A

PROJECT REPORT

ON

NETWORK ANALYSIS BY 'R'LANGUAGE

Submitted by

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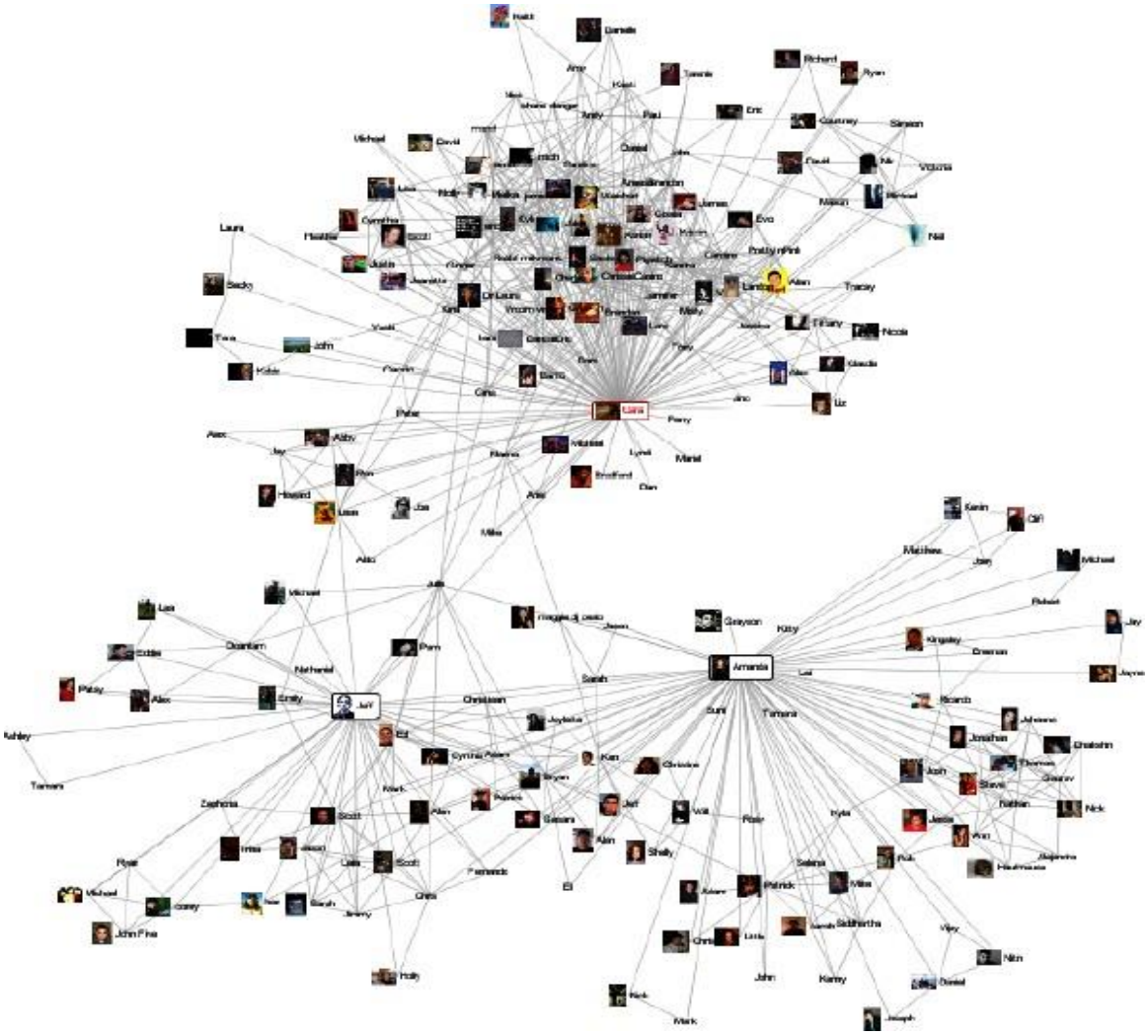
❖ INTRODUCTION

- Networks are collection of points joined by lines.

- **Online Social Networks**
  - Social networking sites allow user to share ideas,digital photos and videos,posts, and to inform others about online or real-world activities and events with people in their network.



❖ IMPLEMENTATION

- **R PROGRAM**
  - PROGRAM:

```
# Social Network Analysis
library(igraph)
g <- graph(c(1,2,2,3,3,4,4,1),
           directed = F,
           n=7)
plot(g,
     vertex.color = "green",
     vertex.size = 40,
     edge.color = 'red')
g[]

g1 <- graph(c("Amy", "Ram", "Ram", "Li", "Li", "Amy",
        "Amy", "Li", "Kate", "Li"),
        directed=T)
plot(g1,
     vertex.color = "green",
     vertex.size = 40,
     edge.color = 'red')

g1

# Network measures
degree(g1, mode='all')
degree(g1, mode='in')
degree(g1, mode='out')

diameter(g1, directed=F, weights = NA)
edge_density(g1, loops = F)
```

```
ecount(g1)/(vcount(g1)*(vcount(g1)-1))
reciprocity(g1)
closeness(g1, mode='all', weights = NA)
betweenness(g1, directed=T, weights=NA)
edge_betweenness(g1, directed=T, weights=NA)

# Read data file
data <- read.csv(file.choose(), header=T)
y <- data.frame(data$first, data$second)

# Create network
net <- graph.data.frame(y, directed=T)
V(net)
E(net)
V(net)$label <- V(net)$name
V(net)$degree <- degree(net)

# Histogram of node degree
hist(V(net)$degree,
    col = 'green',
    main = 'Histogram of Node Degree',
    ylab = 'Frequency',
    xlab = 'Degree of Vertices')

# Network diagram
set.seed(222)
plot(net,
    vertex.color = 'green',
    vertext.size = 2,
    edge.arrow.size = 0.1,
    vertex.label.cex = 0.8)
```

```
# Highlighting degrees & layouts
plot(net,
    vertex.color = rainbow(52),
    vertex.size = V(net)$degree*0.4,
    edge.arrow.size = 0.1,
    layout=layout.fruchterman.reingold)
plot(net,
    vertex.color = rainbow(52),
    vertex.size = V(net)$degree*0.4,
    edge.arrow.size = 0.1,
    layout=layout.graphopt)
plot(net,
    vertex.color = rainbow(52),
    vertex.size = V(net)$degree*0.4,
    edge.arrow.size = 0.1,
    layout=layout.kamada.kawai)

# Hub and authorities
hs <- hub_score(net)$vector
as <- authority.score(net)$vector
par(mfrow=c(1,2))
set.seed(123)
plot(net,
    vertex.size=hs*30,
    main = 'Hubs',
    vertex.color = rainbow(52),
    edge.arrow.size=0.1,
    layout = layout.kamada.kawai)
set.seed(123)
plot(net,
```

```
    vertex.size=as*30,
    main = 'Authorities',
    vertex.color = rainbow(52),
    edge.arrow.size=0.1,
    layout = layout.kamada.kawai)
par(mfrow=c(1,1))

# Community detection
net <- graph.data.frame(y, directed = F)
cnet <- cluster_edge_betweenness(net)
plot(cnet,
    net,
    vertex.size = 10,
    vertex.label.cex = 0.8)
```

- **SCREENSHOT**