



Social Network Analysis

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Why Social Network Analysis?

Facts:

- explosive growth of social networks
- multilateral human activity on them \rightsquigarrow voluminous data, increasing importance of social networks

However,

We want to be able to understand the processes taking place on such networks and predict events or design efficient systems!

Therefore we need: **data analysis on social networks** and ways to **handle large-scale networks efficiently**

This area combines exciting theoretical and practical aspects!

Real-life examples: Identifying important/influential users

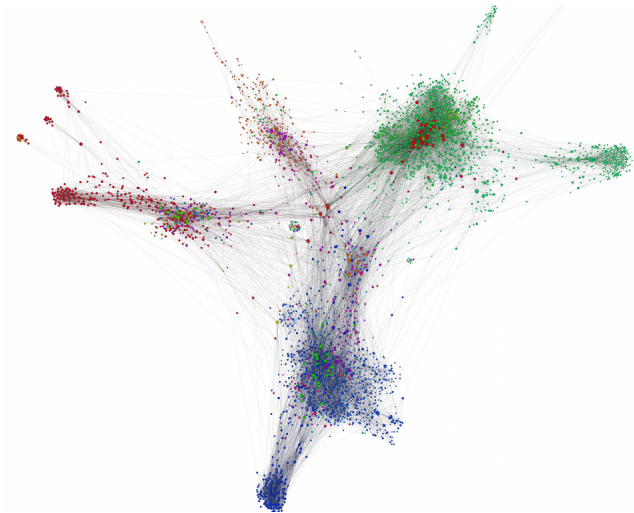


Real-life examples: Identifying important/influential users

Who are the most prestigious or influential users in a social network?



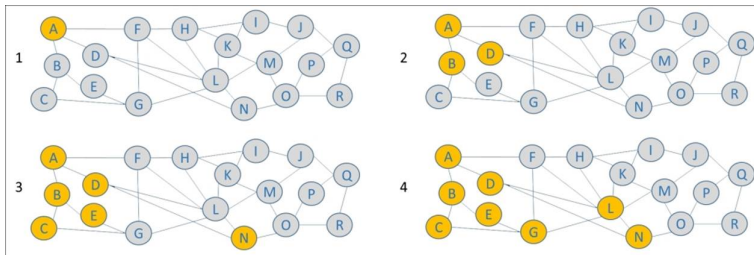
Real-life examples: Community detection



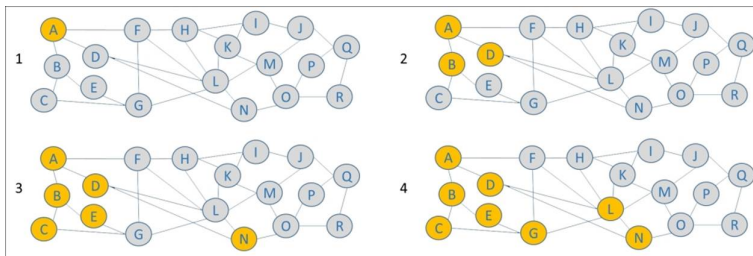
Real-life examples: Community detection



Real-life examples: Information diffusion

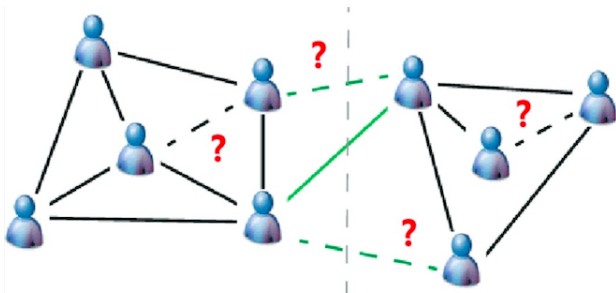


Real-life examples: Information diffusion

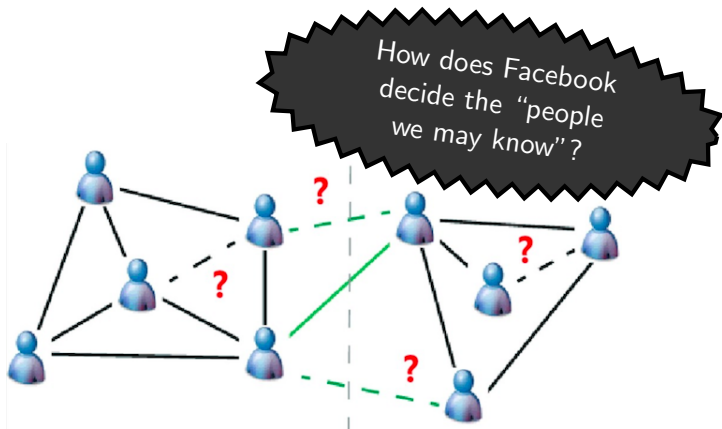


How do news, ideas,
trends, etc spread
within a social network?

Real-life examples: Friend request recommendations



Real-life examples: Friend request recommendations



Key Outcomes of the Course

By completing the course you will be able to:

- understand the main concepts of social networks
- understand the fundamental concepts in analyzing the large-scale data that are derived from social networks
- implement mining algorithms for social networks
- perform mining on large social networks and illustrate the results.

Structure of the Course

Units 1, 2, 3 Social-Network Graph Structure: Graph Models and Node Metrics, Centrality, Betweenness and modularity, (Overlapping) Community detection, Triadic closure, Clustering, Network motif detection.

Units 4, 5 Processes on Social Networks: Cascading behavior, Influence maximization, Information diffusion, Strategic network formation, Opinion analysis, Collective action, Innovation, Network resilience (to attacks), Link prediction, Dynamic social networks, Social learning on networks, Applications of SNA and Research Trends.

Lab sessions Gephi, SNAP, Pregel – Apache Giraph

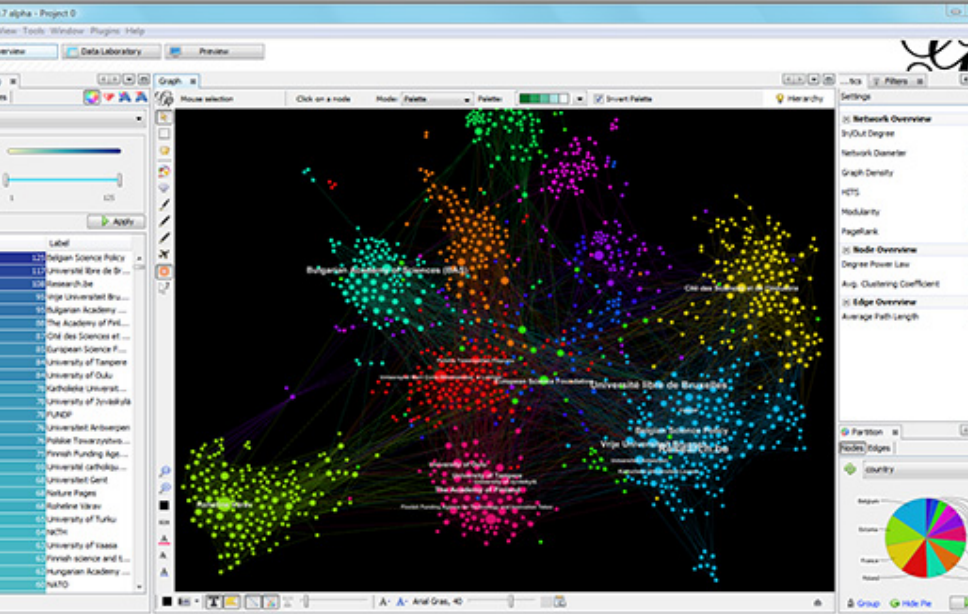
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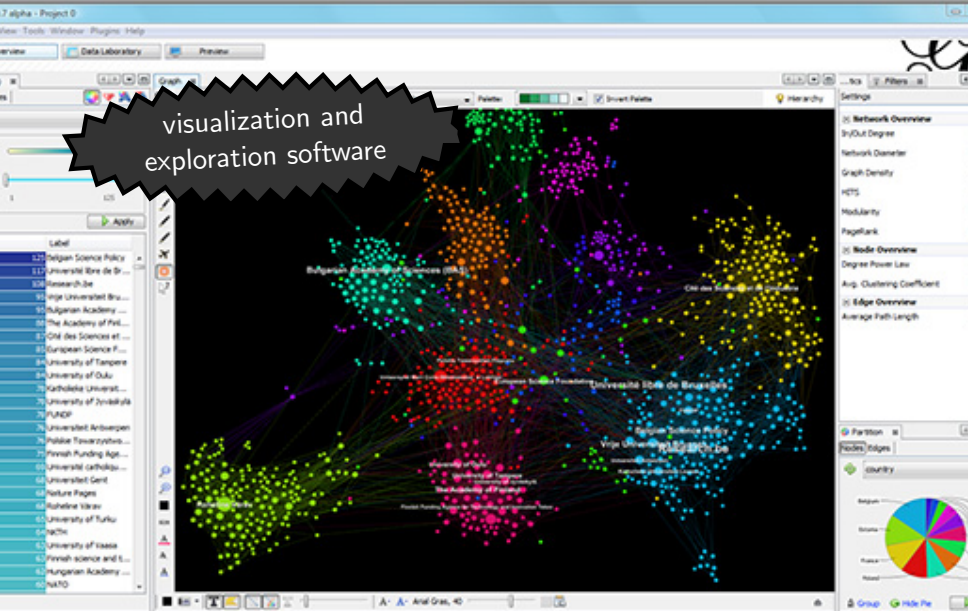
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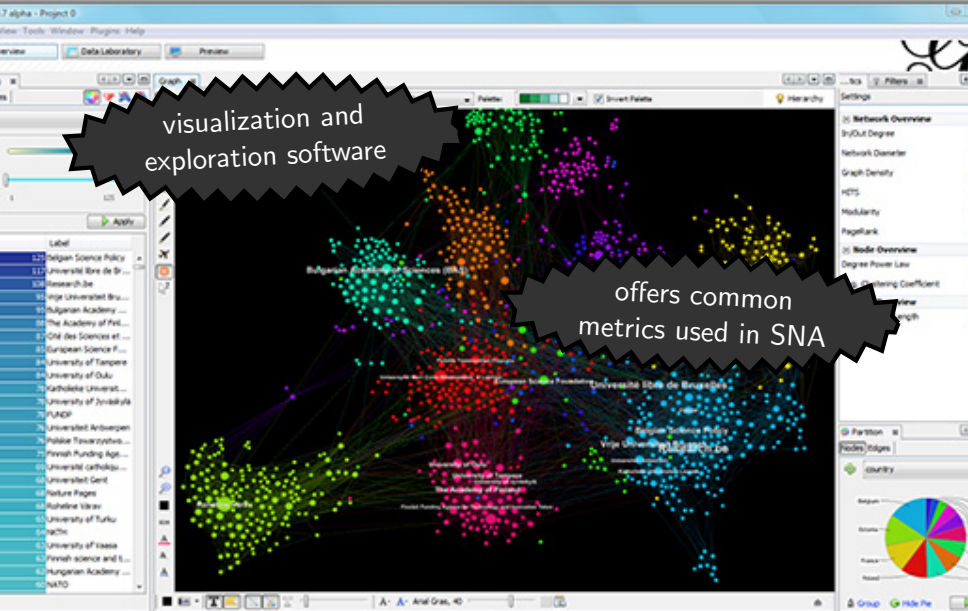
Assignments: Gephi



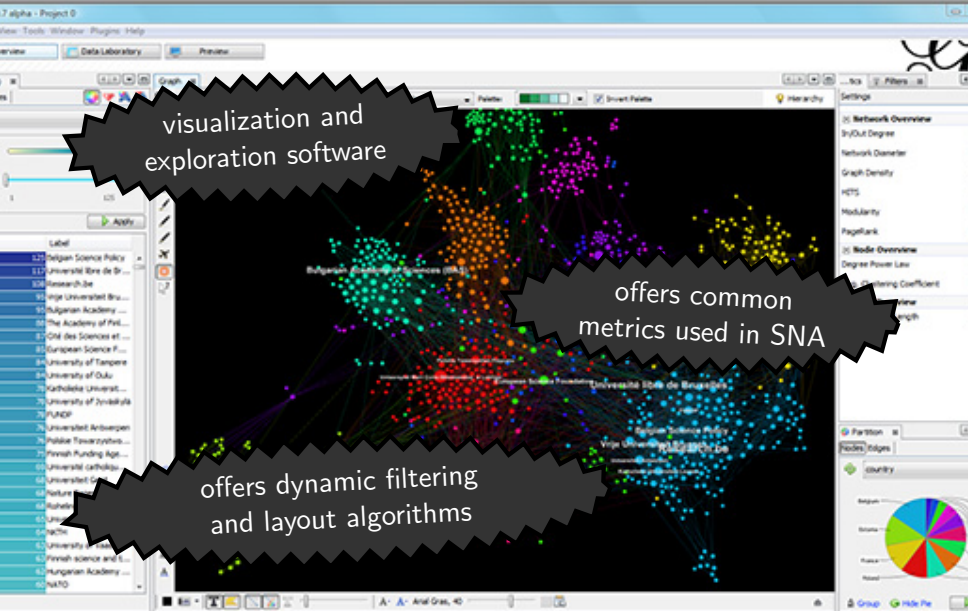
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from snap import *  
  
# create a graph  
G = TNGraph.New()  
G.AddNode(1)  
G.AddNode(5)  
G.AddNode(32)  
G.AddEdge(1,5)  
G.AddEdge(5,1)  
G.AddEdge(5,32)  
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high performance
analysis and
manipulation of
large networks

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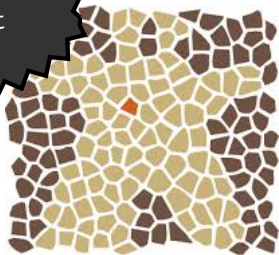
model generators,
community detection, etc.

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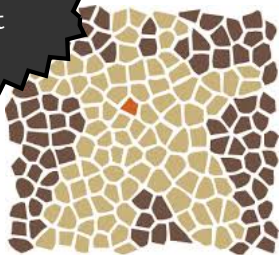
iterative graph processing system built for high scalability



A P A C H E
G I R A P H

Assignments: Apache Giraph

iterative graph processing system built for high scalability



APACHE
GIRAPH

maintained and used by facebook

Questions?

For more details on the area and the course:

www.aueb.gr/users/katia

katia@aueb.gr