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Laboratoire ERIC

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An efficient method for community detection based on formal concept analysis

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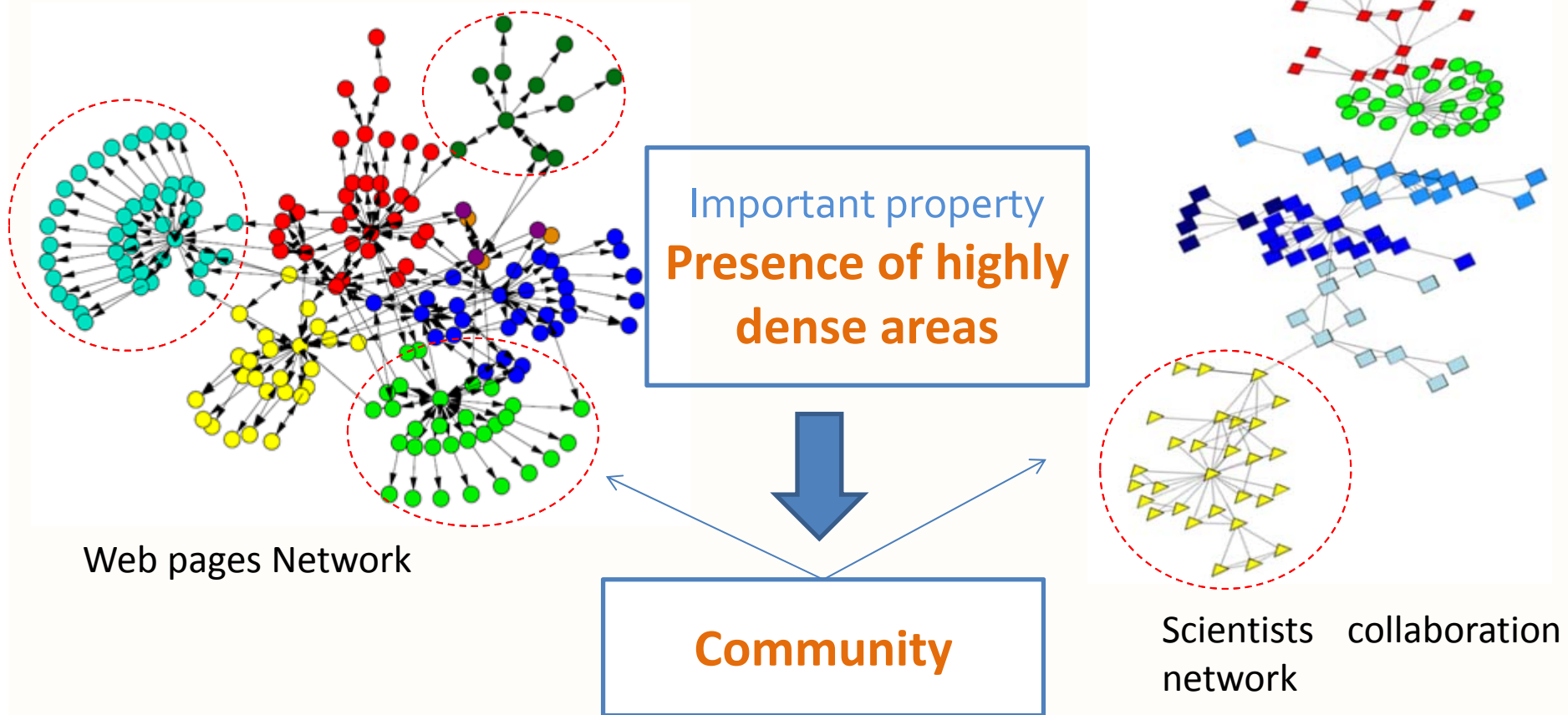
Motivation

- The study of community structure in social networks has become a real challenge
- Social networks have been addressed by two family of approaches:
 - Graph theory
 - Formal Concept Analysis (FCA)
- **FCA methods exploit partially Social networks for community detection**



Community in social networks

Examples



Community in social networks

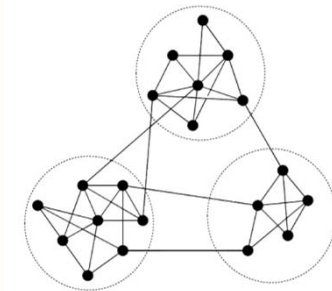
Community

□ “*structural*” point of view

- ❖ *Set of nodes strongly interrelated and weakly linked with other nodes in the graph*

□ “*semantical*” point of view

- ❖ *Set of nodes with common centers of interest or similar profiles*





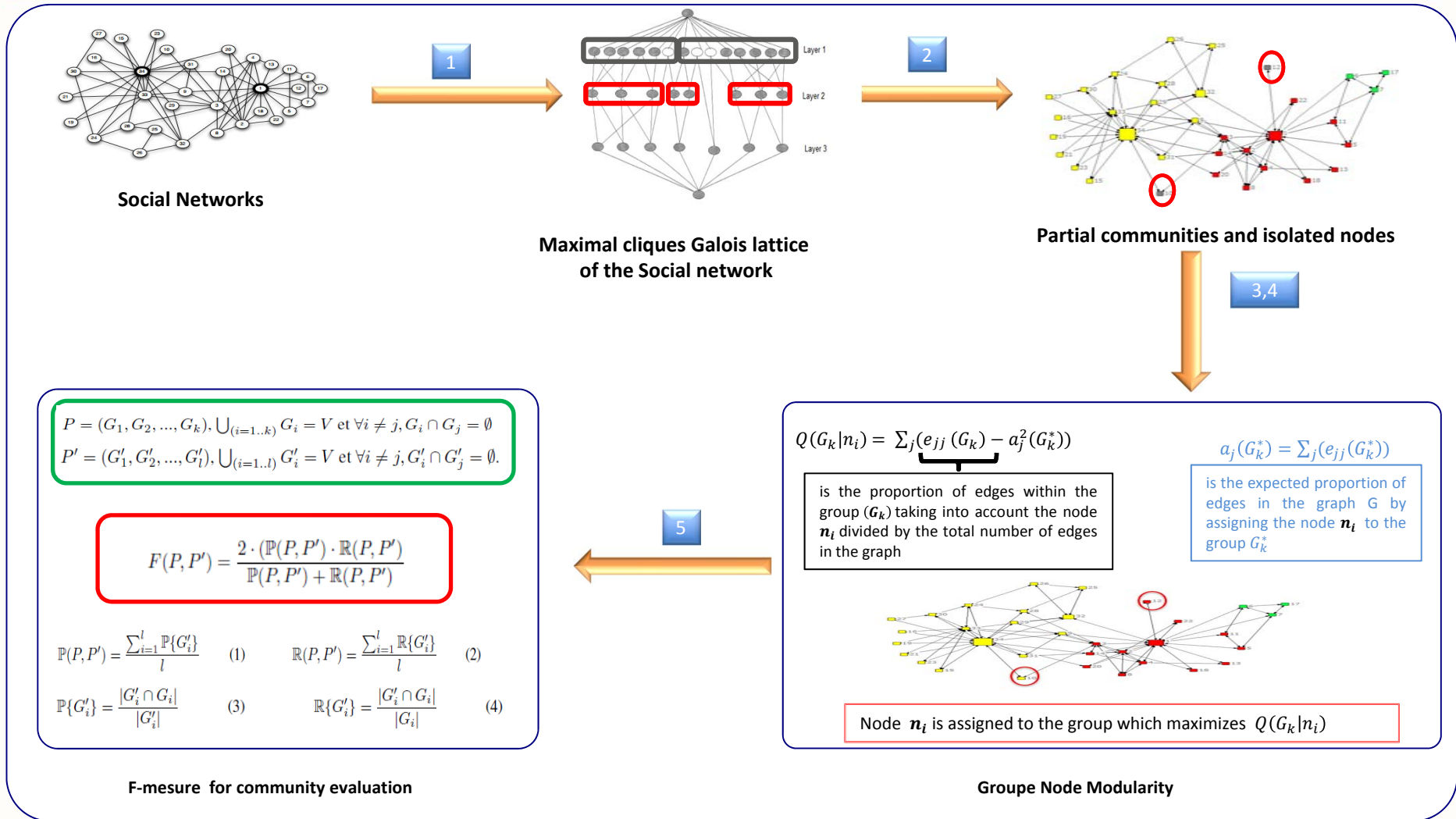
Objectives

- Rely on Formal concept Analysis for discovering communities in Social networks

- Propose a new method for community detection:
 - Taking in account all actors of the network
 - Refine the quality of the detected communities

- Propose a quality measure
 - Better adapted for community detection methods
 - In order to evaluate

GNOM-FCA: Group Node Modularity based on formal concept analysis

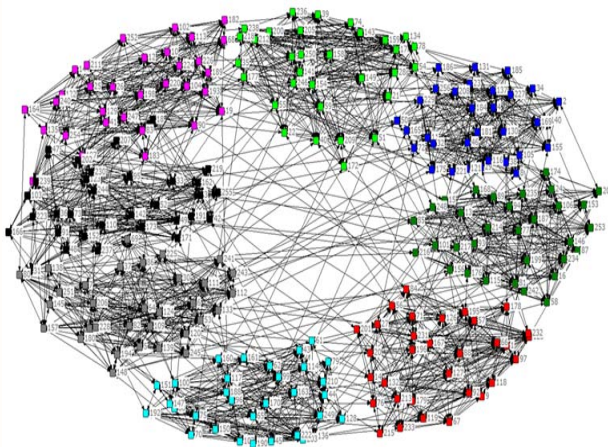


Architecture

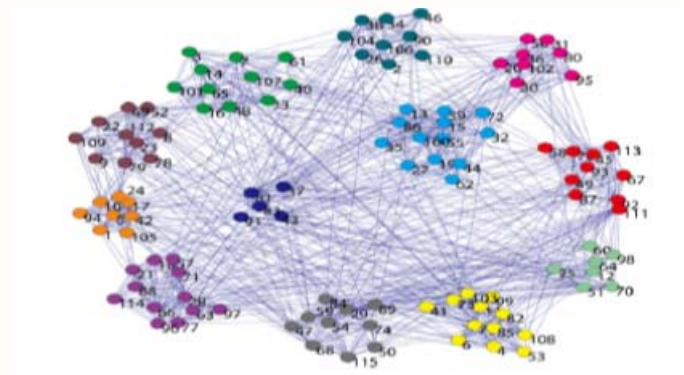
Results

SN	V	E	MC	Na	F_o	F_n
Zachary	34	78	25	2	0.77	0.80
Dolphin	62	159	46	16	0.83	0.96
Football	115	613	185	10	0.80	0.88
Polbooks	105	441	181	22	0.66	0.74
L1000n16c	1000	15168	1902	130	0.78	0.96
L5000n32c	5000	75946	9723	679	0.74	0.91

Fig. 6. F-measure for our approach F_n and Falzon approach F_o



Synthetic Networks



Real world social networks



Questions ?

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http://eric.univ-lyon2.fr/11-FR-membre-?id_user=175