Analyzing Networks Visually

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Overview

Why network visualization?

Native visualization in NetworkX

Introduction to Bokeh

Bokeh: plots and tools

Bokeh: visualizing node attributes

A primer on visual network analysis

Why Network Visualization?

Globomantics PLC

Globomantics PLC

users_table

ID	PAY_ID	REV
1	110283	20.99
2	110270	35.99
3	110268	10.99
4	110283	20.99
5	110321	0.0

users_table

ID	PAY_ID	REV
1	110283	20.99
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user_relationship_mapping

ID_SOURCE	ID_SINK
1	2
1	3
5	4
3	5
3	1

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user_relationship_mapping

ID_SOURCE	ID_SINK
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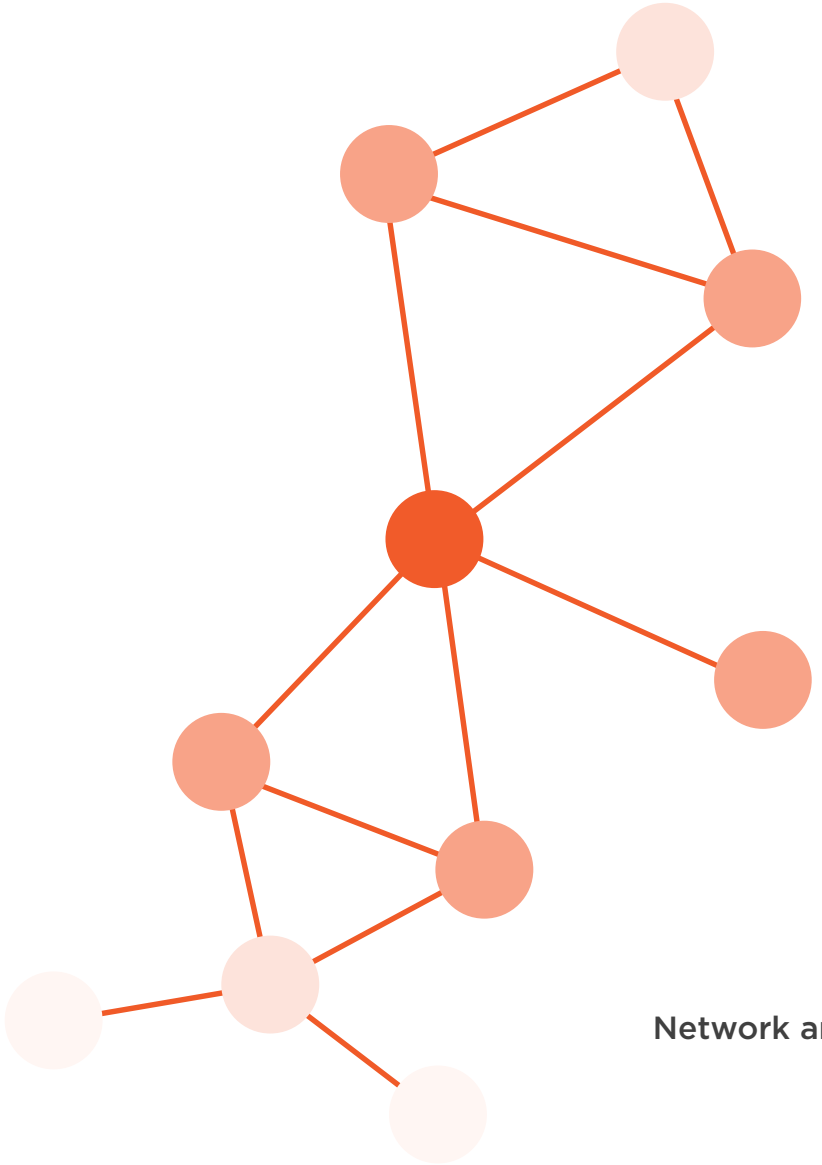
```
SELECT AVG(T.FRIEND_COUNT) FROM (
    SELECT COUNT(*) AS FRIEND_COUNT
        FROM user_relationship_mapping GROUP BY ID_SOURCE
) T;
```



Network analysis

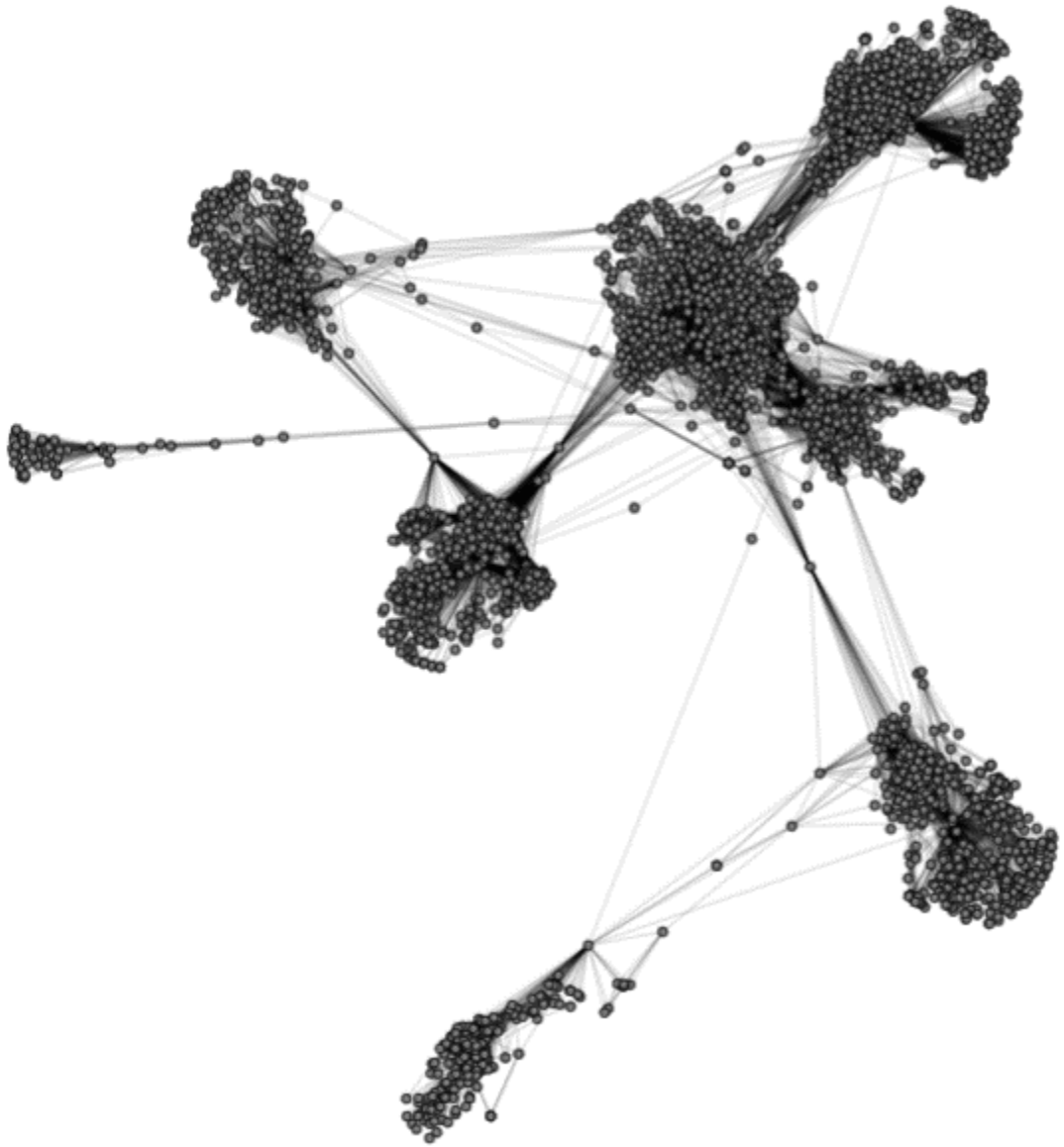
SQL or Dataframe land

Node of interest

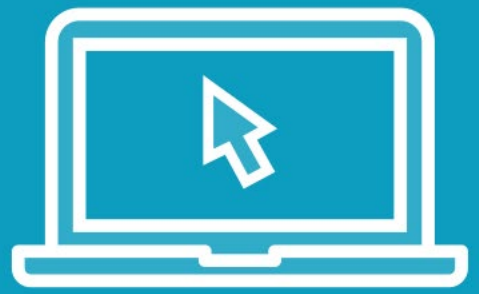
1st order contacts

2nd order contacts

3rd order contacts



Demo



Native visualization in NetworkX

Introduction to Bokeh

Main Contenders

Bokeh

Plotly

Bokeh Visualization Pipeline

Plot/Figure

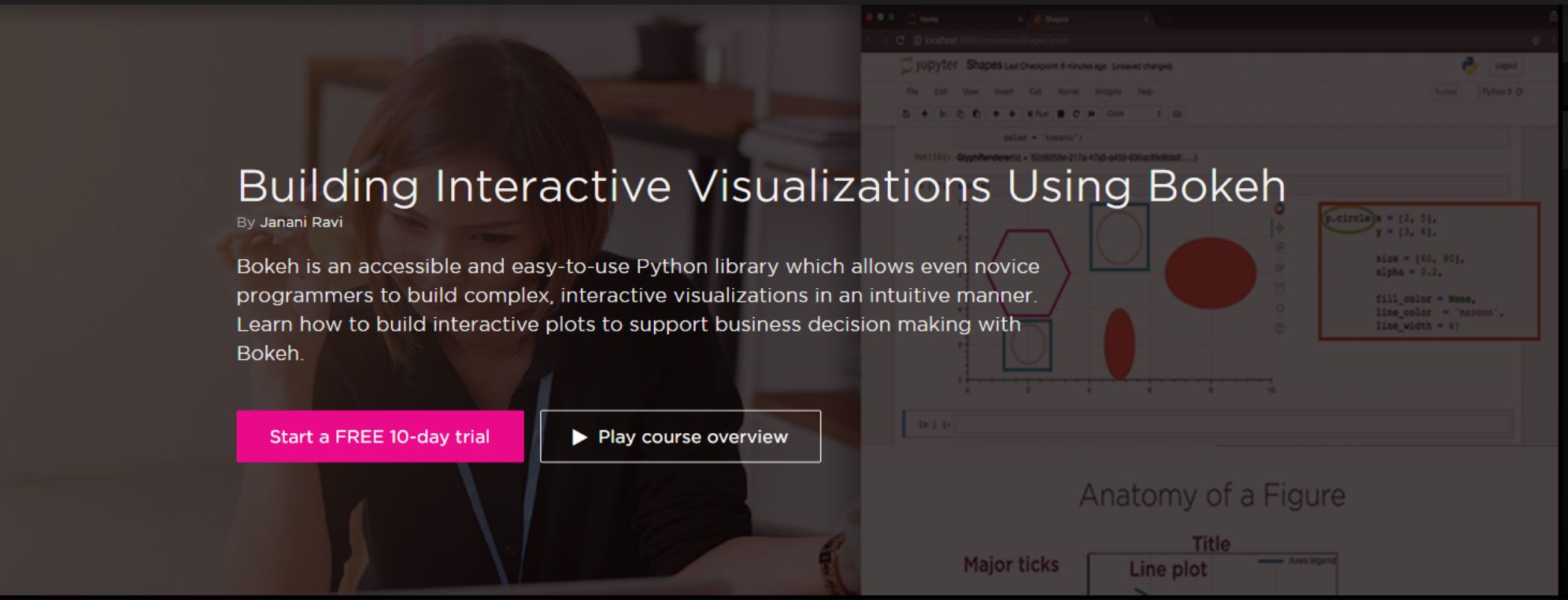
Plot tools

Renderers

Glyphs

show

output_notebook



Building Interactive Visualizations Using Bokeh

By Janani Ravi

Bokeh is an accessible and easy-to-use Python library which allows even novice programmers to build complex, interactive visualizations in an intuitive manner. Learn how to build interactive plots to support business decision making with Bokeh.

Start a FREE 10-day trial

Play course overview

Course Overview

- Course Overview 1m

Plotting with Glyphs in Bokeh

- Module Overview 1m
- Prerequisites and Course Outline 1m
- Introducing Bokeh 5m
- Plotting Basics 1m
- Bokeh Internals 3m
- Plotting to File and within Jupyter Notebooks 6m
- Customizing Markers and Lines 6m
- Drawing Shapes 6m
- Working with Layouts 3m

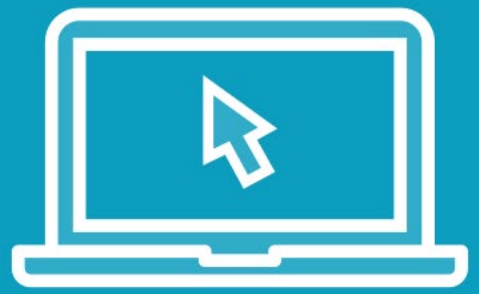
Course info

Level	Beginner
Updated	Sep 11, 2018
Duration	1h 47m

Description

Organizations have huge datasets, usually in a raw format. Visualization of this data is critical in order to understand what is significant before diving into data analysis. In this course, Building Interactive Visualizations Using Bokeh, you'll learn how to use Bokeh to build tweakable visualizations on the web which allows for easy exploration of data without in-depth coding knowledge. First, you'll explore the internals of how Bokeh works and the basic building blocks of Bokeh plots by working with glyphs, plots, tables, arbitrary shapes, and visual layouts. Then, you'll delve into specialized plots in Bokeh, such as plots which work with categorical data, network graphs, and geographical data. Next, you'll discover how to build geo-plots using built-in Bokeh maps and the Google Maps API, along with Bokeh's huge sample dataset to prototype some interesting plots. Finally, you'll learn some advanced features in Bokeh such as integrating with Bokeh plot tools to enhance plot interactivity and working with the Bokeh server which offers a model-view-controller paradigm to manipulate data in Python and view it using a browser. By the end of this course, you'll have the necessary knowledge to effectively work with Bokeh plots and features to extract insights from your own data in the real world.

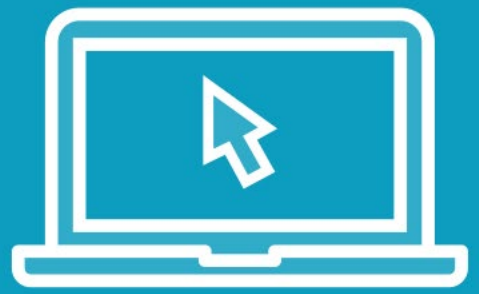
Demo



Bokeh

- Plots and tools

Demo



Bokeh

- Visualizing node attributes

A Primer on Visual Network Analysis

Visual Network Analysis

Tommaso Venturini, Mathieu Jacomy, Débora Pereira

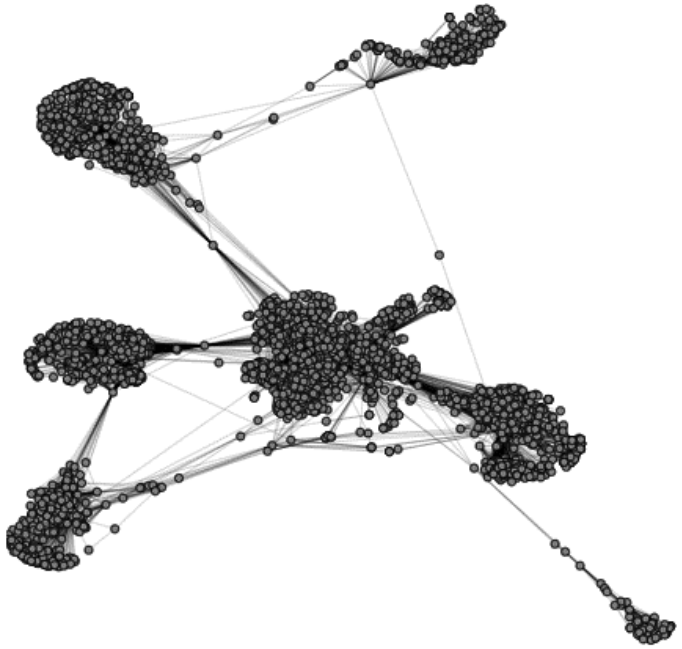
Introduction

In the last few years, a spectre has been haunting our academic and popular culture — the spectre of networks. Throughout social as well as natural sciences, more and more phenomena have come to be conceived as networks. Telecommunication networks, neural networks, social networks, epigenetic networks, ecological and economic networks[1], the very fabric of our existence seems to be made of lines and points.

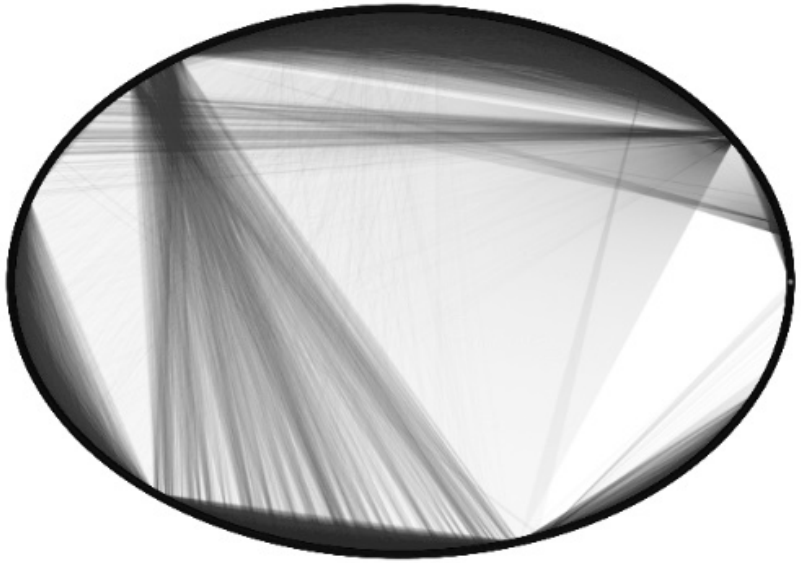
Our fascination for networks is not unjustified and it is not new. Since Euler's walk on Königsberg's bridges[2], networks have proved to be powerful mathematical objects, capable of harnessing the most diverse situations where the connection of discrete elements is at stake. Yet, the recent fortune of networks derives less from their computational power than from their visual affordances. In the last years, the increasing availability of software for network manipulation has turned graphs into something that can be seen and manipulated. Turning graphs into maps and interface, this software has made network analysis available to more and more scholars particularly (but not exclusively) in the social sciences.

Yet the visualization of networks has so far lacked of reflexivity and formalization. Though all network

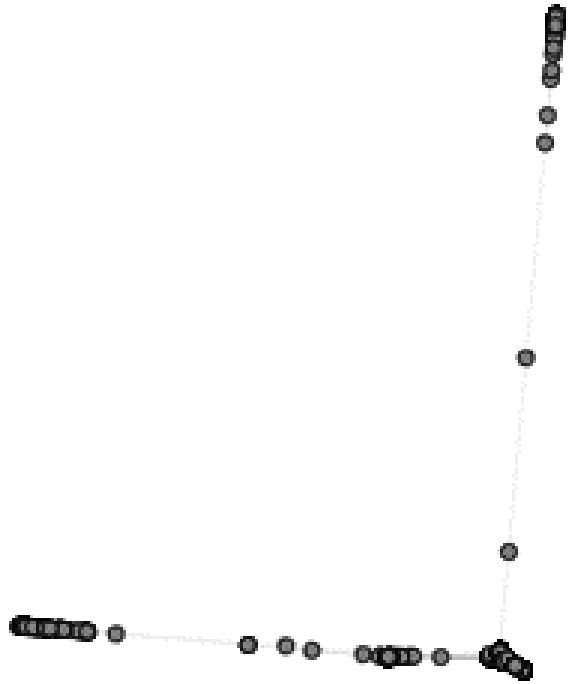
Network Layouts



Spring

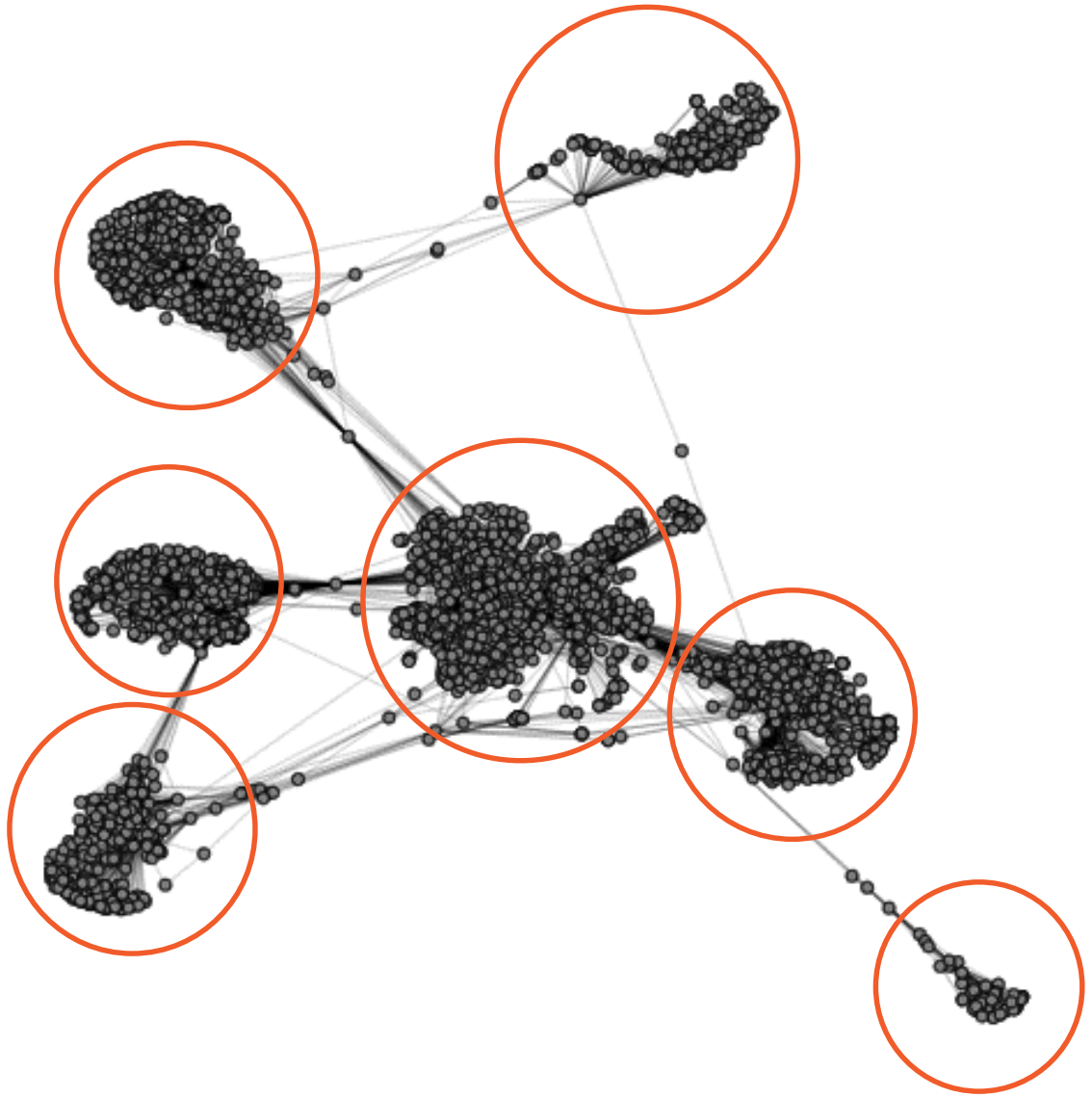


Circular

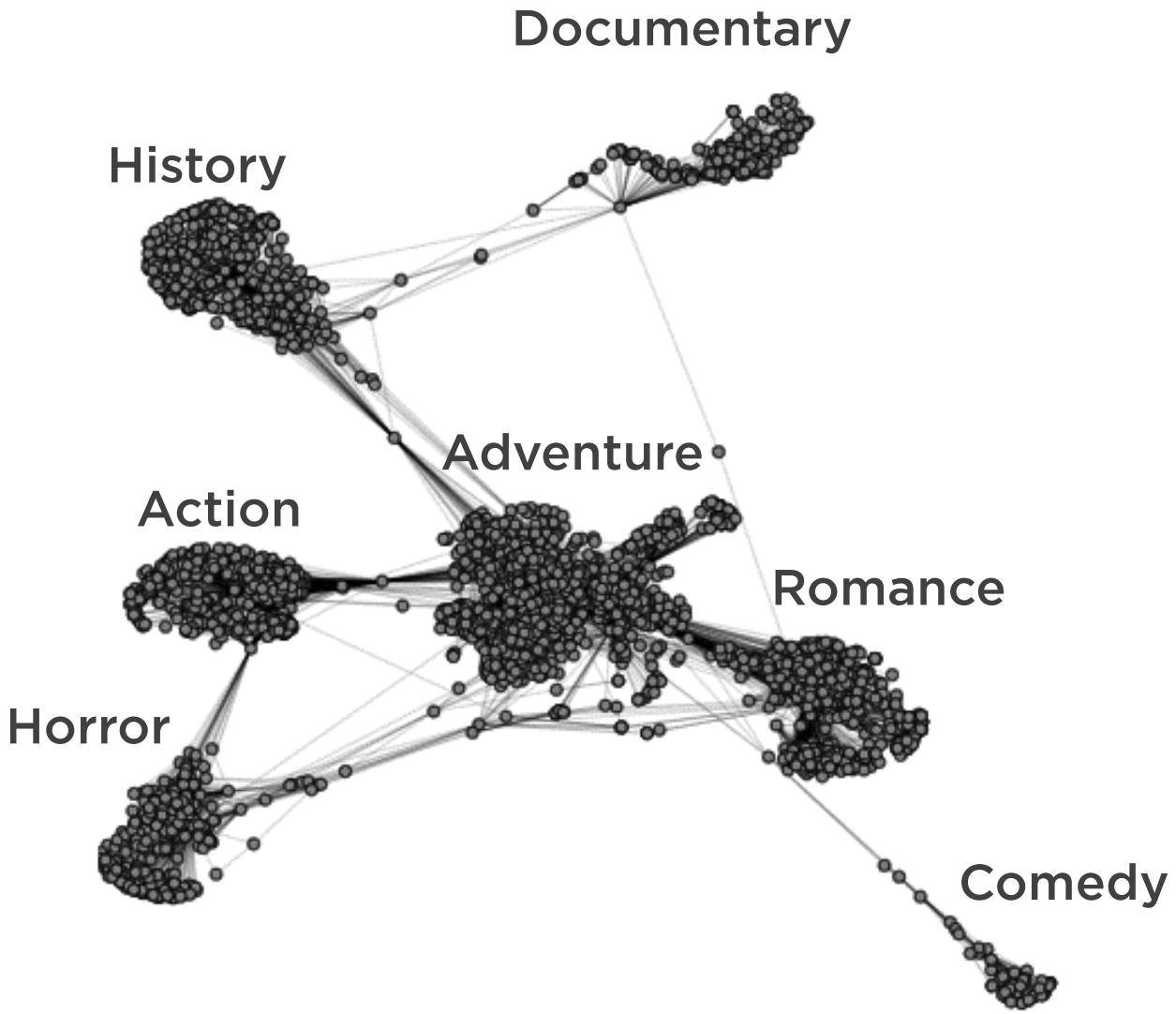


Spectral

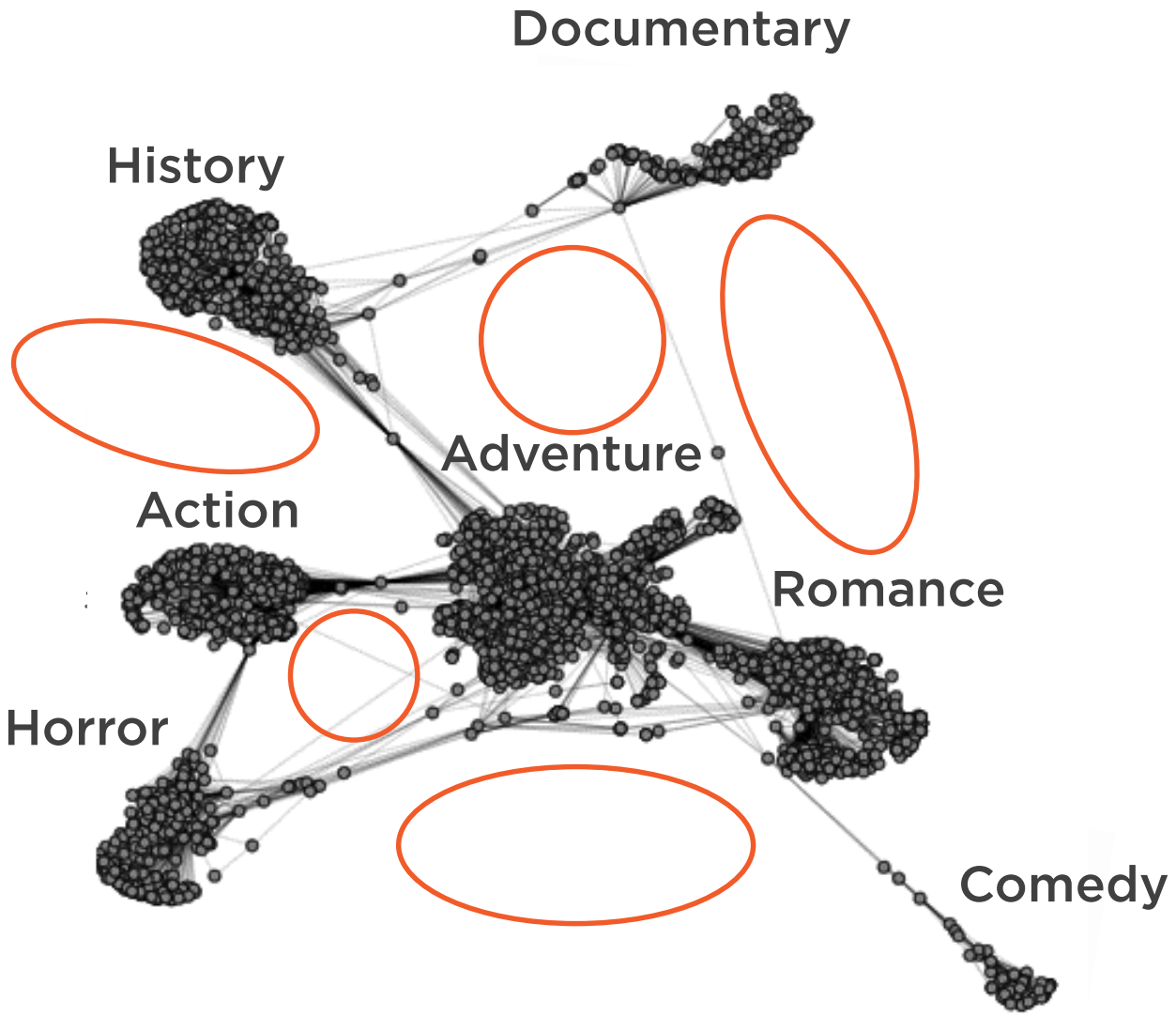
Clusters



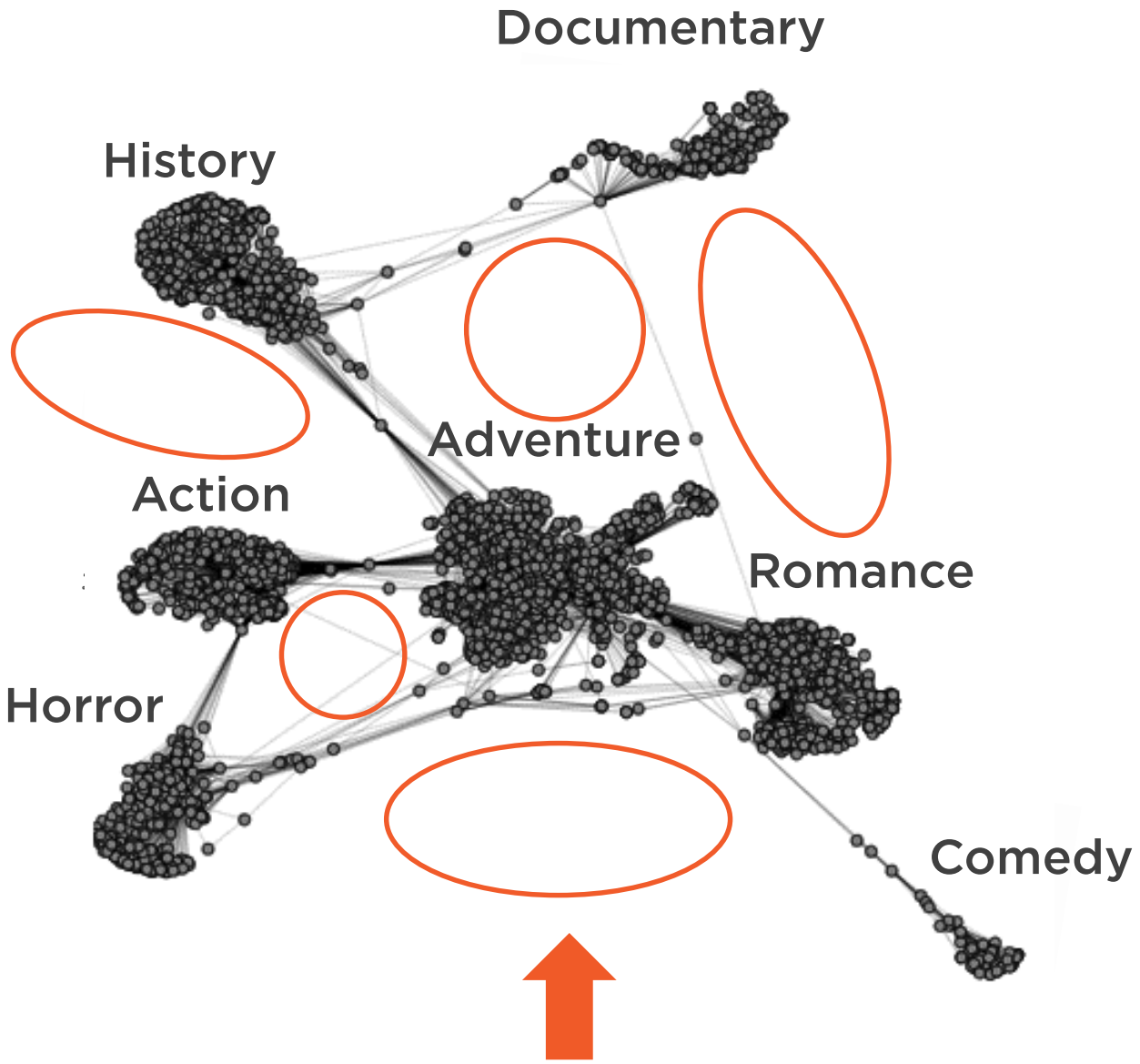
Clusters

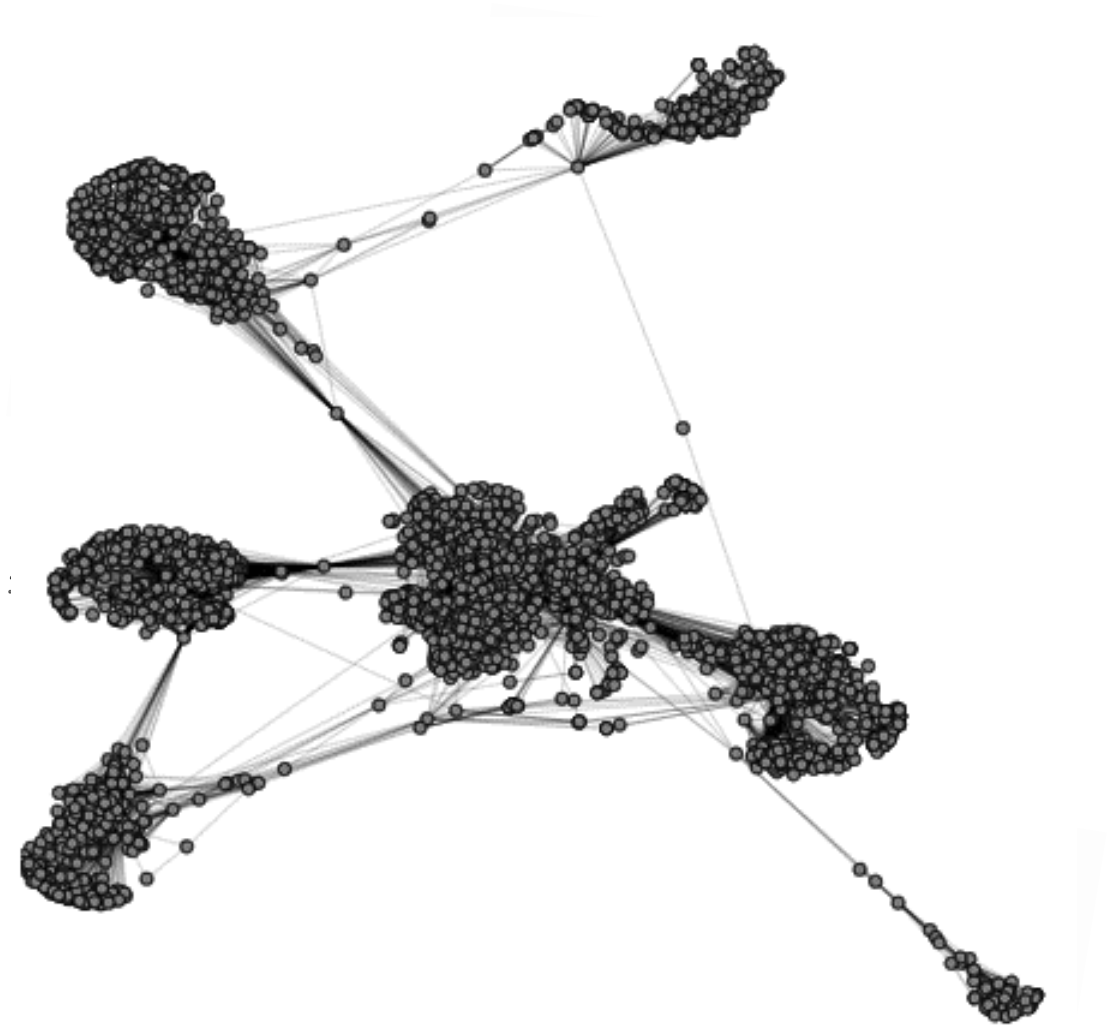

Documentary
History
Adventure
Action
Romance
Horror
Comedy

Structural Holes

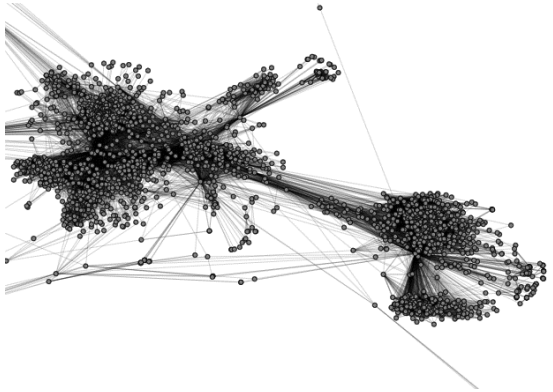


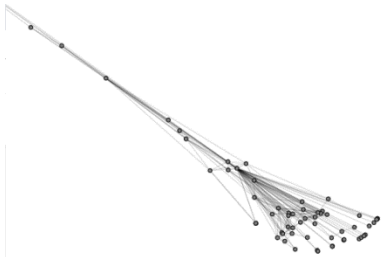
Structural Holes



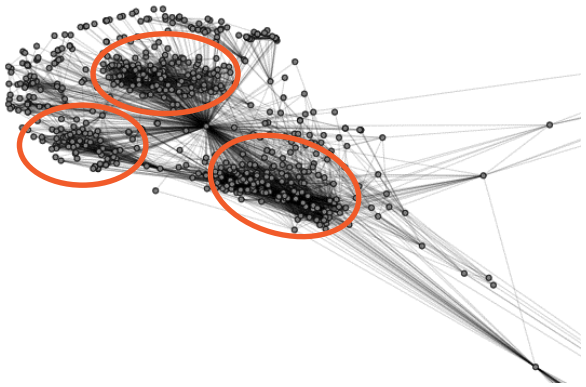


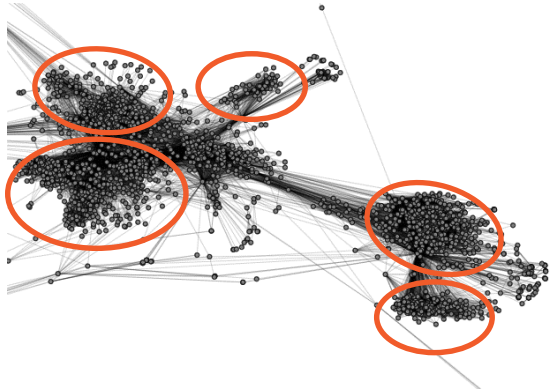
Sub-clusters

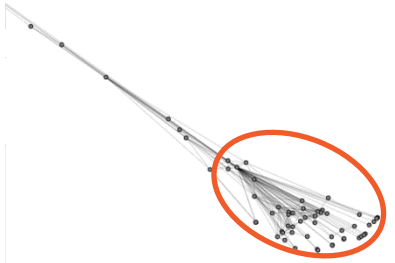




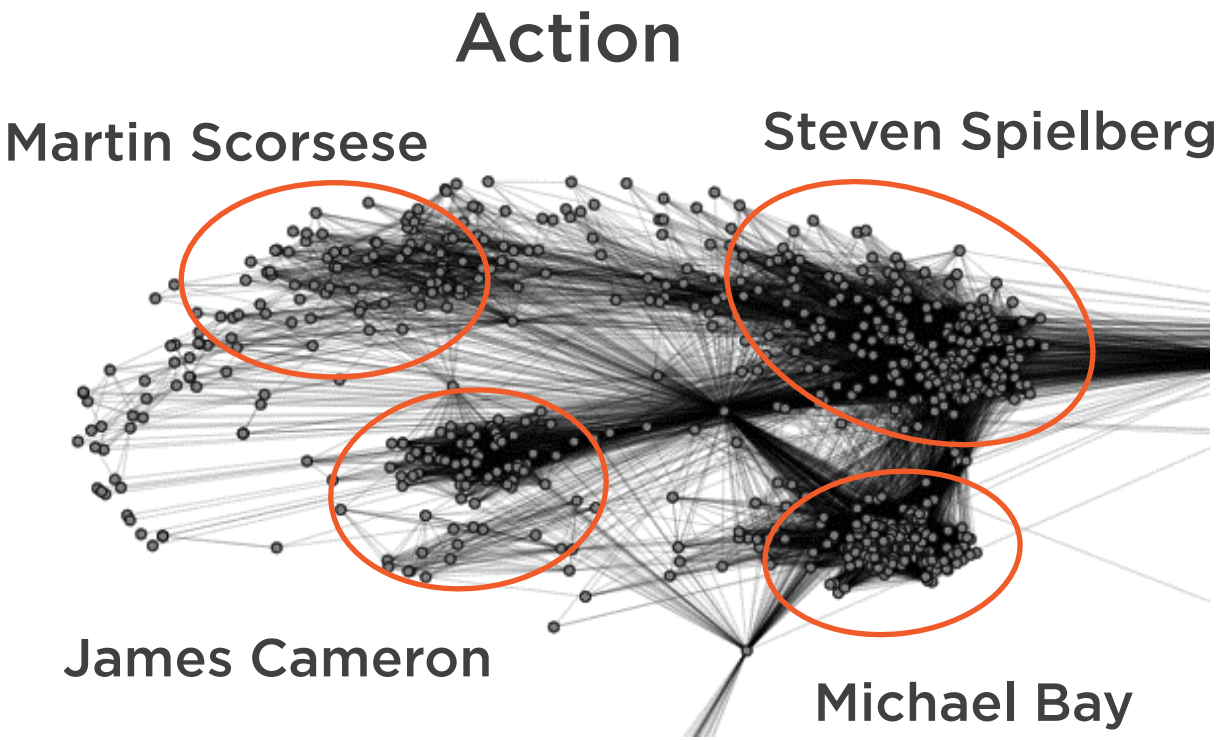
Sub-clusters





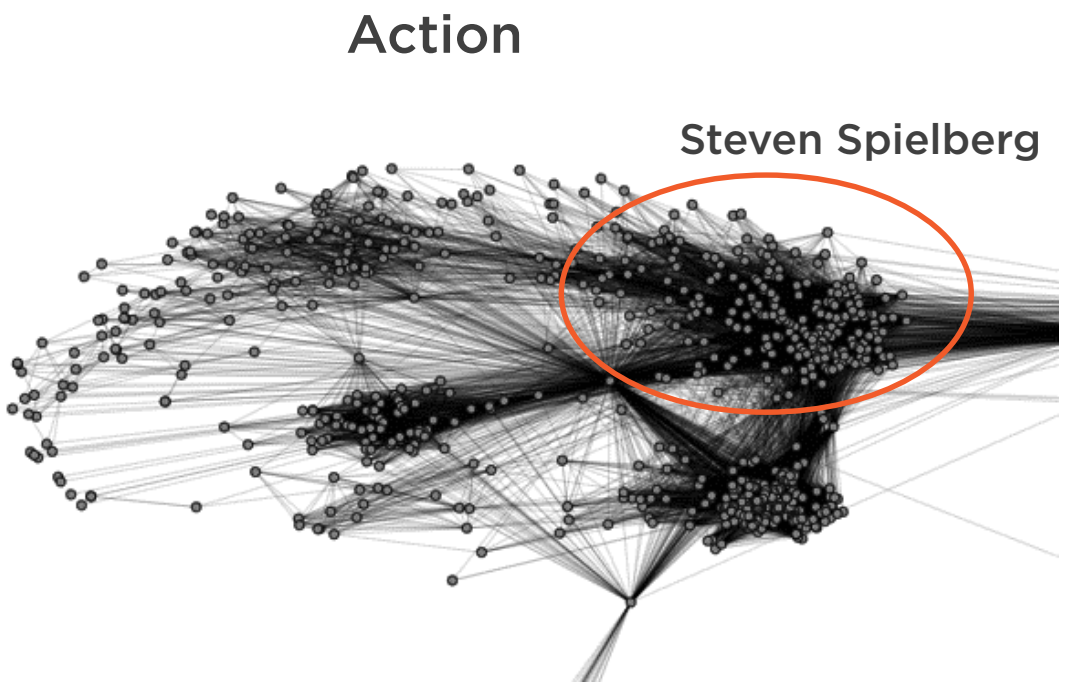


Sub-clusters



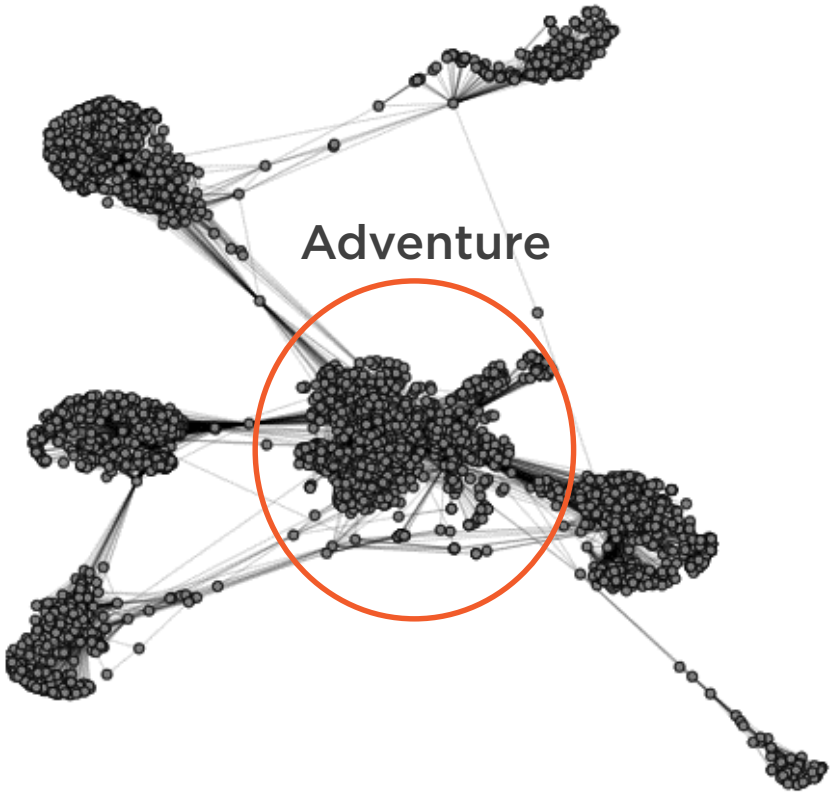
Bridges

Global



Local

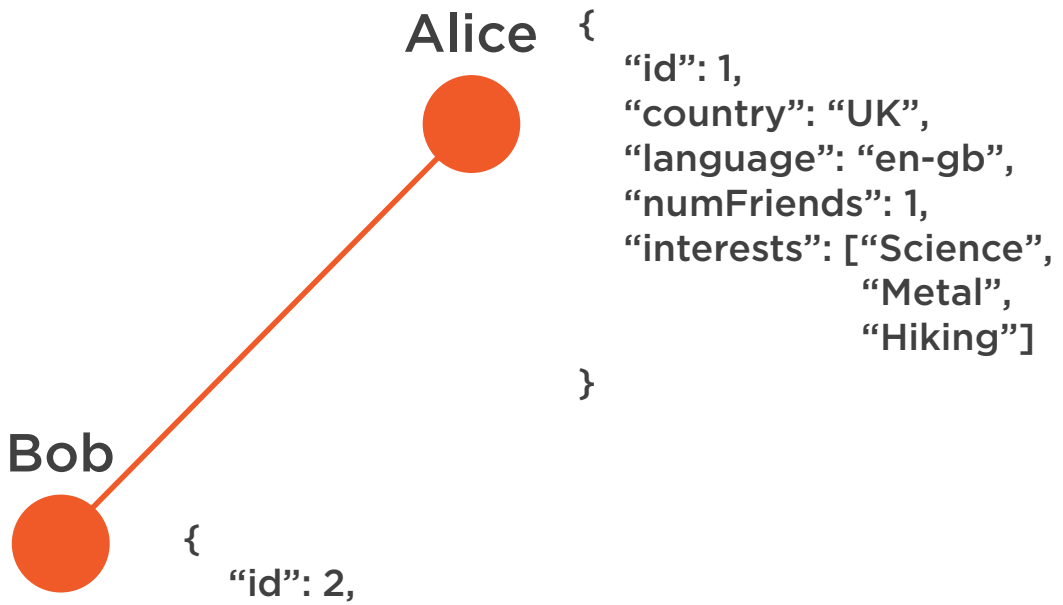
Centers



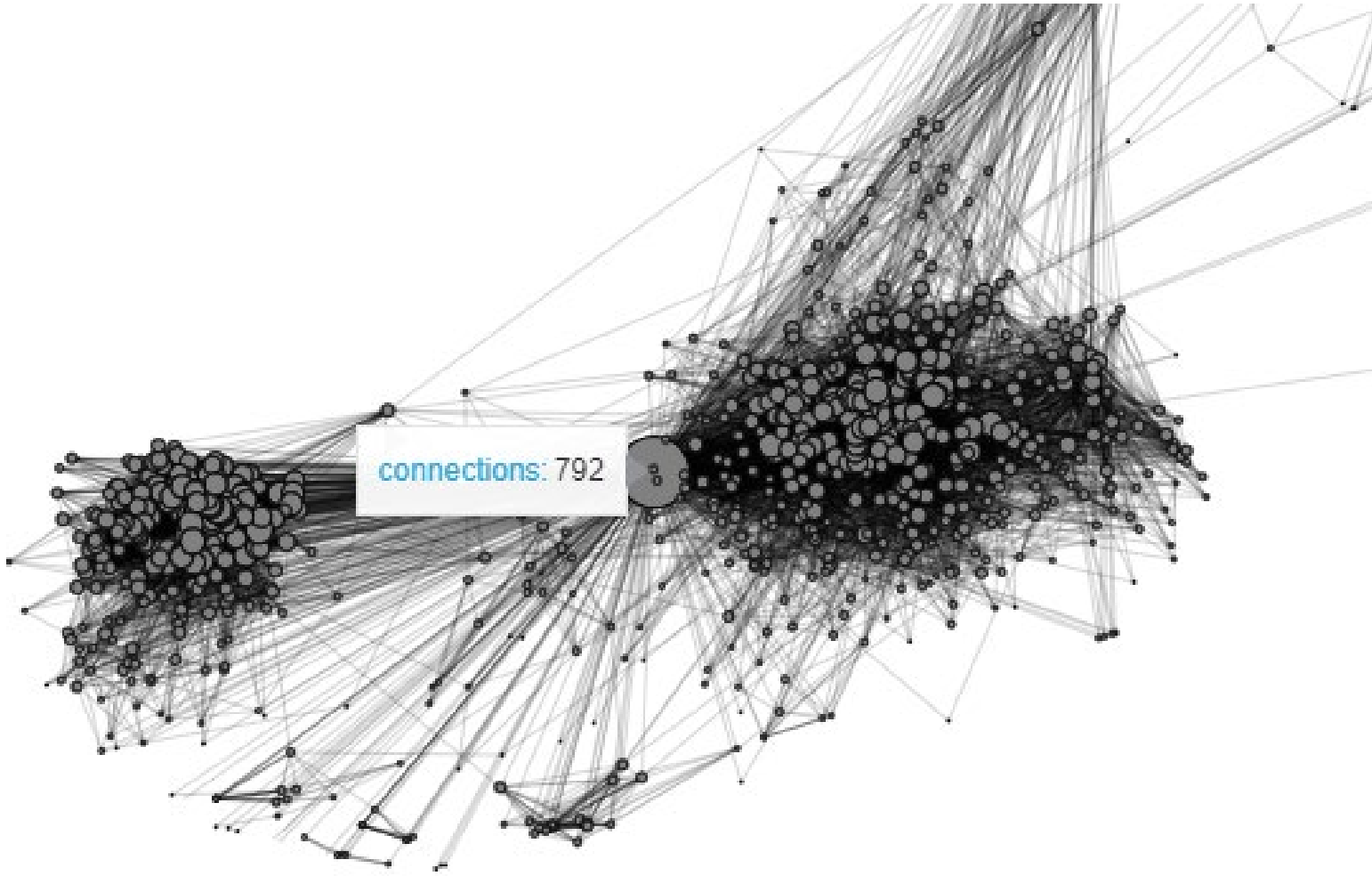
Global

Local

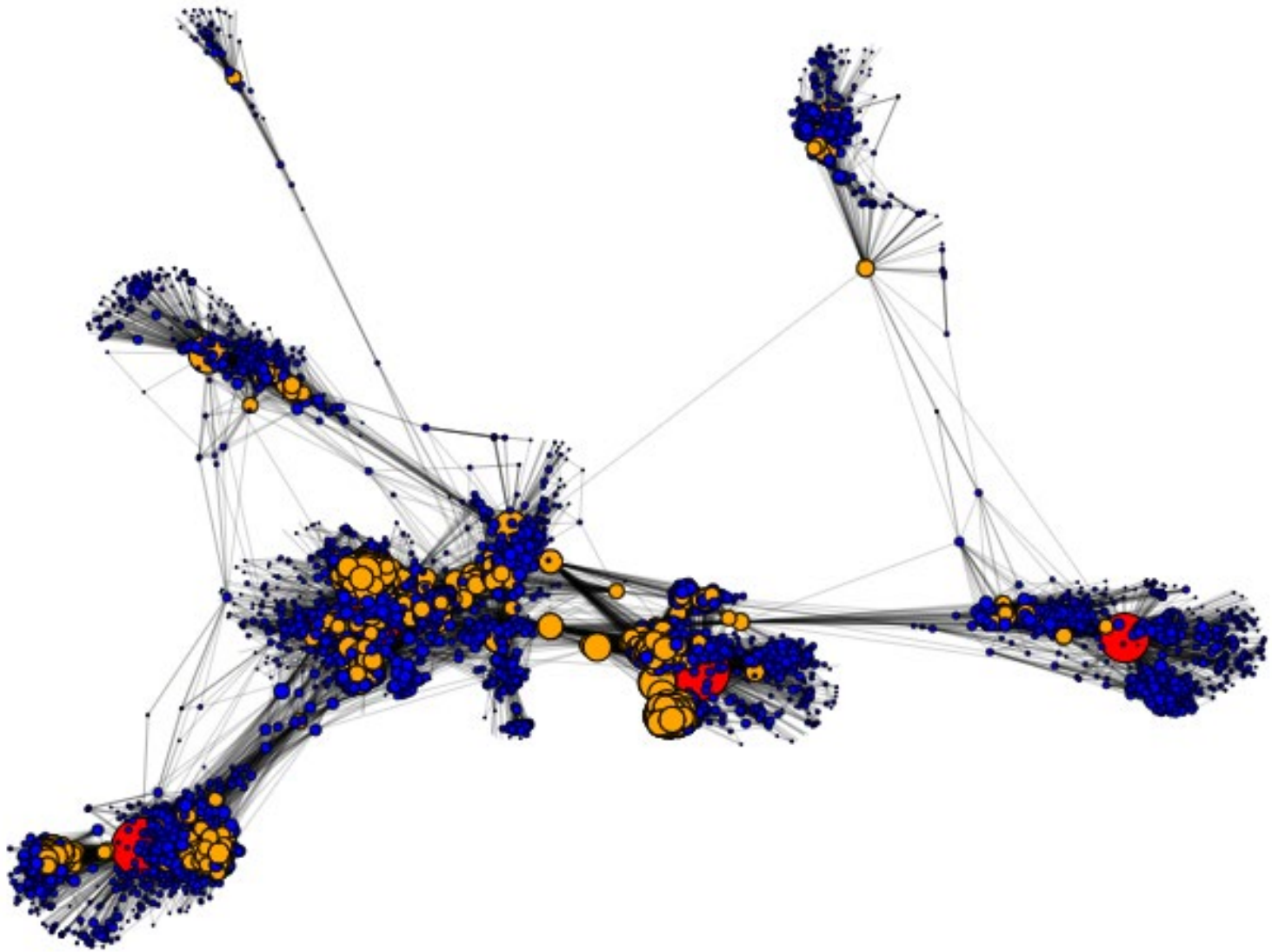
Node Attributes



Node Size



Node Color



Summary

Visual network analysis helps us see the situation beyond first order connections

Matplotlib has great support and compatibility with other packages but is static

Bokeh is a visualization package that offers great interactivity

During visual network analysis one must identify clusters, sub-clusters, structural holes, bridges and centers

Always emphasize node and edge attributes with size and color