Assignment 5

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CS 432

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1. We know the result of the Karate Club (Zachary, 1977) split.

Prove or disprove that the result of split could have been predicted

by the weighted graph of social interactions. How well does the

mathematical model represent reality?

Generously document your answer with all supporting equations, code,

graphs, arguments, etc.

Clues:

1. Draw original Karate club graph (two connected components) after split (Week 6 lecture, slide 98).

2. Run multiple iterations of graph partioning algorithm (e.g., Girvan-Newman Algorithm) on experimental Karate club graph until the graph splits into two connected components.

3. Compare the connected components of the experimental graph (in 2.) with the original connected components of the split Karate club graph (in 1.). Are they similar?

For this question I used the code given and demonstrated by user Anmika Chhabra on her Youtube channel, <https://www.youtube.com/watch?v=5P7ZCk3GM2o>

Most of the code I used is derived from the lesson I found online, most of the work I did was on making it into a graphical representation. A snippet of the algorithm used is as follows.

def girvan(G):

c = nx.connected\_component\_subgraphs(G)

l = len(list(c))

pos = nx.spring\_layout(G)

count = 1

print(count," The number connected compents are ",l)

output = "graph%(id)02d.png" % {"id": count}

pl.figure()

nx.draw\_networkx(G, pos)

pl.savefig(output)

pl.close()

while(l < 5):

G.remove\_edge(\*edge\_to\_remove(G)) #((a,b)) --> (a,b)

c = nx.connected\_component\_subgraphs(G)

l = len(list(c))

pos=nx.spring\_layout(G)

count +=1

print(count, " The number connected compents are ",l)

print(nx.number\_of\_nodes(G))

output = "graph%(id)02d.png" % {"id": count}

pl.figure()

nx.draw\_networkx(G)

pl.savefig(output)

pl.close()

return c

I drew the