

1.Description of the dataset

Files

main

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Karate Case Study

Karate Club Social Network Anal...

README.md

karate.gml

Social-Network-Analysis-Karate-Club-Analysis / Karate Club Social Network Analysis.ipynb

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```
print("Is the graph connected?", nx.is_connected(G))
print("Is the graph a tree?", nx.is_tree(G))
print("Is the graph a bipartite graph?", nx.is_bipartite(G))

radius: 3
diameter: 5
eccentricity: {'1': 3, '2': 3, '3': 3, '4': 3, '5': 4, '6': 4, '7': 4, '8': 4, '9': 3, '10': 4, '11': 4, '12': 4, '13': 4, '14': 3, '15': 5, '16': 5, '17': 5, '18': 4, '19': 5, '20': 3, '21': 5, '22': 4, '23': 5, '24': 5, '25': 4, '26': 4, '27': 5, '28': 4, '29': 4, '30': 5, '31': 4, '32': 3, '33': 4, '34': 4}
center: ['1', '2', '3', '4', '9', '14', '20', '32']
periphery: ['15', '16', '17', '19', '21', '23', '24', '27', '30']
density: 0.13903743315508021
Number of nodes: 34
Number of edges: 78
Average degree: 4.588235294117647
Graph density: 0.13903743315508021
Is the graph directed? False
Is the graph connected? True
Is the graph a tree? False
Is the graph a bipartite graph? False

In [34]: pos = nx.spring_layout(G, seed=3068) # Seed Layout for reproducibility
nx.draw(G, pos=pos, with_labels=True, font_color='white', node_color='lightpink')
plt.show()
```

33°C Sunny

2.Metadata

Karate Club Social Network Anal...

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In [71]:

```
#info of each node and the club they belong to is added
nodes = K.nodes(data=True)
print(list(nodes)[:34])

[('1', {'club': 'Mr. Hi'}), ('2', {'club': 'Mr. Hi'}), ('3', {'club': 'Mr. Hi'}), ('4', {'club': 'Mr. Hi'}), ('5', {'club': 'Mr. Hi'}), ('6', {'club': 'Mr. Hi'}), ('7', {'club': 'Mr. Hi'}), ('8', {'club': 'Mr. Hi'}), ('9', {'club': 'Mr. Hi'}), ('10', {'club': 'John A.'}), ('11', {'club': 'Mr. Hi'}), ('12', {'club': 'Mr. Hi'}), ('13', {'club': 'Mr. Hi'}), ('14', {'club': 'Mr. Hi'}), ('15', {'club': 'John A.'}), ('16', {'club': 'John A.'}), ('17', {'club': 'Mr. Hi'}), ('18', {'club': 'Mr. Hi'}), ('19', {'club': 'John A.'}), ('20', {'club': 'Mr. Hi'}), ('21', {'club': 'John A.'}), ('22', {'club': 'Mr. Hi'}), ('23', {'club': 'John A.'}), ('24', {'club': 'John A.'}), ('25', {'club': 'John A.'}), ('26', {'club': 'John A.'}), ('27', {'club': 'John A.'}), ('28', {'club': 'John A.'}), ('29', {'club': 'John A.'}), ('30', {'club': 'John A.'}), ('31', {'club': 'John A.'}), ('32', {'club': 'John A.'}), ('33', {'club': 'John A.'}), ('34', {'club': 'John A.'})]
```

Calculate all types of centrality (degree, betweenness, closeness, eigenvector, pagerank centrality).

Analyse the nodes based on the centrality values. Write a note on this.

Breaking news Hundreds evacu...

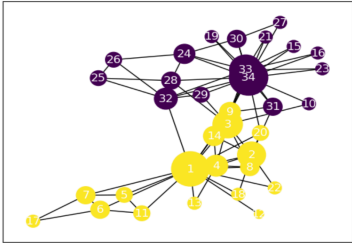
3.Centrality

Degree centrality

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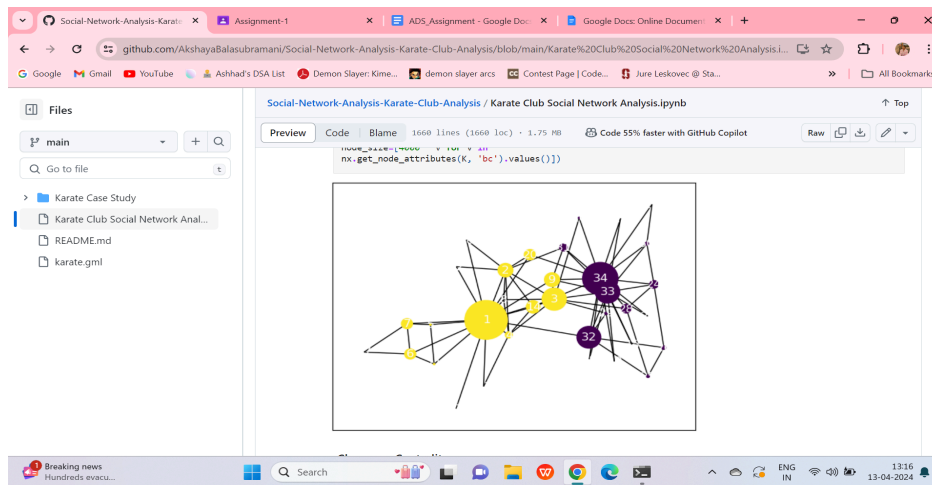
```
nx.get_node_attributes(K, 'dc').values()
```



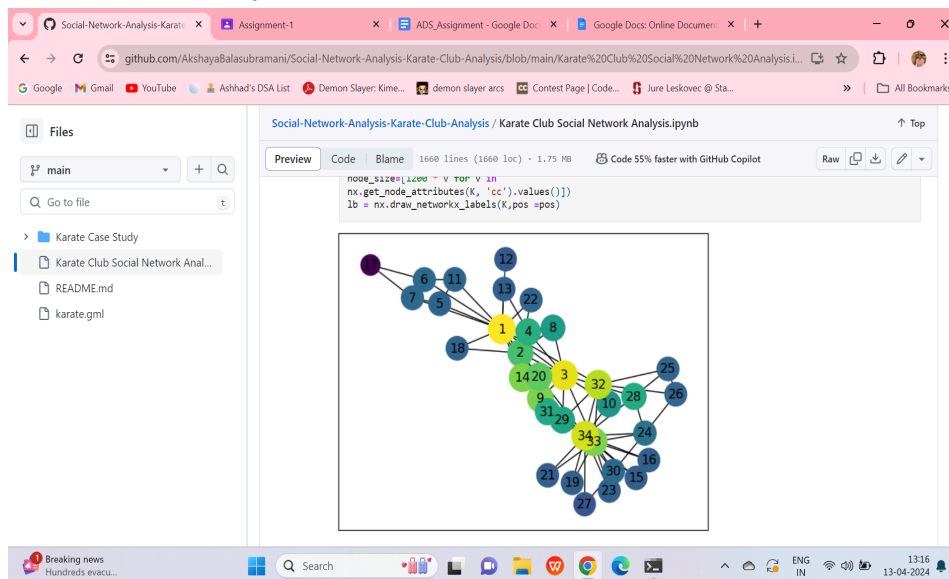
Betweenness Centrality

Breaking news Hundreds evacu...

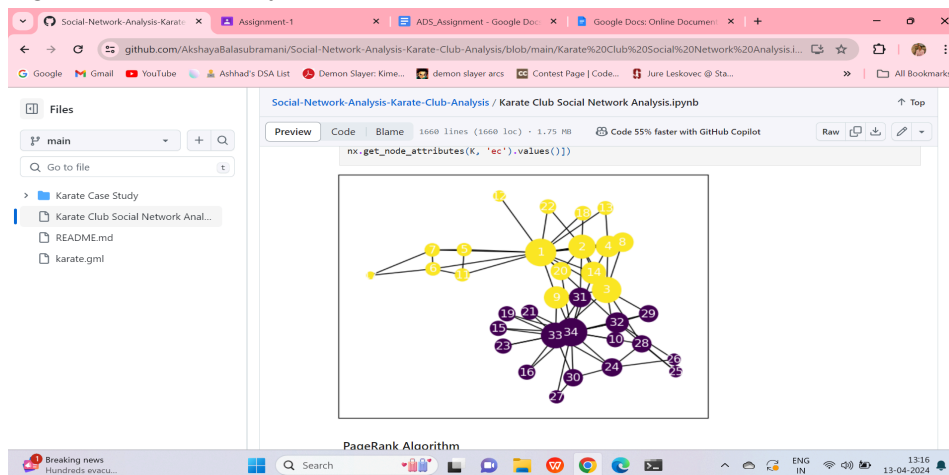
Betweenness centrality



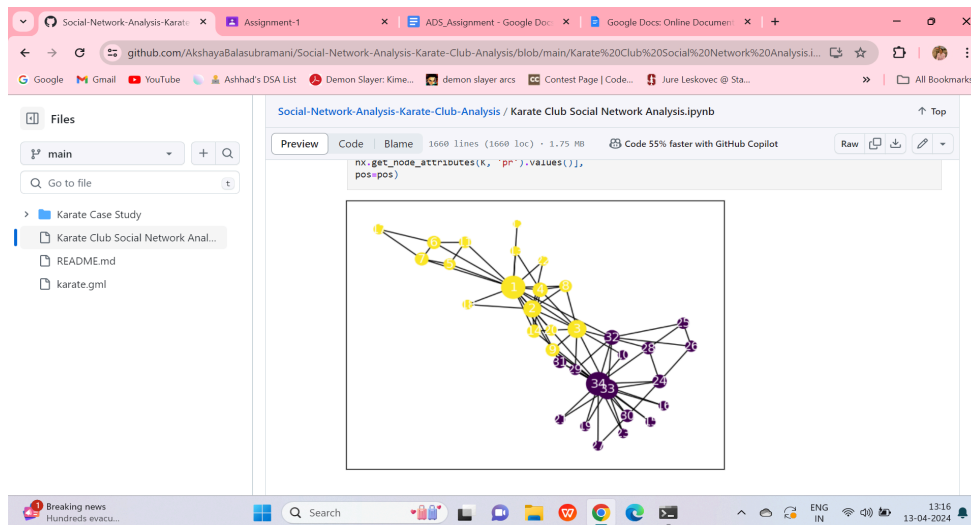
Closeness centrality



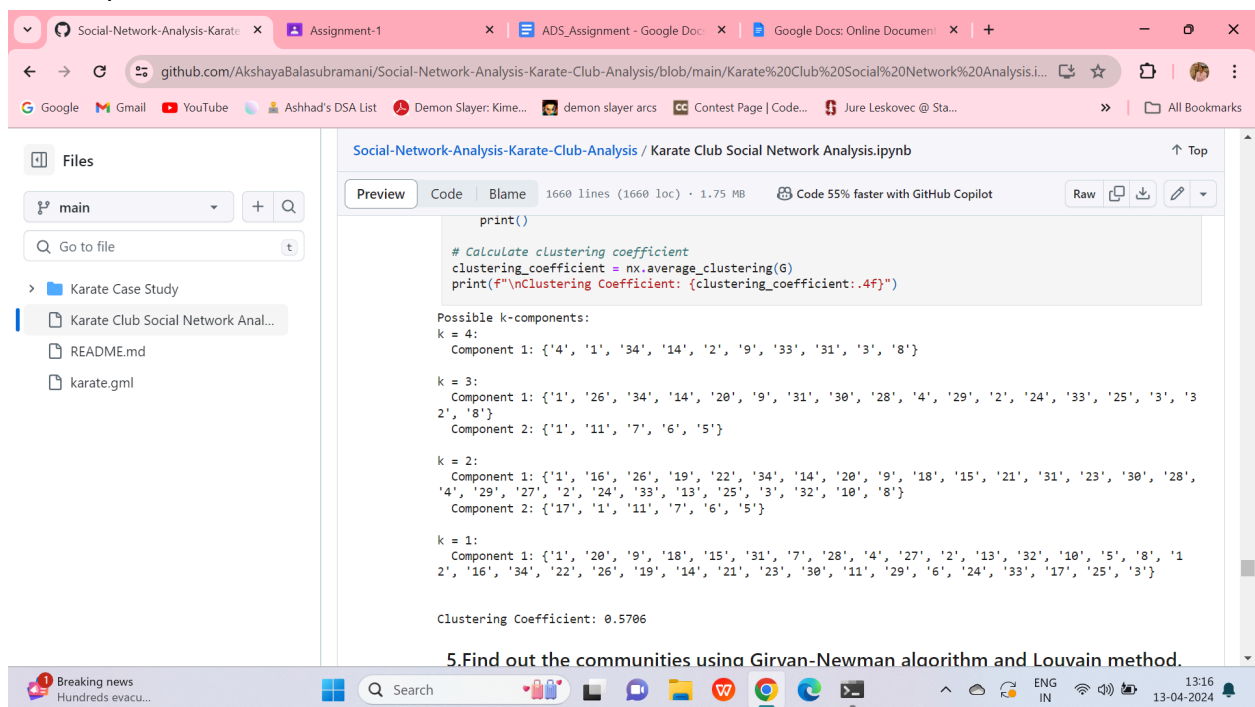
Eigen value centrality



PageRank Centrality



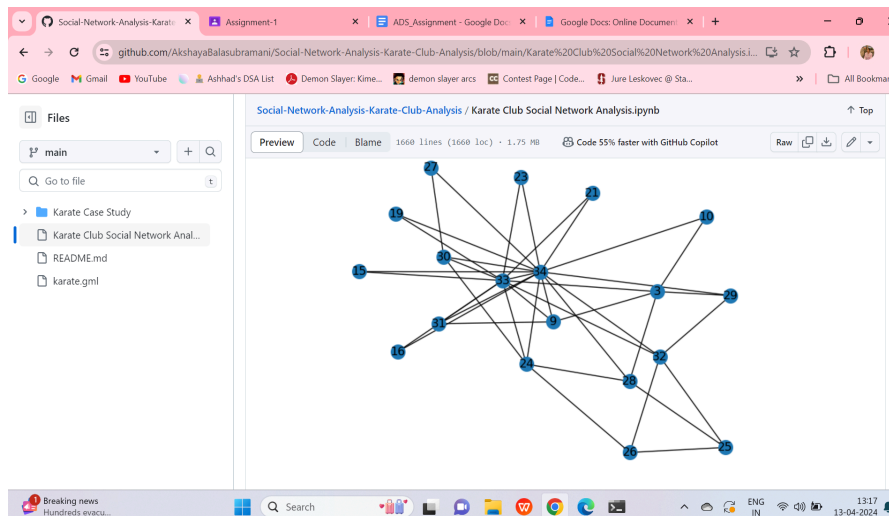
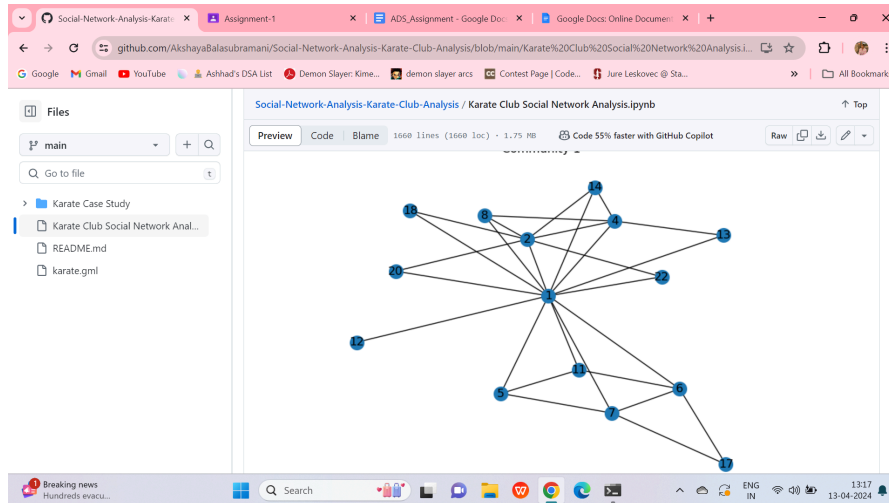
4.k components



5.Find out the communities using Girvan-Newman algorithm and Louvain method.

5. Girvan-Newman algorithm and Louvain method communities

Girwin



Louvain

