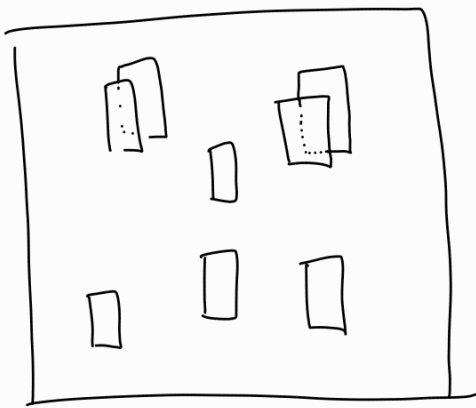


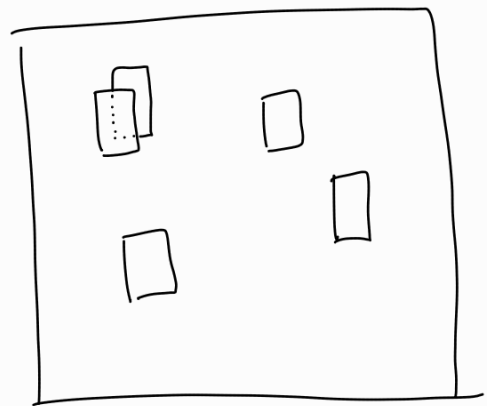
Coreference Resolution

"**I** voted for **Nader** as **he** was the most aligned with **my** views", **she** said.

→ Create clusters where references to the same person lie in same cluster → **Assignment Algorithm**



Frame 1



Frame 2

→ How do you find the cost of assignment?

Distance, facial features, shirt number,
movement

Motion model to predict where the player will be and consider this in your cost

→ Consider cost matrix

$$\begin{bmatrix} 4 & 2 & 5 & 7 \\ 8 & 3 & 10 & 8 \\ 12 & 5 & 4 & 5 \\ 6 & 3 & 7 & 14 \end{bmatrix}$$

1) Subtract minimum from each row

$$\begin{bmatrix} 2 & 0 & 3 & 5 \\ 5 & 0 & 7 & 5 \\ 8 & 1 & 0 & 1 \\ 3 & 0 & 4 & 11 \end{bmatrix}$$

2] Subtract min from each column

$$\begin{bmatrix} 0 & 0 & 3 & 4 \\ 3 & 0 & 7 & 4 \\ 6 & 1 & 0 & 0 \\ 1 & 0 & 4 & 10 \end{bmatrix}$$

3] Find minimum number of lines with which you can cover all zeroes

If (min_lines \geq no. of rows / cols)

start assignment

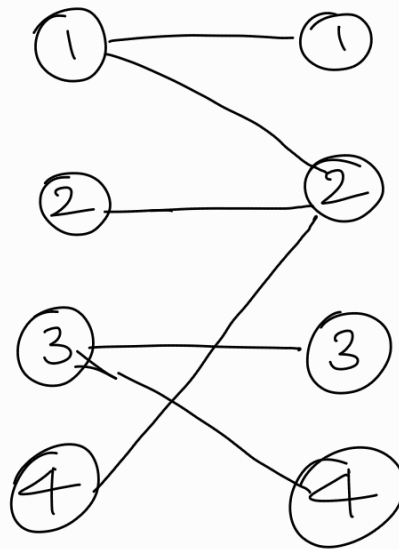
else

reduce further

Finding min_lines

Construct bipartite graph for zeroes

1, 1
1, 2
2, 2
3, 3
3, 4
4, 2



Find vertex cover using Ford-Fulkerson

Here, as num_lines < dimensions,

1] Take min of points not touched by lines and subtract from others

0	0	3	4
2	0	6	3
6	1	0	0
0	0	3	9

2] Increase the line intersection points by the same amount that you subtracted.

$$\begin{bmatrix} 0 & 1 & 3 & 4 \\ 2 & 0 & 6 & 3 \\ 6 & 2 & 0 & 0 \\ 0 & 0 & 3 & 9 \end{bmatrix}$$

The matrix is shown with red vertical lines through the first and second columns, and a red horizontal line through the third row. The elements 6 and 2 in the third row are circled in blue.

Repeat 1 & 2

$$\begin{bmatrix} 0 & 1 & 0 & 1 \\ 2 & 0 & 3 & 0 \\ 6 & 2 & 0 & 0 \\ 0 & 0 & 0 & 3 \end{bmatrix}$$

$$\begin{bmatrix} 0 & 1 & 0 & 1 \\ 2 & 0 & 3 & 0 \\ 9 & 5 & 0 & 0 \\ 0 & 0 & 0 & 3 \end{bmatrix}$$

The matrix is shown with red horizontal lines through the first, second, and third rows.

Now, num_lines = dimension.

Proceed for assignment

There are multiple possible assignments, cost of all is same.

1] Take one zero in every row & column

Tasks	People			
	0	1	0	1
	2	0	3	0
	9	5	0	0
	0	0	0	3

$$\text{Cost} = 19$$

This is one possible solution, but cost will always be 19.

T1 \rightarrow P1 T3 \rightarrow P4

T2 \rightarrow P2 T4 \rightarrow P3