Experiment No.7
Social Network Analysis using R (for example: Community Detection Algorithm)
Date of Performance: 04/09/23
Date of Submission: 11/09/23

AIM : Social Network Analysis using R (for example: Community Detection Algorithm)

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.

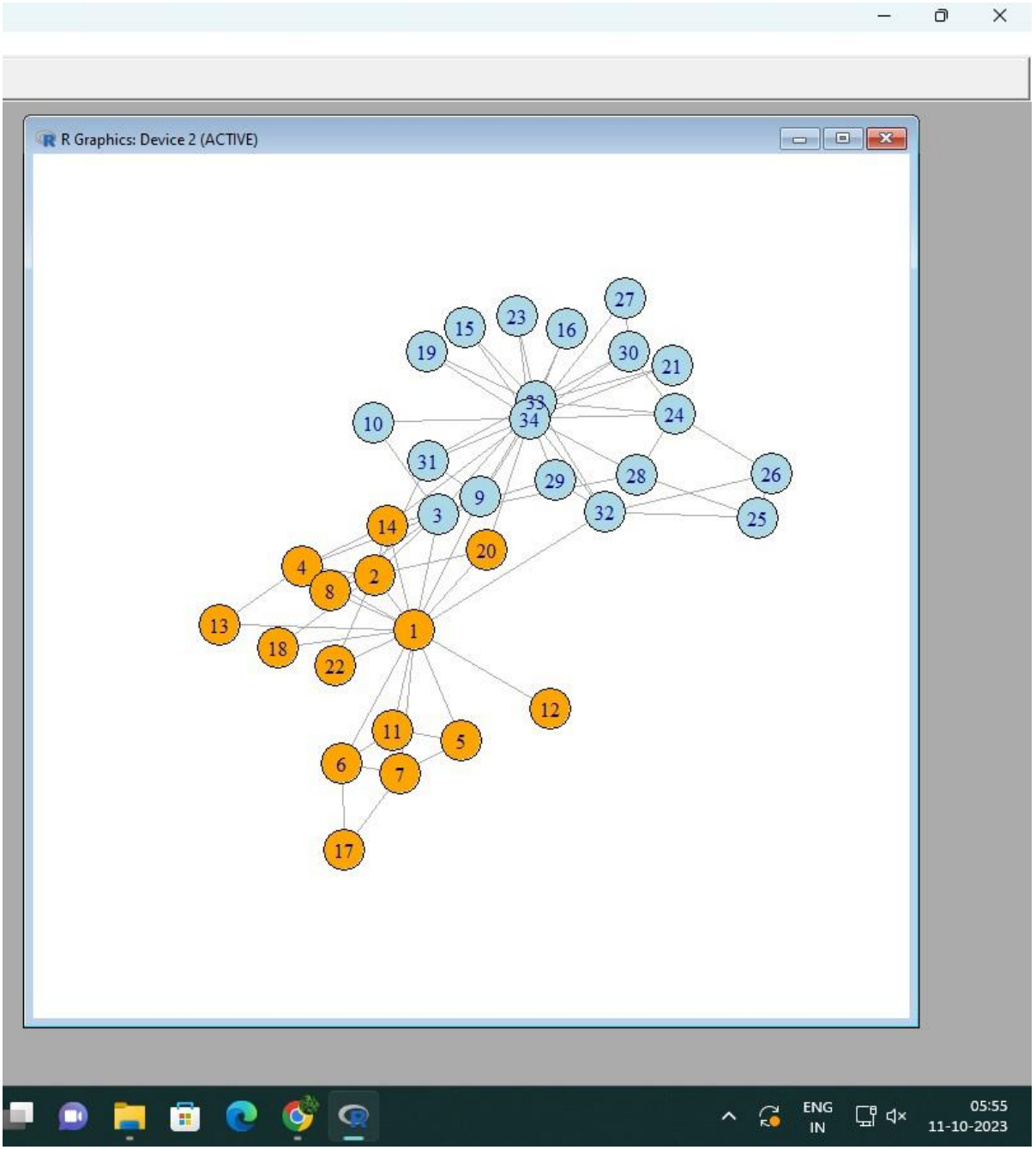
- User Data Extraction — Since we are only interested in user data, we will only extract the following variables:
- User_id — Yelp user ID; this is needed to make nodes and edges
- Name — user's first name
- Review count — the number of reviews user has written
- Yelping since — date user joined Yelp
- 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 :

```
1ibrary(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]$color = "lightblue"
} e1se{
V(G) [i]$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 :


R Graphics: Device 2 (ACTIVE)
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CONCLUSION :

The investigation into social network analysis using R, with a focus on community detection algorithms in particular, reveals a powerful and dynamic tool for understanding the complex architecture of social networks. R is a great tool for undertaking this research because of its adaptability and abundance of packages. Social network analysis is a field that is always expanding in order to meet new difficulties and offer priceless insights into a variety of fields, from online communities to offline communities. These observations have the ability to guide strategy creation and decision-making across a variety of fields.