

Gopi nandna reddy

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## Code:

```
# Reconstruct the missing values in X using with next available value

install.packages("magrittr")

install.packages("dplyr")

install.packages("tidyr")

library(tidyr)

library(dplyr)

library(magrittr)

setwd("C:/Users/morth/Desktop")

# We are reading the data in xls file

x <- read.csv("stores_edited.csv")

x

# here o is original data

o <- x

# here we are finding the number of missing values

s <- sum(is.na(x))

s

# dim will gives the number of rows and columns

dim(x)

v <- 32*7

#Calculating the percentage of missing values

p <- (s/v)*100

p #Now replacing missing values with next available value

g <- x %>%

fill(OperatingCost,Staff_Cnt,TotalSales,Total_Customers,AcqCostPercust,BasketSize,ProfitPercust,

.direction = "up")
```

```

g
o[is.na(o)] <- 0

# Finding the reconstruction error
s = (abs(sum(o-g))*100)/sum(o)

s

#Reconstruct the missing values in X using column-wise mean imputation.
setwd("C:/Users/morth/Desktop")

# We are reading the data in xls file
x <- read.csv("stores_edited.csv")

x

# here o is original data
o <- x

# here we are finding the number of missing values
s <- sum(is.na(x))

s # dim will gives the number of rows and columns
dim(x)

v <- 32*7

#Calculating the percentage of missing values
p <- (s/v)*100

p

#Now replacing zeroes with coloumn wise mean
x$OperatingCost[is.na(x$OperatingCost)]<-mean(x$OperatingCost,na.rm=TRUE)
x$Staff_Cnt[is.na(x$Staff_Cnt)]<-mean(x$Staff_Cnt,na.rm=TRUE)
x$TotalSales[is.na(x$TotalSales)]<-mean(x$TotalSales,na.rm=TRUE)
x$Total_Customers[is.na(x$Total_Customers)]<-mean(x$Total_Customers,na.rm=TRUE)
x$AcqCostPercust[is.na(x$AcqCostPercust)]<-mean(x$AcqCostPercust,na.rm=TRUE)
x$BasketSize[is.na(x$BasketSize)]<-mean(x$BasketSize,na.rm=TRUE)
x$ProfitPercust[is.na(x$ProfitPercust)]<-mean(x$ProfitPercust,na.rm=TRUE)

x

```

```
o[is.na(o)] <- 0
```

```
o
```

```
# Finding the reconstruction error
```

```
s = (abs(sum(o-x))*100)/sum(o)
```

```
s
```

	OperatingCost	Staff_Cnt	TotalSales	Total_Customers	AcqCostPercust	BasketSize
1	21.0	60	160.0	110	3.90	2.620
2	21.0	60	NA	110	3.90	2.875
3	22.8	40	108.0	93	3.85	2.320
4	21.4	60	258.0	110	3.08	3.215
5	NA	80	360.0	175	3.15	NA
6	18.1	NA	225.0	105	2.76	3.460
7	14.3	80	360.0	NA	NA	3.570
8	24.4	40	NA	62	3.69	3.190
9	22.8	40	140.8	95	3.92	3.150
10	19.2	60	167.6	123	3.92	NA
11	NA	60	NA	123	3.92	3.440
12	16.4	NA	275.8	180	NA	NA
13	17.3	80	275.8	NA	NA	3.730
14	15.2	80	275.8	180	NA	3.780
15	10.4	80	NA	205	2.93	5.250
16	NA	80	460.0	215	3.00	NA
17	14.7	80	440.0	230	3.23	5.345

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17	14.7	80	440.0	230	3.23	5.345
18	32.4	40	78.7	66	4.08	2.200
19	30.4	40	75.7	NA	4.93	1.615
20	33.9	NA	NA	65	4.22	1.835
21	NA	40	120.1	97	3.70	NA
22	15.5	80	318.0	NA	2.76	3.520
23	15.2	80	NA	150	NA	3.435
24	13.3	NA	350.0	245	NA	3.840
25	19.2	80	400.0	NA	3.08	3.845
26	NA	NA	79.0	66	4.08	1.935
27	26.0	40	120.3	91	4.43	NA
28	30.4	40	95.1	113	3.77	NA
29	NA	80	351.0	NA	4.22	3.170
30	19.7	60	145.0	175	3.62	2.770
31	15.0	80	301.0	335	NA	3.570
32	21.4	40	121.0	109	4.11	2.780

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ProfitPercust						
1	16.46					
2	17.02					
3	18.61					
4	NA					
5	17.02					
6	20.22					
7	15.84					
8	20.00					

---

8	20.00
9	22.90
10	18.30
11	18.90
12	NA
13	17.60
14	18.00
15	17.98
16	17.82
17	17.42
18	NA
19	18.52
20	19.90
21	20.01
22	16.87
23	NA
24	NA
25	17.05
26	18.90
27	16.70
28	16.90
29	14.50
30	15.50
31	14.60
32	18.60

	OperatingCost	Staff_Cnt	TotalSales	Total_Customers	AcqCostPercust	BasketSize
1	21.0	60	160.0	110	3.90	2.620
2	21.0	60	108.0	110	3.90	2.875
3	22.8	40	108.0	93	3.85	2.320
4	21.4	60	258.0	110	3.08	3.215
5	18.1	80	360.0	175	3.15	3.460
6	18.1	80	225.0	105	2.76	3.460
7	14.3	80	360.0	62	3.69	3.570

8	24.4	40	140.8	62	3.69	3.190
9	22.8	40	140.8	95	3.92	3.150
10	19.2	60	167.6	123	3.92	3.440
11	16.4	60	275.8	123	3.92	3.440
12	16.4	80	275.8	180	2.93	3.730
13	17.3	80	275.8	180	2.93	3.730
14	15.2	80	275.8	180	2.93	3.780
15	10.4	80	460.0	205	2.93	5.250
16	14.7	80	460.0	215	3.00	5.345
17	14.7	80	440.0	230	3.23	5.345
18	32.4	40	78.7	66	4.08	2.200
19	30.4	40	75.7	65	4.93	1.615
20	33.9	40	120.1	65	4.22	1.835
21	15.5	40	120.1	97	3.70	3.520
22	15.5	80	318.0	150	2.76	3.520
23	15.2	80	350.0	150	3.08	3.435
24	13.3	80	350.0	245	3.08	3.840
25	19.2	80	400.0	66	3.08	3.845
26	26.0	40	79.0	66	4.08	1.935
27	26.0	40	120.3	91	4.43	3.170
28	30.4	40	95.1	113	3.77	3.170
29	19.7	80	351.0	175	4.22	3.170
30	19.7	60	145.0	175	3.62	2.770
31	15.0	80	301.0	335	4.11	3.570
32	21.4	40	121.0	109	4.11	2.780

	ProfitPercust
1	16.46
2	17.02
3	18.61
4	17.02
5	17.02
6	20.22
7	15.84
8	20.00
9	22.90
10	18.30
11	18.90
12	17.60
13	17.60
14	18.00
15	17.98
16	17.82
17	17.42
18	18.52
19	18.52
20	19.90
21	20.01
22	16.87
23	17.05
24	17.05

	OperatingCost	Staff_Cnt	TotalSales	Total_Customers	AcqCostPercust	BasketSize
1	21.0	60	160.0	110	3.90	2.620
2	21.0	60	NA	110	3.90	2.875
3	22.8	40	108.0	93	3.85	2.320
4	21.4	60	258.0	110	3.08	3.215
5	NA	80	360.0	175	3.15	NA
6	18.1	NA	225.0	105	2.76	3.460
7	14.3	80	360.0	NA	NA	3.570
8	24.4	40	NA	62	3.69	3.190
9	22.8	40	140.8	95	3.92	3.150
10	19.2	60	167.6	123	3.92	NA
11	NA	60	NA	123	3.92	3.440
12	16.4	NA	275.8	180	NA	NA
13	17.3	80	275.8	NA	NA	3.730
14	15.2	80	275.8	180	NA	3.780
15	10.4	80	NA	205	2.93	5.250
16	NA	80	460.0	215	3.00	NA

16	NA	80	460.0	215	3.00	NA
17	14.7	80	440.0	230	3.23	5.345
18	32.4	40	78.7	66	4.08	2.200
19	30.4	40	75.7	NA	4.93	1.615
20	33.9	NA	NA	65	4.22	1.835
21	NA	40	120.1	97	3.70	NA
22	15.5	80	318.0	NA	2.76	3.520
23	15.2	80	NA	150	NA	3.435
24	13.3	NA	350.0	245	NA	3.840
25	19.2	80	400.0	NA	3.08	3.845
26	NA	NA	79.0	66	4.08	1.935
27	26.0	40	120.3	91	4.43	NA
28	30.4	40	95.1	113	3.77	NA
29	NA	80	351.0	NA	4.22	3.170
30	19.7	60	145.0	175	3.62	2.770
31	15.0	80	301.0	335	NA	3.570
32	21.4	40	121.0	109	4.11	2.780
	ProfitPercust					
1	16.46					
2	17.02					
3	18.61					
4	NA					
5	17.02					
6	20.22					
7	15.84					

8	20.00
9	22.90
10	18.30
11	18.90
12	NA
13	17.60
14	18.00
15	17.98
16	17.82
17	17.42
18	NA
19	18.52
20	19.90
21	20.01
22	16.87
23	NA
24	NA
25	17.05
26	18.90
27	16.70
28	16.90
29	14.50
30	15.50
31	14.60
32	18.60

	OperatingCost	Staff_Cnt	TotalSales	Total_Customers	AcqCostPercust	BasketSize
1	21.00000	60.00000	160.0000	110.0000	3.90	2.6200
2	21.00000	60.00000	233.1423	110.0000	3.90	2.8750
3	22.80000	40.00000	108.0000	93.0000	3.85	2.3200
4	21.40000	60.00000	258.0000	110.0000	3.08	3.2150
5	20.43846	80.00000	360.0000	175.0000	3.15	3.2184
6	18.10000	62.22222	225.0000	105.0000	2.76	3.4600
7	14.30000	80.00000	360.0000	139.5385	3.69	3.5700
8	24.40000	40.00000	233.1423	62.0000	3.69	3.1900
9	22.80000	40.00000	140.8000	95.0000	3.92	3.1500
10	19.20000	60.00000	167.6000	123.0000	3.92	3.2184
11	20.43846	60.00000	233.1423	123.0000	3.92	3.4400
12	16.40000	62.22222	275.8000	180.0000	3.69	3.2184
13	17.30000	80.00000	275.8000	139.5385	3.69	3.7300
14	15.20000	80.00000	275.8000	180.0000	3.69	3.7800
15	10.40000	80.00000	233.1423	205.0000	2.93	5.2500
16	20.43846	80.00000	460.0000	215.0000	3.00	3.2184
17	14.70000	80.00000	440.0000	230.0000	3.23	5.3450
18	32.40000	40.00000	78.7000	66.0000	4.08	2.2000
19	30.40000	40.00000	75.7000	139.5385	4.93	1.6150
20	33.90000	62.22222	233.1423	65.0000	4.22	1.8350
21	20.43846	40.00000	120.1000	97.0000	3.70	3.2184
22	15.50000	80.00000	318.0000	139.5385	2.76	3.5200
23	15.20000	80.00000	233.1423	150.0000	3.69	3.4350
24	13.30000	62.22222	350.0000	245.0000	3.69	3.8400

25	15.20000	80.00000	233.1423	150.0000	3.69	3.4350
24	13.30000	62.22222	350.0000	245.0000	3.69	3.8400
25	19.20000	80.00000	400.0000	139.5385	3.08	3.8450
26	20.43846	62.22222	79.0000	66.0000	4.08	1.9350
27	26.00000	40.00000	120.3000	91.0000	4.43	3.2184
28	30.40000	40.00000	95.1000	113.0000	3.77	3.2184
29	20.43846	80.00000	351.0000	139.5385	4.22	3.1700
30	19.70000	60.00000	145.0000	175.0000	3.62	2.7700
31	15.00000	80.00000	301.0000	335.0000	3.69	3.5700
32	21.40000	40.00000	121.0000	109.0000	4.11	2.7800

ProfitPercust

1	16.46000
2	17.02000
3	18.61000
4	17.85704
5	17.02000
6	20.22000
7	15.84000
8	20.00000
9	22.90000
10	18.30000
11	18.90000
12	17.85704
13	17.60000
14	18.00000
15	17.00000

8	20.00000
9	22.90000
10	18.30000
11	18.90000
12	17.85704
13	17.60000
14	18.00000
15	17.98000
16	17.82000
17	17.42000
18	17.85704
19	18.52000
20	19.90000
21	20.01000
22	16.87000
23	17.85704
24	17.85704
25	17.05000
26	18.90000
27	16.70000
28	16.90000
29	14.50000
30	15.50000
31	14.60000
32	18.60000

	OperatingCost	Staff_Cnt	TotalSales	Total_Customers	AcqCostPercust	BasketSize
1	21.0	60	160.0	110	3.90	2.620
2	21.0	60	0.0	110	3.90	2.875
3	22.8	40	108.0	93	3.85	2.320
4	21.4	60	258.0	110	3.08	3.215
5	0.0	80	360.0	175	3.15	0.000
6	18.1	0	225.0	105	2.76	3.460
7	14.3	80	360.0	0	0.00	3.570
8	24.4	40	0.0	62	3.69	3.190
9	22.8	40	140.8	95	3.92	3.150
10	19.2	60	167.6	123	3.92	0.000
11	0.0	60	0.0	123	3.92	3.440
12	16.4	0	275.8	180	0.00	0.000
13	17.3	80	275.8	0	0.00	3.730
14	15.2	80	275.8	180	0.00	3.780
15	10.4	80	0.0	205	2.93	5.250
16	0.0	80	460.0	215	3.00	0.000
17	14.7	80	440.0	230	3.23	5.345
18	32.4	40	78.7	66	4.08	2.200
19	30.4	40	75.7	0	4.93	1.615
20	33.9	0	0.0	65	4.22	1.835
21	0.0	40	120.1	97	3.70	0.000
22	15.5	80	318.0	0	2.76	3.520

23	15.2	80	0.0	150	0.00	3.435
24	13.3	0	350.0	245	0.00	3.840
25	19.2	80	400.0	0	3.08	3.845
26	0.0	0	79.0	66	4.08	1.935
27	26.0	40	120.3	91	4.43	0.000
28	30.4	40	95.1	113	3.77	0.000
29	0.0	80	351.0	0	4.22	3.170
30	19.7	60	145.0	175	3.62	2.770
31	15.0	80	301.0	335	0.00	3.570
32	21.4	40	121.0	109	4.11	2.780

	ProfitPercust
1	16.46
2	17.02
3	18.61
4	0.00
5	17.02
6	20.22
7	15.84
8	20.00
9	22.90
10	18.30
11	18.90
12	0.00
13	17.60
14	18.00

```
15      17.98
16      17.82
17      17.42
18       0.00
19      18.52
20      19.90
21      20.01
22      16.87
23       0.00
24       0.00
25      17.05
26      18.90
27      16.70
28      16.90
29      14.50
30      15.50
31      14.60
32      18.60
> s = (abs(sum(o-x))*100)/sum(o)
> s
[1] 22.35968
~
```