Category Diffusion in the Reddit Network

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Overview of Reddit

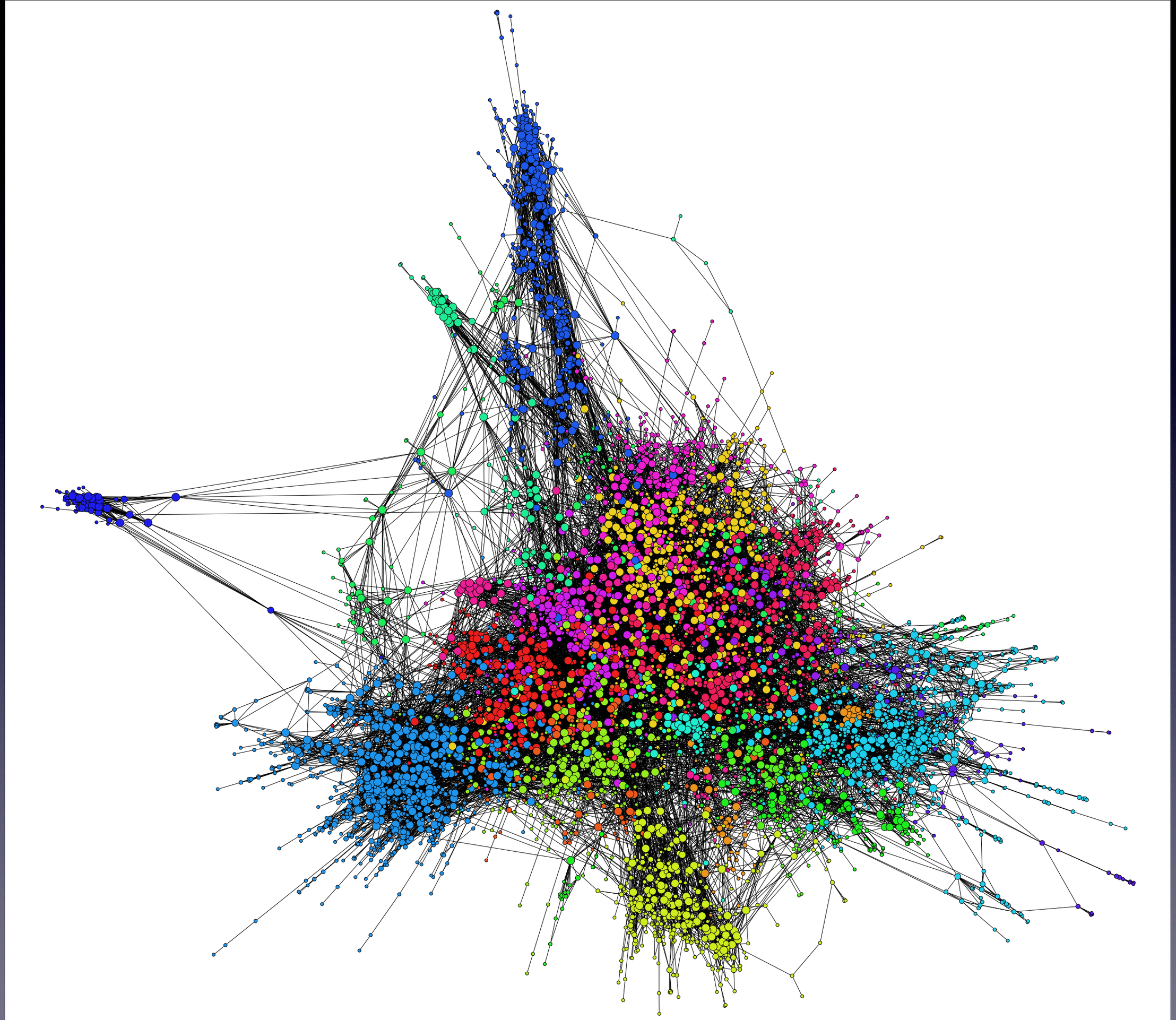
- Collection of communities, called subreddits (> 450k, ~10k active)
- Each subreddit is devoted to a topic:
  - baseball
  - pictures of dogs
  - reddit
- Front page of a subreddit consists of
  - user posts (links, discussion)
  - sidebar with links to related subreddits

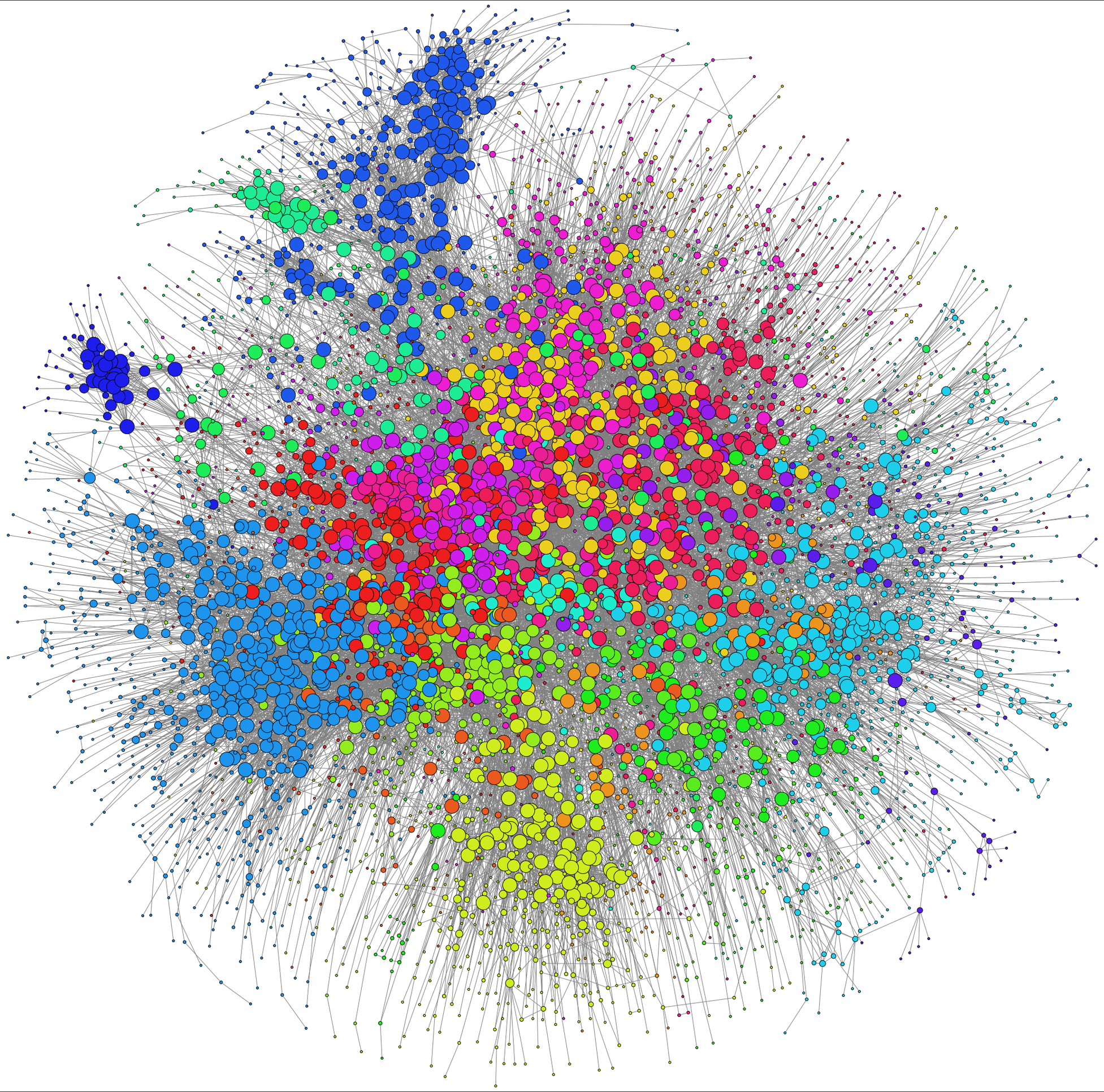
Idea & Hypothesis

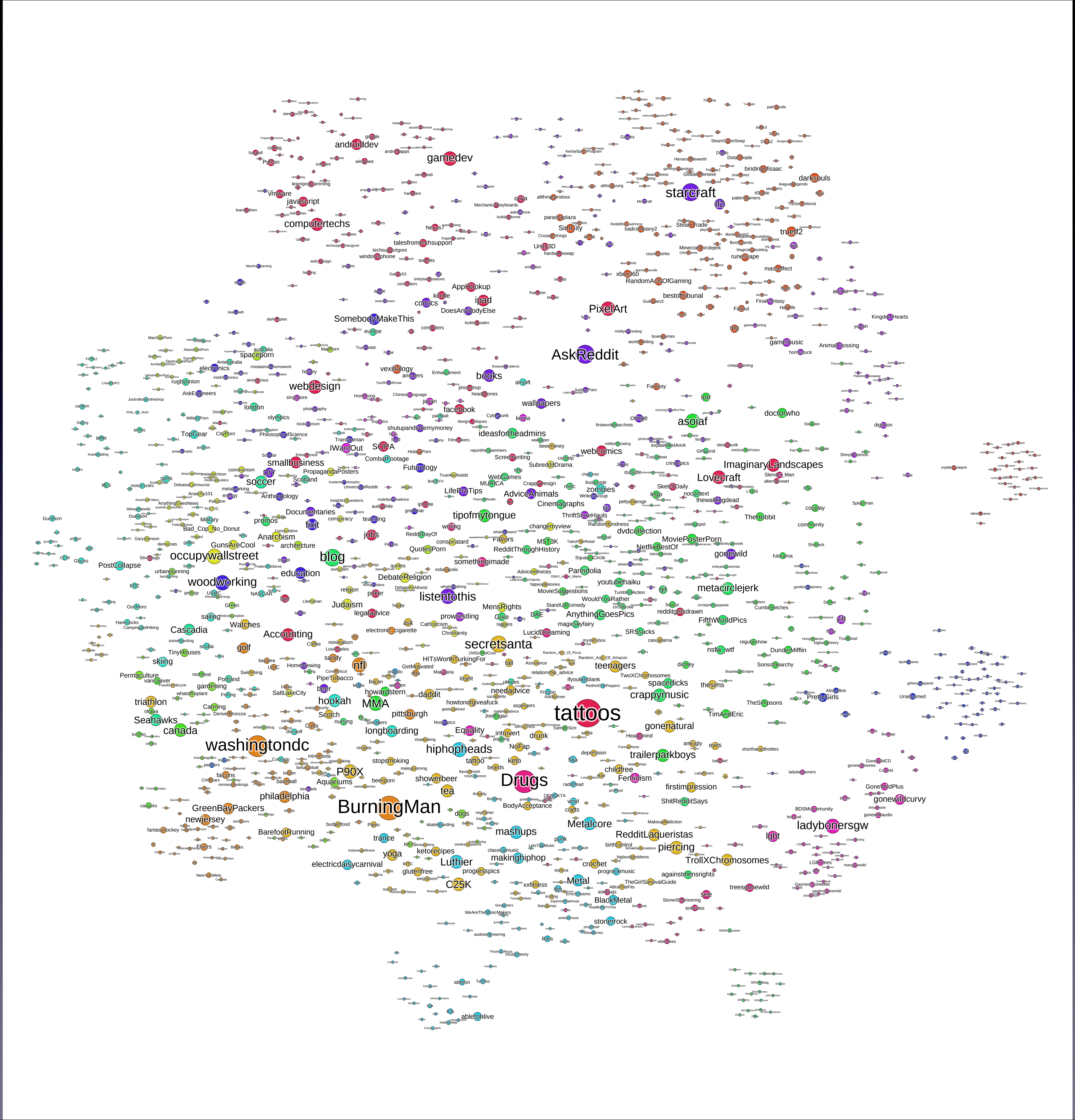
- Reddit as a graph
  - subreddits -> nodes
  - sidebar links -> edges
- That way, we could study the structure of reddit as a community of communities

Data Collection

- First try
  - get list of top 5000 subreddits by size from external website
  - crawl through html of each subreddit to get related subreddits, upload to csv or database
    - problem: reddit's API
- Second try
  - research paper on Github with similar topic
  - 5,288 nodes
  - 22,400 edges



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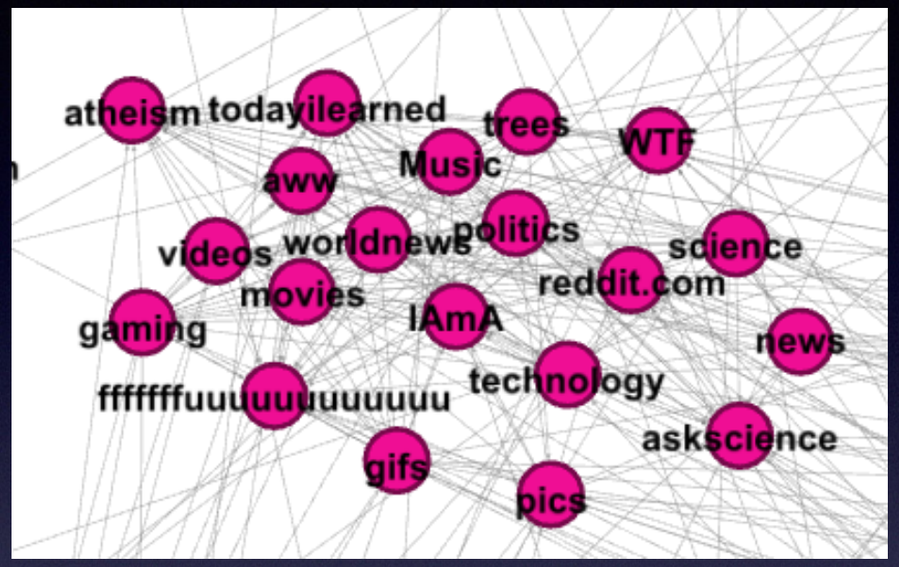
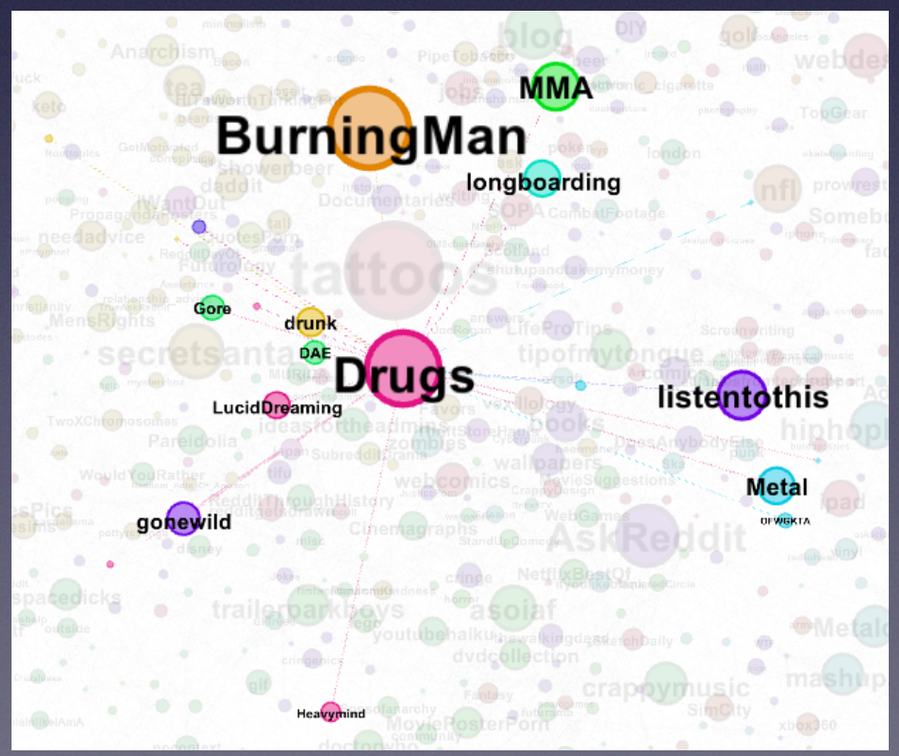
piercing
TrollXChromosomes
Luther
makinghiphop
C25K
Metal
BlackMetal
electricdaisycarnival
yoga
trance
stonerrock
abletonlive

Limits of Modularity

- Cannot discern topic, only communities of nearby nodes
- Subreddits of the same category far apart on the graph will be in different classes
- Subreddits of different categories close by on the graph will be in the same class
- Subreddits can be devoted to multiple topics



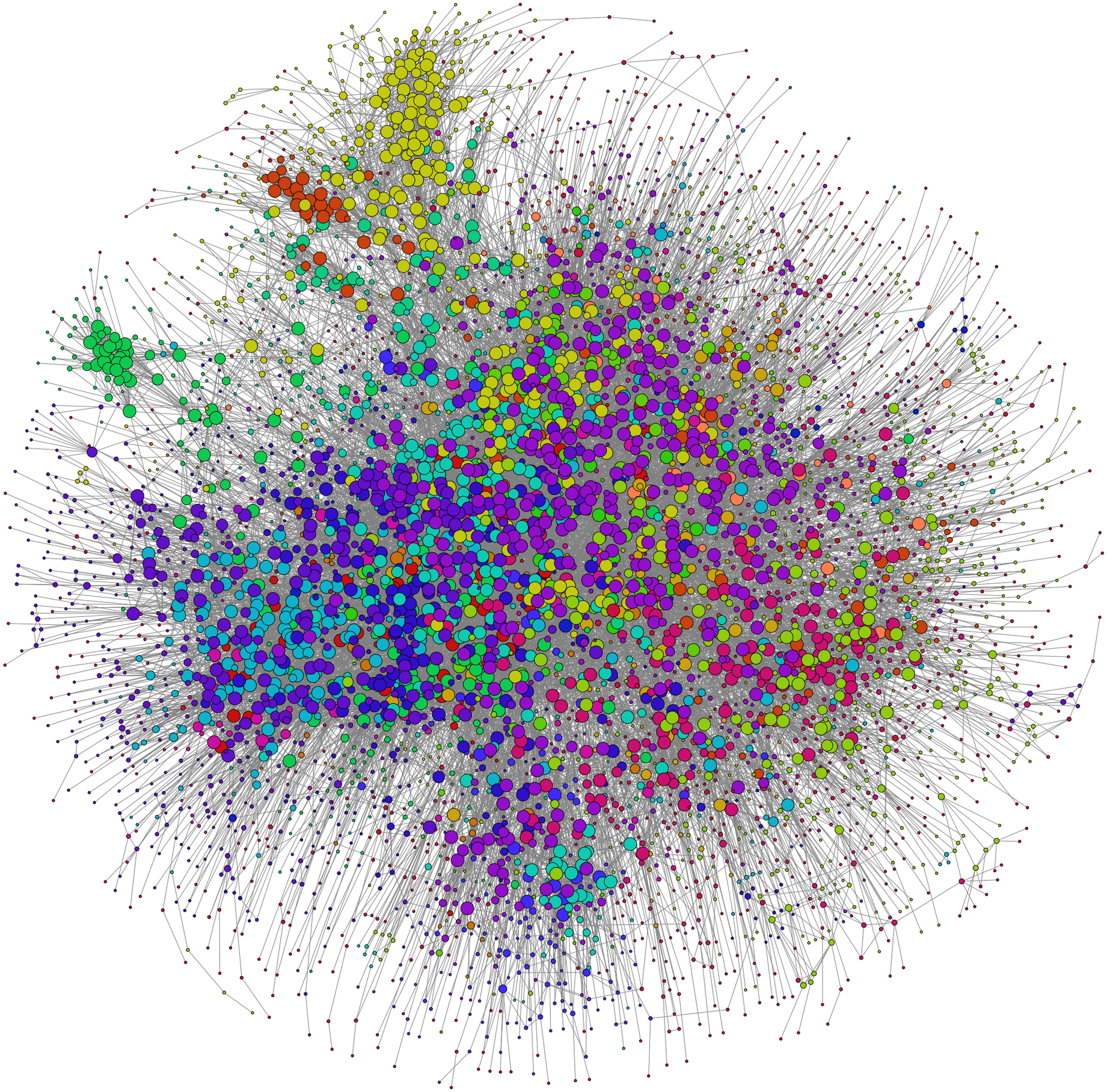


Algorithm Overview

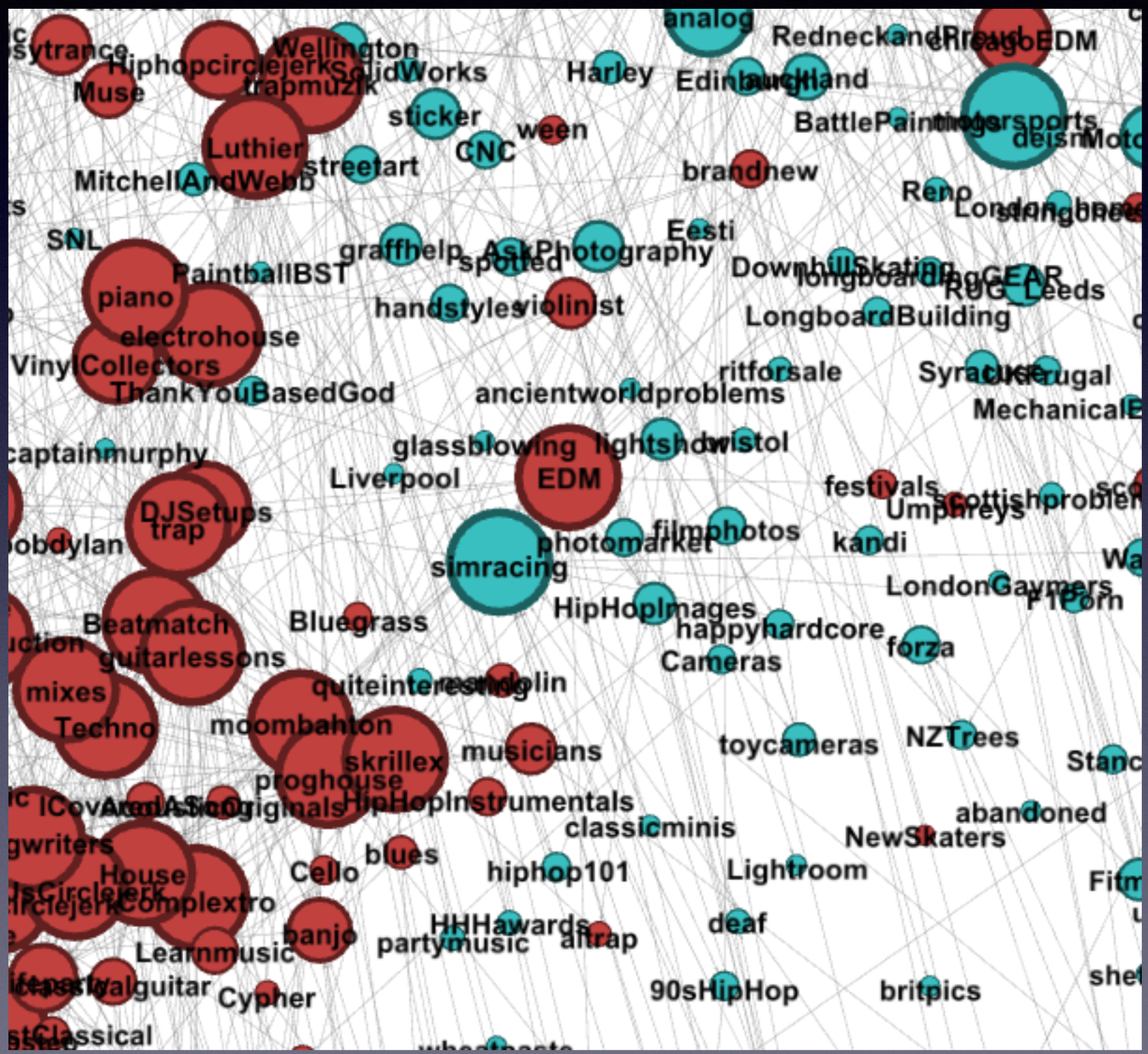
- Create list of topics (22)
  - music, meta, tech, politics, comedy, etc.
- Have the set of nodes be a |V|x22 array where each node has a degree of belonging to each category
- Manually create a seed set of categorized nodes (403)
- Use information diffusion process for each topic to “spread” category throughout the graph

Results

- Graph of each node's "primary category" shows a more nuanced, though more jumbled community structure than modularity
- Displaying each category individually gives better results
- Some categories diffused better than others



Music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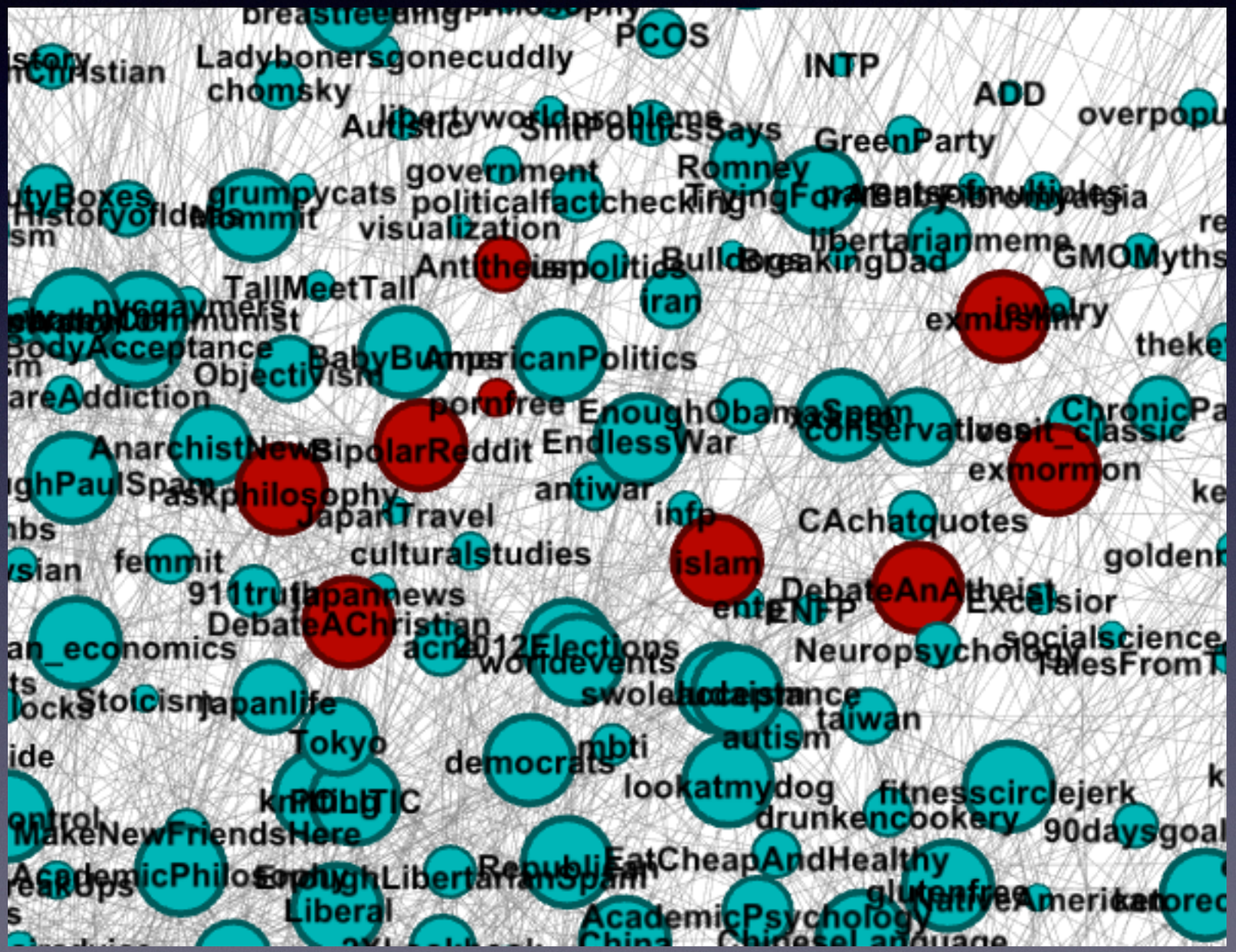
Religion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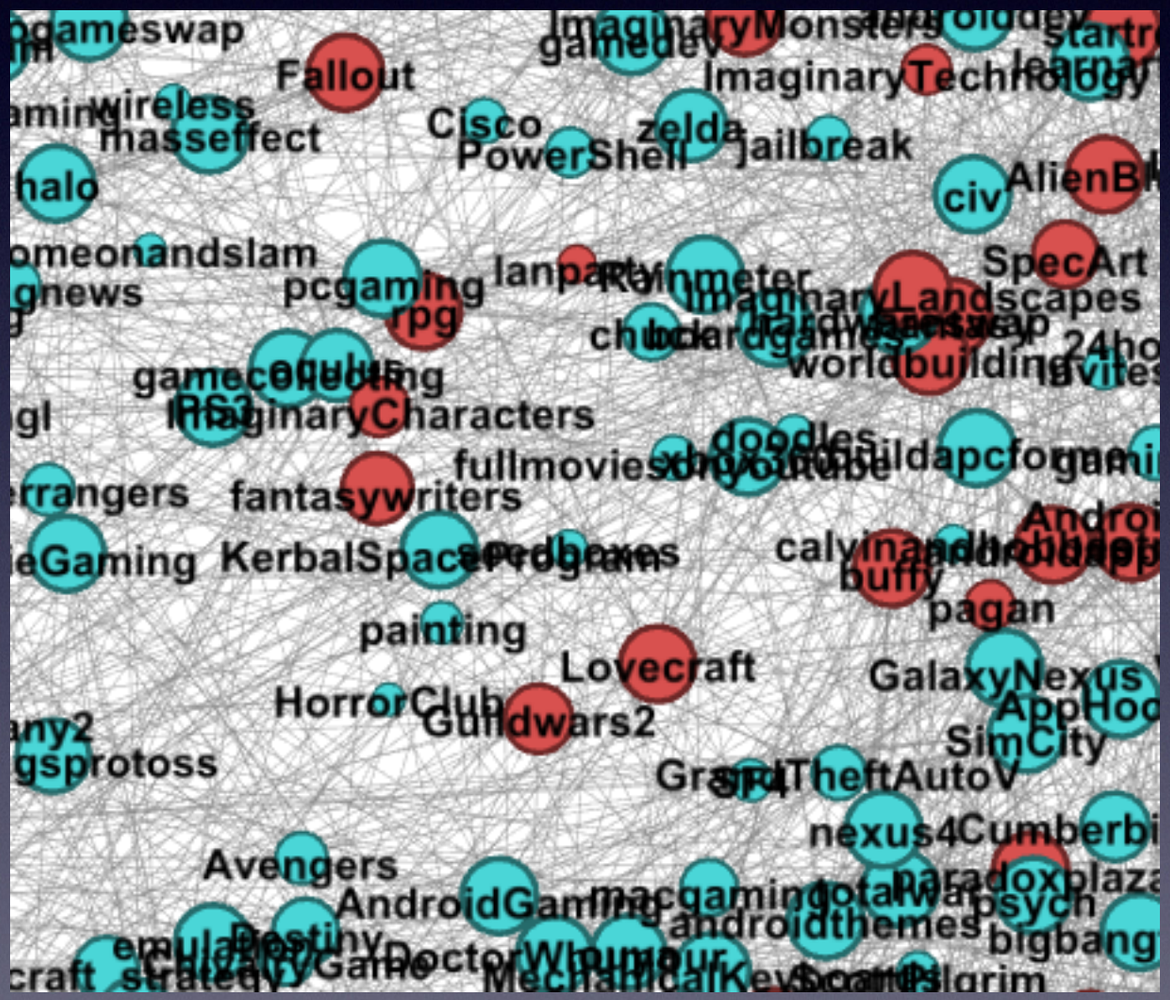
Books/Literature



Improvements & Future Work

- Better seed set
  - more balanced, more correct, more data
  - pick central nodes
- Better categories
- Optimize algorithm parameters
- Implement dictionary/semantic similarity algorithm?
- Take posts into account
- Improve diffusion algorithm

Credits

- Olson, Randal S. & Neal, Zachary P. “Navigating the massive world of reddit: Using backbone networks to map user interests in social media.” December 12, 2013