STA610 Lab 6 Team 4 Report

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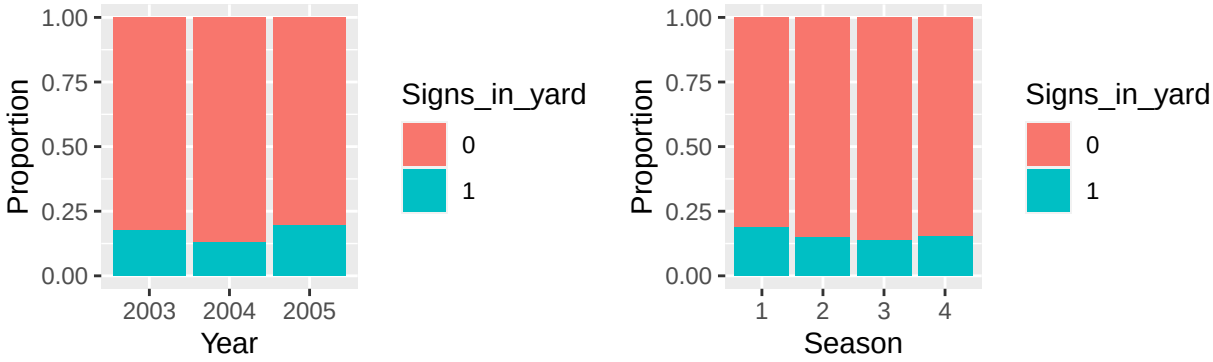
EDA

Response Variable: Signs_in_yard

Table 1: Frequency Table for Signs in Yard

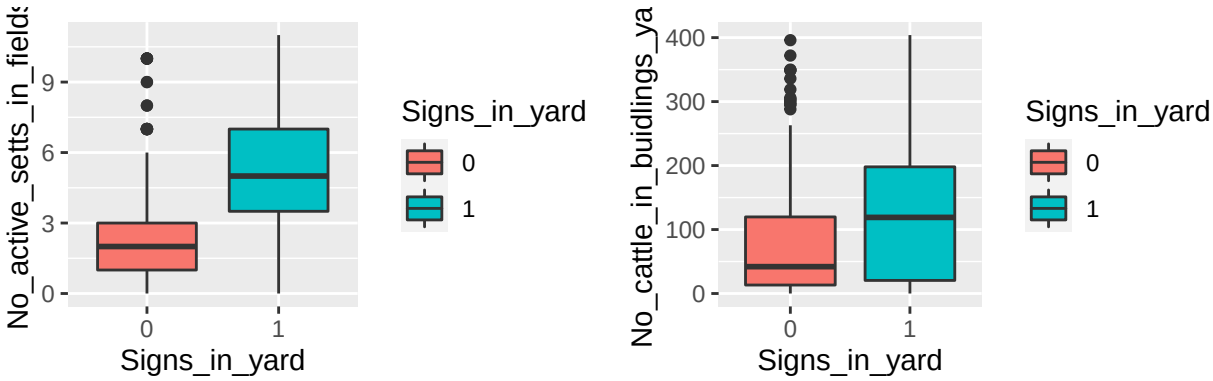
Signs in Yard	Freq
0	230
1	43

Year & Season



From the bar plot of Signs_in_yard by Year we can observe that the presence of badger activity in the farmyard in 2004 is lower than those in 2003 and 2005. From the bar plot of Signs_in_yard by Season we see that presence of badger activity is the highest in season 1 and the lowest in season 3.

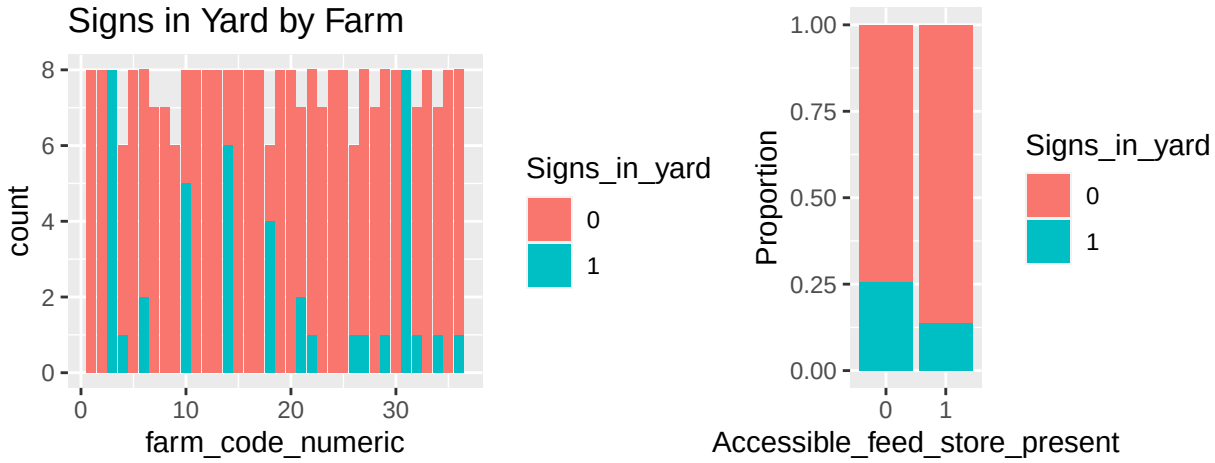
No_active_setts_in_fields & No_cattle_in_buidlings_yard



The median of No_active_setts_in_fields is much higher when there is badger activity in the farmyard than when there is no badger activity. The median of No_cattle_in_buidlings_yard is also much higher

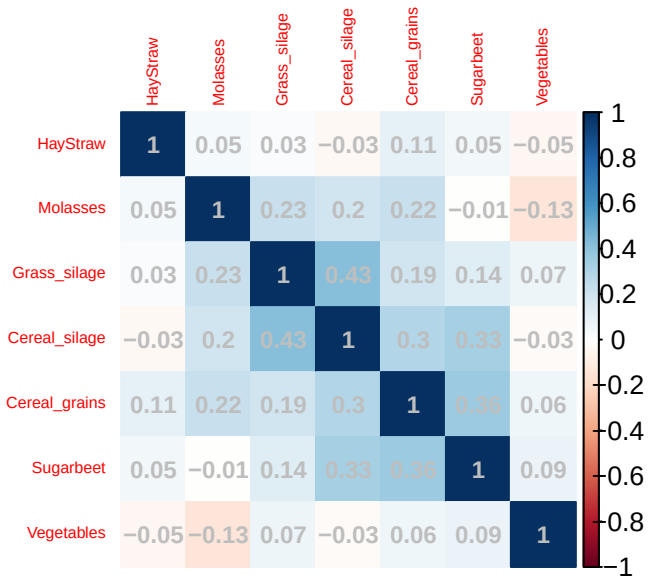
when there is badger activity in the farmyard than when there is no badger activity.

Farm



The patterns in the stacked bar chart of Signs_in_yard by farm indicate the incorporation of the random intercept by farm into our model. From the segmented bar chart for Accessible_feed_store_present we know that there are more presences of badger activities in the farmyard when there is Accessible_feed_store_present than when there is not.

Binary Variables




```
##
##    0    1
##   47  226
```

Model

Predictors to consider include year, season, number of active badger homes in nearby fields (no_active_setts_in_fields), the number of cattle on the farm (no_cattle_in_buildings_yard), whether farm feed can be accessed by badgers (accessible_feed_store_present), and indicators of whether various

types of crops were present on the farm (including grass silage, cereal silage, hay, cereal for grain, sugar beets, vegetables, and molasses).

```
## boundary (singular) fit: see ?isSingular
```

```
## Data: df
## Models:
## mdl4: Signs_in_yard ~ No_active_setts_in_fields + No_cattle_in_buidlings_yard +
## mdl4:     (1 | farm_code_numeric) + Season + HayStraw
## mdl5: Signs_in_yard ~ No_active_setts_in_fields + No_cattle_in_buidlings_yard +
## mdl5:     (1 | farm_code_numeric) + Season + Sugarbeet
## mdl6: Signs_in_yard ~ No_active_setts_in_fields + No_cattle_in_buidlings_yard +
## mdl6:     (1 | farm_code_numeric) + Season + Molasses
##      npar    AIC    BIC  logLik deviance Chisq Df Pr(>Chisq)
## mdl4    8 164.31 193.18 -74.154   148.31
## mdl5    8 164.72 193.59 -74.359   148.72     0  0
## mdl6    8 165.63 194.51 -74.816   149.63     0  0
```

Model Specification

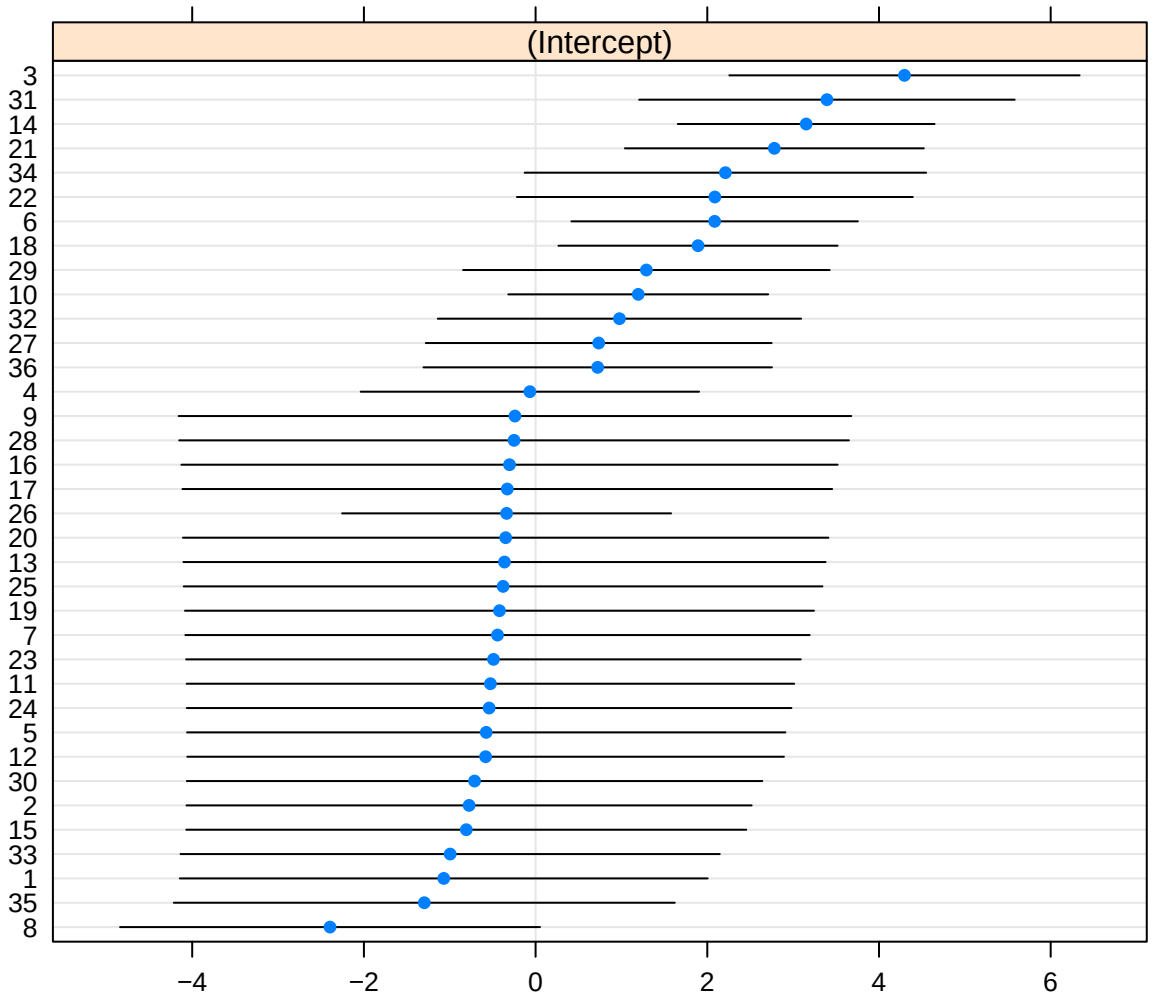
Result

Fixed Effects

	Estimate	Std.Error	t-value	P-value
(Intercept)	-4.6049271	1.1512197	-4.0000420	0.0000633
No_active_setts_in_fields	0.4878348	0.1490160	3.2737069	0.0010615
No_cattle_in_buidlings_yard	0.0051664	0.0036291	1.4236158	0.1545577
Season2	-0.2294778	0.7433120	-0.3087234	0.7575319
Season3	0.0185161	0.8013403	0.0231065	0.9815654
Season4	-0.3679229	0.6917097	-0.5319037	0.5947927
HayStraw	-0.7805303	0.6012218	-1.2982401	0.1942048

Random Effects

Group	Variance	Std.Dev.
Farm (Intercept)	4.94648457248147	2.22406937222773


farm_code_numeric
(Intercept)
3
31
14
21
34
22
6
18
29
10
32
27
36
4
9
28
16
17
26
20
13
25
19
7
23
11
24
5
12
30
2
15
33
1
35
8
−4
−2
0
2
4
6