Boosting_Contiguity_Rook_Migrasi

Anandika Dian P.

3/29/2020

```
#Contiguity rook dengan ordo [1:3]
#Matriks migrasi selisih terstandardisasi (nonsimetris)
```

```
start.time <- Sys.time()
library(spdep)
```

```
## Loading required package: sp
```

```
## Loading required package: spData
```

```
## To access larger datasets in this package, install the spDataLarge
## package with: `install.packages('spDataLarge',
## repos='https://nowosad.github.io/drat/', type='source')`
```

```
## Loading required package: sf
```

```
## Linking to GEOS 3.6.1, GDAL 2.2.3, PROJ 4.9.3
```

```
dataIGI <- read.csv("D:/Skripsweet/data_jateng_w_latlong.csv")
rownames(dataIGI) <- dataIGI$KABUPATEN
attach(dataIGI)
vy <- IGI
vx <- dataIGI[,4:8]
coords <- cbind(x_long,y_lat)
detach(dataIGI)
```

```
migrasi <- read.csv("D:/Skripsweet/Kak Along's/migrasi_selisih.csv")
w_migrasi <- as.matrix(migrasi)
```

```
library(rgdal)
```

```
## rgdal: version: 1.4-3, (SVN revision 828)
##  Geospatial Data Abstraction Library extensions to R successfully loaded
##  Loaded GDAL runtime: GDAL 2.2.3, released 2017/11/20
##  Path to GDAL shared files: C:/Program Files/R/R-3.6.2/library/rgdal/gdal
##  GDAL binary built with GEOS: TRUE
##  Loaded PROJ.4 runtime: Rel. 4.9.3, 15 August 2016, [PJ_VERSION: 493]
##  Path to PROJ.4 shared files: C:/Program Files/R/R-3.6.2/library/rgdal/proj
##  Linking to sp version: 1.3-1
```

```
jt_lp<-readOGR("D:/KULIAH STIS/Tingkat 3/Semester 6/SIG/UAS SIG","Jawa_Tengah")
```

```
## OGR data source with driver: ESRI Shapefile
## Source: "D:\KULIAH STIS\Tingkat 3\Semester 6\SIG\UAS SIG", layer: "Jawa_Tengah"
## with 35 features
## It has 6 fields
```

```
get.list=function(coords,k)
{
  #membuat ketetanggaan contuiguity rook
  nb<-poly2nb(jt_lp,queen = FALSE)
  nb_1<-nblag(nb,k)
  nb_cum<-nblag_cumul(nb_1)
  w_rook<-nb2listw(nb_cum,style = "B")
  #mengembalikan ke bentuk matriks
  w_rook <- listw2mat(w_rook)
  #mengalikan matriks knn dengan migrasi
  m_cust <- w_migrasi*w_rook
  m_cust_tot<-rowSums(m_cust,na.rm = TRUE)
  m_custom<-m_cust/m_cust_tot
  #mengubah ke bentuk listw
  w_custom <- mat2listw(m_custom)
}
```

```
create.instr=function(vy,vx,w_custom){
  ly <- lag.listw(w_custom,vy)
  res <- matrix(data = NA, nrow = nrow(vx), ncol = ncol(vx))
  for (i in 1:ncol(vx))
  {
    res[ ,i]=  lag.listw(w_custom,vx[,i])
  }
  instr=lm(ly~ res)$fitted.values
  instr
}
```

```
#membuat ketetanggaan contuiguity rook
nb<-poly2nb(jt_lp,queen = FALSE)
w_q1<-nb2listw(nb,style = "B")
#mengembalikan ke bentuk matriks
w_q1 <- listw2mat(w_q1)
#mengalikan matriks knn dengan migrasi
m_cust_1 <- w_migrasi*w_q1
m_cust_1_tot<-rowSums(m_cust_1,na.rm = TRUE)
m_custom_1<-m_cust_1/m_cust_1_tot
#mengubah ke bentuk listw
w_custom_1 <- mat2listw(m_custom_1)
s10_o1<-create.instr(vy,vx,w_custom_1)
```

```
degs <- c(2,3)
res<-matrix(NA,length(vy),length(degs))
X <- vx
for(i in 1:length(degs))
  {
  #a untuk membentuk matriks pembobot
  a <- get.list(coords,k=degs[[i]])
```

```
  #menghitung fitted values model pada masing2 matriks pembobot
  b <- create.instr(vy,vx,a)
  names(b)=NULL
  res[,i]=b
}
  mn <- paste("s10_o",degs,sep="")
  res <- data.frame(res)
  names(res)<- mn
  res<-cbind(s10_o1,res)
  res<- as.matrix(res)
  X <- cbind(X,res)
  #X <- res
```

```
X1<-X[,-(1:5)]
n = nrow(X1)
#jumlah kombinasi matriks pembobot
#X berisi matriks dengan baris berupa wilayah dan kolom berupa macam2 matriks pembobot dengan elemen ma

save(X1,vy,n, file="d:/Skripsweet/Bimbingan 10/IGI_jateng.w10.Rdata")

load("d:/Skripsweet/Bimbingan 10/IGI_jateng.w10.Rdata")
jateng_w<-get(load("d:/Skripsweet/Bimbingan 10/IGI_jateng.w10.Rdata"))
jat_w_mat<-as.matrix(jateng_w)
```

```
library(mboost)
```

```
## Loading required package: parallel
```

```
## Loading required package: stabs
```

```
## This is mboost 2.9-1. See 'package?mboost' and 'news(package  = "mboost")'
## for a complete list of changes.
```

```
#u 0.1
m1=glmboost(jat_w_mat,vy,control = boost_control(mstop = 1000,nu=0.1),center = FALSE)
```

```
aic1 <- AIC(m1,method="corrected")
aic1
```

```
## [1] -0.5638006
## Optimal number of boosting iterations: 1
## Degrees of freedom (for mstop = 1): 0.1
```

```
mbest1aic=m1[mstop(aic1)]
names(coef(mbest1aic)[abs(coef(mbest1aic)) > 0])
```

```
## [1] "s10_o2"
```

```
gMDL1 <- AIC(m1,method="gMDL")
gMDL1
```

```
## [1] -1.596668
## Optimal number of boosting iterations: 1
## Degrees of freedom (for mstop = 1): 0.1
```

```
mbest1gMDL=m1[mstop(gMDL1)]
names(coef(mbest1gMDL)[abs(coef(mbest1gMDL)) > 0])
```

```
## [1] "s10_o2"
```

```
end.time <- Sys.time()
time.taken <- end.time - start.time
time.taken
```

```
## Time difference of 8.541671 secs
```

```
nb<-poly2nb(jt_lp,queen = FALSE)
nb_1<-nblag(nb,2)
nb_cum<-nblag_cumul(nb_1)
w_rook<-nb2listw(nb_cum,style = "B")
#mengembalikan ke bentuk matriks
w_rook <- listw2mat(w_rook)
#mengalikan matriks knn dengan migrasi
m_cust <- w_migrasi*w_rook
m_cust_tot<-rowSums(m_cust,na.rm = TRUE)
m_custom<-m_cust/m_cust_tot
#mengubah ke bentuk listw
w_final <- mat2listw(m_custom,style = "W")
```

```
moran.test(dataIGI$IGI,w_final,randomisation = TRUE)
```

```
##
##  Moran I test under randomisation
##
## data:  dataIGI$IGI
## weights: w_final
##
## Moran I statistic standard deviate = 4.5636, p-value = 2.515e-06
## alternative hypothesis: greater
## sample estimates:
## Moran I statistic       Expectation          Variance
##       0.407160802      -0.029411765       0.009151735
```

```
my<- dataIGI$IGI
mx<-cbind(dataIGI$INFLASI,dataIGI$PMTB,dataIGI$UMK,dataIGI$PP,dataIGI$PPS)
ols<-lm(my~mx)
moran.test(ols$residuals,w_final,randomisation = TRUE)
```

```
##
##  Moran I test under randomisation
##
## data:  ols$residuals
## weights: w_final
##
## Moran I statistic standard deviate = 2.4631, p-value = 0.006888
## alternative hypothesis: greater
## sample estimates:
## Moran I statistic       Expectation          Variance
##       0.203407909      -0.029411765       0.008934883
```

```
r.ols <- lm(dataIGI$IGI ~ dataIGI$INFLASI+dataIGI$PMTB+dataIGI$UMK+dataIGI$PPS+dataIGI$PP)
r.lag <- lagsarlm(r.ols, dataIGI, w_final, zero.policy = TRUE)
```

```
## Warning: Function lagsarlm moved to the spatialreg package
```

```
## Registered S3 methods overwritten by 'spatialreg':
##   method                    from
##   residuals.stsls           spdep
##   deviance.stsls            spdep
##   coef.stsls                spdep
##   print.stsls               spdep
##   summary.stsls             spdep
##   print.summary.stsls       spdep
##   residuals.gmsar           spdep
##   deviance.gmsar            spdep
##   coef.gmsar                spdep
##   fitted.gmsar              spdep
##   print.gmsar               spdep
##   summary.gmsar             spdep
##   print.summary.gmsar       spdep
##   print.lagmess             spdep
##   summary.lagmess           spdep
##   print.summary.lagmess     spdep
##   residuals.lagmess         spdep
##   deviance.lagmess          spdep
##   coef.lagmess              spdep
##   fitted.lagmess            spdep
##   logLik.lagmess            spdep
##   fitted.SFResult           spdep
##   print.SFResult            spdep
##   fitted.ME_res             spdep
##   print.ME_res              spdep
##   print.lagImpact           spdep
##   plot.lagImpact            spdep
##   summary.lagImpact         spdep
##   HPDinterval.lagImpact     spdep
##   print.summary.lagImpact   spdep
##   print.sarlm               spdep
##   summary.sarlm             spdep
##   residuals.sarlm           spdep
##   deviance.sarlm            spdep
```

```
##   coef.sarlm               spdep
##   vcov.sarlm               spdep
##   fitted.sarlm             spdep
##   logLik.sarlm             spdep
##   anova.sarlm              spdep
##   predict.sarlm            spdep
##   print.summary.sarlm      spdep
##   print.sarlm.pred         spdep
##   as.data.frame.sarlm.pred spdep
##   residuals.spautolm       spdep
##   deviance.spautolm        spdep
##   coef.spautolm            spdep
##   fitted.spautolm          spdep
##   print.spautolm           spdep
##   summary.spautolm         spdep
##   logLik.spautolm          spdep
##   print.summary.spautolm   spdep
##   print.WXImpact           spdep
##   summary.WXImpact         spdep
##   print.summary.WXImpact   spdep
##   predict.SLX              spdep
```

```
summary(r.lag, Nagelkerke = TRUE)
```

```
##
## Call:spatialreg::lagsarlm(formula = formula, data = data, listw = listw,
##     na.action = na.action, Durbin = Durbin, type = type, method = method,
##     quiet = quiet, zero.policy = zero.policy, interval = interval,
##     tol.solve = tol.solve, trs = trs, control = control)
##
## Residuals:
##        Min         1Q     Median         3Q        Max
## -0.9057819 -0.1265029  0.0078356  0.1627052  0.4648481
##
## Type: lag
## Coefficients: (asymptotic standard errors)
##                   Estimate Std. Error z value  Pr(>|z|)
## (Intercept)      3.5585405  0.9983710  3.5643 0.0003648
## dataIGI$INFLASI -0.0595505  0.1100302 -0.5412 0.5883558
## dataIGI$PMTB     0.0114500  0.0039725  2.8823 0.0039482
## dataIGI$UMK     -0.1005153  0.0336202 -2.9897 0.0027922
## dataIGI$PPS      0.3010292  0.0973568  3.0920 0.0019880
## dataIGI$PP      -0.0057949  0.0054194 -1.0693 0.2849424
##
## Rho: 0.57723, LR test value: 10.806, p-value: 0.0010117
## Asymptotic standard error: 0.13982
##     z-value: 4.1283, p-value: 3.6541e-05
## Wald statistic: 17.043, p-value: 3.6541e-05
##
## Log likelihood: -3.504138 for lag model
## ML residual variance (sigma squared): 0.066652, (sigma: 0.25817)
## Nagelkerke pseudo-R-squared: 0.63474
## Number of observations: 35
## Number of parameters estimated: 8
```

```
## AIC: 23.008, (AIC for lm: 31.814)
## LM test for residual autocorrelation
## test value: 0.13517, p-value: 0.71313
```

```
W <- as(w_final, "CsparseMatrix")
trMatc <- trW(W, type = "mult")
```

```
## Warning: Function trW moved to the spatialreg package
```

```
set.seed(1)
summary(impacts(r.lag, tr=trMatc, R = 99), zstats = TRUE, short = TRUE)
```

```
## Warning: Method impacts.sarlm moved to the spatialreg package
```

```
## Impact measures (lag, trace):
##                        Direct     Indirect       Total
## dataIGI$INFLASI -0.064567634 -0.076290168 -0.14085780
## dataIGI$PMTB     0.012414602  0.014668526  0.02708313
## dataIGI$UMK     -0.108983599 -0.128770043 -0.23775364
## dataIGI$PPS      0.326390649  0.385648285  0.71203893
## dataIGI$PP      -0.006283107 -0.007423833 -0.01370694
## ========================================================
## Simulation results (asymptotic variance matrix):
## ========================================================
## Simulated standard errors
##                      Direct   Indirect      Total
## dataIGI$INFLASI 0.104968795 0.16377112 0.25282506
## dataIGI$PMTB    0.004475676 0.01318266 0.01667302
## dataIGI$UMK     0.039137324 0.11902755 0.15102050
## dataIGI$PPS     0.105759941 0.26967570 0.33785185
## dataIGI$PP      0.006225141 0.01162027 0.01716683
##
## Simulated z-values:
##                     Direct   Indirect      Total
## dataIGI$INFLASI -0.6797914 -0.4577733 -0.5787675
## dataIGI$PMTB     2.9497745  1.3523604  1.8610867
## dataIGI$UMK     -2.8316048 -1.2588760 -1.7260065
## dataIGI$PPS      3.1390682  1.5459475  2.2166288
## dataIGI$PP      -1.0574764 -0.8339210 -0.9479519
##
## Simulated p-values:
##                 Direct    Indirect Total
## dataIGI$INFLASI 0.4966365 0.64712  0.562746
## dataIGI$PMTB    0.0031801 0.17626  0.062732
## dataIGI$UMK     0.0046315 0.20808  0.084346
## dataIGI$PPS     0.0016949 0.12212  0.026648
## dataIGI$PP      0.2902942 0.40433  0.343154
```