



AMRITA
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DEEMED TO BE UNIVERSITY

19CSE337 Social Networking Security

Lecture 15



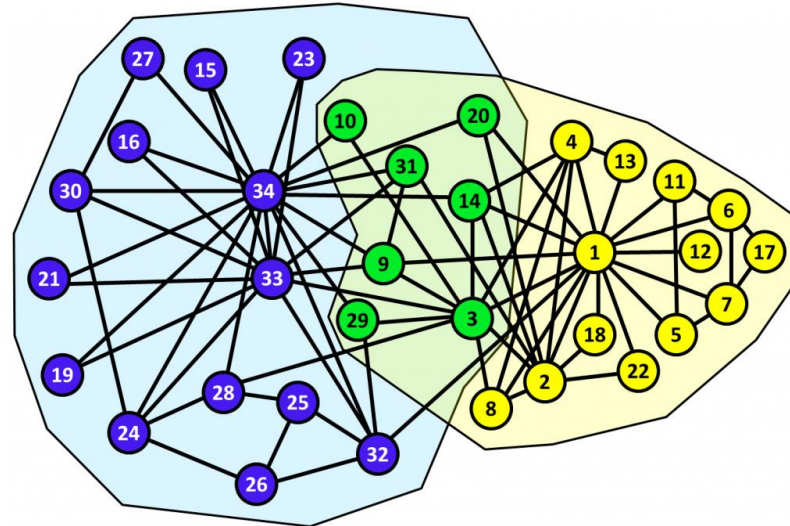
A vertical sidebar on the left side of the slide, featuring a grid of various social media and technology icons. The icons include a television, a camera, a lightbulb, a hand, a speech bubble, a padlock, a smartphone, a person, a shopping cart, a Twitter bird, and a lowercase 't' (Tumblr). The background of the sidebar is a dark blue grid.

Topics to Discuss

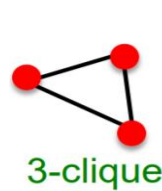
- Overlapping Communities
- Clique Percolation Method (CPM)

Overlapping Community

- If a node is a member of more than one community then it forms overlapping community.



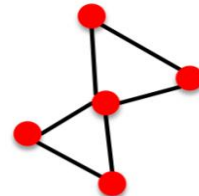
- **Clique:** a maximum complete subgraph in which all pairs of vertices are connected by an edge.
- **k-Clique:** A clique of size k is a subgraph of k vertices where the degree of all vertices in the induced subgraph is $k-1$.



3-clique



Adjacent
3-cliques



Non-adjacent
3-cliques

- **Maximum Clique:** a clique with maximum number of vertices in it. The largest clique in a graph.
- **Maximal Cliques:** cliques that are not a subgraph of a larger clique. It can't be expanded further by adding more edges or vertices.



Finding Maximal Clique

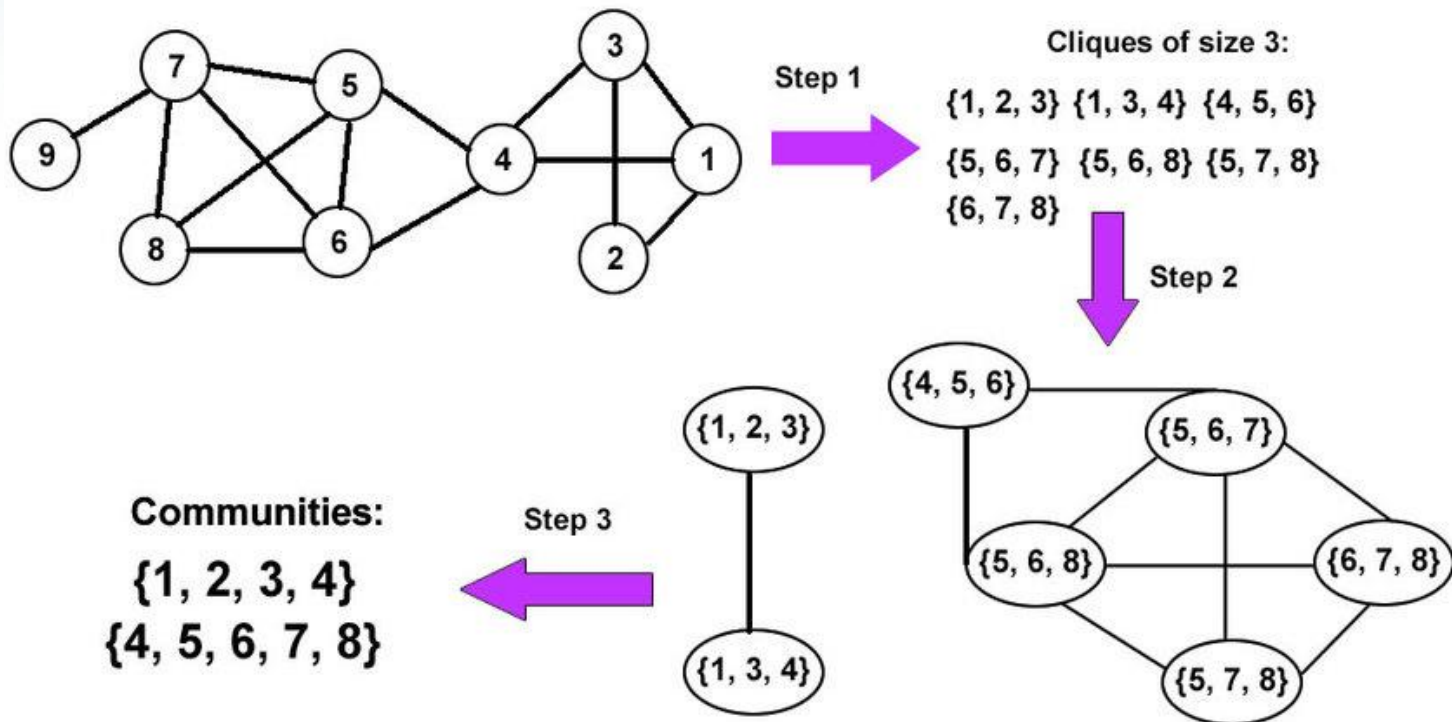
- Algorithm: Maximal Clique.
 - Start with a seed node.
 - Expand the clique around the seed.
 - Once the clique cannot be further expanded, return the maximal clique.



Clique Percolation Method

- Clique percolation is a method to find overlapping communities.
- Algorithm: CPM
- Output: Overlapping Communities.
 - Given k , find all cliques of size k (k will be maximal).
 - Create graph (clique graph) where all cliques are vertices, and two cliques that share $k - 1$ vertices are connected via an edge.
 - Communities are the connected components of this graph.

Clique Percolation Method





Thanks.....