

R Notebook

Code ▾

```
options(warn = FALSE)
Sys.getlocale()
```

```
[1] "LC_COLLATE=Korean_Korea.949;LC_CTYPE=Korean_Korea.949;LC_MONETARY=Korean_Korea.949;LC_NUMERIC=C;LC_TIME=Korean_Korea.949"
```

```
Sys.setlocale('LC_ALL', 'C')
```

```
[1] "C"
```

```
drink <- read.csv("../drink.csv" , header = T, encoding = 'CP949')
drink
```

```
str(drink)
```

```
'data.frame':  12 obs. of  8 variables:
 $ Age      : int  29 31 44 45 52 26 35 46 28 33 ...
 $ Married  : Factor w/ 2 levels "N","Y": 1 2 2 2 2 1 1 2 1 2 ...
 $ Children: Factor w/ 2 levels "N","Y": 1 2 2 2 1 1 1 2 1 1 ...
 $ Health   : Factor w/ 3 levels "상","중","하": 1 3 3 2 2 1 2 3 1 3 ...
 $ Drink    : Factor w/ 3 levels "상","중","하": 1 3 3 3 2 1 1 2 2 3 ...
 $ Position: Factor w/ 6 levels "과장","과장 ",...: 3 1 5 5 4 3 2 6 3 1 ...
 $ Sex      : Factor w/ 2 levels "남","여": 1 1 2 1 1 1 1 1 2 2 ...
 $ Late     : Factor w/ 2 levels "N","Y": 1 2 1 2 2 1 1 2 1 1 ...
```

```
attach(drink)
```

The following objects are masked from drink (pos = 4):

Age, Children, Drink, Health, Late, Married, Position, Sex

```
library(class)
m <- glm(Late ~ Age + Married + Children + Health + Drink + Position + Sex,
family = binomial(link = logit) , data = drink)
m
```

```
Call: glm(formula = Late ~ Age + Married + Children + Health + Drink +
  Position + Sex, family = binomial(link = logit), data = drink)
```

Coefficients:

	(Intercept)	Age	MarriedY	ChildrenY	Health중	Health하
Health하	-2.457e+01	8.063e-15	2.457e+01	2.457e+01	-6.300e-14	-2.457e+01
Drink중	2.457e+01					
Drink하						
Position과장						
Position대리						
Position실장						
Position차장						
Position차장						
Sex여	2.457e+01	2.795e-14	NA	-1.152e-06	-2.457e+0	
1	NA	-2.457e+01				

Degrees of Freedom: 11 Total (i.e. Null); 0 Residual

Null Deviance: 16.3

Residual Deviance: 5.144e-10 AIC: 24

```
predict(m , drink , type = "response")
```

prediction from a rank-deficient fit may be misleading

	1	2	3	4	5
6	2.143345e-11	1.000000e+00	2.143345e-11	1.000000e+00	1.000000e+00
7	2.143345e-11	1.000000e+00			
8					
9	2.143345e-11	2.143345e-11	1.000000e+00	2.143345e-11	
10					
11					
12					

```
predict(m , drink , type = "response") >= 0.5
```

prediction from a rank-deficient fit may be misleading

1	2	3	4	5	6	7	8	9	10	11	12
FALSE	TRUE	FALSE	TRUE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE

```
drink$Late
```

```
[1] N Y N Y Y N N Y N N Y N
```

```
Levels: N Y
```

```
table(drink$Late , predict(m , drink , type = "response") > 0.5)
```

prediction from a rank-deficient fit may be misleading

	FALSE	TRUE
N	7	0
Y	0	5

```
summary(m)
```

```
Call:
```

```
glm(formula = Late ~ Age + Married + Children + Health + Drink +  
      Position + Sex, family = binomial(link = logit), data = drink)
```

```
Deviance Residuals:
```

```
[1] 0 0 0 0 0 0 0 0 0 0 0 0 0
```

```
Coefficients: (2 not defined because of singularities)
```

	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	-2.457e+01	1.701e+06	0	1
Age	8.063e-15	6.176e+04	0	1
MarriedY	2.457e+01	8.513e+05	0	1
ChildrenY	2.457e+01	1.953e+05	0	1
Health중	-6.300e-14	7.281e+05	0	1
Health하	-2.457e+01	5.074e+05	0	1
Drink중	2.457e+01	2.584e+05	0	1
Drink하	2.457e+01	1.124e+06	0	1
Position과장	2.795e-14	3.088e+05	0	1
Position대리	NA	NA	NA	NA
Position실장	-1.152e-06	3.706e+05	0	1
Position차장	-2.457e+01	6.313e+05	0	1
Position차장	NA	NA	NA	NA
Sex여	-2.457e+01	2.269e+05	0	1

```
(Dispersion parameter for binomial family taken to be 1)
```

```
Null deviance: 1.6301e+01 on 11 degrees of freedom  
Residual deviance: 5.1440e-10 on 0 degrees of freedom  
AIC: 24
```

```
Number of Fisher Scoring iterations: 23
```

```
#諛씁좃???씁 ?좃씁?
```

```
ball <- read.csv("./ball.csv" , header = T, encoding = 'UTF8')  
print (ball)
```

```
str(ball)
```

```
'data.frame':  17 obs. of  4 variables:
 $ Age      : Factor w/ 4 levels "10대","20대",...: 2 3 4 2 1 1 2 2 3 2 ...
 $ Job      : Factor w/ 4 levels "IT","디자이너",...: 2 1 2 1 4 4 3 1 2 4 ...
 $ Personality: Factor w/ 2 levels "내성적","외향적": 2 2 1 1 2 1 1 2 2 2 ...
 $ Gift     : Factor w/ 3 levels "꽃","책","화장품": 1 2 3 3 1 1 2 3 1 2 ...
```

```
library(nnet)
m2 <- multinom(Gift ~ . , data = ball)
```

```
# weights:  27 (16 variable)
initial  value 18.676409
iter   10 value 5.581577
iter   20 value 4.119516
iter   30 value 4.117668
final   value 4.117666
converged
```

```
m2
```

```
Call:
multinom(formula = Gift ~ ., data = ball)

Coefficients:
      (Intercept)  Age20대   Age30대   Age40대 Job디자이너 Job언론/출판   Job학생
생책              10.34016  92.08909 119.19771  98.28417  -134.56795    51.05378  -26.
95373
화장품           59.44944  41.61856  48.71482  48.30829   -87.50917    52.78697 -109.
06134
      Personality외향적
책                   -57.51579
화장품              -37.00877

Residual Deviance: 8.235332
AIC: 40.23533
```

```
cbind(fitted(m2) , levels(ball$Gift)[ball$Gift])
```

꽃 품	책	화장 품
1 "0.99999999934563"	"1.15758038388783e-39"	"6.5436932550688e-11"
"꽃"		
2 "3.70509871870748e-32"	"0.704036387996927"	"0.295963612003073"
"책"		
3 "1.60752652636619e-09"	"8.68936739811536e-21"	"0.99999998392473"
"화장 품"		
4 "2.60875663018642e-45"	"0.795962775397963"	"0.204037224602037"
"화장 품"		
5 "1"	"6.39783304305056e-33"	"2.40504957023684e-38"
"꽃"		
6 "0.999999939071344"	"6.0928656135199e-08"	"2.84333538052104e-22"
"꽃"		
7 "8.99294285306516e-68"	"0.408072821418155"	"0.591927178581845"
"책"		
8 "1.51156991632799e-28"	"4.84282425169173e-09"	"0.99999995157176"
"화장 품"		
9 "0.999999920988615"	"6.86556017616431e-28"	"7.90113851991028e-08"
"꽃"		
10 "1.58556509815845e-08"	"0.999999984144349"	"4.52917248143208e-28"
"책"		
11 "4.70593944204618e-48"	"0.704037279709959"	"0.295962720290041"
"책"		
12 "1.07054815135377e-09"	"6.99956323498023e-12"	"0.99999998922452"
"화장 품"		
13 "1.79612945762676e-51"	"8.55824568103296e-10"	"0.99999999144175"
"화장 품"		
14 "2.60875663018642e-45"	"0.795962775397963"	"0.204037224602037"
"책"		
15 "1.04728788433998e-54"	"0.295963426697856"	"0.704036573302144"
"화장 품"		
16 "1.33018911048911e-70"	"0.295964318412118"	"0.704035681587882"
"화장 품"		
17 "1"	"6.39783304305056e-33"	"2.40504957023684e-38"
"꽃"		

```
predicted <- levels(ball$Gift)[apply(fitted(m2) , 1 , which.max)]
predicted
```

```
[1] "꽃"      "책"      "화장품" "책"      "꽃"      "꽃"      "화장품" "화장품"
"꽃"
[10] "책"      "책"      "화장품" "화장품" "책"      "화장품" "화장품" "꽃"
```

```
sum(predicted != ball$Gift)
```

```
[1] 2
```

```
xtabs(~ predicted + ball$Gift)
```

	ball\$Gift		
predicted	꽃	책	화장품
꽃	5	0	0
책	0	4	1
화장품	0	1	6