



◀ Previous	✓	✓	✓		✓	✓	✓	Next ▶
----------------------------	---	---	---	--	---	---	---	------------------------

4. A Few Practical Datasets

Bookmark this page

Exercises due Oct 20, 2021 17:29 IST Completed

Community Detection, Clustering, Modularity Maximization, Louvain Method

[Start of transcript. Skip to the end.](#)



▶

0:00 / 0:00

▶ 2.0x

🔊

🔍

CC

🗣️

Prof Uhler: OK.
Welcome back to the last video of this networks module.
So with the last videos in this lecture,
we've discussed these criminal networks
that you're analyzing for the problem sets
and also, maybe, questions that go

Video

[Download video file](#)

Transcripts

[Download SubRip \(.srt\) file](#)

[Download Text \(.txt\) file](#)

Food Delivery Workers

4/4 points (graded)

Say we have a matrix B that represents a dataset of food delivery workers and areas that they serve. Assume that each row of B represents an area and each column of B represents a worker. An entry $B(i, j)$ is 1 if area i is served by worker j . It is equal to 0, otherwise. Here, we assume that all workers and areas are relevant, i.e., in the problem there are no workers not serving any areas, and no areas not being served by any workers.

1. What does entry $(i, j), i \neq j$ of BB^T represent?

- ☐ Number of workers serving area i or area j .
- ☒ Number of workers serving both area i and j .
- ☐ Number of areas in common served by both worker i and j .



2. What does entry (i, i) of BB^T represent?

- ☒ Number of workers serving area i .
- ☐ Number of areas served by worker i .



3. What does entry $(i, j), i \neq j$ of $B^T B$ represent?

- ☐ Number of workers serving area i or area j .

☐ Number of workers serving both area i and j .

☒ Number of areas in common served by both worker i and j .



4. What does entry (i, i) of $B^T B$ represent?

☐ Number of workers serving area i .

☒ Number of areas served by worker i .



Solution:

We provide an explanation for **1.** here: The inner product of row i of B with column j of B^T is the same as counting the number of places where both rows i and j of B have an entry equal to **1** and hence entry (i, j) of BB^T is equal to the number of workers serving both areas i and j .

Submit

You have used 2 of 2 attempts

i Answers are displayed within the problem

A Bipartite Network

3/3 points (graded)

Say we have m areas and n workers.

1. Is the graph represented by the adjacency matrix

$$\begin{pmatrix} 0 & B \\ B^T & 0 \end{pmatrix}$$

a bipartite graph?

☒ Yes

☐ No



2. How many nodes does the graph have?

m+n

Answer: m+n

3. Which of the following questions can be answered with the food delivery workers dataset?

☒ Minimum number of workers required to cover all areas.

☒ Areas served by the fewest workers.




Solution:

1. **Yes.**
2. $m + n$, which is clear from the structure of the matrix.
3. Both questions can be answered from the dataset. The question **minimum number of workers required to cover all areas** can be answered by finding the smallest number of worker nodes in the bipartite graph whose induced subgraph has all the area nodes in it. The question **areas served by the fewest workers** can be answered directly from matrix B – the question requires us to find the rows of B with the smallest number of non-zero entries.

Submit

You have used 2 of 2 attempts

 Answers are displayed within the problem

Discussion

Hide Discussion

Topic: Module 3: Network Analysis:Spectral Clustering / 4. A Few Practical Datasets

Add a Post

◀ All Posts

A Bipartite Network misleading question

discussion posted 2 months ago by [Leonardo-Rivas-L](#)

ok, question 2 " How many nodes does the graph have?" its clearly asking for a Number and I gave that number and its asking for another thing (not to give away the answer), I think the question needs to be more specific for what the answer is



This post is visible to everyone.

Add a Response

2 responses

[StBishop](#)

2 months ago



Yeah, little vague. Though it didnt ask for the 'node sets'.

I also lost the point, need to be careful between number of edges vs number of nodes :)

Add a comment

[Kathi_007](#)

2 months ago



Thanks for "warning"! Pics of a bipartite graph from wikipedia helped me to answer this question correct:
https://en.wikipedia.org/wiki/Bipartite_graph



Your commentary helped me to find the correct answer, thanks

posted 2 months ago by [rfpcordeiro](#)

Add a comment

Showing all responses

Showing all responses

Add a response:

Preview

Submit

< Previous

Next >

© All Rights Reserved



edX

- [About](#)
- [Affiliates](#)
- [edX for Business](#)
- [Open edX](#)
- [Careers](#)
- [News](#)

Legal

- [Terms of Service & Honor Code](#)
- [Privacy Policy](#)
- [Accessibility Policy](#)
- [Trademark Policy](#)
- [Sitemap](#)

Connect

- [Blog](#)
- [Contact Us](#)
- [Help Center](#)
- [Media Kit](#)
- [Donate](#)





© 2021 edX Inc. All rights reserved.
深圳市恒宇博科技有限公司 [粤ICP备17044299号-2](#)