

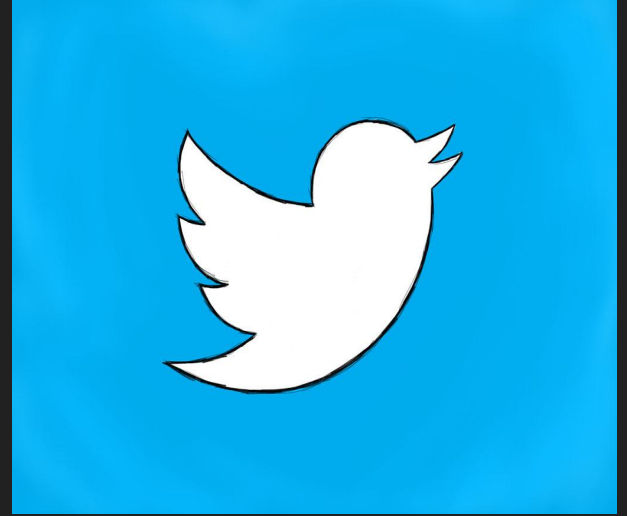
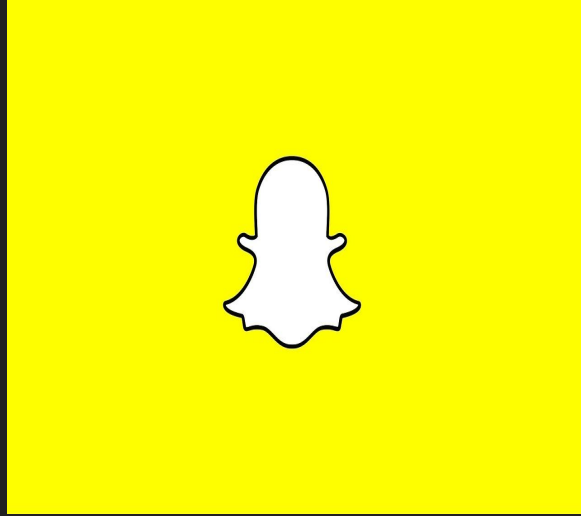
Discrete Structures in Social Media

Lillian Foster

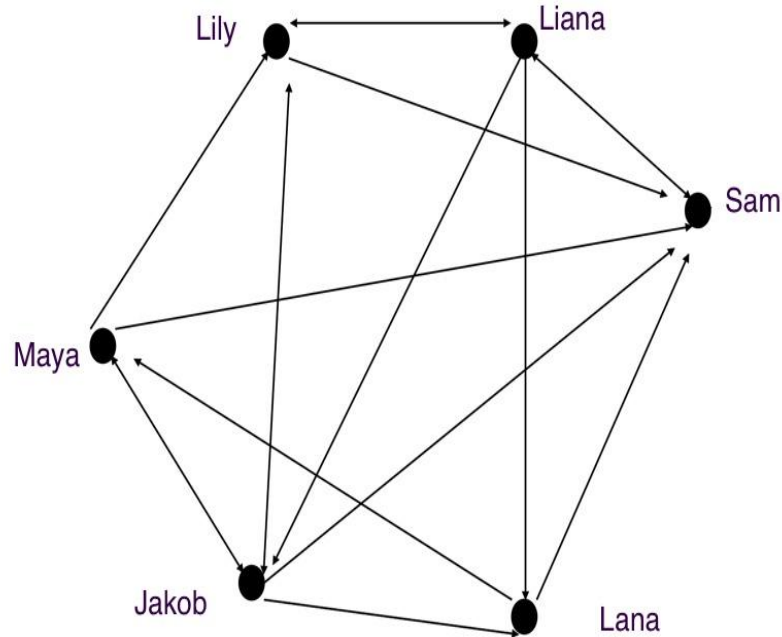
CS 131

2023

Social Media



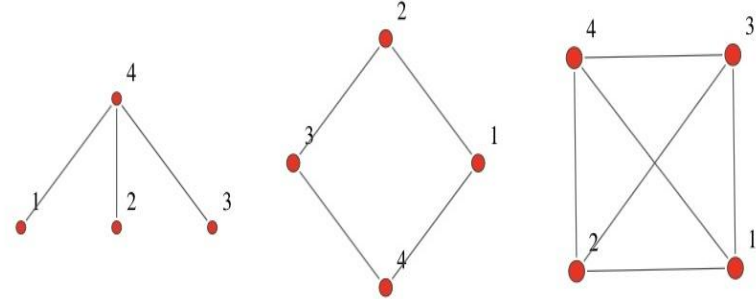
Interactions on Social Media - Social Networks



- ❖ This diagram represents six people interacting on a social media site.
- ❖ Arrows are pointing toward the recipient and away from the sender.
- ❖ Graph Theory ~ Social media platforms often model their networks using graph theory concepts
- ❖ Collaboration graphs, influence graphs, acquaintance/friendship graphs

Adjacency Matrices

- ❖ There are multiple possible adjacency matrices corresponding to a given simple graph
- ❖ If the simple graph has no self-loops, Then the vertex matrix should have 0s in the diagonal
- ❖ The adjacency matrix for an undirected graph is symmetric. This indicates the value in the i th row and j th column is identical with the value in the j th row and i th column



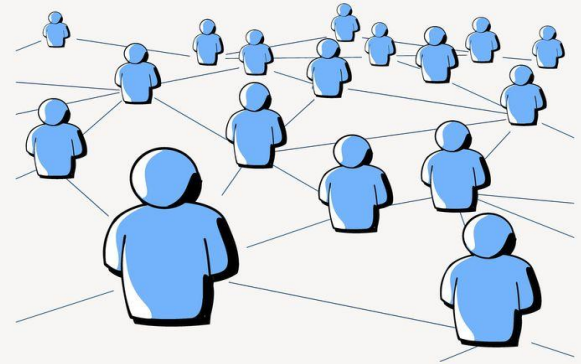
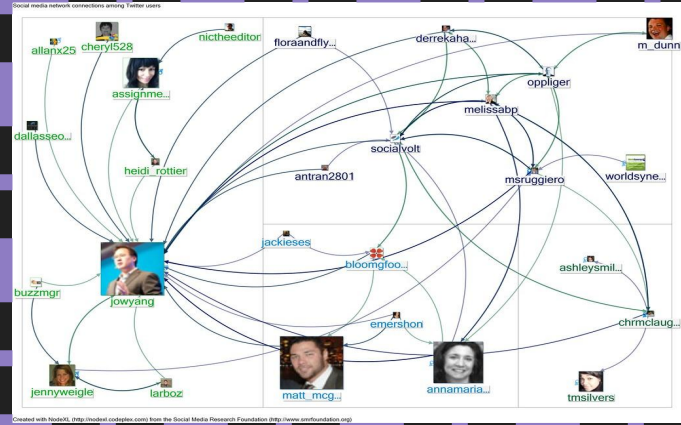
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Algorithms

- ❖ All algorithms are based on machine learning ranking signals derived from adjacency matrices
- ❖ Sorts posts in a users' feed based on relevancy rather than publish time
- ❖ Social networks prioritize which content a user sees in their feed by using data to track what content they'll actually want to see



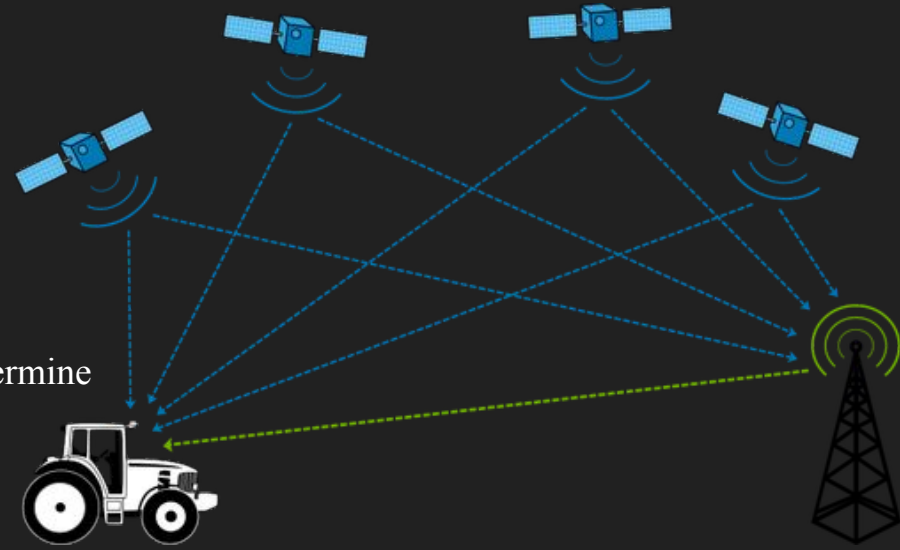
Social Media Searching - Linear Algebra



- ❖ Many social media platforms can process/translate multiple different languages at once
- ❖ retrieval, clustering, and summarization can all be handled by purely mathematical techniques
- ❖ Document retrieval can be formulated as a problem in linear algebra called "latent semantic analysis."

Location Services - GPS

- ❖ Global positioning system
- ❖ network of satellites and receiving devices used to determine the location of something on Earth
- ❖ GPS receivers are programmed to receive information about where each satellite is at any given moment. A GPS receiver determines its own location by measuring the time it takes for a signal to arrive at its location from at least four satellites.



Passwords - Combinatorics



- ❖ Social media sites track password data by counting the structures of a given kind and size, deciding when certain criteria can be met, and constructing & analyzing objects meeting the criteria
- ❖ The goal is to find “largest”, "smallest", or "optimal" objects
- ❖ Combinations/Permutations

A login form with two input fields. The first field is labeled "Username:" and contains the text "Account". The second field is labeled "Password:" and contains a series of asterisks "*****".

Username:
Account

Password:

Discrete Mathematics Used in Social Media

- ❑ Binary math - Adjacency Matrix/Connection Matrix
- ❑ Linear algebra - Searching
- ❑ Combinatorics - Passwords
- ❑ Networks

Bibliography

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