Exploratory Statistical Data Analysis With R Software (ESDAR)

Swayam Prabha

Lecture 15

3D Pie Diagram and Histogram

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Slides can be downloaded from

http://home.iitk.ac.in/~shalab/sp

3 Dimensional Pie diagram

3 Dimensional (3D) Pie charts visualize the absolute and relative frequencies.

A 3D pie chart is a circular slab partitioned into segments where each of the segments represents a category.

The size of each segment depends upon the relative frequency.

The size of each segment is determined by the angle (frequency x 360^0).

3 dimensional Pie diagram

Usage

```
pie3D(x, labels = names(x), …)
```

Need the `plotrix` library. So we need to install the package using the commands.

```
install.packages("plotrix")
```

```
library(plotrix)
```

3 dimensional Pie diagram


```
R R Console                                                        [  -  ][  o  ]
> install.packages("plotrix")
Installing package into 'C:/Users/Shalabh/Documents/R/win-libr$
(as 'lib' is unspecified)
--- Please select a CRAN mirror for use in this session ---
trying URL 'https://cran.usthb.dz/bin/windows/contrib/3.4/plot$
Content type 'application/zip' length 700292 bytes (683 KB)
downloaded 683 KB

package 'plotrix' successfully unpacked and MD5 sums checked

The downloaded binary packages are in
        C:\Users\Shalabh\AppData\Local\Temp\RtmpY3We7I\downloa$
> library(plotrix)
```

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3 dimensional Pie diagram
Example :

Code of qualification of 10 persons by using, say 1 for graduate (G) and 2 for non-graduate (N).

G, N, G, N, G, G, G,   N, G, G
1,   2, 1,   2, 1,   1,   1,   2, 1,   1

```
> quali = c(1, 2, 1, 2, 1, 1, 1, 2, 1, 1)
> quali
 [1] 1 2 1 2 1 1 1 2 1 1
```

```
R Console
> quali = c(1, 2, 1, 2, 1, 1, 1, 2, 1, 1)
> quali
 [1] 1 2 1 2 1 1 1 2 1 1
>
```
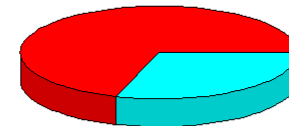
3 dimensional Pie diagram
Example :

```
> quali = c(1, 2, 1, 2, 1, 1, 1, 2, 1, 1)
```

```
R Console
> quali = c(1, 2, 1, 2, 1, 1, 1, 2, 1, 1)
> table(quali)
quali
1 2
7 3
```
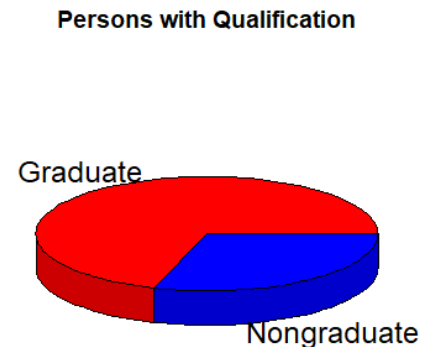
```
> pie3D(table(quali))
```

3 dimensional Pie diagram
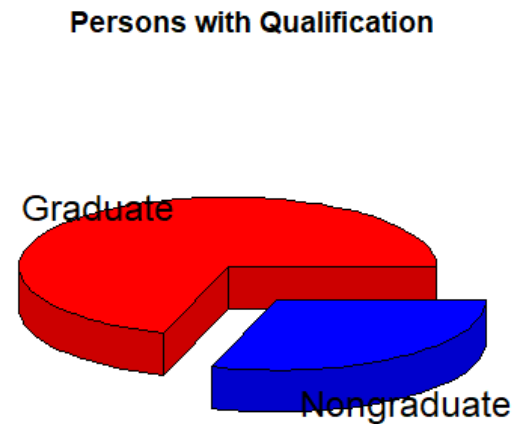**Example :** **Adding labels and colours**

```
> pie3D(table(quali), labels = c("Graduate",
"Nongraduate"), main = "Persons with
Qualification", col=c("red", "blue"))
```


Persons with Qualification

3 dimensional Pie diagram

Example : Use of explode

```
> pie3D(table(quali), explode = 0.2, labels =
c("Graduate", "Nongraduate"), main = "Persons
with Qualification", col=c("red", "blue"))
```

Persons with Qualification

Pie diagram
Example

There are three salespersons in a shop. They are denoted as 1, 2 and 3. The salespersons who served first 100 customers is recorded as follows:

1,1,2,1,2,3,2,2,3,3,3,1,2,3,2,2,3,1,1,3,3,1,2,1,3,3,3,2,2,2,2,1,2,2,1,1,

1,3,2,2,1,2,3,2,2,1,2,3,3,2,1,2,2,3,1,1,2,1,2,3,2,3,2,2,3,1,2,3,3,3,2,1,

1,1,2,1,1,2,1,2,3,3,1,2,3,3,2,1,2,3,2,1,3,2,2,2,2,3,2,2

```
salesper = c(1,1,2,1,2,3,2,2,3,3,3,1,2,3,2,2,3,
1,1,3,3,1,2,1,3,3,3,2,2,2,2,1,2,2,1,1,1,3,2,2,
1,2,3,2,2,1,2,3,3,2,1,2,2,3,1,1,2,1,2,3,2,3,2,
2,3,1,2,3,3,3,2,1,1,1,2,1,1,2,1,2,3,3,1,2,3,3,
2,1,2,3,2,1,3,2,2,2,2,3,2,2)
```
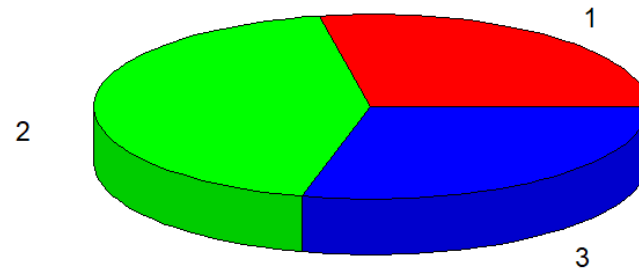
3 dimensional Pie diagram

Example :

```
> table(salesper)
salesper
 1  2  3
28 43 29
```



```
> table(salesper)
salesper
 1  2  3
28 43 29
```
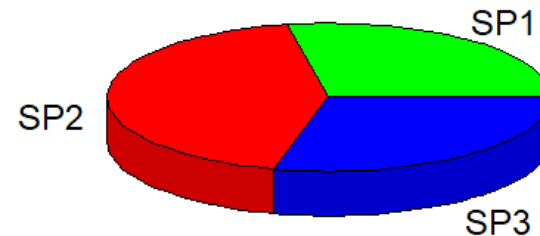
```
> pie3D(table(salesper))
```

3 dimensional Pie diagram

Example : **Adding labels and colours**

```
> pie3D(table(salesper), labels = c("SP1",
"SP2", "SP3"), main = "Salespersons attending
customer", col=c("green", "red", "blue"))
```

Salespersons attending customer

3 dimensional Pie diagram

Example : **Use of explode**

```
> pie3D(table(salesper), explode = 0.3,
labels = c("SP1", "SP2", "SP3"), main =
"Salespersons attending customer",
col=c("green", "red", "blue"))
```

Salespersons attending customer

Histogram

Histogram is based on the idea to categorize the data into different groups and plot the bars for each category with height.

Data is continuous.

The area of the bars (= height X width) is proportional to the frequency (or relative frequency).

So the widths of the bars need not necessarily to be the same

Histogram

Frequency distribution

Class	Frequency	Relative frequency
$a_0 - a_1$	f_1	f_1/n
$a_1 - a_2$	f_2	f_2/n
...	...	...
$a_{k-2} - a_{k-1}$	f_{k-1}	f_{k-1}/n
$a_{k-1} - a_k$	f_k	f_k/n

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Histogram

```
hist(x) # show absolute frequencies


hist(x, freq=F) # show relative frequencies
```

Histogram

`hist(x, main, col, xlab, xlim, ylim)`

`x` : Vector containing numeric values used in histogram.

`main` : Title of the chart.

`col` : Set colour of the bars.

`xlab` : Description of x-axis.

`xlim` : Specifies the range of values on x-axis.

`ylim` : Specifies the range of values on y-axis.

See `help("hist")` for more details

Histogram
Example

Height of 50 persons in centimetres are recorded as follow

166,125,130,142,147,159,159,147,165,156,149,164,137,166,135,142,

133,136,127,143,165,121,142,148,158,146,154,157,124,125,158,159,

164,143,154,152,141,164,131,152,152,161,143,143,139,131,125,145,

140,163

```
> height = c(166,125,130,142,147,159,159,147,
165,156,149,164,137,166,135,142,133,136,127,143,
165,121,142,148,158,146,154,157,124,125,158,159,
164,143,154,152,141,164,131,152,152,161,143,143,
139,131,125,145,140,163)
```

Histogram
Example

```
> hist(height)
```

Histogram of height
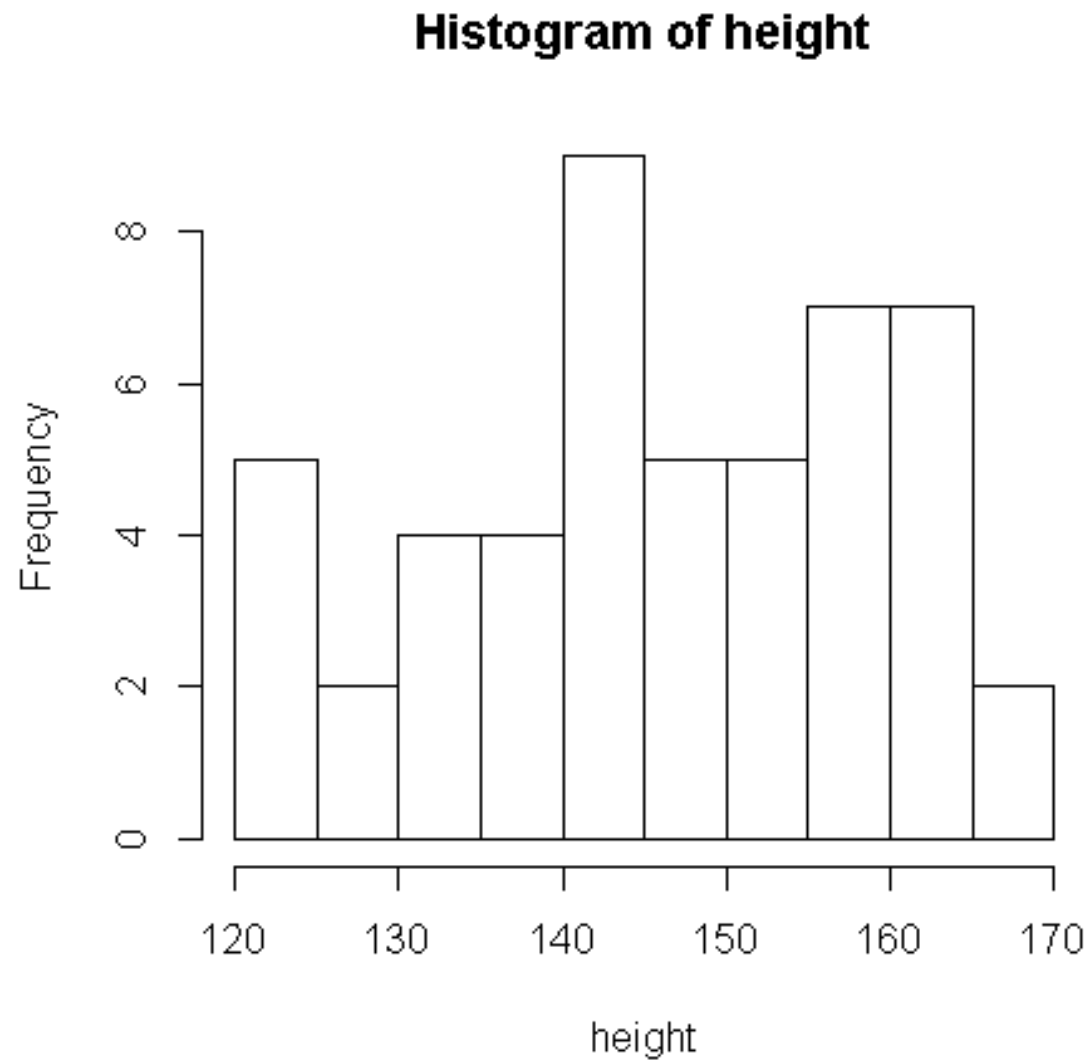
Histogram

Example: **Adding colour to bars and labelling**

```
> hist(height, main = "Heights of persons",
col = "green", xlab = "Heights", ylab =
"Number of Persons")
```


Heights of persons