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library(here)

## here() starts at /Users/marskar/gdrive/nhanes

library(readr)
library(dplyr)

##
## Attaching package: 'dplyr'

## The following objects are masked from 'package:stats':
##
##   filter, lag

## The following objects are masked from 'package:base':
##
##   intersect, setdiff, setequal, union

library(tidyr)
library(survey)

## Loading required package: grid

## Loading required package: methods

## Loading required package: Matrix

##
## Attaching package: 'Matrix'

## The following object is masked from 'package:tidyr':
##
##   expand

## Loading required package: survival

##
## Attaching package: 'survey'

## The following object is masked from 'package:graphics':
##
##   dotchart

library(purrr)

# this function takes in an integer as an argument

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# this function returns a dataframe
get_modelstats <- function(seed){

  set.seed(seed)
  #move PERMTH_INT and canc_mort to the beginning
  #sample a tenth of the dataset columns
  read_rds(here('dat/3-clean-complete-cases.rds')) %>%
    select(~SEQN) %>%
    select(PERMTH_INT,
           canc_mort,
           SDPPSU6,
           SDPSTRA6,
           WTPFQX6,
           everything()[sample(seq(ncol(.)),
                               round(ncol()/10))]) ->
  samp

  # create survey design object
  svydesign(ids = ~SDPPSU6,
           strata = ~SDPSTRA6,
           weights = ~WTPFQX6,
           nest = TRUE,
           data = samp) ->
  des

  # create left side of equations
  form <- as.formula(Surv(PERMTH_INT, canc_mort) ~ x1)
  # create right sides of equations
  vrs <- as.name(paste(names(samp)[6:ncol(samp)],
                      collapse=' + '))
  vrs2 <- as.name(paste(names(samp)[6:ncol(samp)],
                      collapse=', '))

  set.seed(seed)
  #train <- sample(x = seq(nrow(samp)),
  #               size = round(nrow(samp)*.7))
  # generate cox models without and with penalties

  cox <- svycoxph(update(form,
                        paste("~ ", vrs)),
                  design = des, data = samp)

  rid <- svycoxph(update(form,
                        paste("~ ridge(", vrs2, ')')),
                  design = des, data = samp)

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# define functions needed to create first table
get_con <- function(x) {
  signif(summary(x)$concordance[1]*100, digits = 2)
}
get_HR <- function(x) {
  summary(x)$conf.int[, "exp(coef)"]
}
get_HR_CI_lower <- function(x) {
  summary(x)$conf.int[, "lower .95"]
}
get_HR_CI_upper <- function(x) {
  summary(x)$conf.int[, "upper .95"]
}
get_coef_pvalue <- function(x) {
  coefs <- summary(x)$coef
  coefs[, ncol(coefs)]
}
model_list <- list(cox, rid)

data_frame(seed = rep(seed, 2),
            type = c('coxph', 'ridge'),
            aic = AIC(cox, rid)[, "AIC"],
            concordance = map_dbl(model_list,
                                   get_con),
            hazard_ratio = map(model_list,
                                get_HR),
            HR_CI_lower = map(model_list,
                               get_HR_CI_lower),
            HR_CI_upper = map(model_list,
                               get_HR_CI_upper),
            coef_pvalue = map(model_list,
                               get_coef_pvalue))
}
map_dfr(seq(100), get_modelstats) %>%
write_rds(here(paste0("dat/4-model-complete-cases.rds"))))

## Stratified 1 - level Cluster Sampling design (with replacement)
## With (98) clusters.
## svydesign(ids = ~SDPPSU6, strata = ~SDPSTRA6, weights = ~WTPFQX6,
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