Project Proposal

The Swiss Scientific Social Network

Vanessa Braglia

Advisor: Prof. Olaf Schenk

Assistant: Fabio Verbosio

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Project Description

Introduction

A social network consists of a set of objects connected to each other by social relations. The best way to model social networks is using graphs (see an example in Figure 1): the objects (entities) are represented as nodes and the connections as edges between two different nodes.

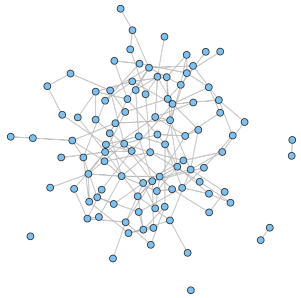

Figure 1: Example of social network graph

The most common example we can take is the World Wide Web (WWW) where we have web pages as nodes connected by hyperlinks, the edges. In order to rank the huge amount of web pages and optimize the search for a particular page, more then twenty years ago was developed the PageRank (PR) algorithm. PageRank works on the graph representing the WWW, so it is applicable to all graphs representing social network.

Goal of the project

The goal of this project is to create a social network of the scientific authors belonging to Swiss institutions, then analyze the relative graph and apply the PR algorithm.
The first step will be retrieving the information necessary for the construction of the social network based on coauthorship relations; then I will implement

and apply the PR algorithm for the analysis of the graph. The results will provide an interesting picture of the different research scenarios in Switzerland and how they interact with each other.

Implementation

The first part, the information retrieval, will be done using the Mendeley API; the data obtained from this process will be filtered, to extract the information we need, and will be organized in order to access them easily.
The second part is the analysis of the information obtained using our own implementation of the PR algorithm and other graph analysis methods.
Graph partitioning (see an example in Figure 2) and other graph manipulation tools will be used to invert the process and interpret the results, in order to recreate the structure of the Swiss institutions.
We will also visualize the connectivity matrices of the institutions and study their structures; looking at the cliques present in the matrices we can for example detect the different research areas of the institutions and the connection between them.

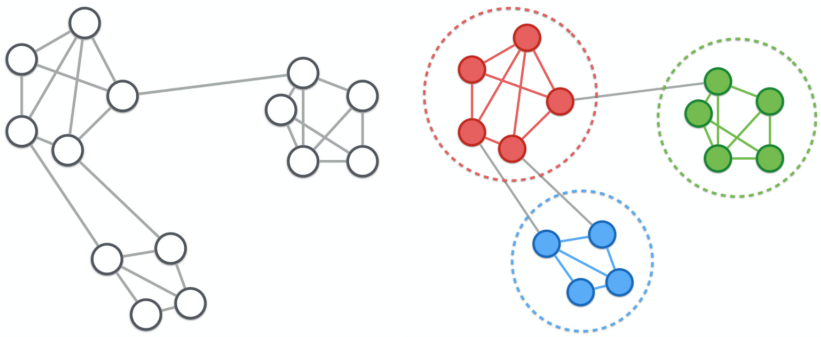

Figure 2: Example of graph partitioning

Milestones

1. Information retrieval
2. Data filtering
3. Data organization
4. Implementation of PR algorithm
5. Analysis of the information

Time Table

Milestones	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Information retrieval														
Data filtering														
Data organization														
Implementation of PR algorithm														
Analysis of the information														
Project thesis														
Project poster														