Sense making of cardiovascular diseases using network analysis

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Outline

- **Introduction**
  - What is the topic
- **Small recap of last time**
  - Where
  - Some facts
- **New stuff**
  - Software tools that I will use
  - Techniques (Not completely decided, just bunch of techniques)
- **Main research questions**

Introduction

- **What** is the topic?
  - Research on network analysis of cardiovascular diseases
  - Array data (I will show example)
  - Computational problem because of the data size (n = 500, 10-15 thousand attributes)
- **Why** is this important?
  - People die and we do not want that

Small Recap

- **Where?**
  - MUMC+(Maastricht Hospital) + supervision from CERN(with chance of possible visit)
- **No heartbeat = Dead(returns true in 99.(9) percent of cases)**
- **Atherosclerosis**
  - Is a disease in which plaque builds up inside your arteries
  - Leads to heart attacks, stroke and sometimes death
  - Is one of the main causes for death of people

New stuff

- **Software tools**
  - R
  - WEKA
  - Java
  - Cytoscape(Optional, mainly for visualization purposes)
  - GLPK
- **Possible techniques**
  - WGCNA(Weighted Gene Co-Expression Network Analysis)
  - Artificial Neural Networks
  - Network Simplex Method (Min cut problem)
  - Bunch of other data mining/machine learning techniques
    - Clusterings, SVM, Regression(Multivariate) etc.

Main research questions

- Can we model how human genes react to cardiovascular diseases?
- Can we predict heart attack, stroke for some given patient given information about patient?
- Can we find regulatory genes concerning this disease?
- Main of all : Can we cure it? Or decrease it to almost non-existing amount?

Thanks

- Thanks for listening and if there are any questions I would like to give a try at answering them :)