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# find model that has the smallest average misfit

setwd("J:/_Energy_Futures/Endeavour/Gthrm1_Next_Gen/Project 1
EXPLORE/WS_1.2_Crustal_structure/shear-wave-splitting/20230411/")

#load each file within a folder then run code
folder=paste("input/", batch, "/",sep="") files
<- list.files(path=folder,pattern = ".csv")
##### for(k
in 1:length(files)){

  file.name=files[k]
  File.in=read.csv(paste(folder, file.name, sep=""))
  if(!(c("model") %in% colnames(File.in) )){
    File.in$model=paste(File.in$Strike1, File.in$dip1, File.in$Strike2,
File.in$dip2, sep="")
  }
  # extract model parameters from the filename
  GeothField=substr(file.name, start = 1, stop=2)
  Temp=substr(file.name, start = 31, stop=34)   cd=substr(file.name,
start = 17, stop=22)
  StrikeF1=substr(file.name, start = 24, stop=29)

  # average misfit for each model. all misfits are >0 so no need to take
square or abs()
  # table with misfits for each model   for(i in
1:length(unique(File.in$model))){
    tmp.mod.id=unique(File.in$model)[i]
    tmp.in=File.in[which(File.in$model %in% tmp.mod.id),]

    tmp.out.lambda=sum(tmp.in$misfit_lamda)/dim(tmp.in)[1]
    tmp.out.simple=sum(tmp.in$misfit_simple)/dim(tmp.in)[1]
    tmp.out=as.data.frame( cbind(
model=tmp.mod.id,
misfit.lamda.ave=tmp.out.lambda,
misfit.simple.ave=tmp.out.simple
    ))
    rm(tmp.mod.id, tmp.out.lambda,tmp.out.simple,
tmp.in )
    if(i==1){
out=tmp.out    }else{
out=rbind(out, tmp.out)
    }
    rm(tmp.out)
    if(i==length(unique(File.in$model))){
out$GeothField=GeothField
out$Temp=substr(Temp, start=1, stop=3)
out$cd=substr(cd, start=3, stop = 6)
out$StrikeF1=substr(StrikeF1, start=4, stop=6)

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    }
}
rm(i)

#table with the model having the minimum misfits for tested parameters
out.overall=as.data.frame(cbind(
  GeothField.nb=GeothField,
  Temp=substr(Temp, start=1, stop=3),
  cd=as.character(substr(cd, start=3, stop = 6)),
  StrikeF1=as.character(substr(StrikeF1, start=4, stop=6)),
  min.misfit.lamda.name=out$model[which(out$misfit.lamda.ave ==
min(out$misfit.lamda.ave))],
min.misfit.lamda.value=out$misfit.lamda.ave[which(out$misfit.lamda.ave ==
min(out$misfit.lamda.ave))],

  min.misfit.simple.name=out$model[which(out$misfit.simple.ave ==
min(out$misfit.simple.ave))],
min.misfit.simple.value=out$misfit.simple.ave[which(out$misfit.simple.ave
== min(out$misfit.simple.ave))],

  GeothField=GeothField,
Temp=Temp,      cd=cd,
  StrikeF1=StrikeF1 ))
#out.overall
write.csv(out, paste("output/", file.name, "_summary_misfits.csv",
sep = ""), row.names=F)
# write.csv(out.overall, paste("output/",file.name, "_minimum_misfits.csv",
sep = ""), row.names=F)
if(k==1){
out.all.folder=out.overall
}else{  out.all.folder=rbind(out.all.folder,
out.overall)
} print(paste(file.name, " done")) rm(out, out.overall,
file.name, cd, GeothField, StrikeF1, Temp) rm(File.in)
} rm(k) #end of loop through
filenames
write.csv(out.all.folder, paste("output/",batch, "_minimum_misfits.csv", sep
= ""), row.names=F)
rm(out.all.folder, batch, folder,
files)

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