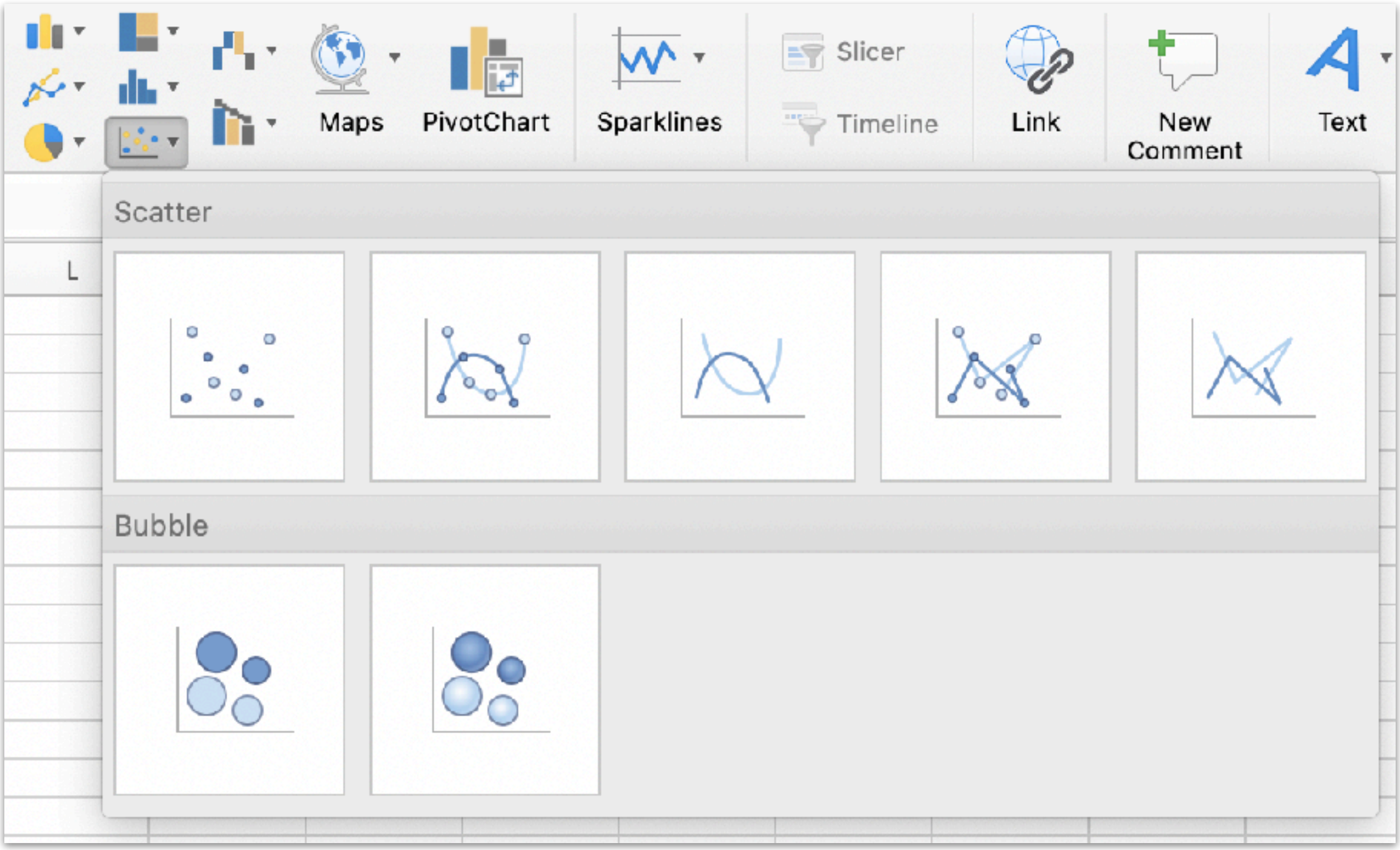
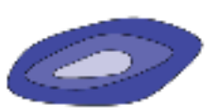
图表分类&图形语法

数据可视化

李晨辉


Maps
PivotChart
Sparklines
Slicer
Timeline
Link
New Comment
Text
Scatter
Bubble
L

	1D	2D	3D
Functions			
Point			
Line			
Area			
Interval			
Path			
Schema			
Partitions			
Polygon			
Contour			
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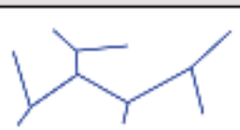
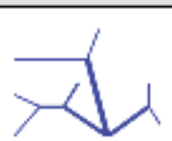
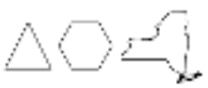
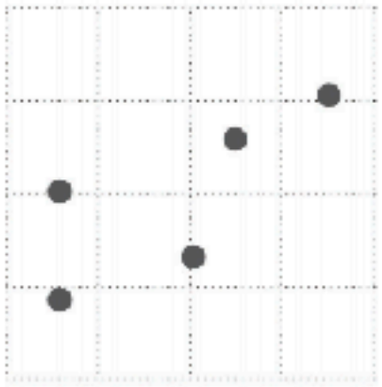
Edge			

	Point	Line	Area	Surface	Solid
Form					
Size					
Shape					
Rotation					
Color					
Brightness					
Hue					
Saturation					
Texture					
Granularity					
Pattern					
Orientation					
Optics					
Blur					
Transparency					

Position

Where in space the data is

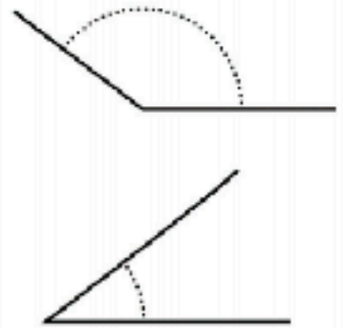


Length

How long the shapes are

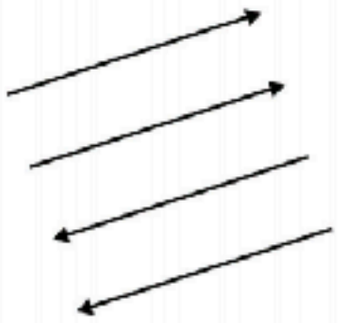
Angle

Rotation between vectors



Direction

Slope of a vector in space



Shapes

Symbols as categories

Area

How much 2-D space

Volume

How much 3-D space

Color saturation

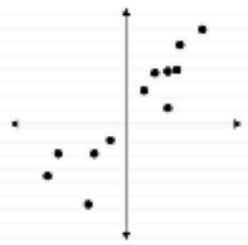
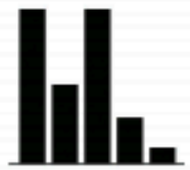
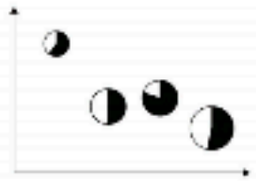
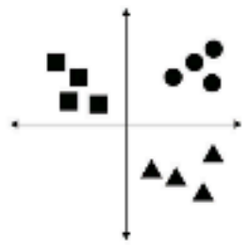
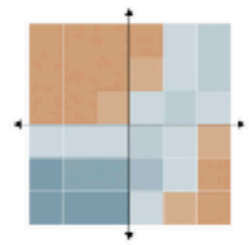
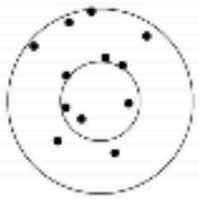
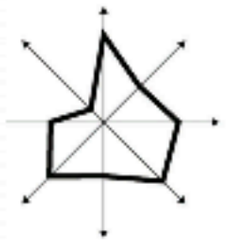
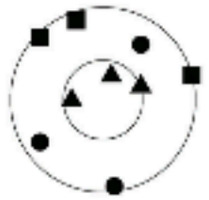
Intensity of a color hue

Color hue

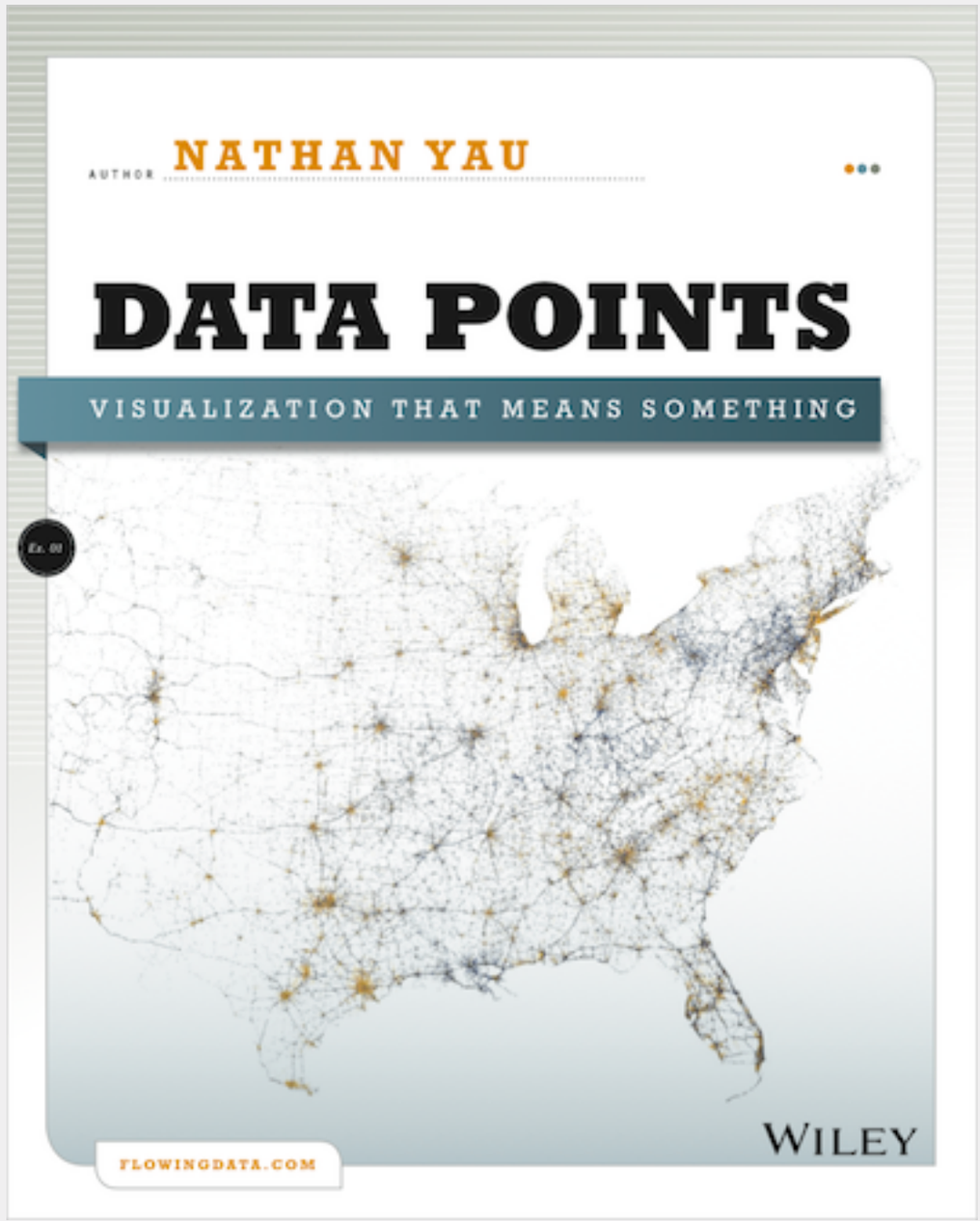
Usually referred to as color

来自《Data Points》一书

Visual cues

Coordinate systems	Position	Length	Angle	Direction	Shapes	Area or Volume	Color
Cartesian							
Polar							
Geographic							

来自《Data Points》一书



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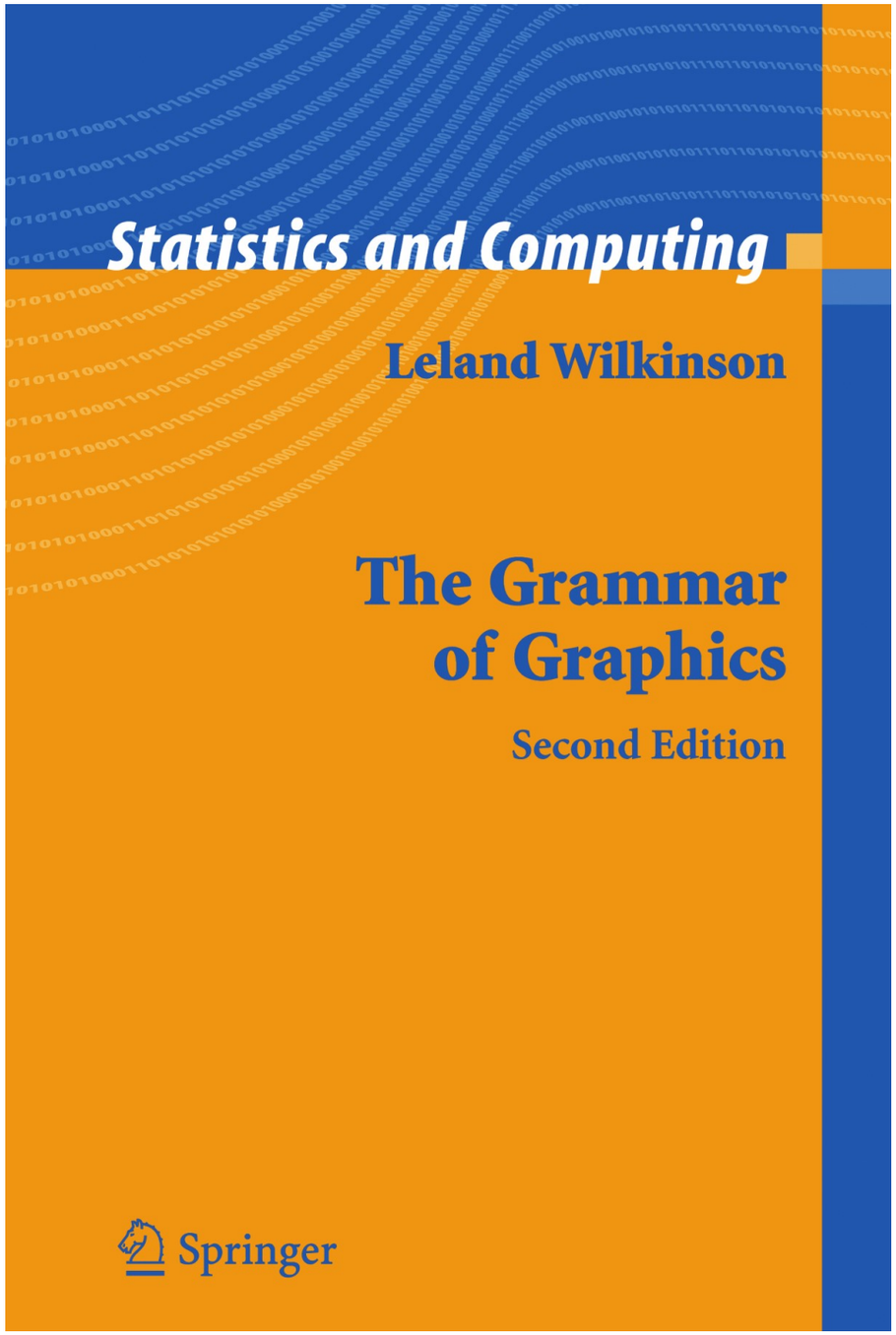
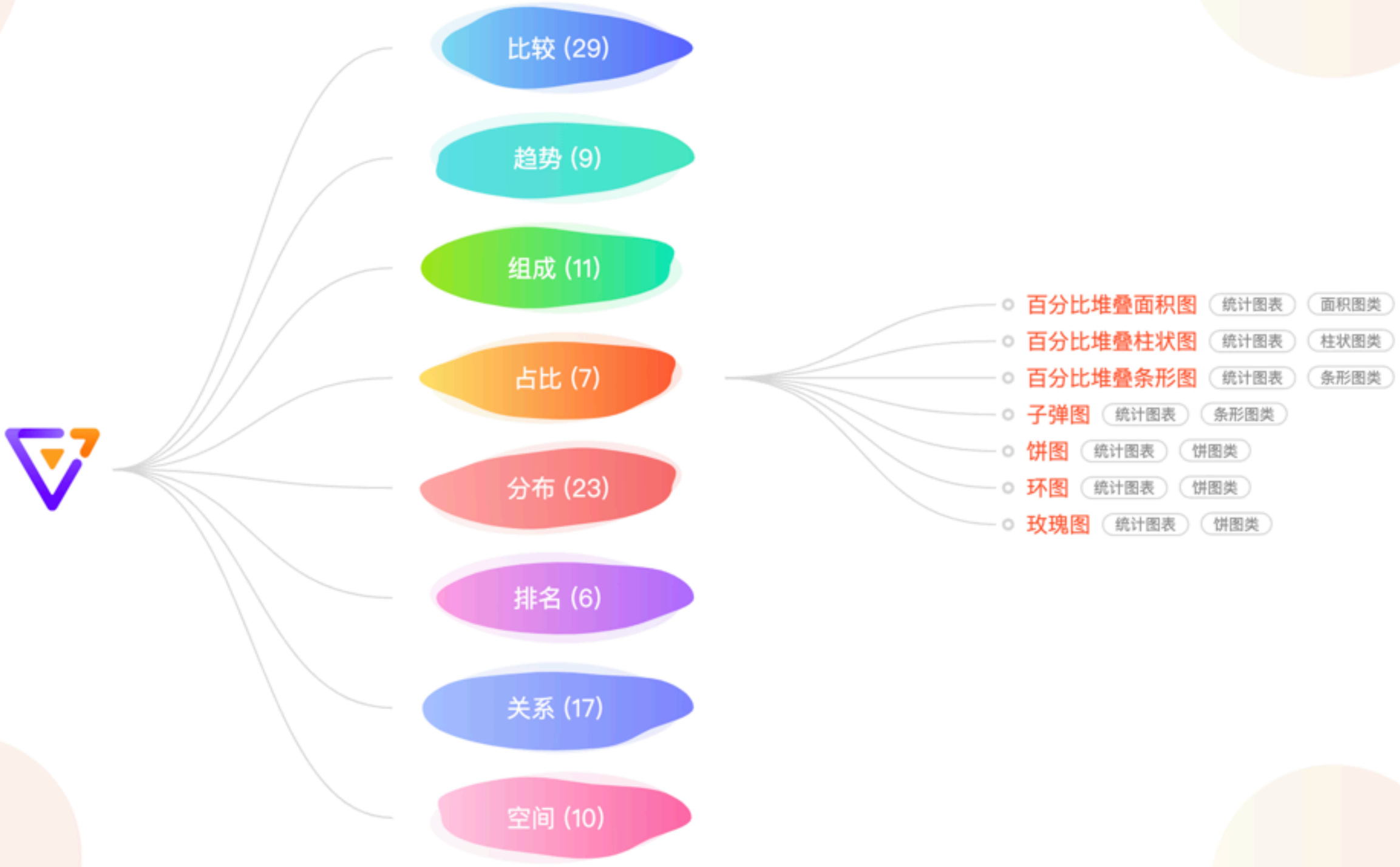
Chapter 7 — **Where to Go from Here**

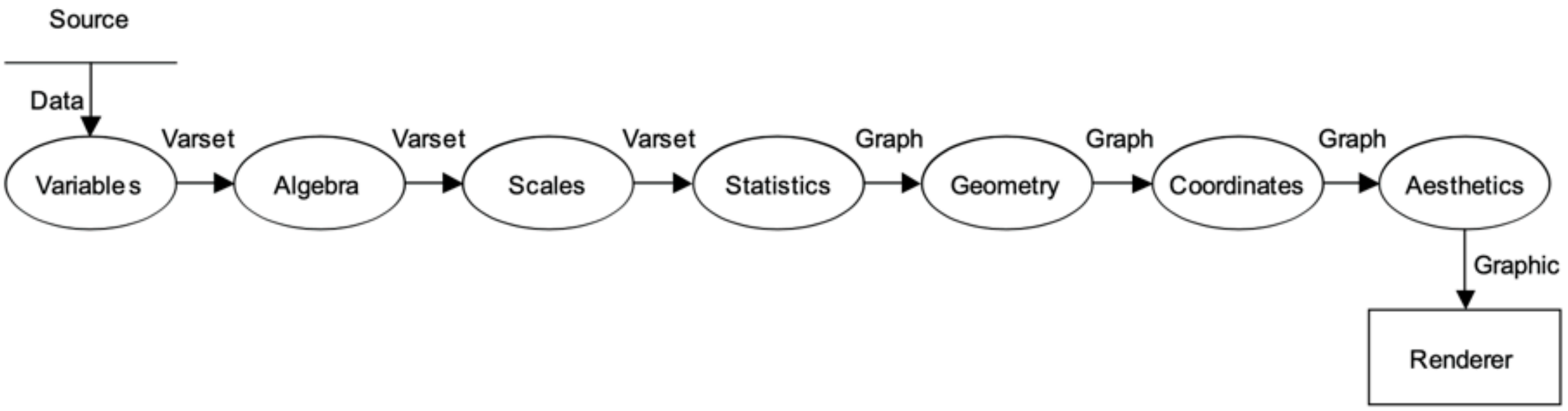

Statistics and Computing
Leland Wilkinson
The Grammar of Graphics
Second Edition
Springer

图形语法



AntV-G2: https://antv.vision

Source
Data
Make a pie
Graphic
Renderer


Source
Data
Varset
Varset
Varset
Graph
Graph
Graph
Variables
Algebra
Scales
Statistics
Geometry
Coordinates
Aesthetics
Graphic
Renderer

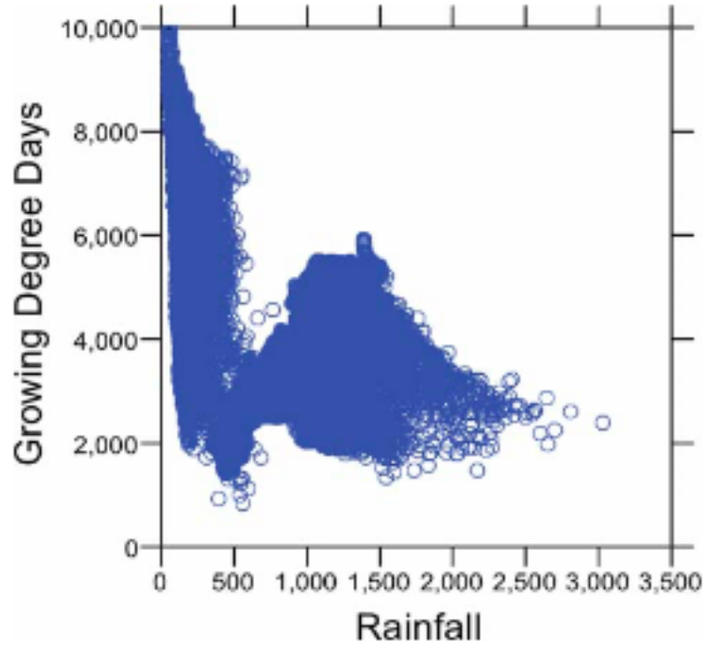
Empirical Data	***Abstract Data***	***Metadata***
col(*source*(), *name*(), *unit*(), *weight*()) *map*(*source*(), *id*()) *stream*(*source*(), *id*()) *image*(*source*()) *sample*(x, *n*) *reshape*(x_1,...,x_n, "<*index*>")	*iter*(*from*,*to*,*step*) *mesh*(*min*, *max*, *n*) *count*(*n*) *proportion*(*n*) *percent*(*n*) *constant*(*c*, *n*) *string*("<*string*>", *n*) *rand*(*n*)	*meta*(*source*(), *name*())

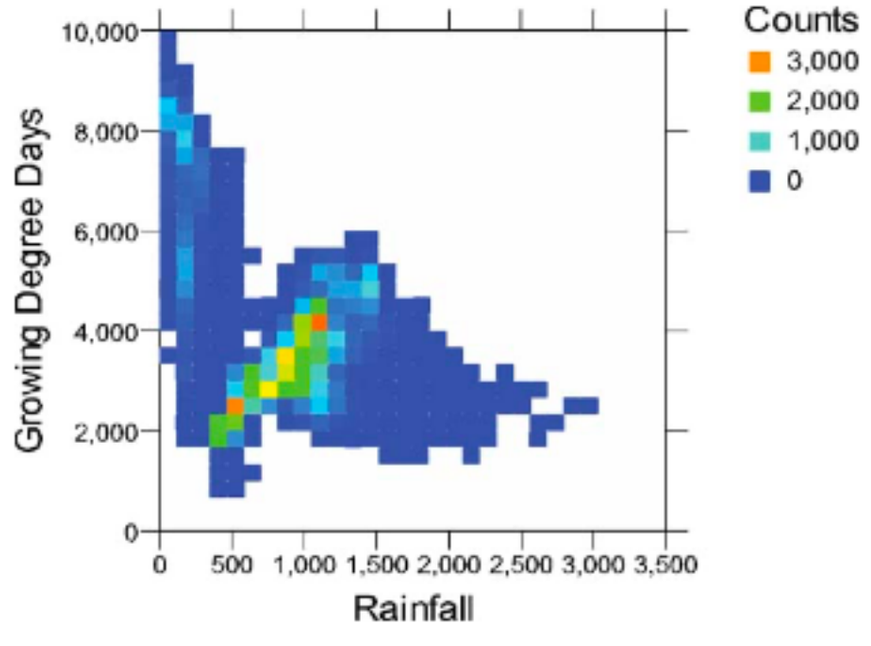
Mathematical	***Statistical***	***Multivariate***
log(**x**)	*mean*(**x**)	*sum*($\mathbf{x}_1$,$\mathbf{x}_2$,...,$\mathbf{x}_n$)
exp(**x**)	*median*(**x**)	*diff*($\mathbf{x}_1$,$\mathbf{x}_2$)
sin(**x**)	*mode*(**x**)	*prod*($\mathbf{x}_1$,$\mathbf{x}_2$)
cos(**x**)	*residual*(**x**,**y**)	*quotient*($\mathbf{x}_1$,$\mathbf{x}_2$)
tan(**x**)	*sort*(**x**)	*influence*($\mathbf{x}_1$,$\mathbf{x}_2$,...,$\mathbf{x}_n$)
asin(**x**)	*rank*(**x**)	*miss*($\mathbf{x}_1$,$\mathbf{x}_2$,...,$\mathbf{x}_n$,"<*f*>")
acos(**x**)	*prank*(**x**)	
atan(**x**)	*cut*(**x**,*k*)	
atanh(**x**)	*zinv*(**x**)	
sign(**x**)	*lag*(**x**)	
pow(**x**, *p*)	*grpfun*(**x**,**g**,"<*f*>")	

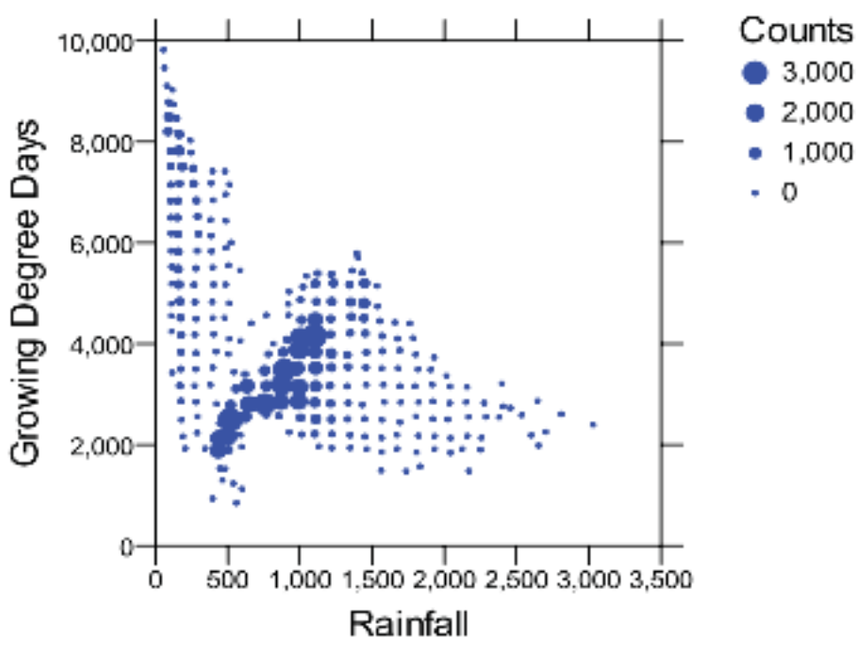
Length	*Mass*	*Time*	*Current*	*Temperature*
meter	***kilogram***	***second***	***amp***	***kelvin***
point	*gram*	*minute*		*rankine*
pica	*grain*	*hour*		*celsius*
inch	*slug*	*day*		*fahrenheit*
foot	*carat*	*week*		
yard		*month*		
mile		*quarter*		
furlong		*year*		
fathom		*century*		

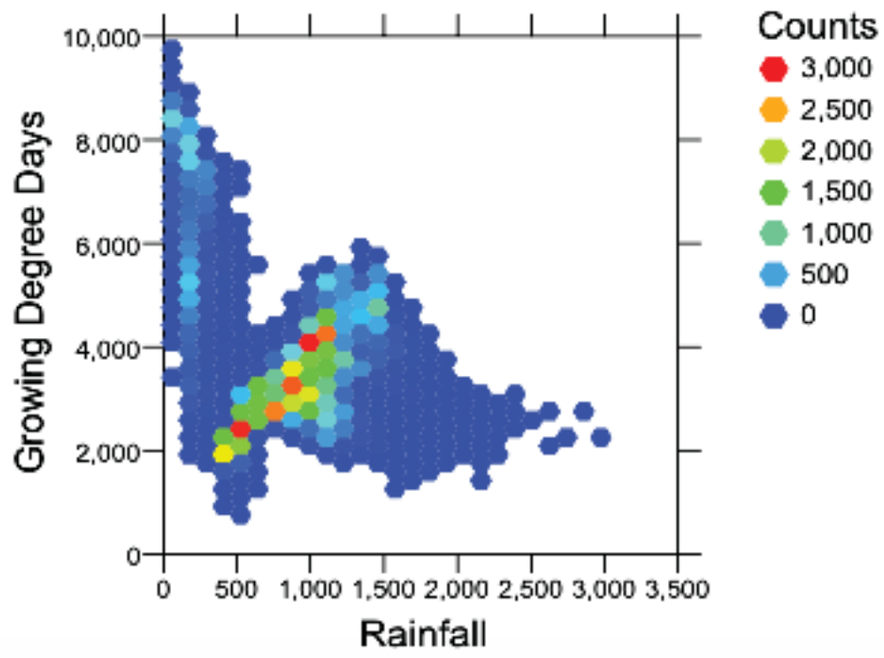
Substance	*Luminous Intensity*	*Angle*	*Count*	*Currency*
mole	***candela***	*radian*	*unit*	*dollar*
		degree	*dozen*	*euro*
		minute	*gross*	*pound*
		second		*yen*

Bin	Summary	Region	Smooth	Link
rect	*count*	*spread*	*linear*	*join*
tri	*proportion*	*sd*	*quadratic*	*sequence*
hex	*sum*	*se*	*cubic*	*mst*
quantile	*mean*	*range*	*log*	*delaunay*
boundary	*median*	*confi*	*mean*	*hull*
voronoi	*mode*	*mean*	*median*	*tsp*
dot	*sd*	*sd*	*mode*	*complete*
stem	*se*	*smooth*	*spline*	*neighbor*
	range		*density*	
	leaf		*normal*	
			kernel	

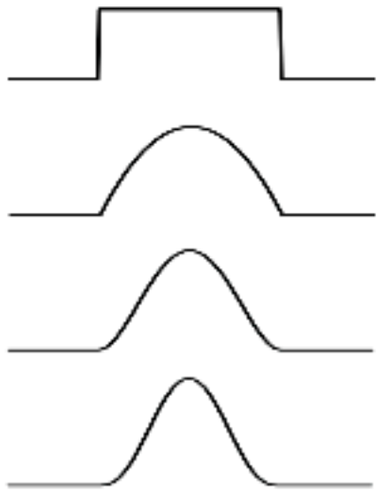

Growing Degree Days
10,000
8,000
6,000
4,000
2,000
0
0
500
1,000
1,500
2,000
2,500
3,000
3,500
Rainfall


Growing Degree Days
10,000
8,000
6,000
4,000
2,000
0
0
500
1,000
1,500
2,000
2,500
3,000
3,500
Rainfall
Counts
3,000
2,000
1,000
0


Growing Degree Days
10,000
8,000
6,000
4,000
2,000
0
0
500
1,000
1,500
2,000
2,500
3,000
3,500
Rainfall
Counts
3,000
2,000
1,000
0


Growing Degree Days
10,000
8,000
6,000
4,000
2,000
0
0
500
1,000
1,500
2,000
2,500
3,000
3,500
Rainfall
Counts
3,000
2,500
2,000
1,500
1,000
500
0

Bin



uniform: $f(x) = a : (-w \le x \le w)$, else 0

epanechnikov: $f(x) = a(1 - (x/w))^2 : (-w \le x \le w)$, else 0

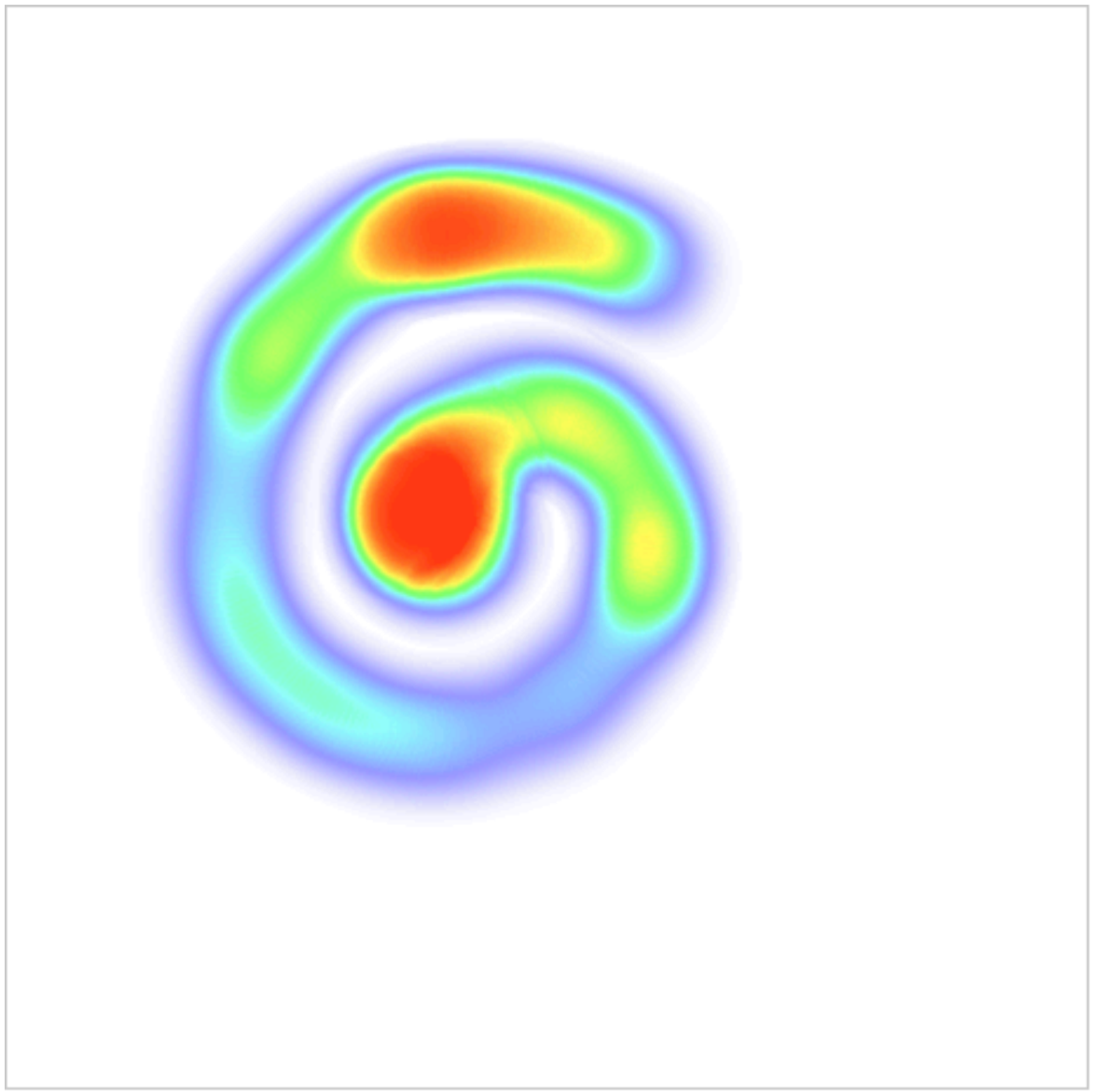
biweight: $f(x) = a(1 - (x/w)^2)^2 : (-w \le x \le w)$, else 0

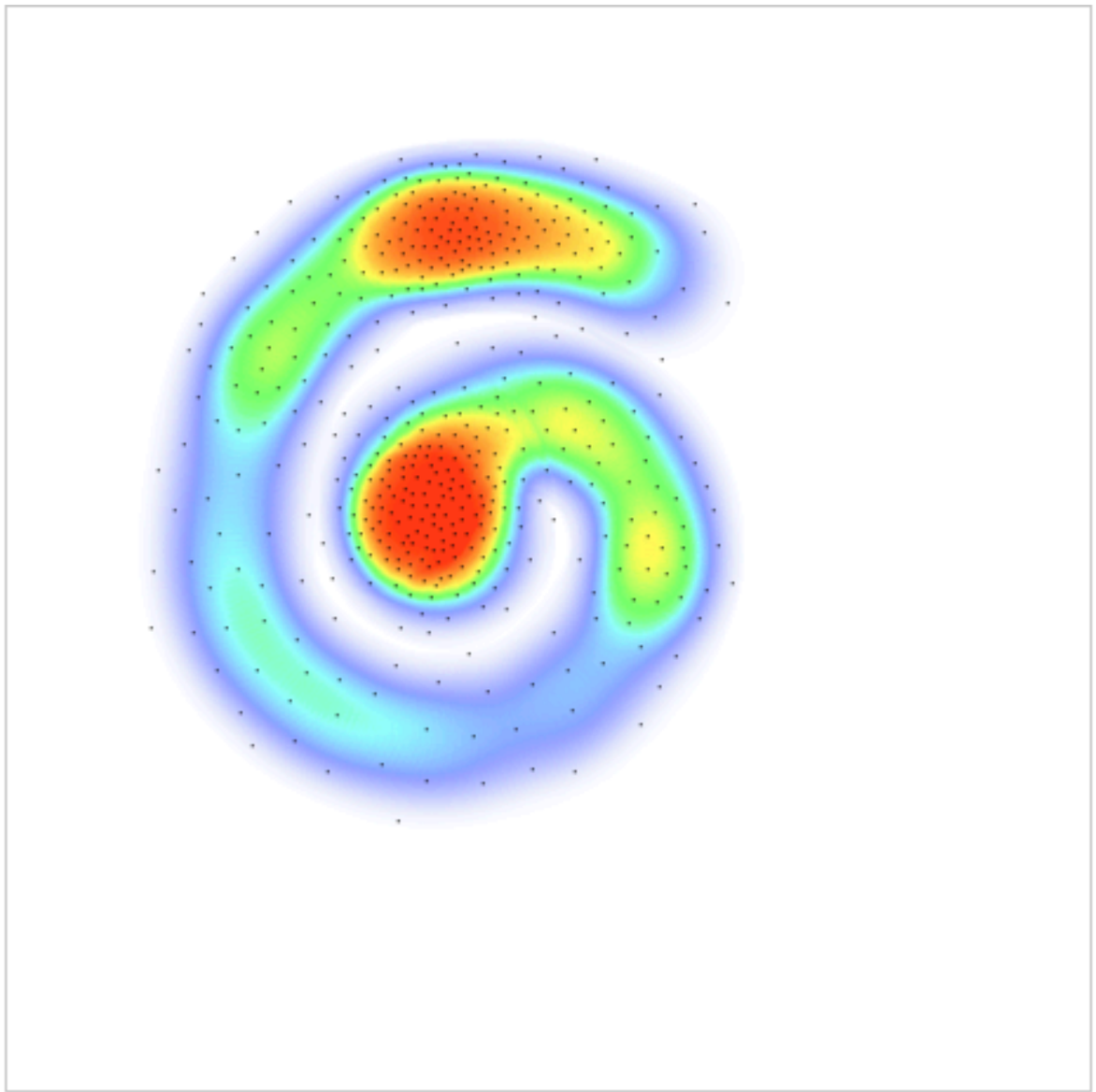
triweight: $f(x) = a(1 - (x/w)^2)^3 : (-w \le x \le w)$, else 0

tricube: $f(x) = a(1 - |x/w|^3)^3 : (-w \le x \le w)$, else 0

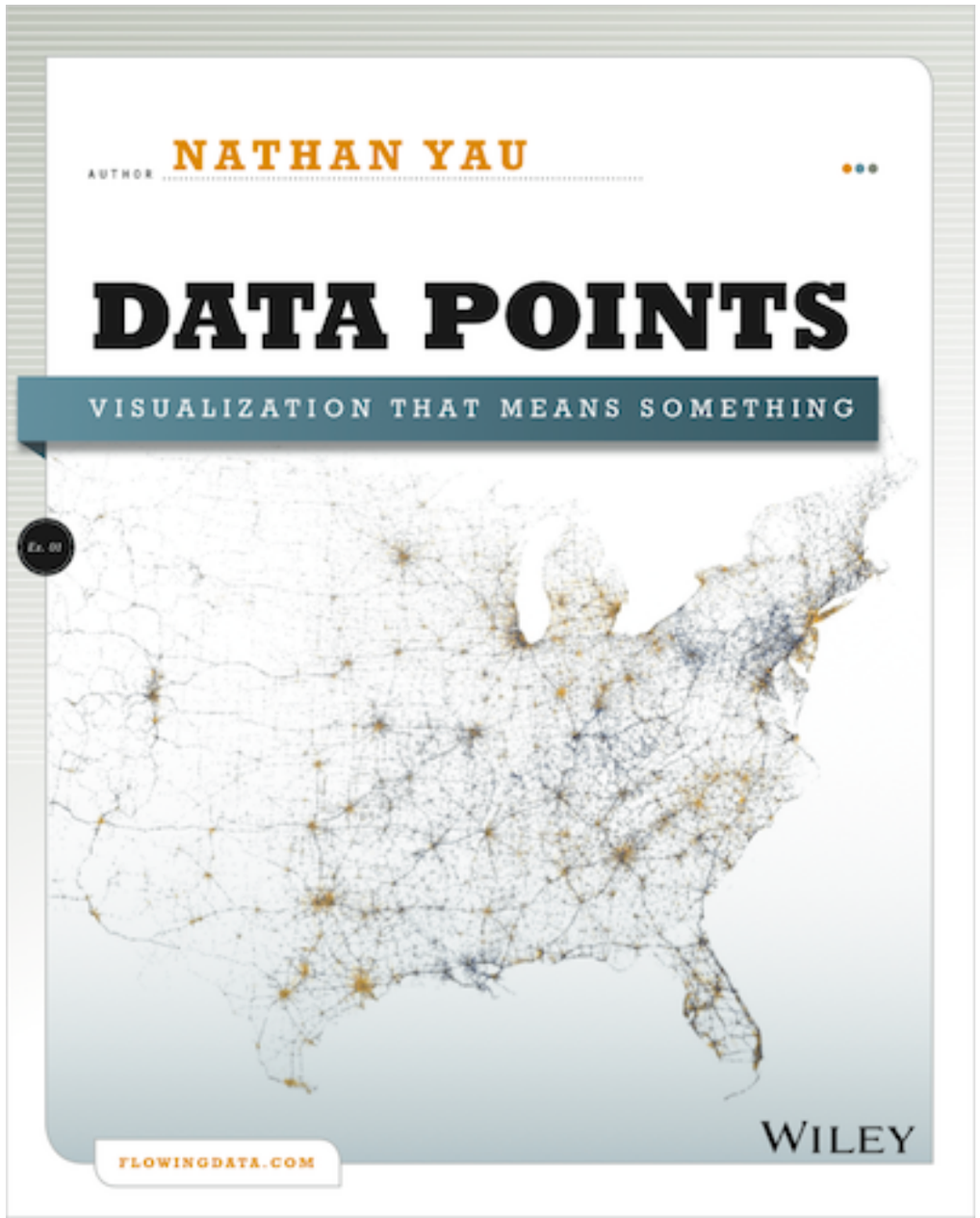
gaussian: $f(x) = ae^{-(x/w)^2}$

cauchy: $f(x) = a/(b + (x/w)^2)$





Density & Smooth
http://chenhui.li/demo/heatmaptool/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NATHAN YAU
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VISUALIZATION THAT MEANS SOMETHING
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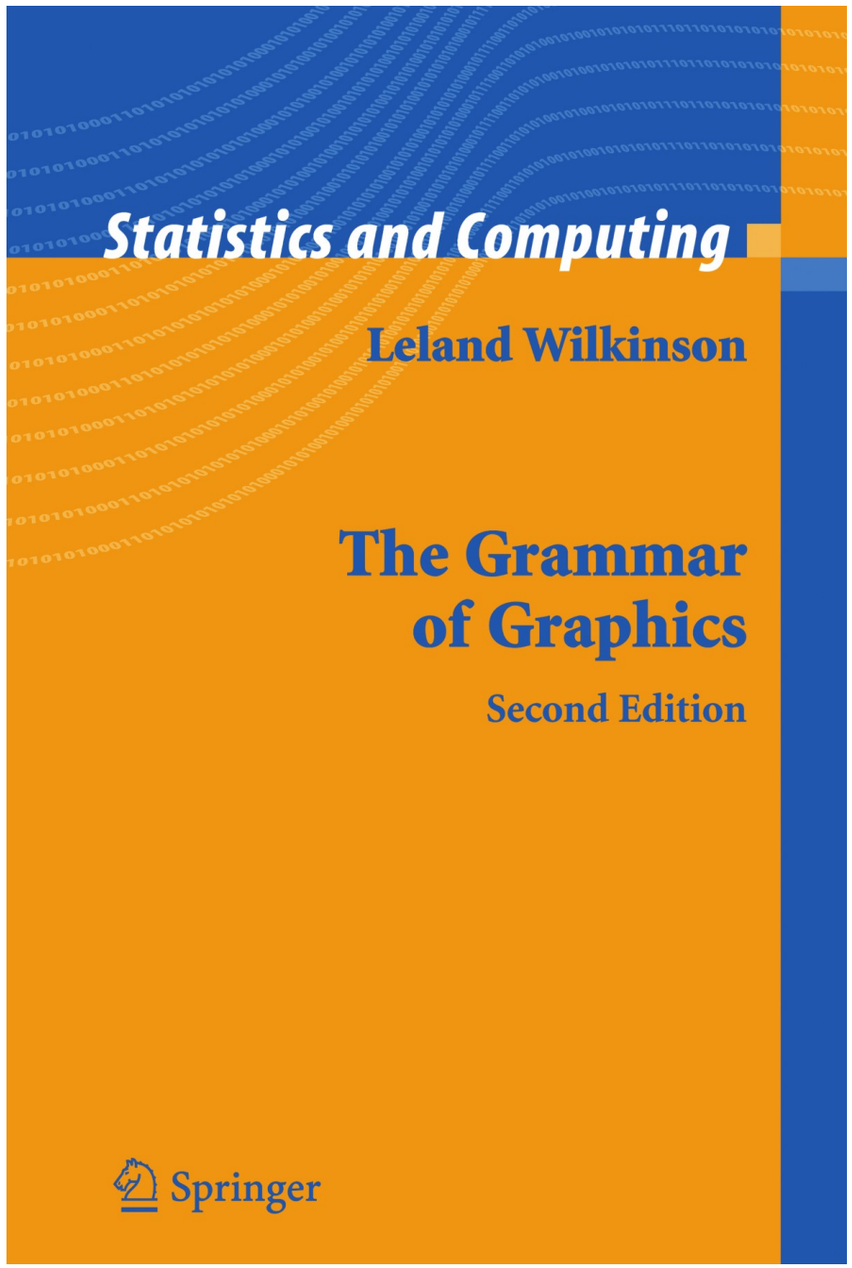
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