Experiment No.6
Social Network Analysis using R (for example: Community Detection Algorithm)
Date of Performance: 05/10/2023
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Aim:Social Network Analysis using R (for example: Community DetectionAlgorithm)

Theory:

Online social platforms have enabled people around the world to interact with each other and
build relationships with others they share common interests with. This can be observed in real
life — naturally, we tend to develop and maintain relationships with others that are similar to
us. People with similar interests tend to gravitate towards each other and become associated
in communities — clusters or groups of people that share similar traits with each other. Since
people tend to cluster with others similar to them, we can use community detection to identify
users with a high number of degrees (connections) and see how far their reach can travel in
the network.

- User Data Extraction — Since we are only interested in user data, we will only extract the following variables:
- User_id — Yelp user ID; this is needed to make nodes and edges
- Name — user's first name
- Review count — the number of reviews user has written
- Yelping since — date user joined Yelp
- Friends — a list containing all of the user's friends by user_id
- Fans — number of fans user has
- Elite — number of years the user has Elite status
- Average stars — user's average rating of all reviews written

CODE:

```
library(igraph)
gizvan <- function(G) {
c= decompose. graph (G)
l = length(c)
v <= vector()
while(1==1){
x <-E(G)
y <- edge_betweenness (G)
z <- which.max(y)
edge <- x[z]
a <- ends (G,z[1]) [1]
b <- ends(G,z[1]) [2]
v <- c(v,a,b)
G <- delete_edges (G, edge)
c = decompose.graph (G)
l= length(c)
}
if(l==2)(
paths <- shortest.paths (G)
for(i in 1:lengea(V(G)))(
if (paths[a, i] !=Inf) {
V(G) [i]$color = "lightblue"
}
else{
V(G) [i]$color = "orange"
}
}
G <- G + edge(v)
plot(G)
}
return(c)
}
g <- read.graph("C:/Users/admin/Desktop/ComunityDetection/karate.gml",format =
"gml")
plot(g)
c <- girvan(g)
```

Output :
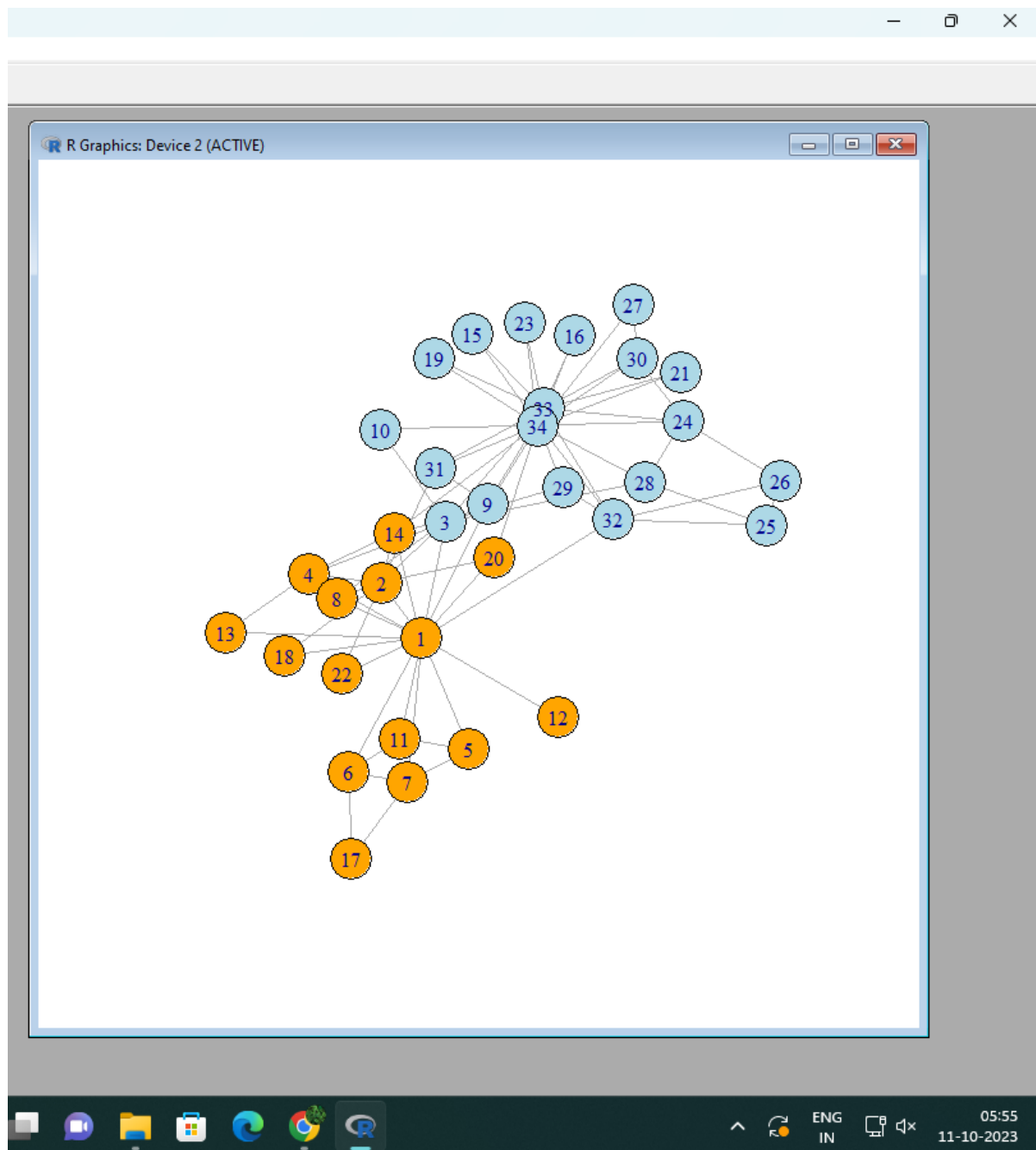
Conclusion:

This experiment demonstrates how Social Network Analysis using R, particularly with regard to Community Detection Algorithms, is a potent and developing instrument for comprehending social network architectures. R's versatility and wide range of packages make it the perfect tool for this kind of study. This field is always changing to meet new challenges and provide insightful information about a variety of domains, from online platforms to real-world communities. This information may be used to inform strategies and decision-making in a variety of disciplines.