

# HistogramTools 0.3.1

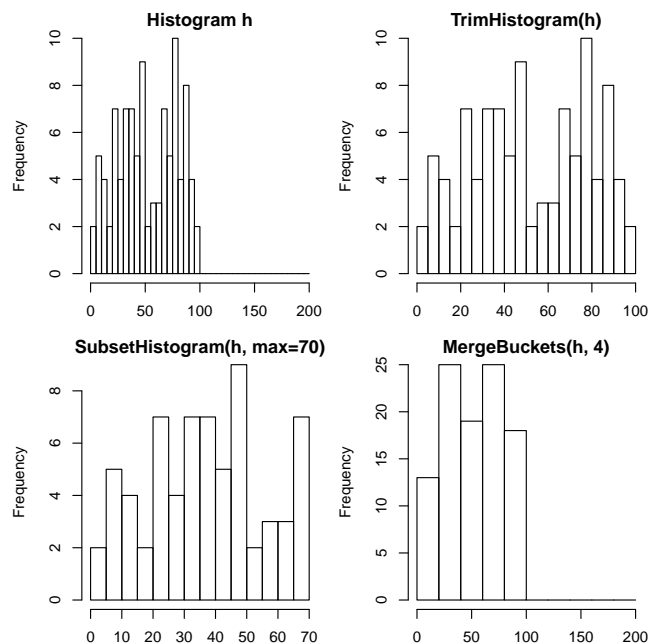
## Quick Reference Guide

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August 27, 2014

**Histogram Manipulation** This package includes a number of basic functions for subsetting, trimming, merging, adding, and otherwise manipulating basic R histogram objects.

```
> h <- hist(runif(100, 0, 100),
+           breaks=seq(from=0,to=200,by=5))
> plot(TrimHistogram(h))
> plot(SubsetHistogram(h, maxbreak=70))
> plot(MergeBuckets(h, adj.buckets=2))
```



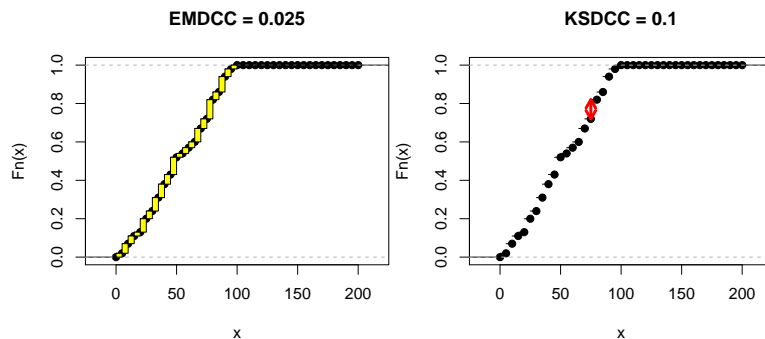
**Information Loss** The introduction of binning a dataset into a histogram introduces information loss. The package provides standard Histogram distance measures as well as distance functions on the possible ECDFs that could have been constructed from the original data: the Kolmogorov-Smirnov Distance of the Cumulative Curves (KSDCC) and Earth Mover's Distance of the Cumulative Curves (EMDCC). The plots here show a visual representation of the returned value. EMDCC is the area of the yellow boxes and KSDCC is the distance of the red arrow.

```
> par(mfrow=c(1,2), par(mar=c(5,4,4,0)+0.1))
> PlotEMDCC(h)
> PlotKSDCC(h)
> EMDCC(h)
```

[1] 0.025

```
> KSDCC(h)
```

[1] 0.1



**Serialize a Histogram** This package includes functions for reading and writing Histograms from other tools. Most notably, it can encode or decode any arbitrary R histogram into a portable protocol buffer format to send to other programs written in other languages.

```
> hist.msg <- as.Message(h)
> length(hist.msg$serialize(NULL))
```

NULL

## Common HistogramTools Functions

Bin Manipulation	
TrimHistogram	Remove empty consecutive buckets from ends
AddHistograms	Aggregate two or more histograms
MergeBuckets	Merge adjacent bucket boundaries
SubsetHistogram	Return histogram with subset of buckets
IntersectHistograms	Return an intersection of two histograms
ScaleHistogram	Scale the counts of a histogram by a factor
Quantiles and Empirical CDFs	
HistToEcdf	Return the ECDF of histogram
Count	Return the number of data points in hist
ApproxMean	Return an approximate mean of the binned data
ApproxQuantile	Return an approximate quantile of the binned data
Distance Measures of Two Histograms	
minkowski.dist	The Minkowski distance of order $p$ .
intersect.dist	The intersection distance.
kl.divergence	Kullback-Leibler Divergence.
jeffrey.divergence	Jeffrey Divergence.
Binned CDF Distance Measures	
PlotKSDCC	Plot ECDF with annotation at point of KS distance of the cumulative curves
PlotEMDCC	Plot ECDF with annotation showing EMD of the cumulative curves
KSDCC	Return the Kolmogorov-Smirnov distance of the cumulative curves (btwn 0 and 1)
EMDCC	Return the Earth Mover's distance of the cumulative curves (btwn 0 and 1)
Misc	
PlotLog2ByteEcdf	Plot ECDF of hist with power of two bucket boundaries
PlotLogTimeDurationEcdf	Plot ECDF of hist with log-scaled time duration bucket boundaries
as.histogram	Parse a HistogramState protocol buffer and return an R histogram
as.Message	Serialize an R histogram as a HistogramState protocol buffer
ReadHistogramsFromDTraceOutputFile	Read histograms from DTrace output