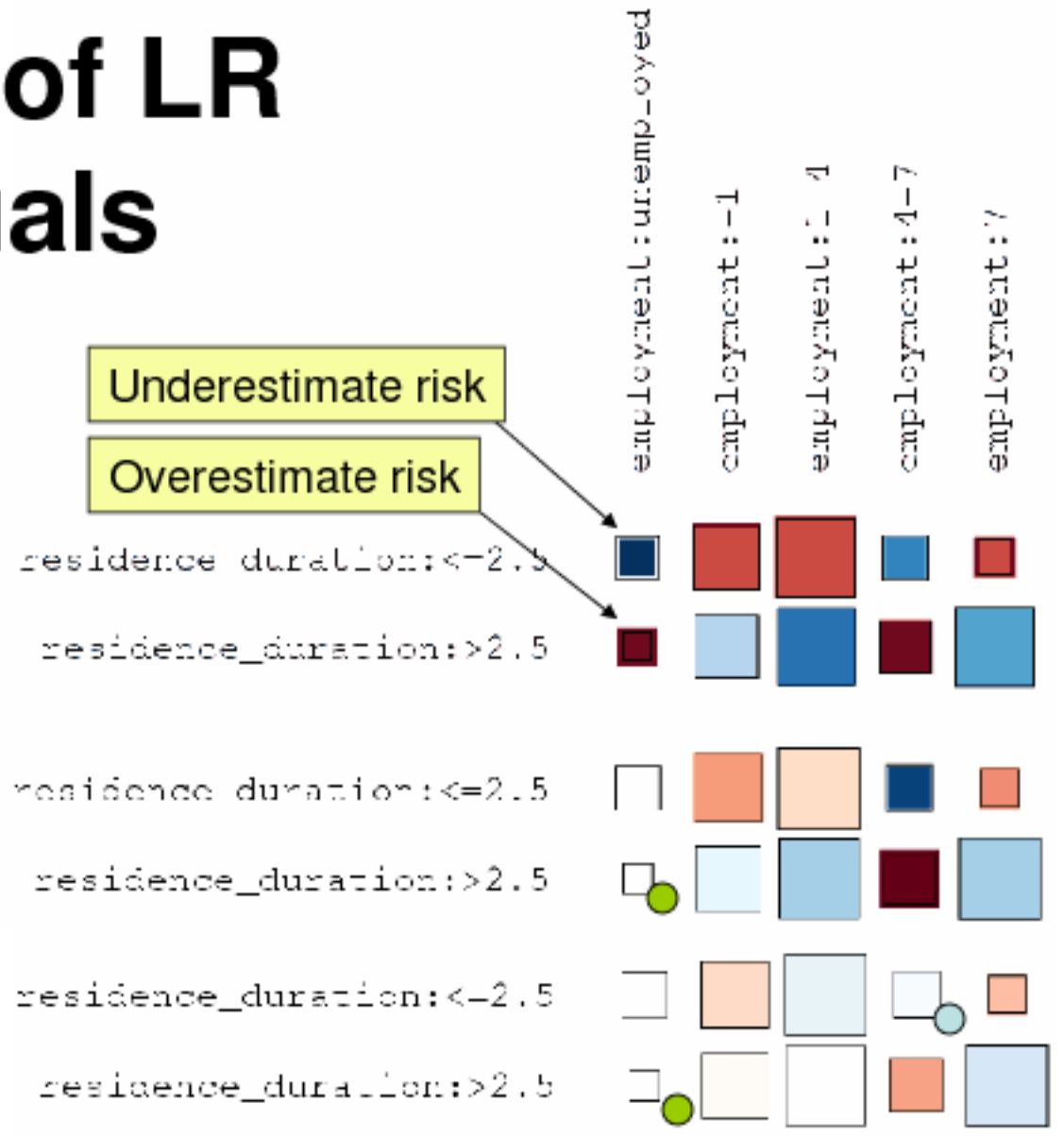
1. Assume independence between eye and hair color.
2. Assume dependence between eye and hair color.

Compare the difference in predictions of these two models (std. Pearson residuals).



Analysis of LR Residuals

Risky instances:



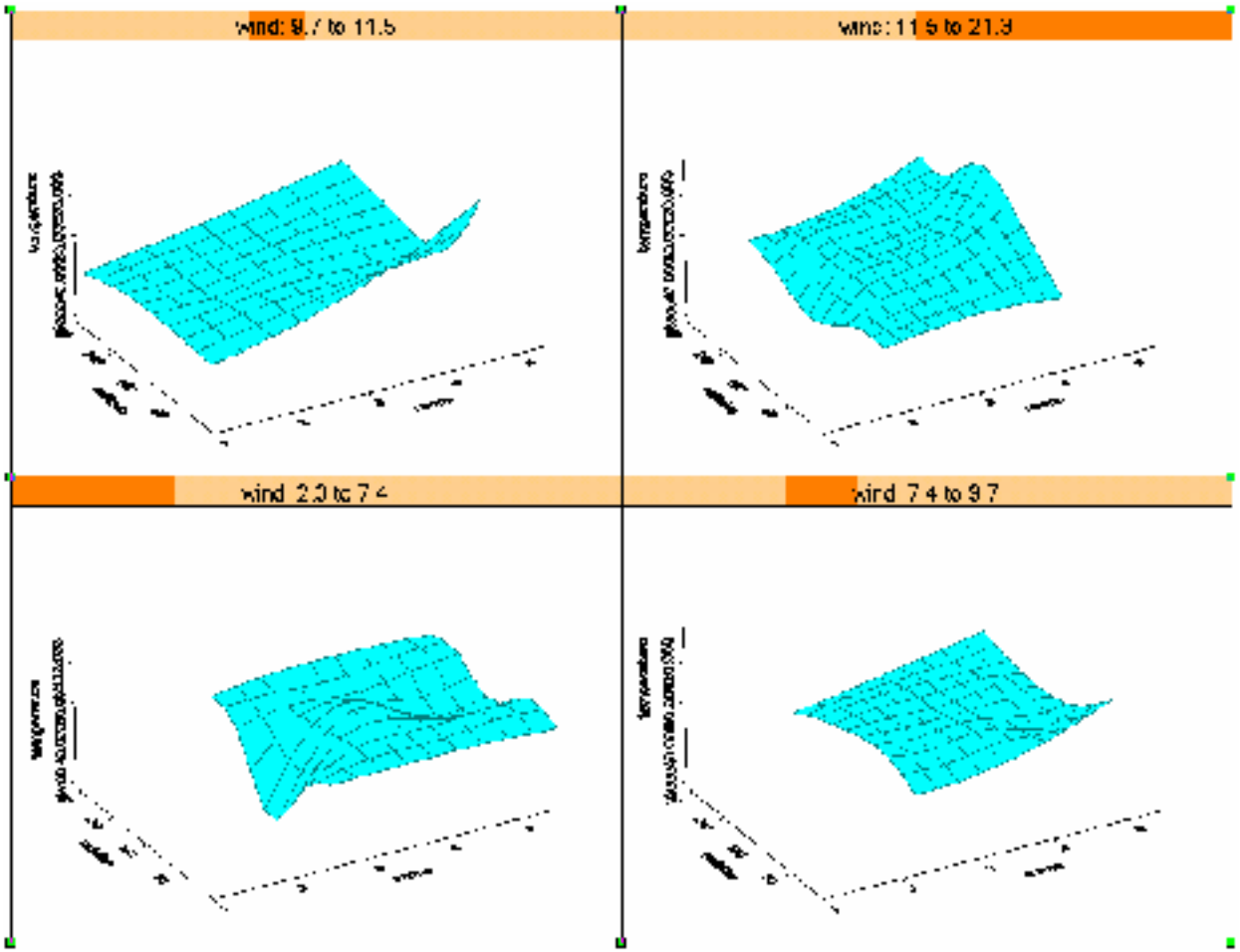
LL = -448.7

"unemployed migrant" LL = -441.0

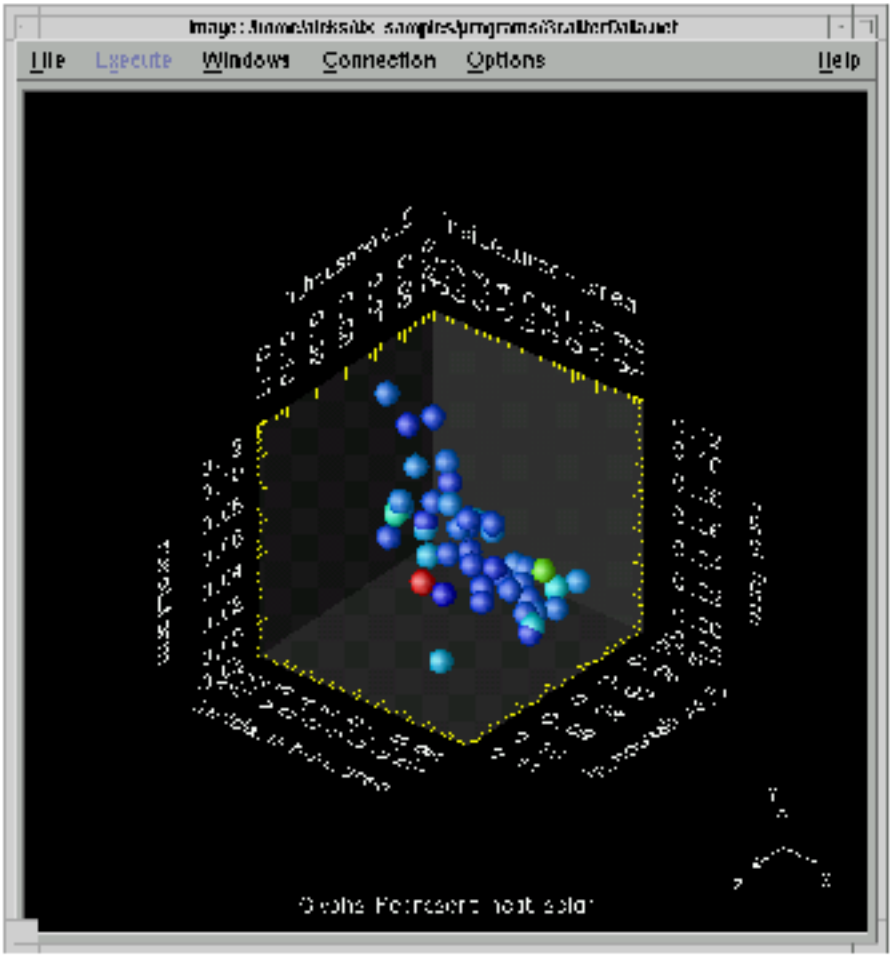
"business move" LL = -439.2

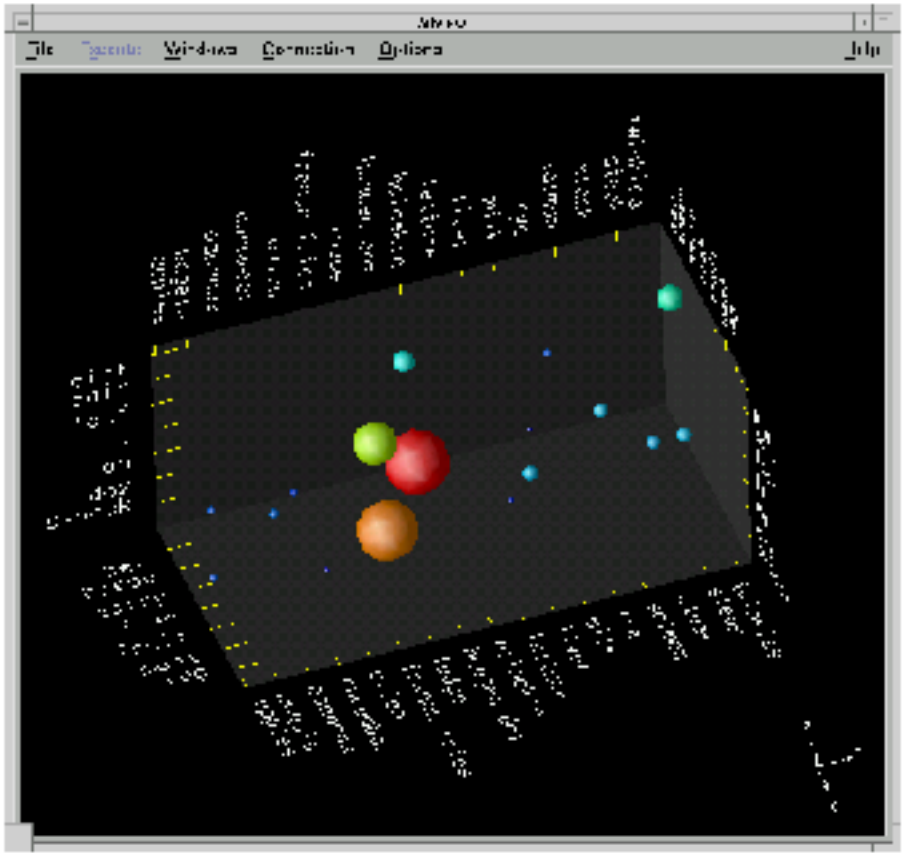
Full interaction LL = -438.8

Trellis Plots



3D

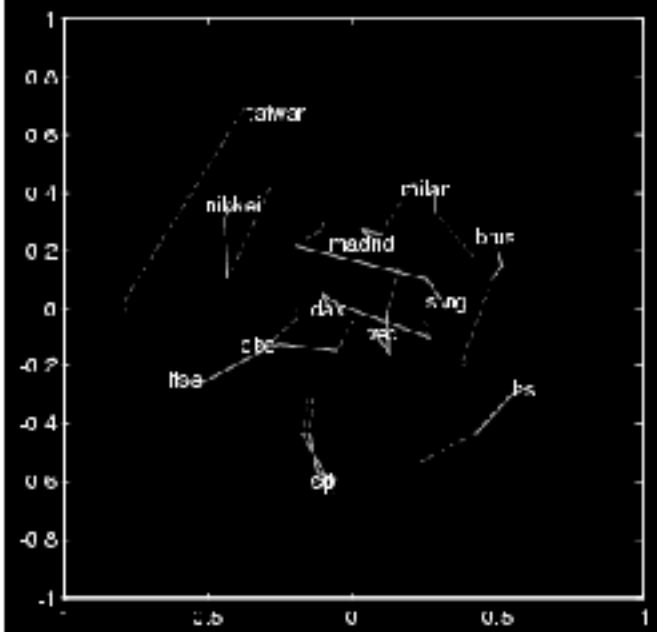




5 dimensions:

- Space
- Color
- Size

Multidimensional Scaling



Pontiac Phoenix
Buick Skylark
Dodge Colt
Chevy Citation
Fiat Strada
Ford LTD
Chevy Malibu Wagon
Olds Omega
Honda Accord LX
Chevy Caprice Classic
Mercury Grand Marquis
AMC Spirit
Plymouth Horizon
Ford Country Squire Wagon
Toyota Corona
Dodge St Regis
Dodge Aspen
Ford Mustang 4
Dodge Omni
Buick Century Special
Mazda GLC
Chrysler LeBaron Wagon
Ford Mustang Ghia
Datsun 210
Chevette
AMC Concord D/L
VW Scirocco
VW Rabbit
Datsun 510
VW Dasher
Mercury Zephyr
Buick Estate Wagon
Datsun 810
BMW 320i
Volvo 240 GL
Saab 99 GLE
Audi 5000
Peugeot 694 SL

Visual Elements

	Nominal	Ordinal	Numerical
• Quantity:			
– position	○	○	○
– size	○	○	○
– grayscale		○	○
• Difference:			
– direction	○	○	○
– color	○	○	○
– shape	○		
– pattern	○	○	○

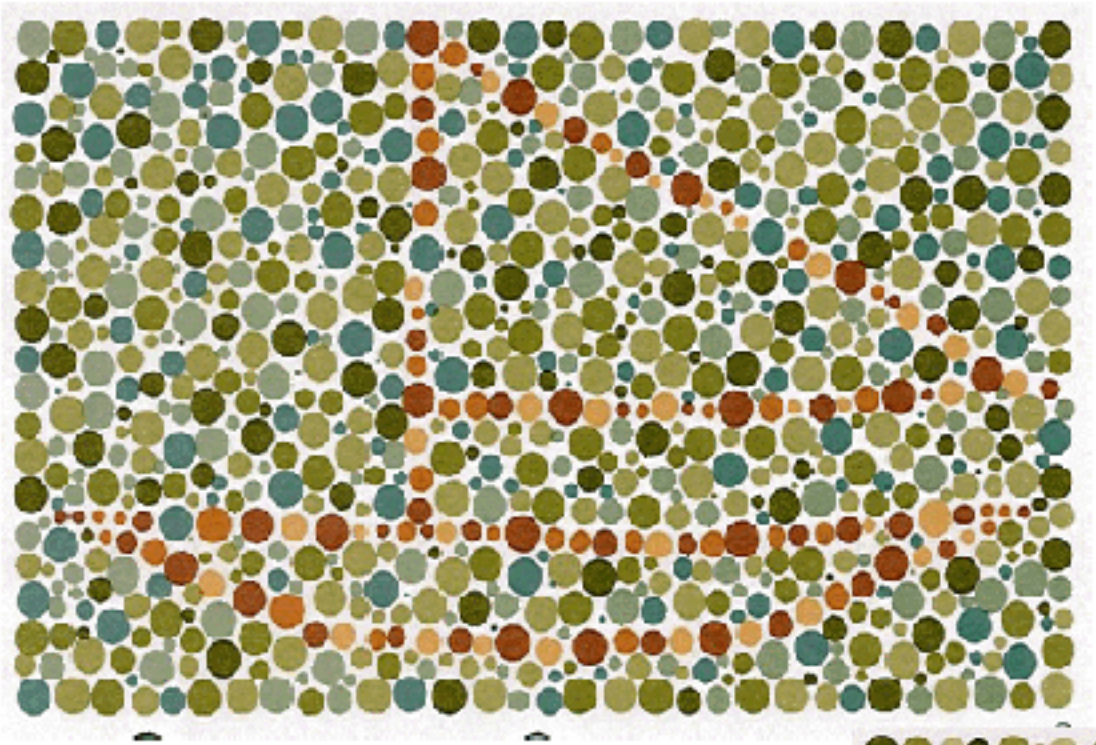
Demo

- VRML

  http://cic.nist.gov/vrml/vbdetect.html

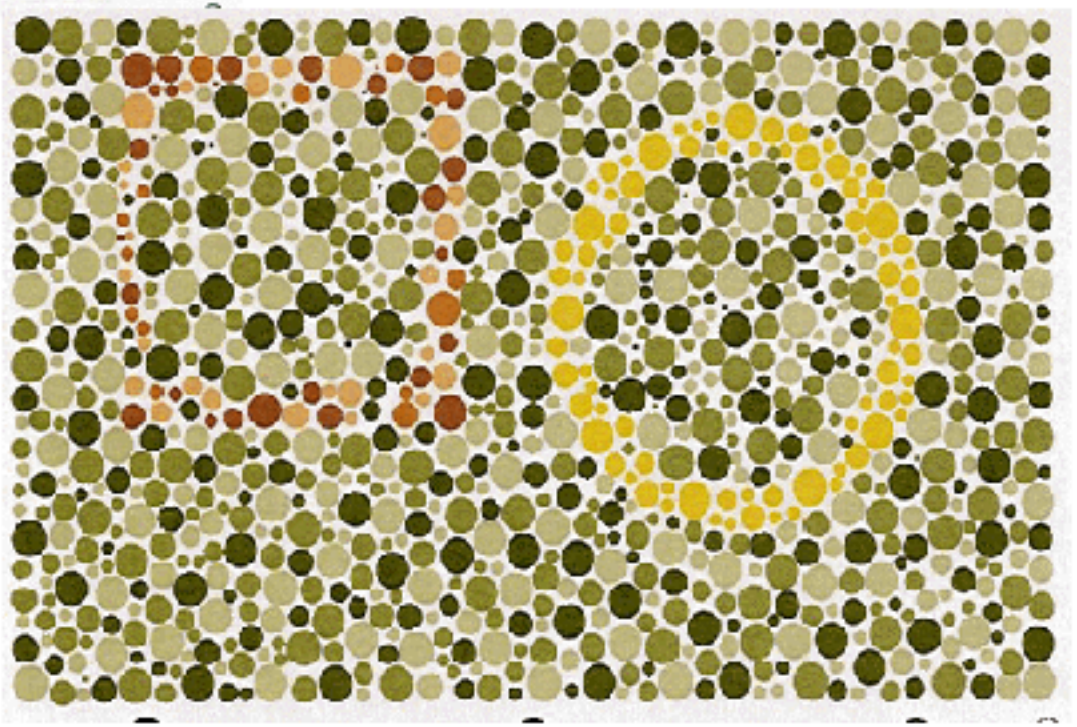
- Orange

  http://www.ailab.si/orange/



sailboat

square & circle



Ishihara test

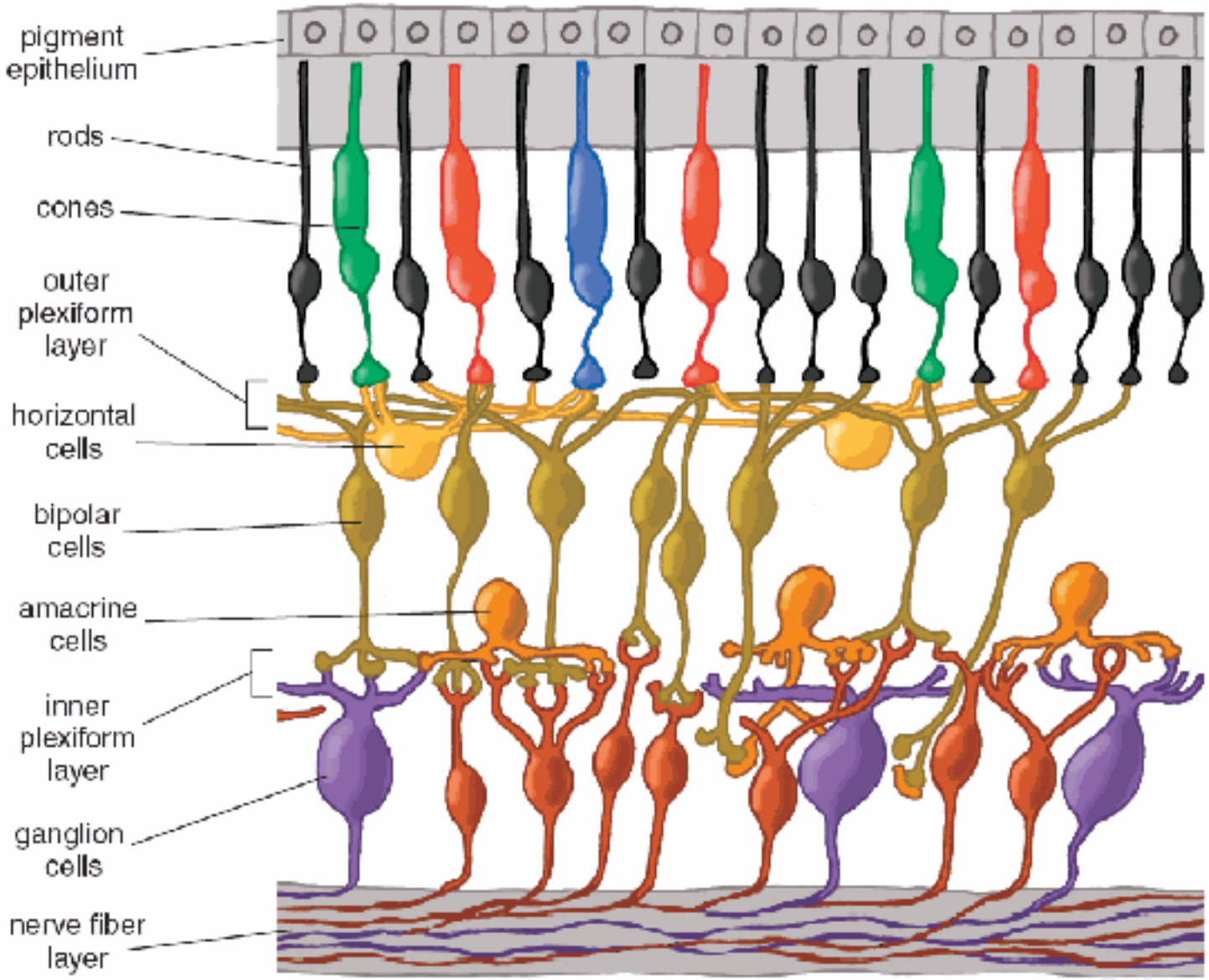


Figure 3. Cells in the retina are arrayed in discrete layers. The photoreceptors are at the top of this rendering, close to the pigment epithelium. The bodies of horizontal cells and bipolar cells compose the inner nuclear layer. Amacrine cells lie close to ganglion cells near the surface of the retina. Axon-to-dendrite neural connections make up the plexiform layers separating rows of cell bodies.

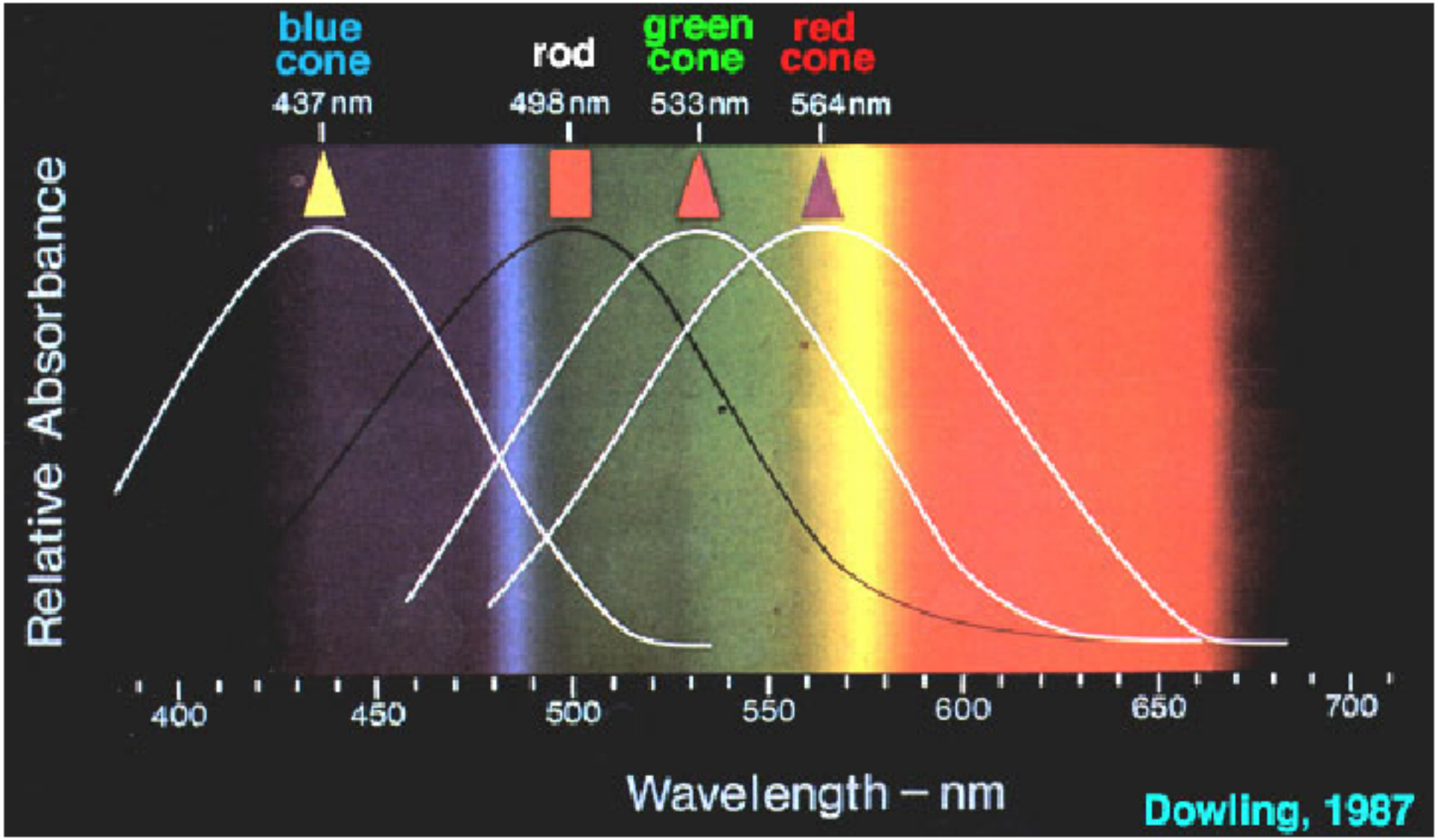
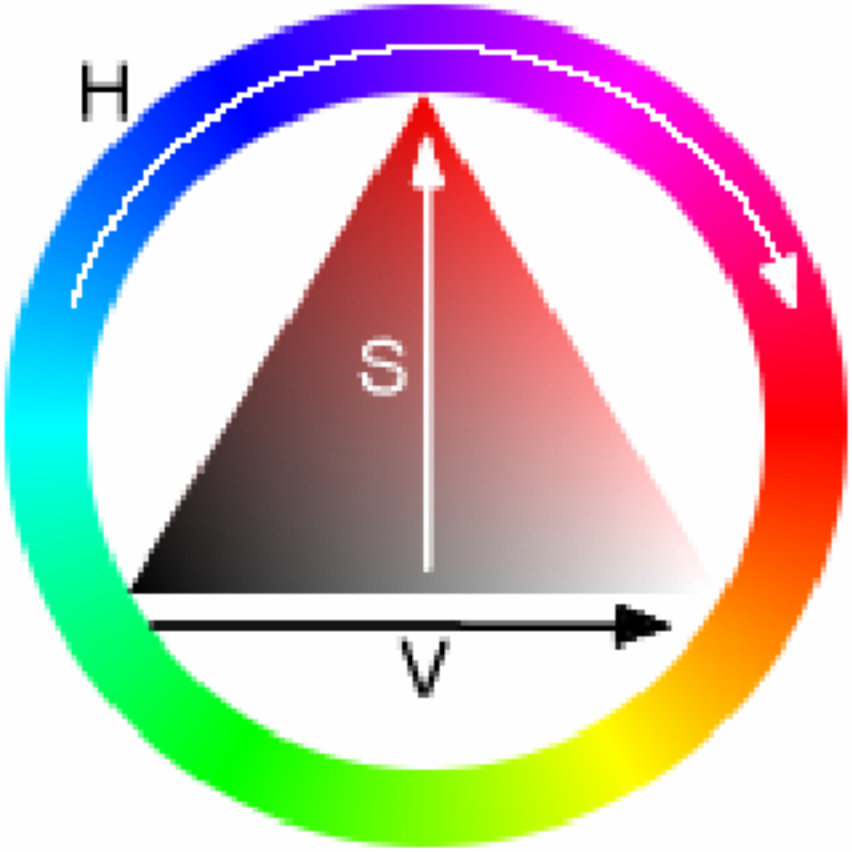
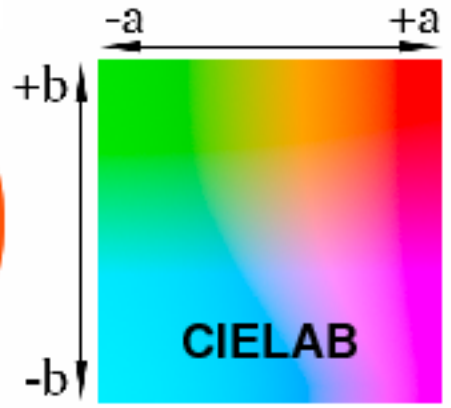


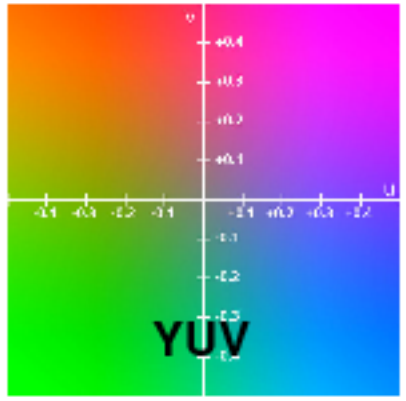
Fig. 14. The peak spectral sensitivities of the the 3 cone types and the the rods in the primate retina (Brown and Wald, 1963). From Dowling's book (1987).

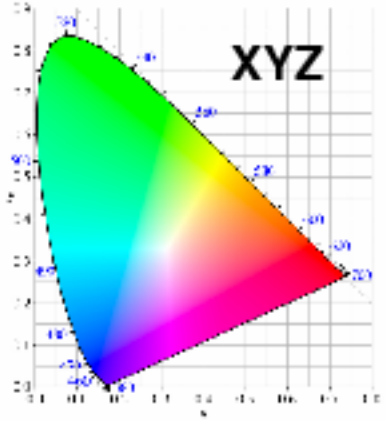
Color Spaces



HSV: hue / saturation / value

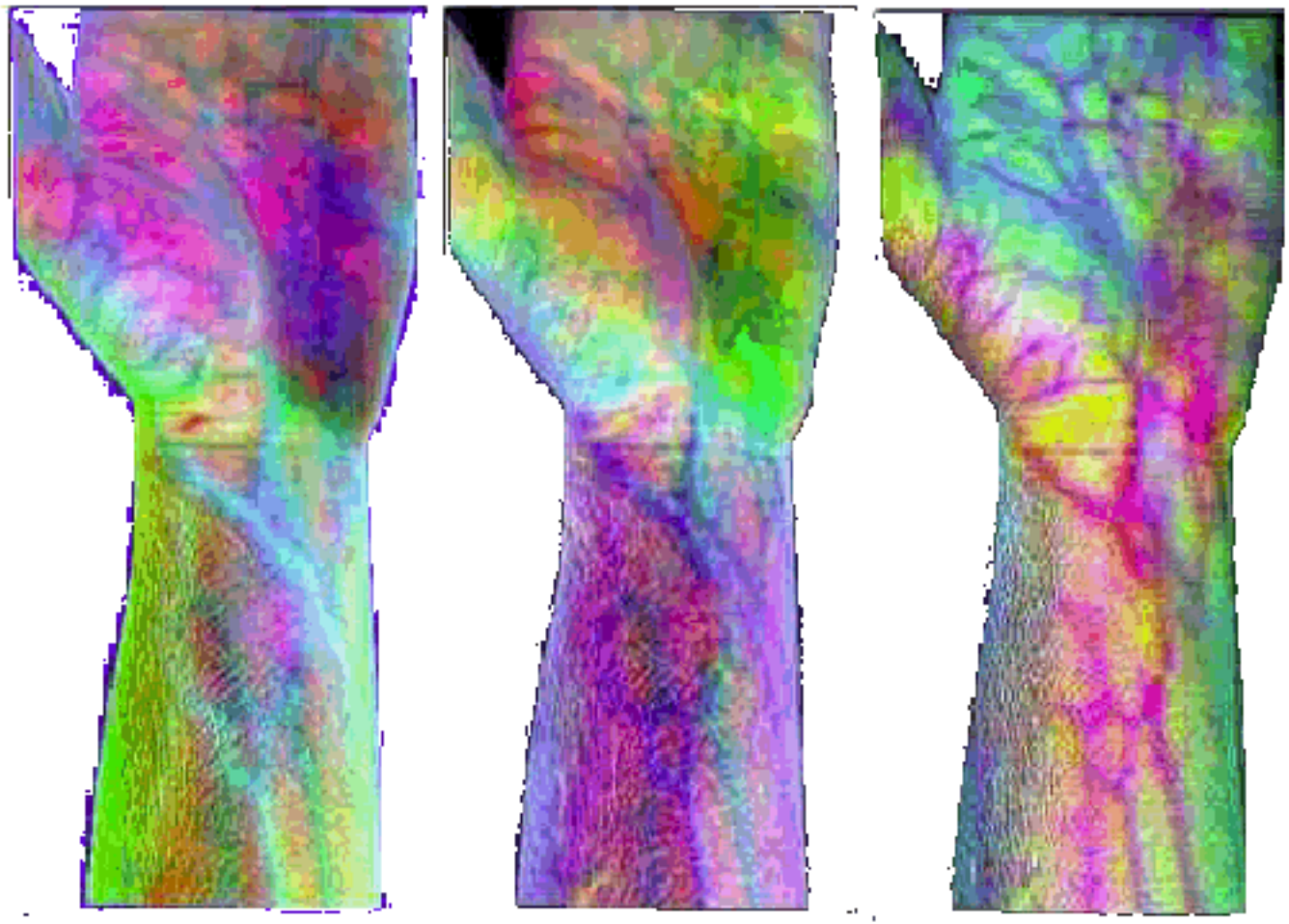






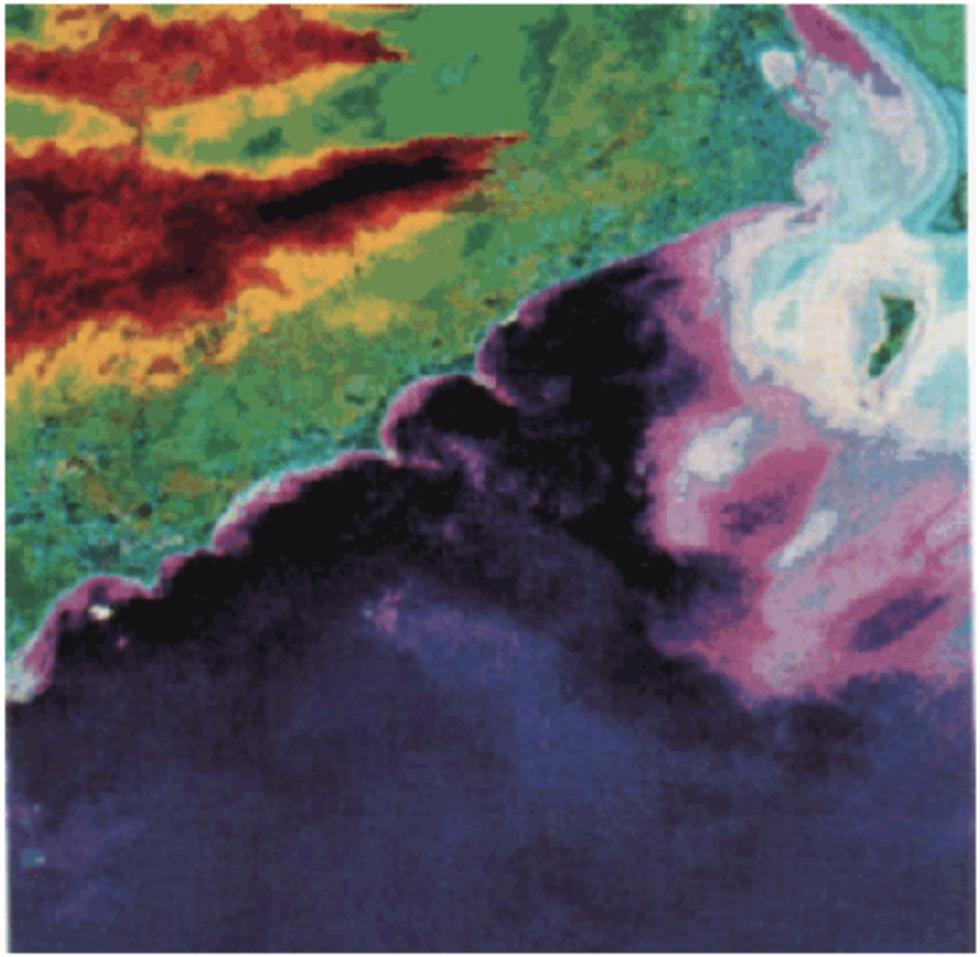
Wikipedia, “colorspace” package

Hyperspectral Photography

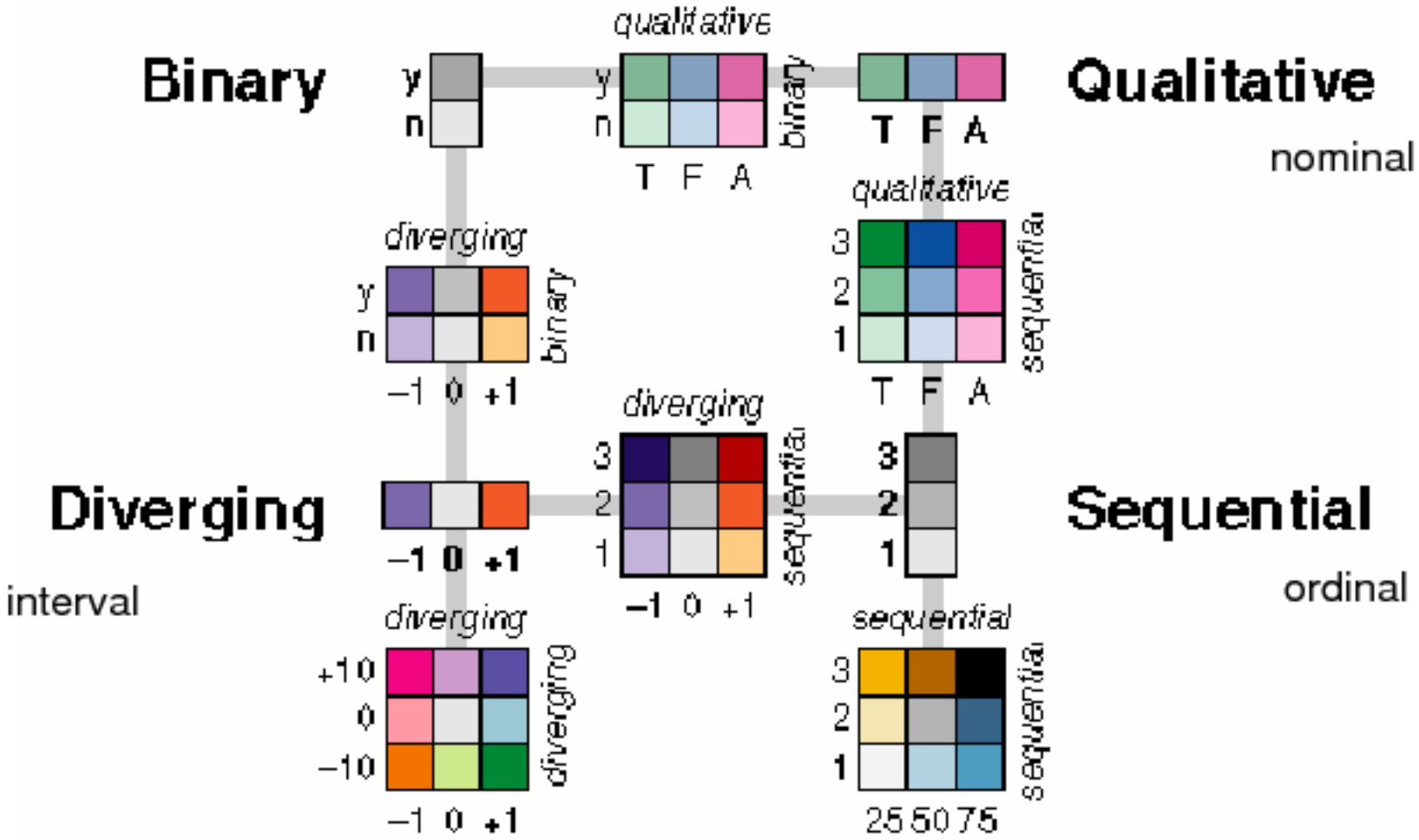


Principal components -> RGB

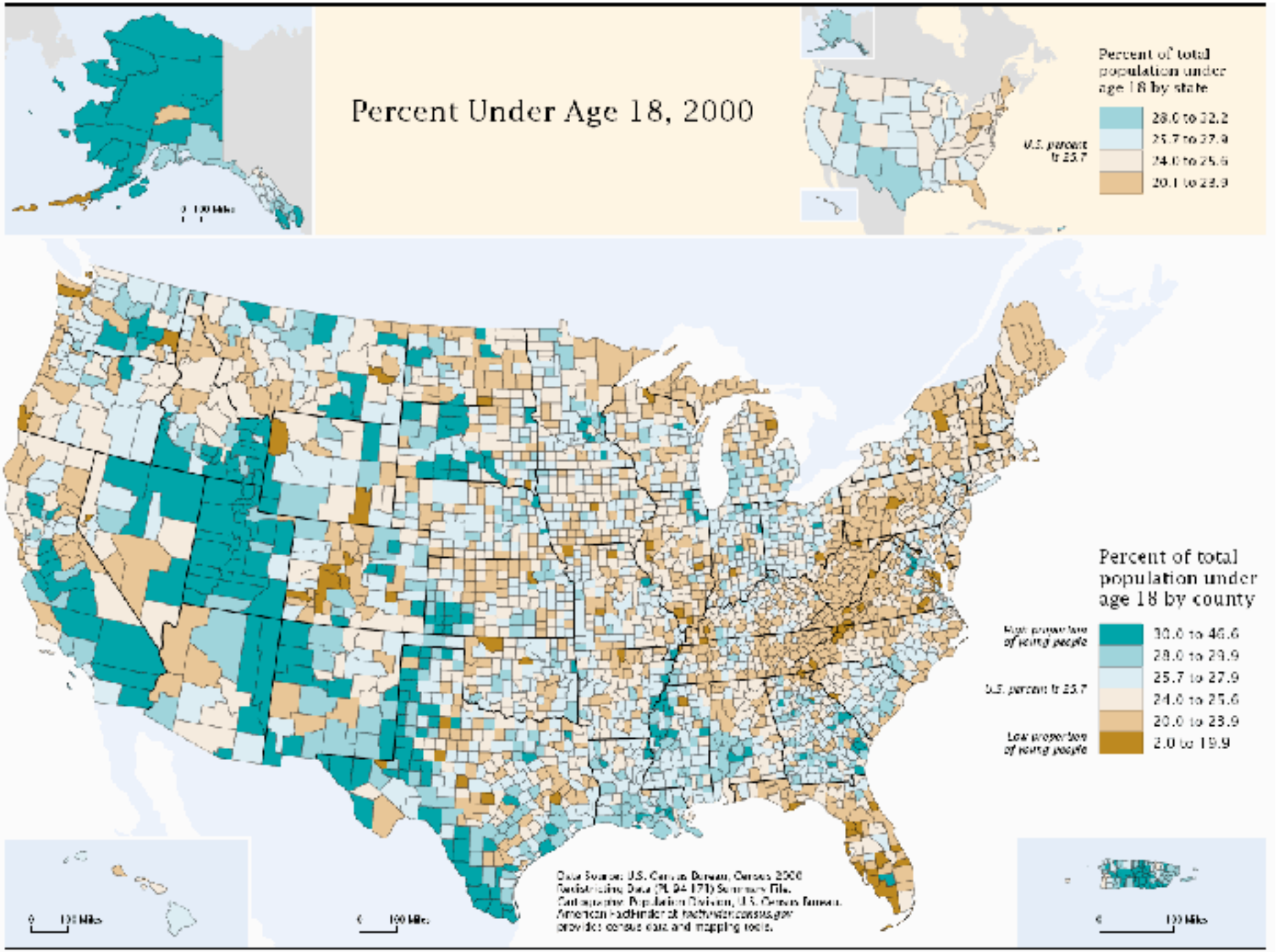
Clustering of Terrain Types

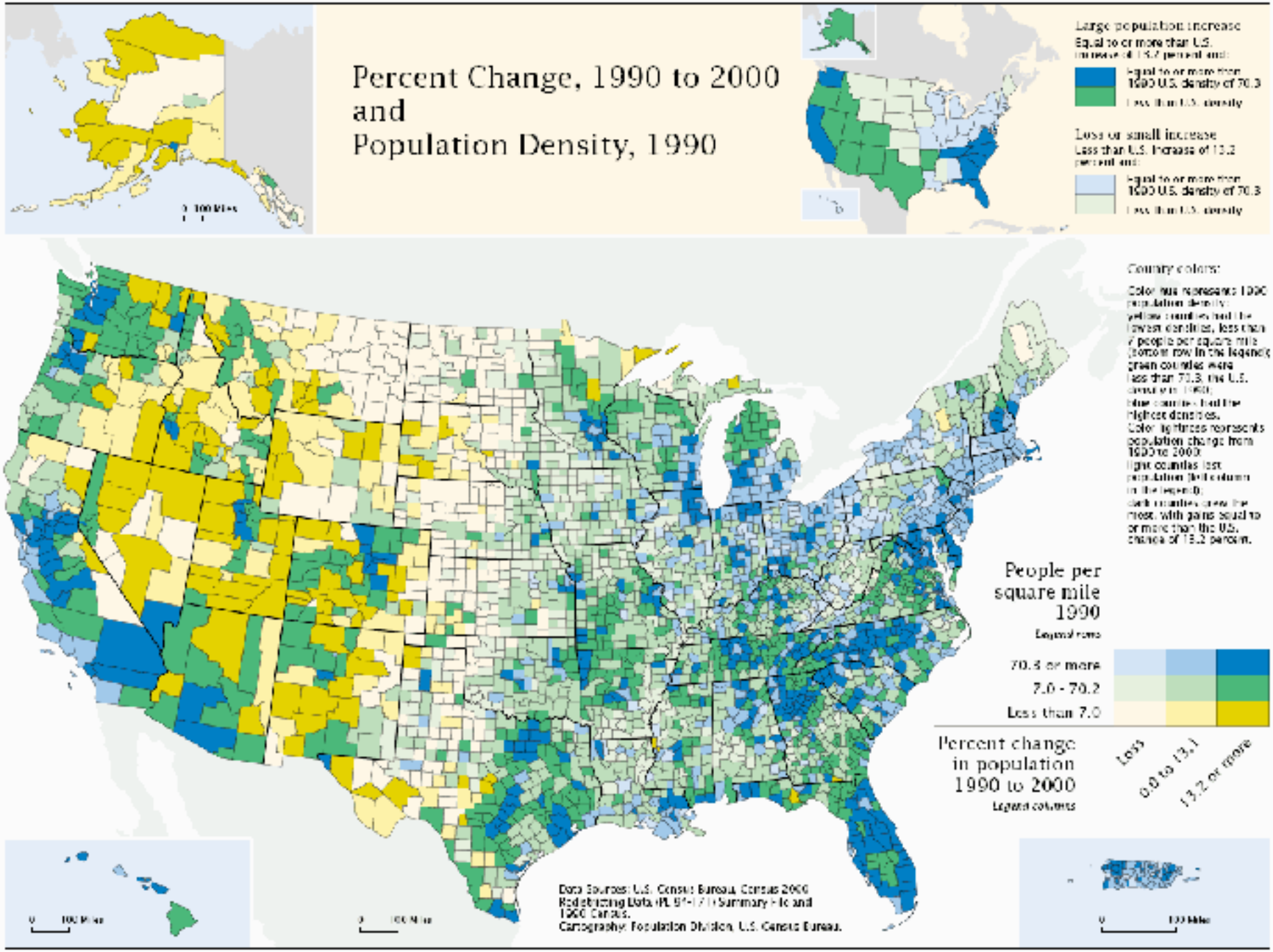


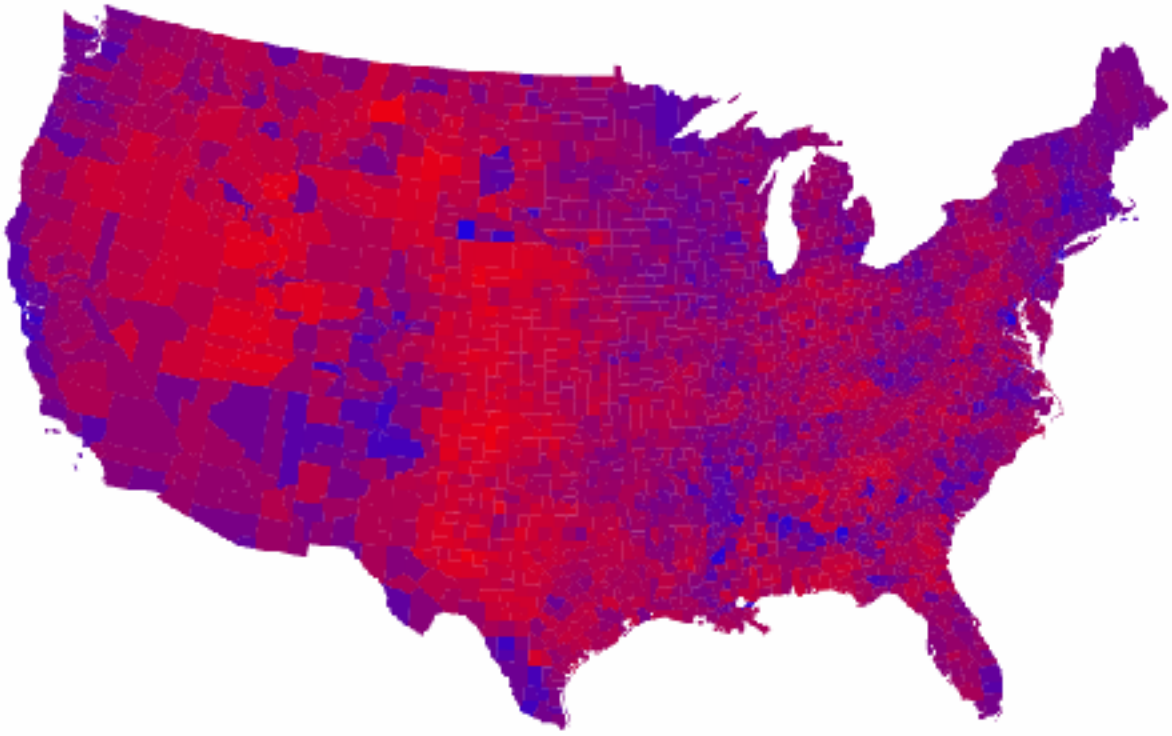
Types of Variables

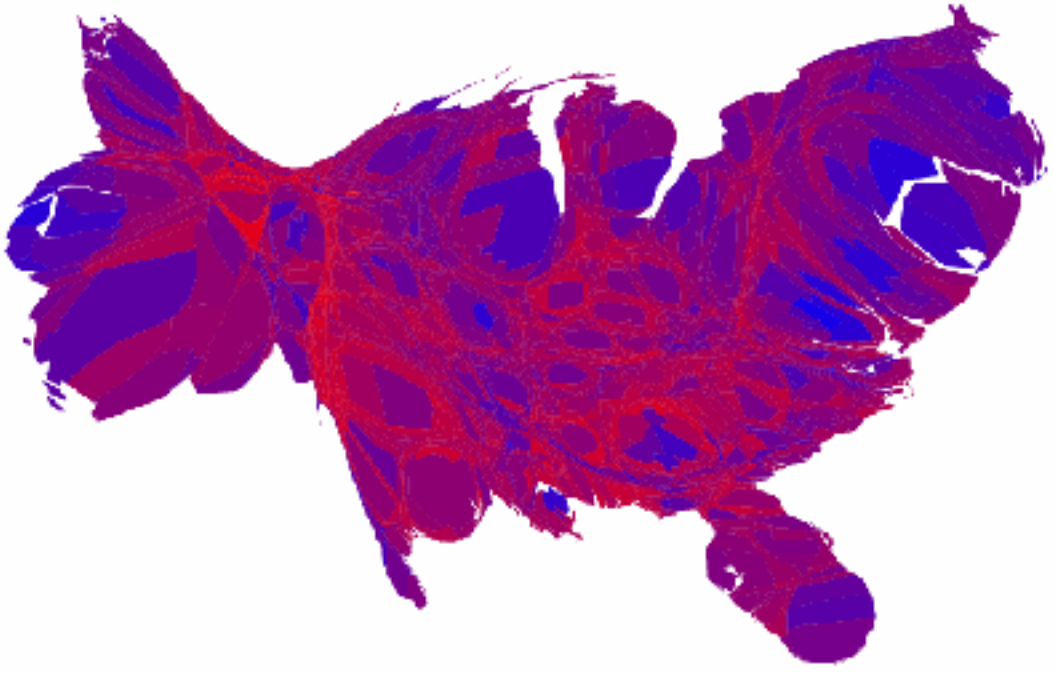


C. Brewer


Percent Under Age 18, 2000
Percent of total population under age 18 by state
U.S. percent is 25.7
28.0 to 32.2
25.7 to 27.9
24.0 to 25.6
20.1 to 23.9
Percent of total population under age 18 by county
High proportion of young people
U.S. percent is 25.7
Low proportion of young people
30.0 to 46.6
28.0 to 29.9
25.7 to 27.9
24.0 to 25.6
20.0 to 23.9
2.0 to 19.9
Data Sources: U.S. Census Bureau, Census 2000
Redistricting Data (P.L. 94-171) Summary File.
Cartographer: Population Division, U.S. Census Bureau.
American FactFinder at factfinder.census.gov
provides census data and mapping tools.
0 100 Miles
0 100 Miles
0 100 Miles


Percent Change, 1990 to 2000
and
Population Density, 1990
Large population increase
Equal to or more than U.S. increase of 13.2 percent and:
Equal to or more than 1990 U.S. density of 70.3
Less than U.S. density
Loss or small increase
Less than U.S. increase of 13.2 percent and:
Equal to or more than 1990 U.S. density of 70.3
Less than U.S. density
County colors:
Color hue represents 1990 population density:
yellow counties had the lowest densities, less than 7 people per square mile (bottom row in the legend);
green counties were less than 70.3, the U.S. density in 1990;
blue counties had the highest densities.
Color lightness represents population change from 1990 to 2000:
light counties lost population (left column in the legend);
dark counties grew the most, with gains equal to or more than the U.S. change of 13.2 percent.
People per square mile 1990
Legend rows
70.3 or more
7.0 - 70.2
Less than 7.0
Percent change in population 1990 to 2000
Legend columns
Loss
0.0 to 13.1
13.2 or more
Data Sources: U.S. Census Bureau, Census 2000 Redistricting Data (P.L. 94-171) Summary File and 1990 Census.
Cartography: Population Division, U.S. Census Bureau.





Maps and cartograms of the 2004 US presidential election results

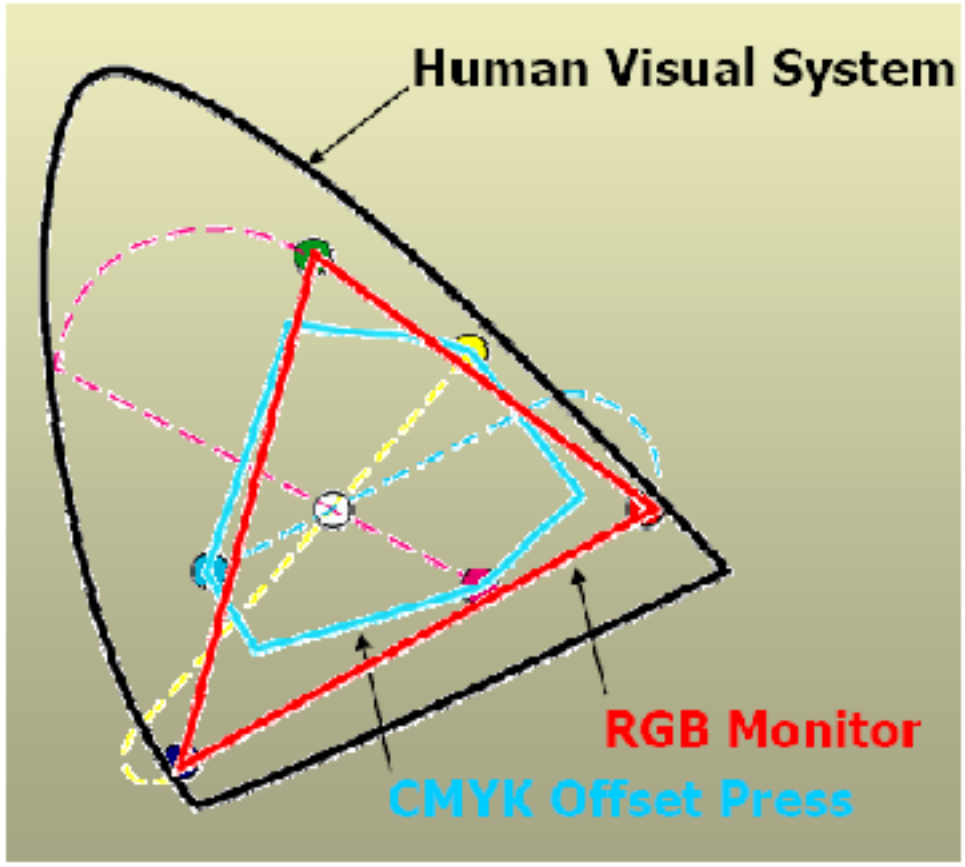
Michael Gastner, Cosma Shalizi, and Mark Newman

Demo

http://**colorbrewer**.org/

http://www.colorschemer.com/

Gamut



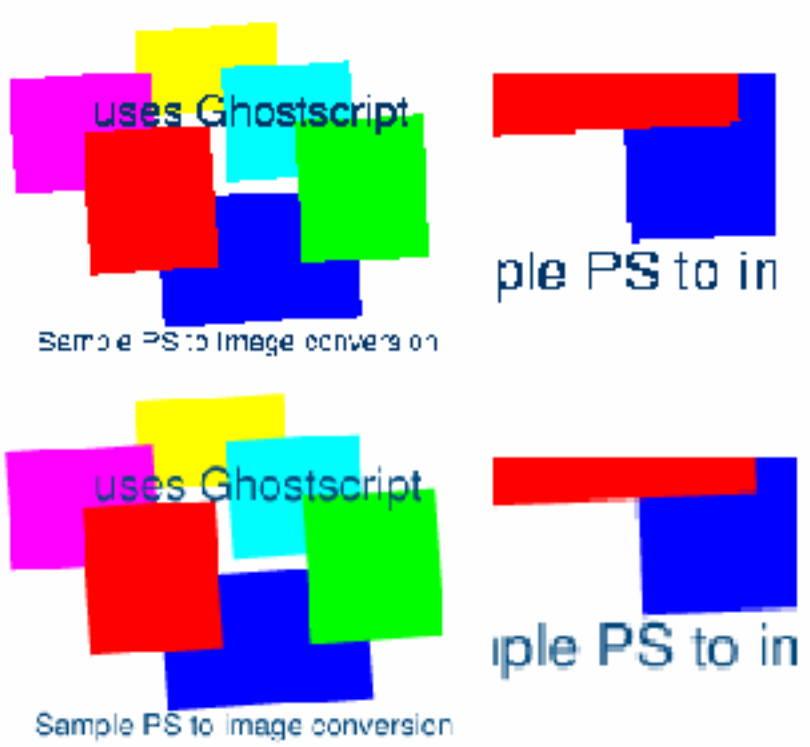
Alpha Channel

(partial opacity)

Aliasing

vs

Antialiasing



Vector vs Raster Graphics

Raster/bitmap formats

PNG, JPG, (GIF)

Vector formats

EPS, PDF, PS, SVG

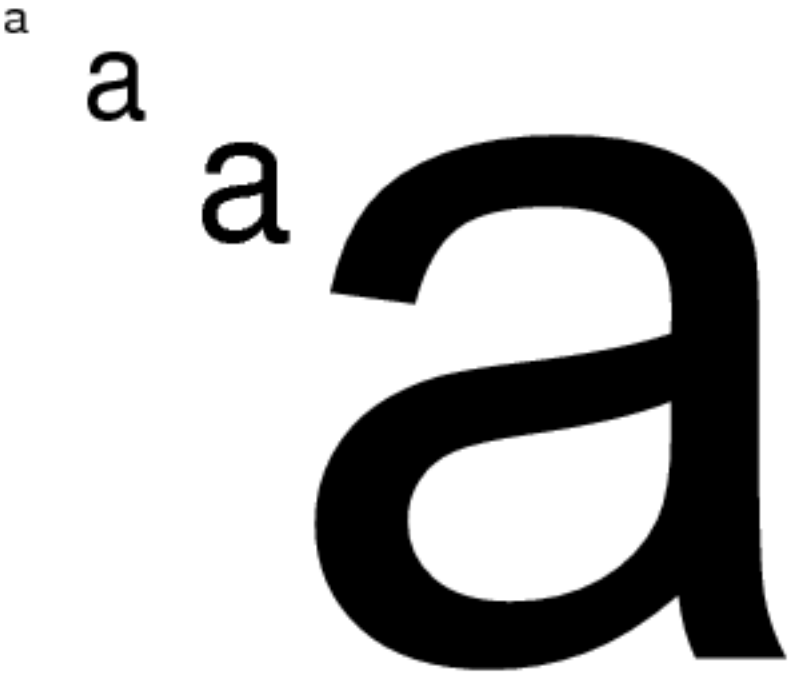
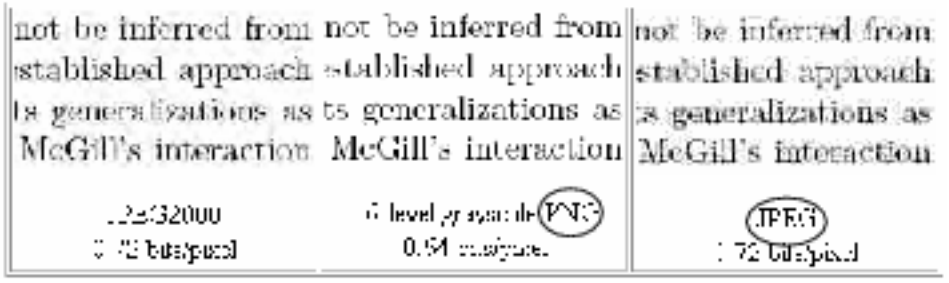
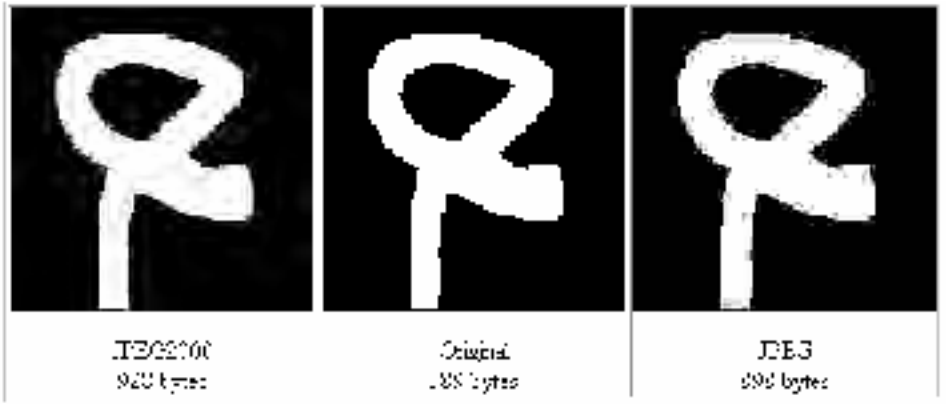


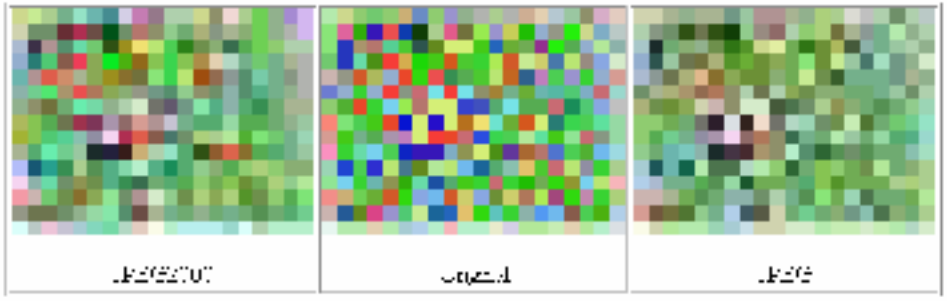
Image Distortions

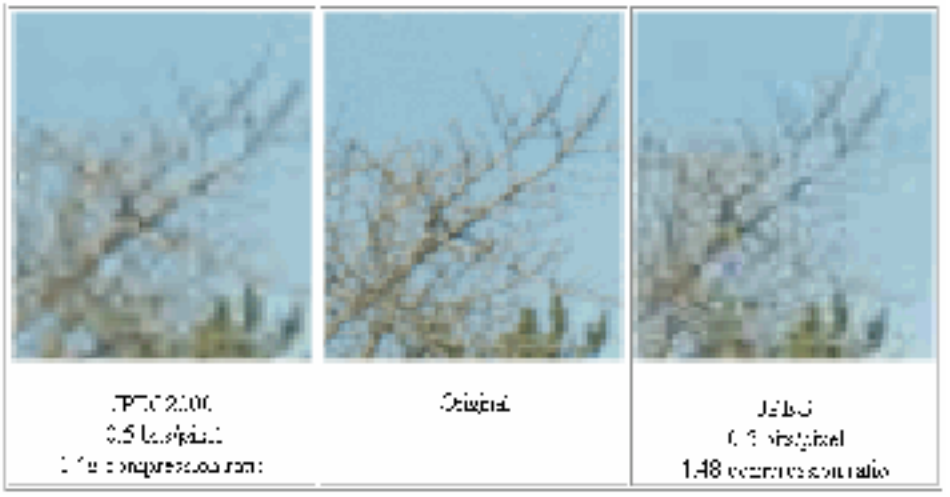


RINGING



Color WASHING





BLOCKING

Software

Commercial:

- Paint Shop Pro (raster)
- Corel Draw
- Adobe Illustrator

Free:

- GIMP (raster)
- InkScape
- Xfig Jfig WinFIG