Debunking Hollywood:

A Network Productions Inquiry

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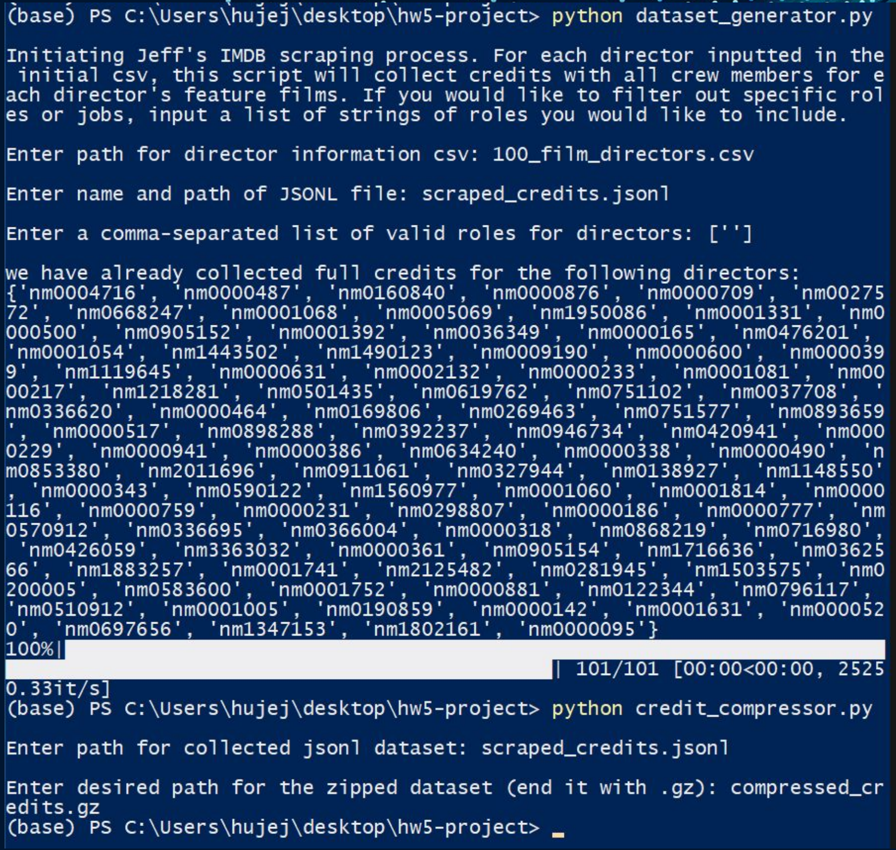
Subtask 1: Data Extraction Methods

Created two scripts, "dataset_generator" and "credit_compressor"

- **dataset_generator** loops through the director dataframe and generates a full credits dictionary, which is added to a jsonl.
- **credit_compressor** compressed the inputted jsonl into a gzip.



Subtask 1: Data Extraction Output

Final dataset was a .jsonl list of json-style “director dictionaries”.

This was originally 20 mb, compressed to a 4 mb gzip file.

While filtering crew roles was possible in this code, we collected the entire credits for each movie and then filtered out redundant roles at the network generation step.


```
{
    "dir_id":"nm0009190",
    "name":"J.J. Abrams",
    "gender":"M",
    "ethnicity":"W",
    "otherlabel":"H",
    "movies": [
          {
          "title_id":"tt2527338",
          "title":"Star Wars: Episode IX - The Rise of Skywalker",
          "crew":[
          ["Writing Credits", "Chris Terrio"],
          ["Writing Credits", "Derek Connolly"],
          ]
      },
    ]
}
```

Subtask 2: Network Generation

Pipeline:

- Preprocessing
  - Load data as a generator
  - Normalize roles
  - Remove extra white spaces
- Node & Edge Attributes
  - Node type, indv. & grouped labels, AHS
  - Roles, abs. weight, custom crew weight
- Network Models: weighted undirected
  - Full: all director-crew collaborations
  - Main: with role exclusion
  - Bipartite Subnetwork: co-occurrence projections
- Generate Network
  - Create and write network to a .graphml file for visualization in Gephi


```
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          ]
      },
    ]
}
```
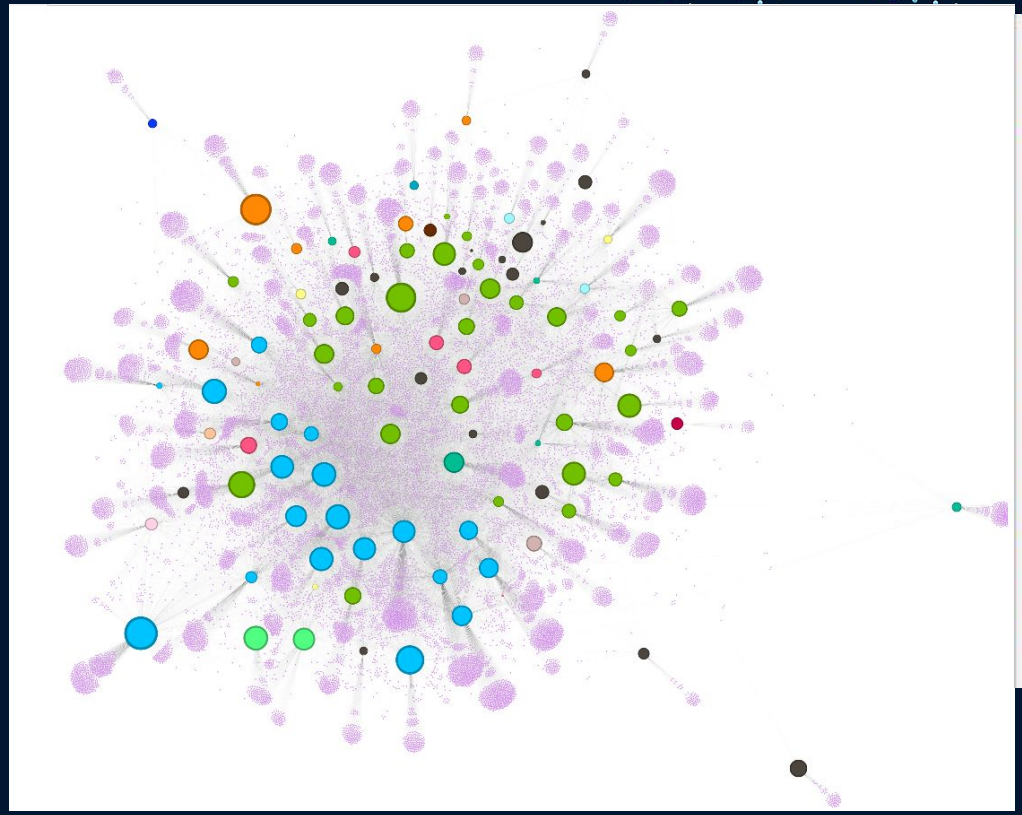

Subtask 3: Network Visualization

Background:

- Layout: ForceAtlas 2
- Size of Nodes: Average Director Homogeneity
- Color of Nodes: Grouped Labels
  - First Letter: Gender
  - Second: Ethnicity
  - Third: Renowned Status



Subtask 4: Analyses

Process:

- Raw Data Analysis
  - Basic summary statistics
- Metric engineering
  - Role homogeneity
  - Weights
- Answering research questions
  - Network characteristics
  - Important nodes
  - Analyzing metric

$$S = \begin{cases} 0 & ; P = 1 \\ \frac{N-1}{P-1} & ; P > 1 \end{cases}$$

N = # times a crew member was re-used in their role

P = # opportunities to be re-used in their role

Relationship Strength (Weights)

$$H = \begin{cases} 1 & ; u = 1 \\ 1 - \frac{u}{n} & ; u > 1 \end{cases}$$

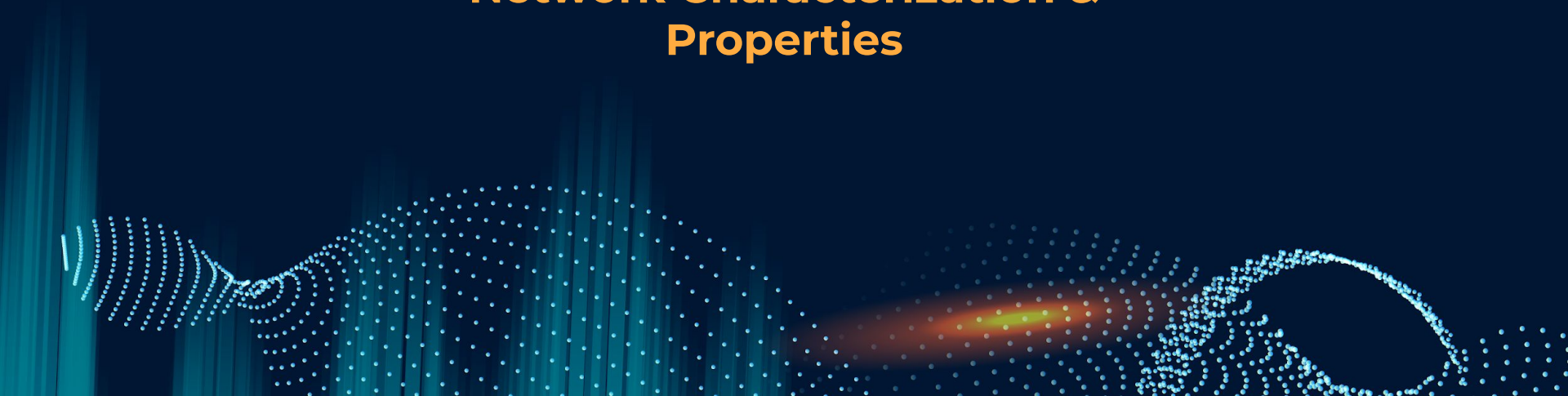
u = unique crew members for role across movies

n = total crew members for role across movies

Role Homogeneity

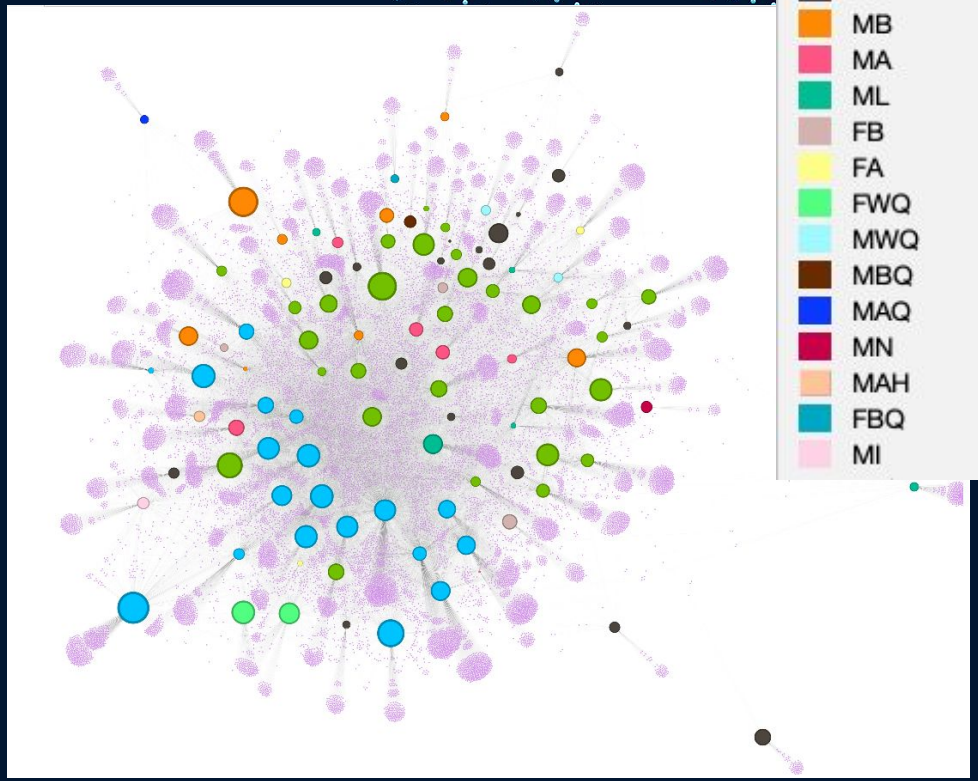
Research Question 2

Network Characterization & Properties



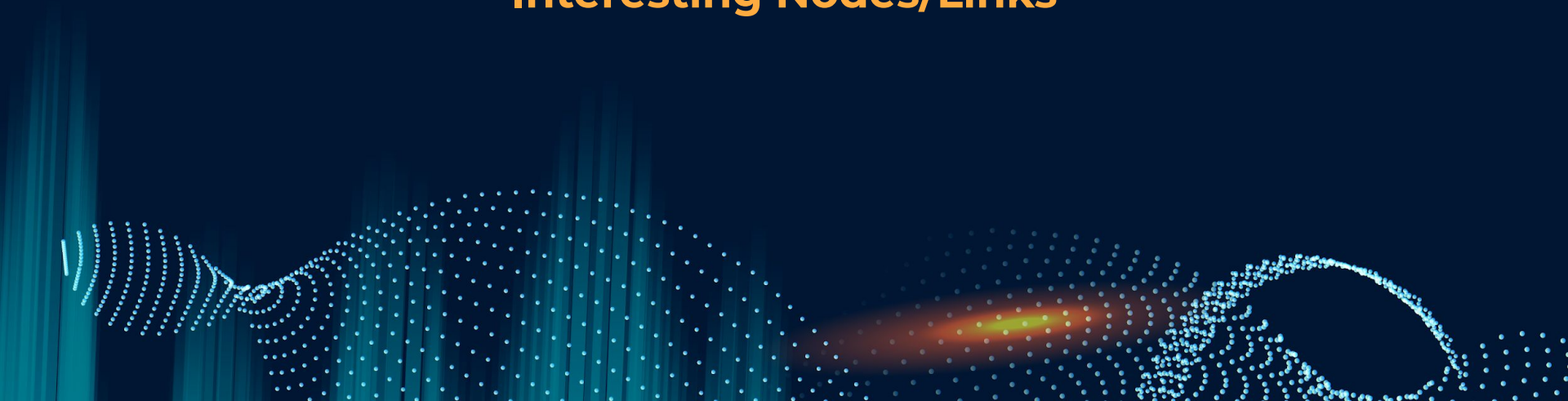
Network Characterization & Properties

- Density: 0.00018
- Triangles: 5339
- Mean Clustering Coeff: 0.00076
- Triangles may not tell the whole story
    - No crew-crew edges



Research Question 3

Interesting Nodes/Links



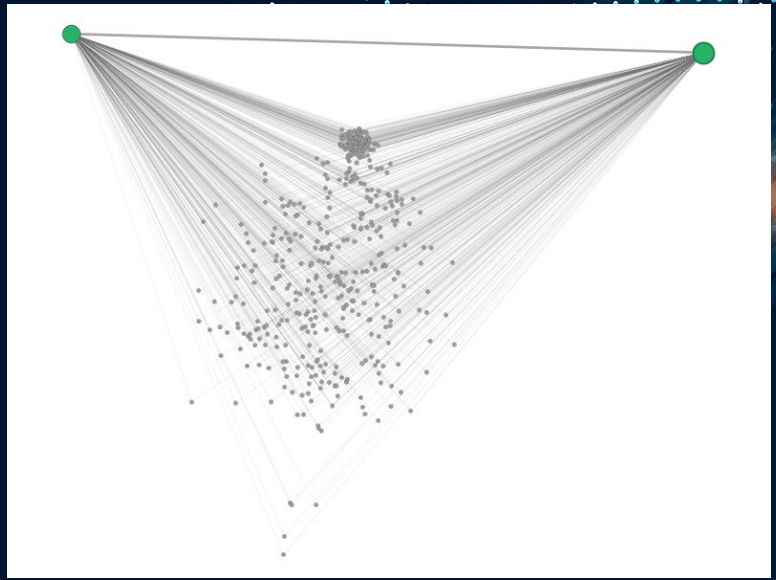
Wachowski Ego

Lilly Wachowski:

- Homogeneity: 0.457 (Rank 8)
- Triangles: 464
- Top 3 Roles: Directed by, Writing Credits, Music by

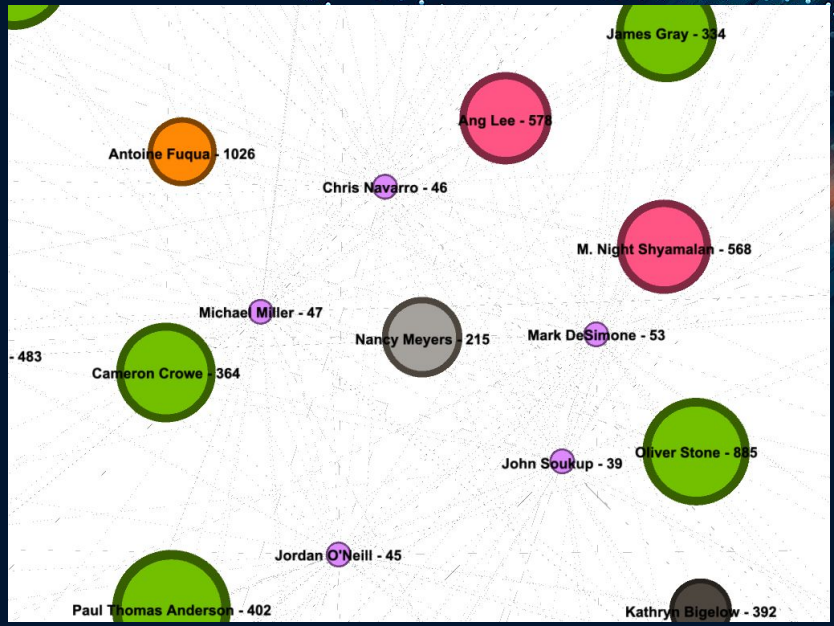
Lana Wachowski:

- Homogeneity: 0.415 (Rank 19)
- Triangles: 464
- Top 3 Roles: Directed by, Writing Credits, Costume Design by



Top 5 Highest Degree (Crew)

Rank	Name	Degree	% of director colab
1	Mark DeSimone	53	52%
2	Michael Miller	47	47%
3	Chris Navarro	46	46%
4	Jordan O'Neill	45	45%
5	John Soukup	39	37%



- All sound department guys
- All worked worked with Tim Burton, Roland Emmerich
- Sound department is not very homogeneous (Ranked 8/10)

Hubs and Interesting Nodes

Top 5 Betweenness Centrality:

1. Steven Spielberg: 53,574
2. Tim Burton: 47,527
3. Ridley Scott: 45,772
4. Ron Howard: 43,388
5. Roland Emmerich: 31,138

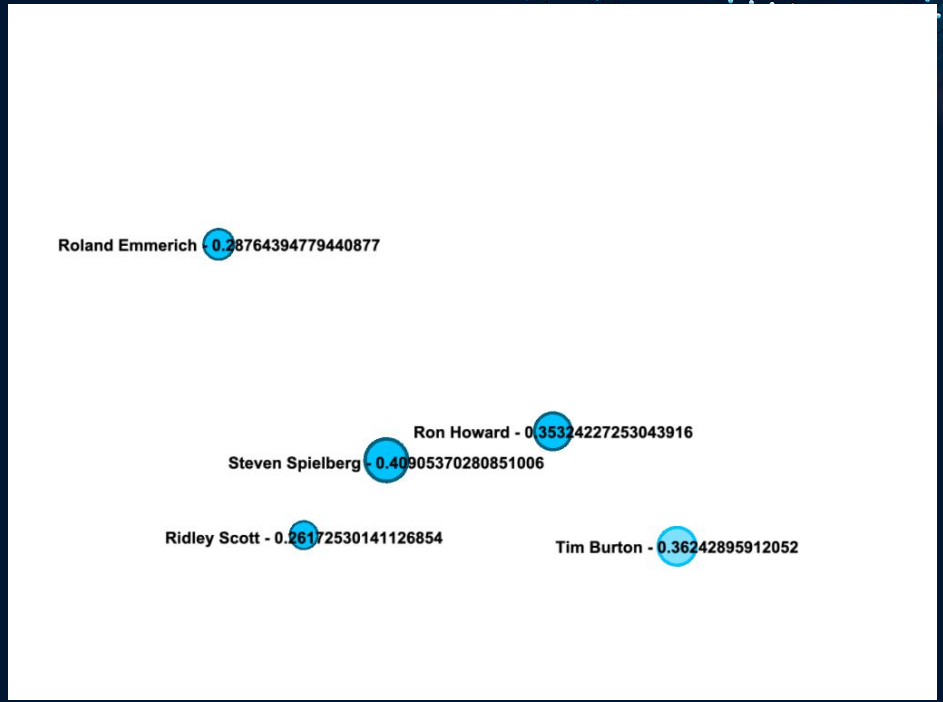
Interesting Scores:

90. Jordan Peele: 3,501
93. Chloé Zhao: 3,249

Mean Betweenness Centrality: 12,475

Top 5 Director Degree:

1. Steven Spielberg: 2,030
2. Tim Burton: 1,702
3. Ridley Scott: 1,643
4. Ron Howard: 1,605
5. Roland Emmerich: 1,195



Research Question 1

How widespread is the phenomenon of directors re-using the same crew?

Director Rankings

Ranking of Directors by Homogeneity Score

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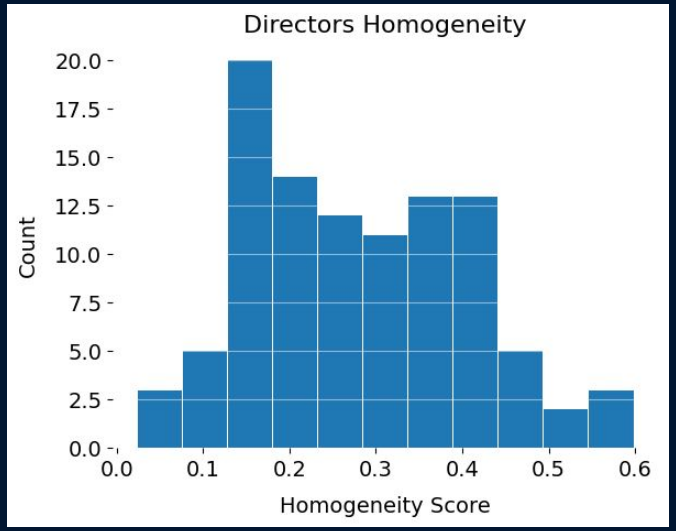
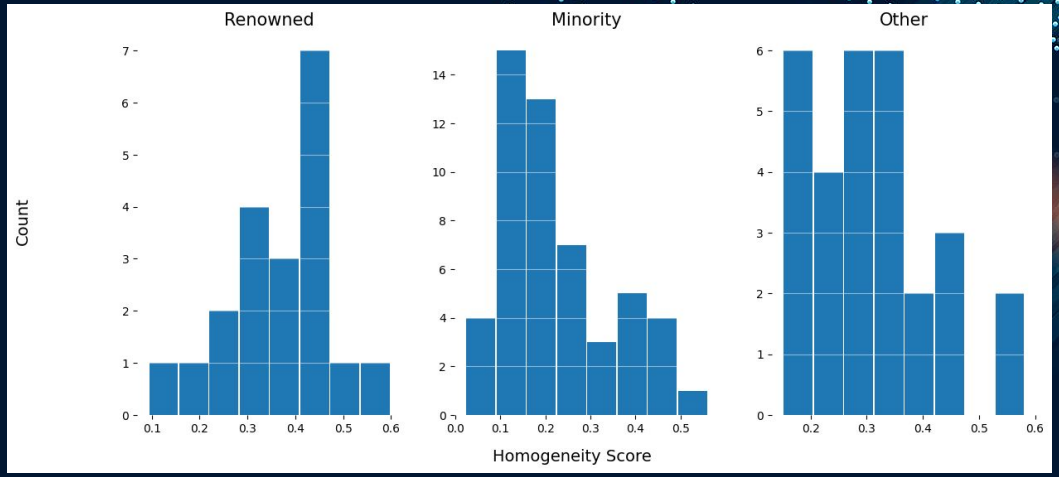
Rank	Name	AHS	Top 3 Roles
1.	Peter Jackson	0.598319772586482	Writing Credits – Film Editing by – Cinematography by
2.	Clint Eastwood	0.5817356536996472	Directed by – Film Editing by – Cinematography by
3.	Tyler Perry	0.5595145606597748	Cinematography by – Film Editing by – Production Design by
4.	Steven Soderberg	0.53781649411341	Directed by – Cinematography by – Film Editing by
5.	David Yates	0.5124667078329002	Film Editing by – Writing Credits – Music by

Research Question 1:





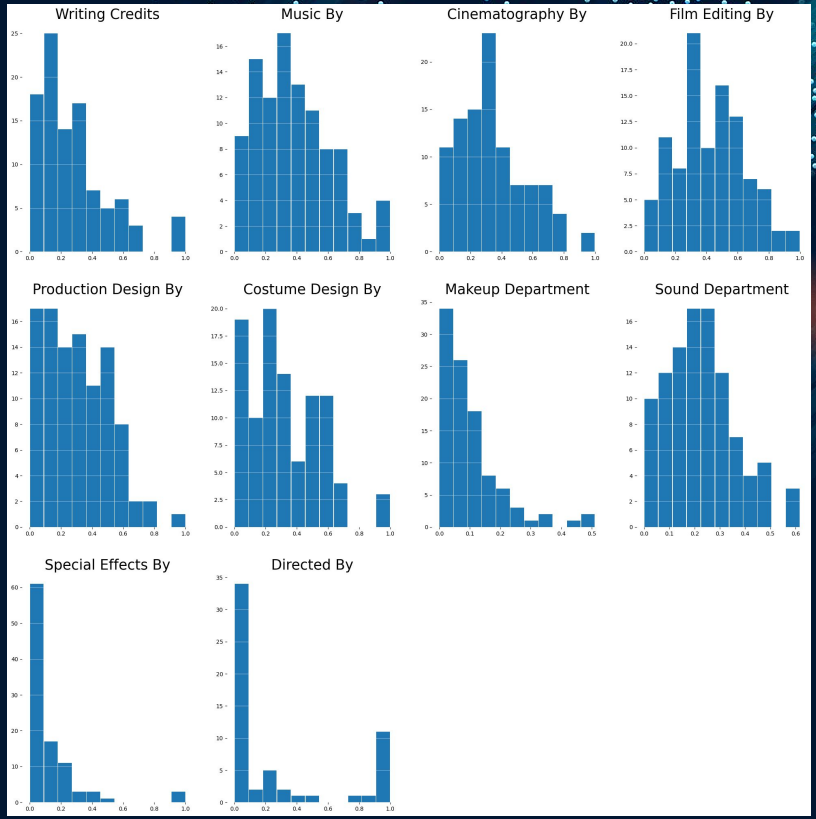
Avg Homogeneity By Role:

- Renowned: 0.36
- Minority: 0.23
- Other: 0.31

Research Question 1:

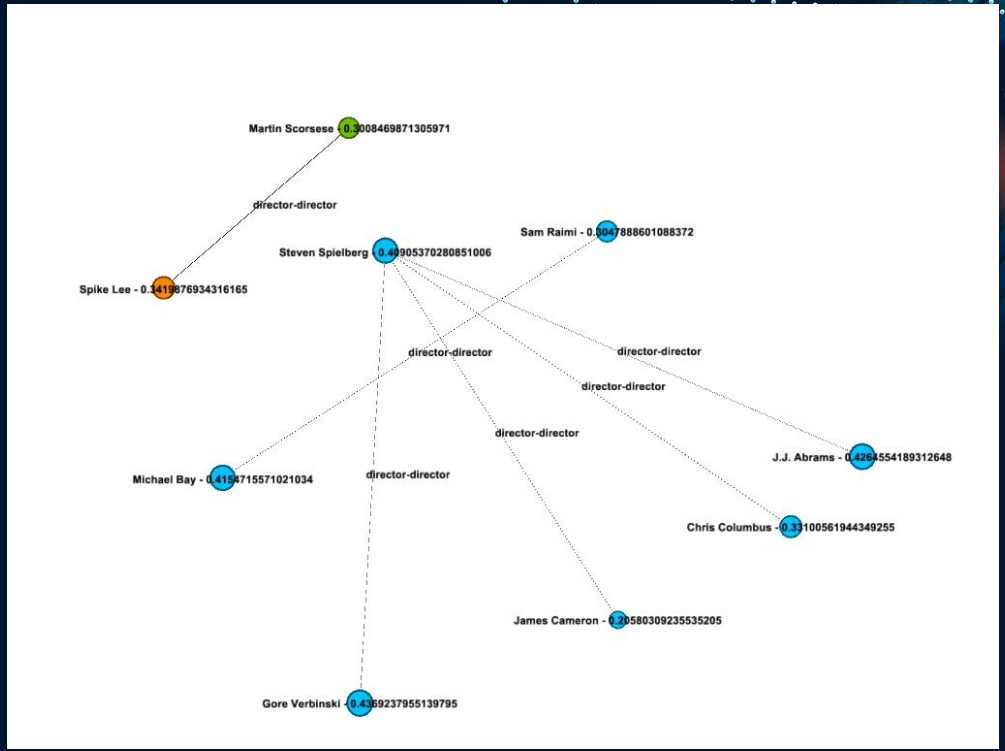
Mean Homogeneity Scores:

1. Film Editing: 0.43
2. Music: 0.38
3. Cinematography: 0.34
4. Costume Design: 0.31
5. Production Design: 0.30
6. Writing Credits: 0.28
7. Directed By: 0.27
8. Sound: 0.23
9. Special Effects: 0.12
10. Makeup: 0.10



Research Question 1:

- Co-Occurrence Network
- Filtered to pairs of directors who have hired 1000 or more of the same crew members
- 6/7 pairings: **Male, White, and Renowned**
- Takeaway: Male, White, and Renowned directors not only re-use the same crew members, but they hire from the same pool of people as each other.



Final Conclusion

- Renowned directors (mostly white men) have the most shared crew and trended with higher crew reuse.
- Most other directors seemed do not have strong networks of crew reuse. (See the many small clouds of crew who only worked on a single movie on our visualization)
- Most minority and less-renowned directors are unable to cultivate strong relationships or crew reuse networks for themselves, and must work with unfamiliar and one-time crew members.
- Lead editors, musicians, and cinematographers are the most commonly reused roles by those directors with strong connections.

THANKS!

Do you have any questions?
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