

CS 485 In-class exercise, 2/20/24

Binary classification problem where  $y=1$  indicates a “government-related” topic.

TEXT:

*Social Security benefits*

Features: unigram and bigram (two-word phrases) on lowercased text with 1GRAM\_ and 2GRAM\_ prefixes.

Logistic regression feature weights:

-1.0 1GRAM\_social  
-2.0 1GRAM\_security  
+2.99 2GRAM\_social\_security  
0.0 1GRAM\_benefits

1. Calculate the predicted probability under logistic regression. You don't need to resolve  $\exp(\dots)$ .

$$p(y=1 \mid x) =$$

2. Calculate the hard classification

$$y' = \operatorname{argmax}_{k \in \{0,1\}} p(y=k \mid x) =$$