

# 'R' Application in Making Designs

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**Abstract:** Creating design is an art. We see designs on wall papers, glass utensils, sarees, bed sheets, etc. For marketing, designs on all such things, plays very important role. This also includes rangoli designs. Manually creating designs require skill and is time consuming. If it is replaced by machine, then definitely it will require less efforts and will reduce time. This thought leads to write codes for making designs. Since R is emerging as a tool for business analysis, it can be used to create designs. Creating designs using R will be beneficial since it will reduce time and money and hence economical.

**Keywords:** Designs, Rangoli, R code.

## 1. Introduction

Making designs start from the house. Rangolies are drawn in the morning at the entrance. Rangolies can be drawn using geometrical figures or images of deities, living as well as nonliving things.

### A. Rangoli as Spiritual Indicator

When rangoli is drawn at the entrance of a house, visitors who is entering into the house feels happy and comfortable because rangoli drawn shows the sign of 'All Is Well' in the house. It is considered auspicious to draw rangoli in Hindu Dharma during special occasions and religious ceremonies. Rangolies have spiritual value. It is believed that the vibration of a rangoli changes with the change of color, design and form. Since the shapes and patterns of a rangoli have different implications and effects on the mind, it should be properly used. It has been believed that triangle shapes in a rangoli design stimulate emotions and neural circuitry.

### B. Scientific Significance of Rangoli

Practice of drawing rangolies in its most original form is still going on in India. Those are symmetric around both X & Y axis, mostly have rounded edges as shown in the figure 1.

We know that sound is made up of several harmonics where each harmonic corresponds to a certain frequency. When the right harmonics are combined, pleasing sounds that soothes the mind and calms us is generated. It becomes melodious music. This is in the sound domain. Similarly, when we consider visual domain, we have corresponding harmonics for every frequency which when combined, leads to artistic patterns which are pleasing to see and have a calming effect. There is a separate field of science called *Cymatics* which deals with the

relationship between vibrations and the geometric patterns corresponding to it. Scientists & Doctors have extended it further and created a new medical field called Cymotherapy in which highly complex vibrations are converted into sound patterns, which in turn can be used to heal a person's body and emotions.

Hence, rangoli is not just an art but actually a science of vibration pattern which was discovered by Indians thousands of years ago and been made a part of the culture. Geometrical figures such as point, lines which includes Diagonal lines, horizontal lines and vertical lines, circles, squares, rectangles, triangles are the sources of energy so they are used in the rangolies.

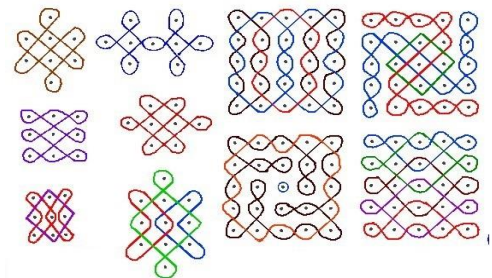


Fig. 1. Symmetric around both X & Y axis

## 2. The R Programming Language

In the field of Machine Learning, R plays a very important role. With the ever growing popularity and necessity of Machine Learning, R has now become one of the vital skills for organizations. R has a lot of in-built functionalities for statisticians as well as it has incompatible graphics and charting facilities too. So it is the most popular language used in the field of statistics. Also the advantages of R includes its package ecosystem which is its strongest quality. Because of this and other important features, R is emerging as a business analytics tool.

### A. Use of R

Advantages of R is its package ecosystem and is considered to be one of its strongest qualities.

Many different prominent companies, social websites are using R. Some of these are: Facebook, Ford Motor company, Google, Microsoft, Mozilla, New York Times, Thomas Cook etc.

*B. R in creating designs*

Designs are everywhere. They are on glass utensils, dress materials, sarees, bags, purses, etc. Here designs of ornaments made of different metals can also be considered. Designs play very vital role in marketing.

Creating designs using R coding is very economical. To create design using R, geometrical figures such as lines, triangles, rectangles, circles can be used. Once a colorful design is created, its various forms can be generated by changing color combinations and some geometrical figures and this can be done within fraction of a second. Lots of efforts will be reduced. So R coding to make designs is a step towards progress and is economical. This can be elaborated with the example of jewellery shop. Jewellery with different designs are available in the shop and one has to buy from these available restricted stock. So customer has limitations and so he/she may not be satisfied with this stock. If R coding is used to generate then various designs of the given ornament may be generated and shown till the customer get satisfaction. This will naturally increase marketing of that shop.

Recognizing the importance of R in marketing, three rangoli type designs are created using R cods. They are listed one by one. By R coding number of rangoli stickers can be made with less efforts and this will definitely attract one who is interested in this matter.

*1) Rangoli I*

In this rangoli geometrical figures circles and lines are used. Circles are filled with yellow, red and green color. The R code for this rangoli is

```
library(draw)
drawLine(x = c(2.7,3.3),y = c(4,4.7),lineWidth = 8, lineType = "solid", arrowEnds = "first",lineColor = "red")
drawLine(x = c(4,3.3),y = c(4,4.7),lineWidth = 8, lineType = "solid", arrowEnds = "first",lineColor = "red")
drawLine(x = c(2.7,3.4),y = c(2,1.3),lineWidth = 8, lineType = "solid", arrowEnds = "first",lineColor = "red")
drawLine(x = c(4,3.4),y = c(2,0,1.3),lineWidth = 8, lineType = "solid", arrowEnds = "first",lineColor = "red")
drawLine(x = c(4,4.8),y = c(4,3.7),lineWidth = 8, lineType = "solid", arrowEnds = "first",lineColor = "red")
drawLine(x = c(4.5,4.8),y = c(3,3.7),lineWidth = 8, lineType = "solid", arrowEnds = "first",lineColor = "red")
drawLine(x = c(4.5,4.8),y = c(3,2.3),lineWidth = 8, lineType = "solid", arrowEnds = "first",lineColor = "red")
drawLine(x = c(4.8,4),y = c(2.3,2),lineWidth = 8, lineType = "solid", arrowEnds = "first",lineColor = "red")
drawLine(x = c(2.2,2),y = c(3,3.7),lineWidth = 8, lineType = "solid", arrowEnds = "first",lineColor = "red")
drawLine(x = c(2,2.7),y = c(3.7,4.0),lineWidth = 8, lineType = "solid", arrowEnds = "first",lineColor = "red")
drawLine(x = c(2.2,2.0),y = c(3,2.3),lineWidth = 8, lineType = "solid", arrowEnds = "first",lineColor = "red")
drawLine(x = c(2.0,2.7),y = c(2.3,2),lineWidth = 8, lineType = "solid", arrowEnds = "first",lineColor = "red")
```

```
drawCircle(x = 3.35, y = 3, radius = 1.1,fillColor = "green",lineWidth = 15,lineColor = "red")
drawCircle(x = 3.35, y = 3, radius = 0.8,fillColor = "red",lineWidth = 15,lineColor = "yellow")
drawCircle(x = 3.35, y = 3, radius = 0.5,fillColor = "yellow",lineWidth = 15,lineColor = "green")
drawCircle(x = 3.35, y = 3, radius = 0.2,fillColor = "red",lineWidth = 15,lineColor = "red")
drawCircle(x = 1.8, y = 3, radius = 0.4,fillColor = "yellow",lineWidth = 15,lineColor = "yellow")
drawCircle(x = 4.9, y = 3, radius = 0.4,fillColor = "yellow",lineWidth = 15,lineColor = "yellow")
drawCircle(x = 4.25, y = 4.3, radius = 0.4,fillColor = "yellow",lineWidth = 15,lineColor = "yellow")
drawCircle(x = 2.45, y = 4.3, radius = 0.4,fillColor = "yellow",lineWidth = 15,lineColor = "yellow")
drawCircle(x = 2.45, y = 1.7, radius = 0.4,fillColor = "yellow",lineWidth = 15,lineColor = "yellow")
drawCircle(x = 4.25, y = 1.7, radius = 0.4,fillColor = "yellow",lineWidth = 15,lineColor = "yellow")
drawCircle(x = 1.8, y = 3, radius = 0.3,fillColor = "green",lineWidth = 15,lineColor = "red")
drawCircle(x = 4.9, y = 3, radius = 0.3,fillColor = "green",lineWidth = 15,lineColor = "red")
drawCircle(x = 4.25, y = 4.3, radius = 0.3,fillColor = "green",lineWidth = 15,lineColor = "red")
drawCircle(x = 2.45, y = 4.3, radius = 0.3,fillColor = "green",lineWidth = 15,lineColor = "red")
drawCircle(x = 2.45, y = 1.7, radius = 0.3,fillColor = "green",lineWidth = 15,lineColor = "red")
drawCircle(x = 4.25, y = 1.7, radius = 0.3,fillColor = "green",lineWidth = 15,lineColor = "red")
```

The output is

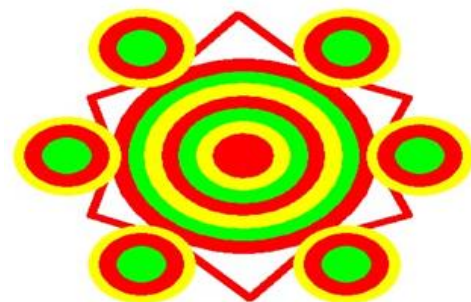


Fig. 2. Output for Rangoli I

*2) Rangoli II*

Here also lines are circles are used to generate the another type of design.

```
The R code is,
library(draw)
drawCircle(x = 3.5, y = 4, radius = 0.7,fillColor = "red",lineWidth = 15,lineColor = "red")
drawCircle(x = 3.5, y = 1.2, radius = 0.7,fillColor =
```

```
"red",lineWidth = 15,lineColor = "red")
  drawCircle(x = 2.1, y = 2.6, radius = 0.7,fillColor =
"red",lineWidth = 15,lineColor = "red")
  drawCircle(x = 4.9, y = 2.6, radius = 0.7,fillColor =
"red",lineWidth = 15,lineColor = "red")
  drawCircle(x = 2.45, y = 3.5, radius = 0.7,fillColor =
"red",lineWidth = 15,lineColor = "red")
  drawCircle(x = 4.55, y = 3.5, radius = 0.7,fillColor =
"red",lineWidth = 15,lineColor = "red")
  drawCircle(x = 2.45, y = 1.7, radius = 0.7,fillColor =
"red",lineWidth = 15,lineColor = "red")
  drawCircle(x = 4.55, y = 1.7, radius = 0.7,fillColor =
"red",lineWidth = 15,lineColor = "red")
  drawCircle(x = 3.5, y = 4, radius = 0.6,fillColor =
"yellow",lineWidth = 15,lineColor = "red")
  drawCircle(x = 3.5, y = 1.2, radius = 0.6,fillColor =
"yellow",lineWidth = 15,lineColor = "red")
  drawCircle(x = 2.1, y = 2.6, radius = 0.6,fillColor =
"yellow",lineWidth = 15,lineColor = "red")
  drawCircle(x = 4.9, y = 2.6, radius = 0.6,fillColor =
"yellow",lineWidth = 15,lineColor = "red")
  drawCircle(x = 2.45, y = 3.5, radius = 0.6,fillColor =
"yellow",lineWidth = 15,lineColor = "red")
  drawCircle(x = 4.55, y = 3.5, radius = 0.6,fillColor
="yellow",lineWidth = 15,lineColor = "red")
  drawCircle(x = 2.45, y = 1.7, radius = 0.6,fillColor =
"yellow",lineWidth = 15,lineColor = "red")
  drawCircle(x = 4.55, y = 1.7, radius = 0.6,fillColor =
"yellow",lineWidth = 15,lineColor = "red")
  drawCircle(x = 3.5, y = 2.6, radius = 1.0,fillColor =
"green",lineWidth = 8,lineColor = "red")
  drawCircle(x = 3.5, y = 2.6, radius = 0.8,fillColor =
6,lineWidth = 8,lineColor = "red")
  drawBox(3.5,2.6,width=1,height = 1,fillColor =
"yellow",lineWidth =6,lineColor = "red")
  drawCircle(x = 3.5, y = 4, radius = 0.3,fillColor =
"red",lineWidth = 15,lineColor = "green")
  drawCircle(x = 3.5, y = 1.2, radius = 0.3,fillColor =
"red",lineWidth = 15,lineColor = "green")
  drawCircle(x = 2.1, y = 2.6, radius = 0.3,fillColor =
"red",lineWidth = 15,lineColor = "green")
  drawCircle(x = 4.9, y = 2.6, radius = 0.3,fillColor =
"red",lineWidth = 15,lineColor = "green")
  drawCircle(x = 2.45, y = 3.5, radius = 0.3,fillColor =
"red",lineWidth = 15,lineColor = "green")
  drawCircle(x = 4.55, y = 3.5, radius = 0.3,fillColor =
"red",lineWidth = 15,lineColor = "green")
  drawCircle(x = 2.45, y = 1.7, radius = 0.3,fillColor =
"red",lineWidth = 15,lineColor = "green")
  drawCircle(x = 4.55, y = 1.7, radius = 0.3,fillColor =
"red",lineWidth = 15,lineColor = "green")
```

The output of this code is

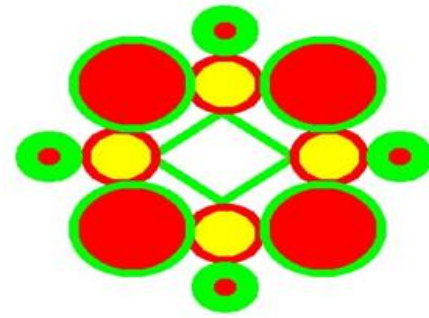


Fig. 3. Output for Rangoli II

### 3) Rangoli III

Here different type of rangoli design is created by using R coding. R code written for this rangoli design is,

```
library(draw)
  drawLine(x = c(2.7,3.3),y = c(3.2,3.7),lineWidth = 8,
lineType = "solid", arrowEnds = "first",lineColor = "green")
  drawLine(x = c(2.7,3.3),y = c(3.2,2.7),lineWidth = 8,
lineType = "solid", arrowEnds = "first",lineColor = "green")
  drawLine(x = c(3.9,3.3),y = c(3.2,3.7),lineWidth = 8,
lineType = "solid", arrowEnds = "first",lineColor = "green")
  drawLine(x = c(3.9,3.3),y = c(3.2,2.7),lineWidth = 8,
lineType = "solid", arrowEnds = "first",lineColor = "green")
  drawCircle(x = 3.33, y = 2.35, radius = 0.3,fillColor =
"yellow",lineWidth = 8,lineColor = "red")
  drawCircle(x = 3.33, y = 4.0, radius = 0.3,fillColor =
"yellow",lineWidth = 8,lineColor = "red")
  drawCircle(x = 4.2, y = 3.2, radius = 0.3,fillColor =
"yellow",lineWidth = 8,lineColor = "red")
  drawCircle(x = 2.45, y = 3.2, radius = 0.3,fillColor =
"yellow",lineWidth = 8,lineColor = "red")
  drawCircle(x = 2.55, y = 4.0, radius = 0.5,fillColor =
"red",lineWidth = 8,lineColor = "green")
  drawCircle(x = 2.55, y = 2.4, radius = 0.5,fillColor =
"red",lineWidth = 8,lineColor = "green")
  drawCircle(x = 4.15, y = 4.0, radius = 0.5,fillColor =
"red",lineWidth = 8,lineColor = "green")
  drawCircle(x = 4.15, y = 2.4, radius = 0.5,fillColor =
"red",lineWidth = 8,lineColor = "green")
  drawCircle(x = 3.33, y = 4.6, radius = 0.2,fillColor =
"red",lineWidth = 18,lineColor = "green")
  drawCircle(x = 3.33, y = 1.75, radius = 0.2,fillColor =
"red",lineWidth = 18,lineColor = "green")
  drawCircle(x = 1.85, y = 3.2, radius = 0.2,fillColor =
"red",lineWidth = 18,lineColor = "green")
  drawCircle(x = 4.8, y = 3.2, radius = 0.2,fillColor =
"red",lineWidth = 18,lineColor = "green")
```

The output is the following beautiful rangoli.

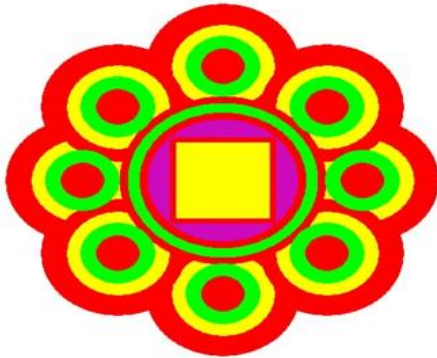


Fig. 3. Output for Rangoli III

### 3. Conclusion

Using R various types of rangolies, designs can be created

which is definitely economical in terms of time and money. It can be used to create designs on cloths, walls, wall papers, on utensils, bags and on many other things wherever designs are needed. Number of patterns of a design can be generated till the customer' satisfaction. Creating designs using R code has unique value in the present fashion world.

### References

- [1] K. Madhu, "Yantra: The Tantric Symbol of Cosmic Unity. Inner Traditions," ISBN 0-89281-132-3 & ISBN 978-0-89281-132-8, 2003.
- [2] N. Tadvalkar, "Motifs and their Symbolism: Floor Art and other Art," 2012. Available at [http://shodhganga.inflibnet.ac.in/.../4.../10/10\\_chapter%204.pdf](http://shodhganga.inflibnet.ac.in/.../4.../10/10_chapter%204.pdf)
- [3] <http://www.dandavats.com/.../Sacred%20geometry,%20Rangolis,%20...>
- [4] W. D. Gordon, "The Alchemical Body: Siddha Traditions in Medieval India," Chicago: The University of Chicago Press, ISBN 0-226-89499-1, 1996.