Sticky-Evidence-Illustration.R

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2019-07-29

rm(list=ls(all=TRUE))
#clear console
cat("\014")

scale\_param<- 1.5 #for weighting function

weight\_fun<- function(distance,scale\_param){
 the\_weight<- 1-exp(-distance/scale\_param)
 return(the\_weight)
}

#sample raw uncorrelated (across time) evidence
raw\_evidence<-rnorm(10^3,mean=0,sd=1)
sticky\_evidence<-raw\_evidence
weights<-numeric(length(sticky\_evidence))
distances<-numeric(length(sticky\_evidence))

for(trial in 2:length(sticky\_evidence)){ #starts at second trial because there can be no prior evidence for trial 1

 distance<-abs(sticky\_evidence[trial]-sticky\_evidence[trial-1])
 w <-weight\_fun(distance,scale\_param)
 #the sticky weighting process
 sticky\_evidence[trial]<-(w)\*sticky\_evidence[trial]+(1-w)\*sticky\_evidence[trial-1]
 weights[trial]<-w
 distances[trial]<-distance
} #end of trial loop

output<-data.frame(re=raw\_evidence,
 se=sticky\_evidence,
 w=weights,
 d=distances)

print(head(output))

## re se w d
## 1 -1.3519396 -1.3519396 0.00000000 0.00000000
## 2 0.8725943 0.3677348 0.77304933 2.22453392
## 3 0.3967134 0.3682893 0.01913361 0.02897854
## 4 0.2574025 0.3603877 0.07125818 0.11088674
## 5 -0.7299261 -0.2028500 0.51658311 1.09031382
## 6 0.1626076 -0.1238275 0.21622901 0.36545760

#plot relation of weights and evidence distances
with(output,
 plot(w,d))



#autocorrelation plot of raw evidence
print(acf(output$re,lag.max=5))



##
## Autocorrelations of series 'output$re', by lag
##
## 0 1 2 3 4 5
## 1.000 -0.006 -0.031 0.011 0.026 -0.010

#autocorrelation plot of sticky evidence
print(acf(output$se,lag.max=5))



##
## Autocorrelations of series 'output$se', by lag
##
## 0 1 2 3 4 5
## 1.000 0.285 0.075 0.040 0.043 0.016

samp=50
plot(1:samp,output$re[1:samp],type='l')
lines(1:samp,output$se[1:samp],type='l',col='red')



print(apply(output,2,FUN='sd'))

## re se w d
## 1.0367588 0.7960157 0.2402895 0.7939131