1.  Read the subset\_minimum\_tarrant.csv file.  x, y, date, county.  (note x should be longitude and y is the latitude, date is mm/dd/yy, county should be the same in this file and can be ignored for now. )

2.  Define a spatial grid, e.g. 100 meter squares? And time window (1 month)

3.  Based on the spatial grid and time window divided the data into a set of data cube (spatial-temporal divided)

4.

For each grid cell,

For data cubes of each time window,

   Running a GI\* stats.

   (note: the results is an indicator whether this is a hotspot or not).

           Running Mann-Kendall analysis on the result of GI\* stats.

                                  (note: the results is an indicator whether this series is in uptrend or down trend)

5.      summarizes the results in the form of (?) :

   grid boundaries (shape file?), [GI\* indicator overtime],  up / down trend.

Open source support:

R:

   GI\* stats: Spdep package: GlobalG, LocalG,

   Mann-Kendall: kendall package:  MannKendall(x)

Spark:   <https://github.com/hgryoo/SparkHotspotAnalysis>

<https://stackoverflow.com/questions/32889531/r-how-can-i-count-how-many-points-are-in-each-cell-of-my-grid>

<https://stackoverflow.com/questions/10036822/how-to-get-a-data-frame-into-a-multidimensional-array-in-r>

<https://healthycities.zendesk.com/hc/en-us/articles/233420187-Mann-Kendall-Test-for-Trend-Overview>

install.packages('trend')

library('trend')

library('spdep')

data(getisord)

data(getisord)

xycoords <- cbind(xyz$x, xyz$y)

nb30 <- dnearneigh(xycoords, 0, 30)

G30 <- localG(xyz$val, nb2listw(nb30, style="B"))

brks <- seq(-5,5,1)

cm.col <- cm.colors(length(brks)-1)

image(x, y, t(matrix(G30, nrow=16, ncol=16, byrow=TRUE)),

breaks=brks, col=cm.col, asp=1)

Mann Kendall test (mk test z core plot)

