Exploring the community structure of a diabetes forum

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Applications in M.I.

• Identifying ‘important’ peers
• Identifying peers in need of help
• Identifying temporal community development patterns
• Predicting & influencing community structure development
Goal

- Compare algorithms in terms of
  - community detection accuracy
    - topology
    - key actors
    - community quality
  - community visualization
Methods

• Public data from diabetes forum
• Limitations
  – No private messages
  – Only poster and commenter
• # posts: 200 000
• # edges: 73821
• # nodes: 9679
Methods: Algorithms

• Greedy optimization (GO) (*Girvan-Newman*)
• Affinity propagation (AF) (*Frey et al.*)
• Connected Components Cluster (CC) (*Morris et al.*)
• Mcode (MC) (*Bader et al.*)
Results

20th Top User
(ID#: 17713)
Degree: 837

1st Top User
(ID#: 8110)
Degree: 5798
## Results

<table>
<thead>
<tr>
<th></th>
<th>GO</th>
<th>AP</th>
<th>CC</th>
<th>MC</th>
</tr>
</thead>
<tbody>
<tr>
<td># clusters</td>
<td>337</td>
<td>799</td>
<td>25</td>
<td>34</td>
</tr>
<tr>
<td>Average size clusters</td>
<td>27,8</td>
<td>11,7</td>
<td>24,9</td>
<td>11,2</td>
</tr>
<tr>
<td>Max (min) size clusters</td>
<td>3679 (1)</td>
<td>1543 (1)</td>
<td>80 (2)</td>
<td>60 (2)</td>
</tr>
<tr>
<td>Modularity</td>
<td>0,57</td>
<td>0,17</td>
<td>0,84</td>
<td>0,02</td>
</tr>
<tr>
<td># Top 20 nodes in top clusters</td>
<td>11</td>
<td>15</td>
<td>6</td>
<td>18</td>
</tr>
</tbody>
</table>
Years after diagnosis blue: no information; green: 0-1 year; red: 2-10 years; black >10 years
Discussion

• To our knowledge this is the first network analysis of a health forum
• It is a scale free network
• Most algorithms identified a star topology
  – Mentor - apprentice network
• Experienced users hold the central positions
• A few inexperienced users are very eager
• Only public data
  – Several forums in the future?
Thank you!

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