Statistical Consulting

Homework 2

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目錄

一、讀取資料、安裝包下載

```
library(reticulate)
library(Hmisc)
library(stringr)
setwd("C:/Users/chars/Desktop/2025_Statistical_Consulting/Homework2")
mushroom <- read.csv("primary_data.csv",sep = ";")
```

二、資料介紹

本資料共有 12 個變數，共 891 個觀測值。
其中包含 8 個離散型變數（包含 Nominal 及 Ordinal）：

- PassengerId：乘客編號
- Survived：是否生還（0 = No, 1 = Yes）
- Pclass：票務艙等（1 = 貴賓艙, 2 = 中等艙, 3 = 經濟艙）
- Name：乘客姓名
- Sex：性別
- Ticket：票號
- Cabin：艙房號碼
- Embarked：登船港口（C = Cherbourg, Q = Queenstown, S = Southampton）

以及 4 個連續型變數：

- Age：年齡
- SibSp：同行兄弟姊妹、配偶數量
- Parch：同行父母、子女數量
- Fare：票價

三、資料前處理及摘要

將資料中缺失的欄位紀錄為 NA，並將除了類別型變數。

```
mushroom[mushroom==""] <- NA

content <- function(item) {
  result <- lapply(item, function(text) {
    value <- gsub("\\[|\\]", "", text)
    if (grepl("\\d", value)) {
      observation <- as.numeric(unlist(str_extract_all(value, "-?\\d+(\\.\\d+)?")))
    } else {
      observation <- unlist(str_extract_all(value, "[a-zA-Z]+"))
    }
    return(observation)
  })
  return(result)
}

preprocess <- function(data){
  len <- c()
  n <- length(lapply(data,content))
  for (i in 1:n) {
    len <- c(len, length(content(data)[[i]]))
  }
  maximum <- max(len)

  if (class(unique(do.call(c,content(data))))=="numeric"){
    mtx <- matrix(NA,nrow = n, ncol = maximum+1)
    for (i in 1:n) {
        if (length(content(data)[[i]])==1) {
          if(is.na(content(data)[[i]])==FALSE){
            mtx[i,1] <- content(data)[[i]]
          }
        }
        else{
          if(is.na(content(data)[[i]])==FALSE){
            mtx[i,2:(maximum+1)] <- content(data)[[i]]
          }
        }
      }
    }else{
      col_name <- c(na.omit(unique(do.call(c,content(data)))))
      mtx <- matrix(NA,nrow = n, ncol = length(col_name))
      colnames(mtx) <- col_name
      for (i in 1:n) {
```

```
        for (j in 1:ncol(mtx)) {
          for(k in 1:length(content(data)[[i]])){
            if(is.na(content(data)[[i]][k])==FALSE){
              if (colnames(mtx)[j]==content(data)[[i]][k]) {
                mtx[i,j] <- 1
              }
            }
          }
        }
      }
      mtx[is.na(mtx)] <- 0
      }
  return(mtx)
}

# family <- preprocess(mushroom$family)
```

```
latex(describe(mushroom), file="")
```

mushroom
23 Variables 173 Observations

---

family

n	missing	distinct
173	0	23

```
lowest : Amanita Family     Bolbitius Family   Bolete Family      Bracket Fungi      Chanterelle Family
highest: Russula Family     Saddle-Cup Family  Stropharia Family  Tricholoma Family  Wax Gill Family
```

---

name

n	missing	distinct
173	0	173

```
lowest : Amethyst Deceiver        Aniseed Funnel Cap       Apricot Fungus           Bare-toothed Russula     Bay Bolete
highest: Yellow-gilled Russula    Yellow-staining Mushroom Yellow-stemmed Bell Cap  Yellow Swamp Russula     Yellow Wax cap
```

---

class

n	missing	distinct
173	0	2

Value	e	p
Frequency	77	96
Proportion	0.445	0.555

---

cap.diameter

n	missing	distinct
173	0	51

```
lowest : [0.4, 1]   [0.5, 1.5] [0.5, 1]   [0.7, 1.3] [1, 1.5]
highest: [8, 14]    [8, 15]    [8, 20]    [8, 25]    [8, 30]
```

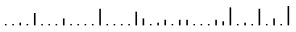
---

cap.shape

n	missing	distinct
173	0	27

```
lowest : [b, f, s] [b, f]    [b, x, f] [b, x]    [b]
highest: [x, f]    [x, o]    [x, p]    [x, s]    [x]
```

Cap.surface

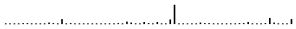


n	missing	distinct
133	40	40

```
lowest : [d, e, y, i] [d, k, s]    [d, k]       [d, s]       [d]
highest: [t]          [w, t]       [w]          [y, s]       [y]
```

---

cap.color



n	missing	distinct
173	0	67

```
lowest : [b, p, e, y]    [b, u]          [b]             [e, n, p, w]    [e, n, y]
highest: [y, n]          [y, o, g, n, r] [y, o, r, n]    [y, o]          [y]
```

---

does.bruise.or.bleed

n	missing	distinct
173	0	2

Value	[f]	[t]
Frequency	143	30
Proportion	0.827	0.173

---

gill.attachment

n	missing	distinct
145	28	8

Value	[a, d]	[a]	[d]	[e]	[f]	[p]	[s]	[x]
Frequency	8	32	25	16	10	17	16	21
Proportion	0.055	0.221	0.172	0.110	0.069	0.117	0.110	0.145

---

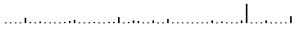
gill.spacing

n	missing	distinct
102	71	3

Value	[c]	[d]	[f]
Frequency	70	22	10
Proportion	0.686	0.216	0.098

---

gill.color

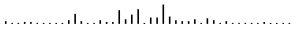


n	missing	distinct
173	0	59

```
lowest : [b, p, w] [b, u]    [b]       [e]       [f]
highest: [y, o, e] [y, r, k] [y, r]    [y, w]    [y]
```

---

stem.height



n	missing	distinct
173	0	46

```
lowest : [0]      [1, 2]   [1, 3]   [10, 12] [10, 15], highest: [8, 12]  [8, 15]  [8, 20]  [8, 25]  [8, 30]
```

---

stem.width

n	missing	distinct
173	0	48

```
lowest : [0.5, 1] [0]      [1, 2]   [1, 3]   [1]     , highest: [7, 15]  [8, 12]  [8, 15]  [8, 18]  [8, 20]
```

---

stem.root

n	missing	distinct
27	146	5

Value	[b]	[c]	[f]	[r]	[s]
Frequency	9	2	3	4	9
Proportion	0.333	0.074	0.111	0.148	0.333

stem.surface

n	missing	distinct
65	108	14

Value	[f]	[g]	[h]	[i, s]	[i, t]	[i, y]	[i]	[k, s]	[k]	[s, h]	[s]	[t]
Frequency	3	5	1	1	1	1	11	1	4	1	15	7
Proportion	0.046	0.077	0.015	0.015	0.015	0.015	0.169	0.015	0.062	0.015	0.231	0.108

Value	[y, s]	[y]
Frequency	1	13
Proportion	0.015	0.200

stem.color

n	missing	distinct
173	0	41

```
lowest : [b, u]    [e, n]    [e, u, y] [e, y]    [e]
highest: [w]       [y, e, n] [y, n]    [y, o, k] [y]
```

veil.type

n	missing	distinct	value
9	164	1	[u]

Value	[u]
Frequency	9
Proportion	1

veil.color

n	missing	distinct
21	152	7

Value	[e, n]	[k]	[n]	[u]	[w]	[y, w]	[y]
Frequency	1	1	1	1	15	1	1
Proportion	0.048	0.048	0.048	0.048	0.714	0.048	0.048

has.ring

n	missing	distinct
173	0	2

Value	[f]	[t]
Frequency	130	43
Proportion	0.751	0.249

ring.type

n	missing	distinct
166	7	13

Value	[e, g]	[e]	[f]	[g, p]	[g]	[l, e]	[l, p]	[l, r]	[l]	[m]	[p]	[r]
Frequency	1	6	137	2	2	1	1	2	2	1	2	3
Proportion	0.006	0.036	0.825	0.012	0.012	0.006	0.006	0.012	0.012	0.006	0.012	0.018

Value	[z]
Frequency	6
Proportion	0.036

Spore.print.color

n	missing	distinct
18	155	8

Value	[g]	[k, r]	[k, u]	[k]	[n]	[p, w]	[p]	[w]
Frequency	1	1	1	5	3	1	3	3
Proportion	0.056	0.056	0.056	0.278	0.167	0.056	0.167	0.167

---

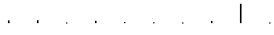
habitat

n	missing	distinct
173	0	21

lowest :	[d, h]	[d]	[g, d, h]	[g, d]	[g, h, d]
highest:	[m, d]	[m, h]	[m]	[p, d]	[w]

---

season



n	missing	distinct
173	0	10

Value	[a, w]	[a]	[s, a, w]	[s, u, a, w]	[s, u, a]	[s, u]
Frequency	15	16	1	13	5	3
Proportion	0.087	0.092	0.006	0.075	0.029	0.017

Value	[s]	[u, a, w]	[u, a]	[u]
Frequency	1	12	106	1
Proportion	0.006	0.069	0.613	0.006
