Package ‘DCPO’

April 15, 2020

Version 0.5.1
Title Dynamic Comparative Public Opinion
Description Estimates latent variables of public opinion cross-
nationally and over time from sparse and incomparable survey data. ‘DCPO’ uses a population-
level graded response model with country-specific item bias terms. Sampling is con-
License GPL (>= 3)
Encoding UTF-8
LazyData true
ByteCompile true
Depends R (>= 3.4.0), Rcpp (>= 0.12.17), methods
Imports rstantools (>= 2.0.0), beepar, dplyr,
forcats, janitor, purrr, tibble, tidyr
LinkingTo StanHeaders (>= 2.18.0), rstan (>= 2.18.1), BH (>=
1.66.0-1), Rcpp (>= 0.12.0), RcppEigen (>= 0.3.3.4.0)
Suggests knitr
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DCPO estimates dynamic comparative public opinion as a latent variable from survey data.

Usage

dcpo(dcpo_input, chime = TRUE, ...)

Arguments

dcpo_input: a data frame of survey items and marginals generated by DCPOtools::dcpo_setup
chime: play chime when complete?
...: arguments to be passed to rstan::stan. Defaults reset by dcpo are described below under details.

Details

dcpo, when passed a data frame dcpo_input of survey marginals created by dcpo_setup, estimates a latent variable of public opinion. See rstan::stan for additional options; stan defaults reset by dcpo are seed = 324, thin = 2, cores = min(stan_args$chains,parallel::detectCores()/2), and control <- list(adapt_delta = 0.99, stepsize = 0.005, max_treedepth = 14)

Value

a stanfit object
Examples

```r
out1 <- dcpo(demsup_data,
    chime = FALSE,
    chains = 2,
    iter = 150) # 2 chains/150 iterations for example purposes only; use defaults
```

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**dcpo_xvt**

*Cross-validation testing for DCPO*

**Description**

dcpo_xvt performs a single cross-validation test for DCPO

**Usage**

```r
dcpo_xvt(
    dcpo_input,
    fold_number = 1,
    number_of_folds = 10,
    fold_seed = 324,
    chime = TRUE,
    ...
)
```

**Arguments**

- `dcpo_input`: a data frame of survey items and marginals generated by `DCPOTools::dcpo_setup`
- `fold_number`: an integer indicating the number of the fold to treated as test data in the current analysis
- `number_of_folds`: an integer indicating the total number of folds
- `fold_seed`: a seed for reproducibly randomly assigning observations to folds; when a complete set of k-fold cross-validations is to be performed, the same seed should be used for all
- `chime`: play chime when complete?
- `...`: arguments to be passed to `rstan::stan`. See dcpo.

**Details**

dcpo_xvt performs a single cross-validation test of a DCPO estimation. To perform a complete k-fold cross-validation, call it repeatedly, changing only the fold_number argument.
demsup_data

Value

a stanfit object

Examples

# Single cross-validation test with 25% test set
demsup_xvtest_25pct <- dcpo_xvt(demsup_data,
   chime = FALSE,
   number_of_folds = 4,
   iter = 150,
   chains = 2) # 2 chains/150 iterations for example only; use defaults

==

demsup_data  Support for Democracy in 51 Survey Datasets

Description

A dataset containing the prices and other attributes of almost 54,000 diamonds.

Usage

demsup_data

Format

A list of 15 elements

K an integer, the total number of countries in the data
T an integer, the total number of years in the data
Q an integer, the total number of distinct survey questions in the data
R an integer, the maximum number of response cutpoints in any survey question in the data
N an integer, the number of KTQR observations
kk a numeric vector of length N, the country of each observation
tt a numeric vector of length N, the year of each observation
qq a numeric vector of length N, the question of each observation
rr a numeric vector of length N, the response cutpoint of each observation
y_r a numeric vector of length N, the number of respondents who provided a response above the relevant cutpoint for each observation
n_r a numeric vector of length N, the total number of respondents for each observation

fixed_cutp a QxR matrix, a truth table indicating the question-cutpoint to be fixed at difficulty .5

use_delta a QxK tibble, a truth table indicating whether item difficulty should be estimated to vary by question-country to account for potential item-response bias
get_xvt_results

**data** an Nx14 tibble, the aggregate survey response dataset in its original format

**data_args** a list of length 3, indicating the arguments passed to DCPOtools::format_dcpo to generate demsup_data from demsup_data$data

**Details**

Data on aggregate support for democracy reported in 51 survey datasets in 998 country-years, formatted for use with the functions of the DCPO package

**Source**


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get_xvt_results **Get results of DCPO cross-validation testing**

**Description**

get_xvt_results performs a single cross-validation test for dcpo’s estimates of cross-national public opinion

**Usage**

get_xvt_results(dcpo_xvt_output, ci = 80)

**Arguments**

dcpo_xvt_output
output from a single call to DCPO::dcpo_xvt or a k-fold test list of such output generated by purrr::map

**ci** an integer indicating the desired width of credible interval for coverage testing; 80 is the default.

**Value**

a stanfit object

**Examples**

# Single cross-validation test with 25% test set
demsup_xvttest_25pct <- dcpo_xvt(demsup_data,
  chime = FALSE,
  number_of_folds = 4,
  iter = 150,
  chains = 2)  # 2 chains/150 iterations for example only; use defaults
summarize_dcpo_results

Extract DCPO Results

Description

`summarize_dcpo_results` is a convenience function that produces summary statistics of the main parameters of a DCPO stanfit object along with the relevant identifying information (country, year, question, and cutpoint).

Usage

```r
summarize_dcpo_results(
  dcpo_input,
  dcpo_output,
  pars = c("theta", "sigma", "alpha", "beta", "delta"),
  probs = c(0.1, 0.9)
)
```

Arguments

- `dcpo_input`: the data frame of survey items and marginals generated by `DCPOtools::dcpo_setup` previously passed to `DCPO::dcpo` to generate the stanfit object passed as `dcpo_output`
- `dcpo_output`: a stanfit object output by `DCPO::dcpo`
- `pars`: a character vector of parameter names to be summarized from the DCPO model: theta (mean public opinion), sigma (polarization in public opinion), alpha (question dispersion), beta (question-cutpoint difficulty), and/or delta (country-specific question bias)
- `probs`: a numeric vector of quantiles of interest; the default is c(0.1, 0.9)

Value

a tibble

Examples

```r
## Not run:
out1 <- dcpo(demsup_data,
  chime = FALSE,
  chains = 2,
  iter = 150) # 2 chains/150 iterations for example purposes only; use defaults
theta_results <- summarize_dcpo_results(dcpo_input = demsup_data,
  dcpo_output = out1,
  pars = c("theta", "sigma", "alpha", "beta", "delta"),
  probs = c(0.1, 0.9))
```
summarize_dcpo_results

dcpo_output = out1,
pars = "theta")

## End(Not run)
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