Package ‘DCPO’

May 29, 2020

Version 0.5.3
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 conducted with 'Stan'. References: Solt (2020) <doi:10.31235/osf.io/d5n9p>.
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R topics documented:

DCPO-package ................................................................. 2
dcpo ................................................................. 2
DCPO-package

DCPO: Dynamic Comparative Public Opinion

Description

DCPO estimates dynamic comparative public opinion as a latent variable from survey data.

References


dcpo

Estimate Dynamic Comparative Public Opinion

Description

dcpo uses diverse survey data to estimate public opinion across countries and over time.

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,
  chains = 1,
  iter = 300) # 1 chain/300 iterations for example purposes only; use defaults
```

---

**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.

**Value**

- a stanfit object
Examples

```r
# Single cross-validation test with 25% test set
demsup_xvtst_25pct <- dcpp_xvt(demsup_data,
    number_of_folds = 4,
    iter = 300,
    chains = 1) # 1 chain/300 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
- **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
get_xvt_results

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


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_xvtest_25pct <- dcpo_xvt(demsup_data, 
  chime = FALSE, 
  number_of_folds = 4, 
  iter = 300, 
  chains = 1) # 1 chain/300 iterations for example only; use defaults

get_xvt_results(demsup_xvtest_25pct)
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

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

out1 <- dcpo(demsup_data,  
  chime = FALSE,  
  chains = 1,  
  iter = 300) # 1 chain/300 iterations for example purposes only; use defaults

theta_results <- summarize_dcpo_results(dcpo_input = demsup_data,  
  dcpo_output = out1,  
  pars = "theta")
Index

*Topic datasets
  demsup_data, 4

DCPO (DCPO-package), 2
dcpo, 2
DCPO-package, 2
dcpo_xvt, 3
demsup_data, 4
get_xvt_results, 5
summarize_dcpo_results, 6