Experimental Design Project

Maryam Abarahams ABRMAR043   Bheka Mabika MBKBHE002

Table of contents

1 Experimental Design:

1.1 Imports and Setup:

```
1   # Imports, libraries, and setup
2
3   #| results: hide
4   #| warning: false
5   #| echo: false
6
7   # install.packages("EDproject_2.0.zip", repos = NULL, type = "win.binary")
8
9   library(EDproject)
10
11  library(ggplot2)
```

Warning: package 'ggplot2' was built under R version 4.4.3

```r
1  library(dplyr)
```

Warning: package 'dplyr' was built under R version 4.4.3

Attaching package: 'dplyr'

The following objects are masked from 'package:stats':

    filter, lag

The following objects are masked from 'package:base':

    intersect, setdiff, setequal, union

```r
1  library(tidyr)
```

Warning: package 'tidyr' was built under R version 4.4.3

```r
1   library(EDproject)
2
3   # Making a color Palette for my document:
4   col_palette = c (
5     "#0B1D39",
6     "#333333",
7     "#666666",
8     "#F5F5F5",
9     "#D3D3D3",
10    "#007ACC",
11    "#1DB954",
12    "#FF6F61",
13    "#f9c74f"
14
15  )
```

1.2 Simulating data:

Creating the design matrix in accordance t

```r
set.seed(22)

# Treatment combinations:
treatments <- expand.grid(
            light = c(1, 2, 3, 4),
            heat = c(1, 2, 3, 4),
            variety = c("R", "F")
)

# Per season split plots:
plots_s1 <- expand.grid(
            greenhouse = c("A", "B"),
            side = c("n", "s"),
            plot_id_in_bock = 1:8
)
plots_s1$season <- 1
set.seed(22)
treatments_s1 <- treatments[sample(nrow(treatments)), ]
design_s1 <- cbind(plots_s1, treatments_s1)

plots_s2 <- expand.grid(
            greenhouse = c("A", "B"),
            side = c("n", "s"),
            plot_id_in_bock = 1:8
)
plots_s2$season <- 2
set.seed(22)
treatments_s2 <- treatments[sample(nrow(treatments)), ]
design_s2 <- cbind(plots_s2, treatments_s2)

# Final design matrix:
design
```

	season	greenhouse	light	heat	variety	side	plot
1	1	A	1	1	R	n	1
2	1	A	2	2	R	n	2
3	1	A	3	3	R	n	3
4	1	A	4	4	R	n	4

5	1	A	1	1	R	n	5
6	1	A	2	2	R	n	6
7	1	A	3	3	R	n	7
8	1	A	4	4	R	n	8
9	1	A	1	1	R	n	9
10	1	A	2	2	R	n	10
11	1	A	3	3	R	n	11
12	1	A	4	4	R	n	12
13	1	A	1	1	R	n	13
14	1	A	2	2	R	n	14
15	1	A	3	3	R	n	15
16	1	A	4	4	R	n	16
17	1	B	1	1	F	s	17
18	1	B	2	2	F	s	18
19	1	B	3	3	F	s	19
20	1	B	4	4	F	s	20
21	1	B	1	1	F	s	21
22	1	B	2	2	F	s	22
23	1	B	3	3	F	s	23
24	1	B	4	4	F	s	24
25	1	B	1	1	F	s	25
26	1	B	2	2	F	s	26
27	1	B	3	3	F	s	27
28	1	B	4	4	F	s	28
29	1	B	1	1	F	s	29
30	1	B	2	2	F	s	30
31	1	B	3	3	F	s	31
32	1	B	4	4	F	s	32
33	1	A	1	1	R	n	1
34	1	A	2	2	R	n	2
35	1	A	3	3	R	n	3
36	1	A	4	4	R	n	4
37	1	A	1	1	R	n	5
38	1	A	2	2	R	n	6
39	1	A	3	3	R	n	7
40	1	A	4	4	R	n	8
41	1	A	1	1	R	n	9
42	1	A	2	2	R	n	10

43	1	A	3	3	R	n	11
44	1	A	4	4	R	n	12
45	1	A	1	1	R	n	13
46	1	A	2	2	R	n	14
47	1	A	3	3	R	n	15
48	1	A	4	4	R	n	16
49	1	B	1	1	F	s	17
50	1	B	2	2	F	s	18
51	1	B	3	3	F	s	19
52	1	B	4	4	F	s	20
53	1	B	1	1	F	s	21
54	1	B	2	2	F	s	22
55	1	B	3	3	F	s	23
56	1	B	4	4	F	s	24
57	1	B	1	1	F	s	25
58	1	B	2	2	F	s	26
59	1	B	3	3	F	s	27
60	1	B	4	4	F	s	28
61	1	B	1	1	F	s	29
62	1	B	2	2	F	s	30
63	1	B	3	3	F	s	31
64	1	B	4	4	F	s	32

1.3 Obtaining observations:

1.4 Design motivation:

1.5 Randomization:

2 Analysis and Results:

2.1 Conclusion:

3 Future Reccomendations: