Title

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1 Introduction

2 Model Building

2.1 Fitting Process

2.2 Model Overview

3 Bootstrapping for Feature Significance

3.1 Resampling Bootstrap

Procedure

Using $B = 10000$, an algorithm was written to perform a resampling bootstrap on the dataset. On each iteration, a sample of size n (where n was the number of rows in the dataset) was taken with replacement. Using this sample, a new model was fit. The parameter estimates were recorded.

```
resampBoot <- function(df, B) {
    # Get sample size
    n <- nrow(df)
    # Initialize empty dataframe
    params <- c()
    # Initialize progress bar
    bar <- txtProgressBar(min=0, max=B, style=1)
    # Perform B iterations
    for (b in 1:B) {
        # Select a sample of size n
        indices <- sample(1:n, replace = TRUE)
        samp <- df[indices, ]
        # Fit the model with the sample
        boot_model <- glm.nb(protests ~., data=samp, init.theta =
           10)
        boot_params <- coef(boot_model)
        params <- rbind(params, boot_params)
        setTxtProgressBar(bar, b)
    }
    close(bar)
    return(params)
}
```

Results

3.2 Parametric Bootstrap

Procedure

Results

3.3 Smooth Bootstrap

Procedure

Results

3.4 Method Comparison

	mean	sd	2.5%	50%	97.5%	contains 0
intercept	3.62	0.49	2.64	3.63	4.57	FALSE
Aug	-0.71	0.16	-1.02	-0.71	-0.40	FALSE
Dec	-0.64	0.36	-1.07	-0.62	-0.29	FALSE
Feb	0.04	0.16	-0.26	0.04	0.36	TRUE
Jan	-0.34	0.16	-0.64	-0.34	-0.02	FALSE
Jul	-0.56	0.16	-0.87	-0.56	-0.23	FALSE
Jun	-0.35	0.13	-0.61	-0.35	-0.09	FALSE
Mar	-0.11	0.15	-0.39	-0.11	0.18	TRUE
May	-0.03	0.14	-0.30	-0.03	0.25	TRUE
Nov	-0.08	0.14	-0.37	-0.08	0.20	TRUE
Oct	0.04	0.14	-0.23	0.03	0.32	TRUE
Sep	0.10	0.13	-0.15	0.10	0.36	TRUE
BC	0.82	0.13	0.55	0.82	1.08	FALSE
M	-1.87	0.87	-3.56	-1.89	-0.11	FALSE
NB	-2.58	0.99	-4.49	-2.59	-0.57	FALSE
NL	-3.01	1.05	-5.05	-3.03	-0.86	FALSE
NT	-5.37	1.33	-7.81	-5.37	-2.90	FALSE
NS	-2.36	0.94	-4.18	-2.37	-0.44	FALSE
N	-4.95	1.20	-7.28	-4.97	-2.53	FALSE
O	5.49	2.23	0.96	5.52	9.81	FALSE
PEI	-4.07	1.16	-6.30	-4.07	-1.72	FALSE
Q	2.16	0.83	0.49	2.17	3.79	FALSE
S	-2.54	0.90	-4.29	-2.56	-0.73	FALSE
Y	-4.08	1.18	-6.39	-4.10	-1.70	FALSE
retail	-1.80	0.98	-3.70	-1.81	0.18	TRUE

4 Monte Carlo Estimation

5 Conclusion