

Social Network Analysis Of Conan TV series

by

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Major: Information System

for

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I. Introduction

Social Network Analysis (SNA) is the systematic analysis of social networks. Social network analysis presents social relationships in terms of network theory consisting of nodes (which represent individual actors within networks) and connections (which represent relationships between individuals, such as friendship, kinship, organizational status, sexual relations, etc.). These networks are often portrayed through diagrams. Social networks, where nodes are represented by points and links in the form of lines. This report will apply social network analysis theories on Japanese TV series. It is a manga(manga like comics but in Japanese culture) series by Gosho Aoyama, which was converted into a Japanese anime.. The manga started on June 18, 1994.

The story begins with the emergence of the main character, Seventeen-year-old Shinichi Kudo, who is a high school student and detective who helps police and Inspector Meguri solve some cases, famous for his intelligence and genius that surprise everyone with conclusions that contradict expectations. On one day off, he went out with his childhood friend Ran Mori to the amusement park, and a murder occurred inside the roller coaster, and it was resolved as usual with his intelligence and skill, and while they were there, Shinichi Kudo spotted a black-clothed man carrying out a blackmail. He wanted to know the story, so he was struck from behind and fell unconscious, and then he was forced to take a new drug, which had been used before only on mice, and the black-dressed man thought that he would kill him and would not leave a trace of poisoning in him, but the toxic drug caused his body to shrink to become A seven-year-old boy. This amusement park accident caused the birth of the series hero Conan Edogawa and changed the life of Shinichi Kudo.

II. METHODS

The series has many characters and 30 were chosen to apply the social network analysis. The report will use Case-by-case matrices and case-by-affiliation matrix. After that, these matrices will be converted into visualizations. These visualizations will help to gain clear insight of the structure of the network. Farther more, the density of the network and the point of centrality will be calculated and founded. Also, it will be a discussion on the components of the network. Like cliques' stars, brokers, and influencers.

III. RESULTS

Yokiko : 1
Yosako : 2
Shizako : 3
Weizo : 4
Prof.Agasa: 5
Shinchi : 6
Hijey: 7
Hiaibara:8
Aiyomi :9
Conan :11
Genta:12
Ran: 13
Sonoko:14
Metso:15
Kisaki:17
Mori:16
Barboun: 18
Kir:19
Etakakora:20
Pisco:21
Irish:22
Vermouth:23
Gin:24
RUM:25
Vodka:26
Chianti:27
Korn:28
Calvados:29
Taqila:30

This Key Number for every character

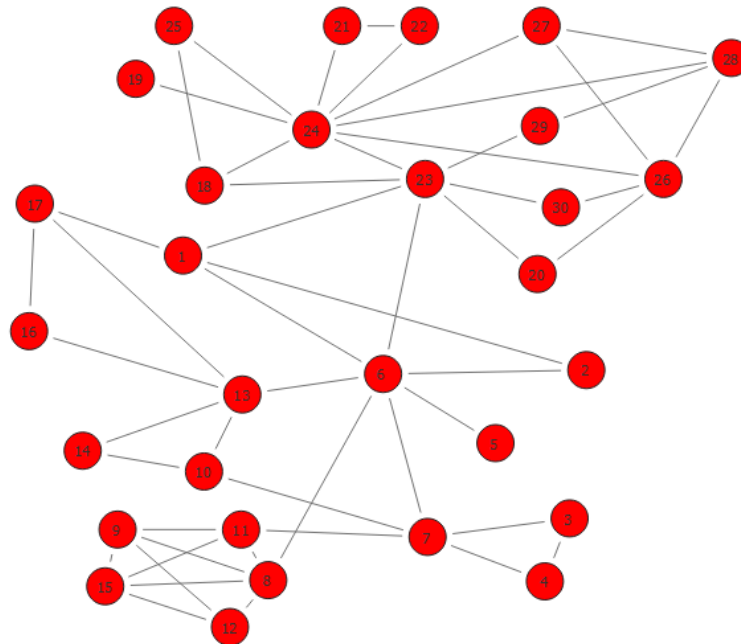


Figure 1 for the whole network

The adjacency matrix of a social network is a $N \times N$ matrix where each element (i,j) is the value of the edge from actor i to actor j , or 0 if no edge exists.

Actor/Actor	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0
2	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	1	1	0	0	1	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
7	0	0	1	1	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	1	0	0	1	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	1	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	1	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	1	0	0	0	1	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
17	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0
23	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	1	0	0	0	0	1	1
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	1	0	1	1	1	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1	1	0	1
27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	1	0	0
29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0

Table 1 case by case matrix for the whole network

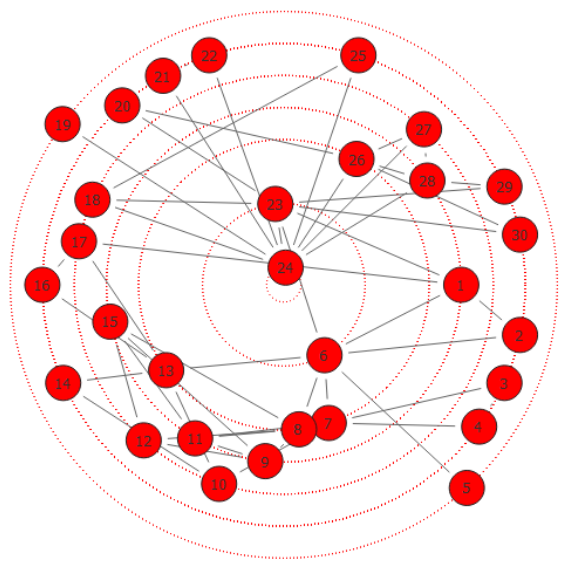
Network	
Type:	Undirected
Nodes:	30
Edges:	51
Density:	0.117241

Influence data

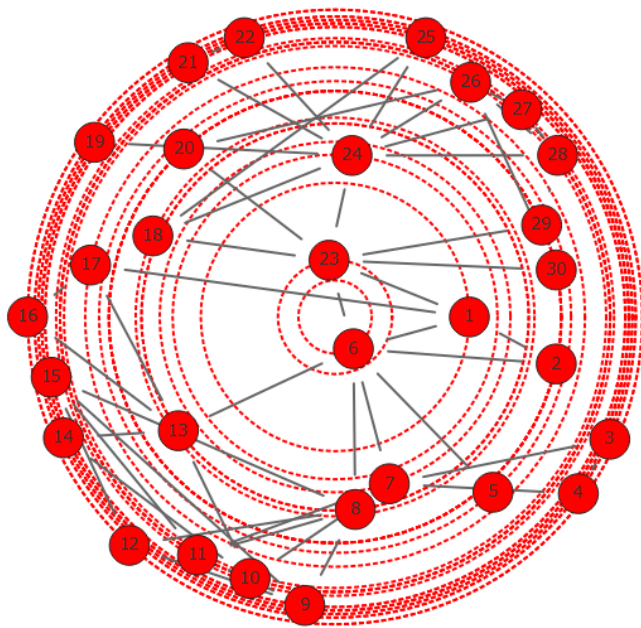
IRCC range: $0 \leq \text{IRCC} \leq 1$ (IRCC is a ratio)

Node↑	Label↑	IRCC↑	%IRCC'↑
1	1	0.420290	42.028986
2	2	0.345238	34.523810
3	3	0.284314	28.431373
4	4	0.284314	28.431373
5	5	0.337209	33.720930
6	6	0.500000	50.000000
7	7	0.386667	38.666667
8	8	0.371795	37.179487
9	9	0.292929	29.292929
10	10	0.305263	30.526316
11	11	0.305263	30.526316
12	12	0.278846	27.884615
13	13	0.371795	37.179487
14	14	0.287129	28.712871
15	15	0.292929	29.292929
16	16	0.278846	27.884615
17	17	0.325843	32.584270
18	18	0.367089	36.708861
19	19	0.287129	28.712871
20	20	0.345238	34.523810
21	21	0.290000	29.000000
22	22	0.290000	29.000000
23	23	0.483333	48.333333
24	24	0.397260	39.726027
25	.	0.290000	29.000000
26	26	0.308511	30.851064
27	27	0.302083	30.208333
28	28	0.305263	30.526316
29	29	0.345238	34.523810
30	30	0.345238	34.523810

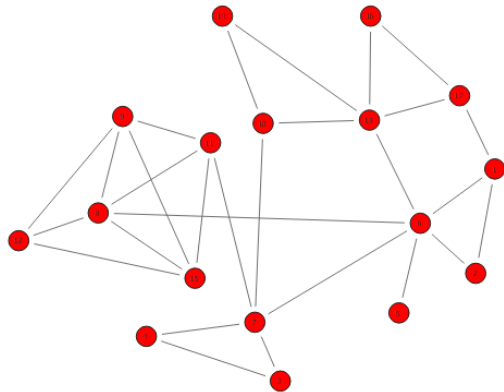
The Radial Degree of Centrality Graph



The Radial Closeness Graph



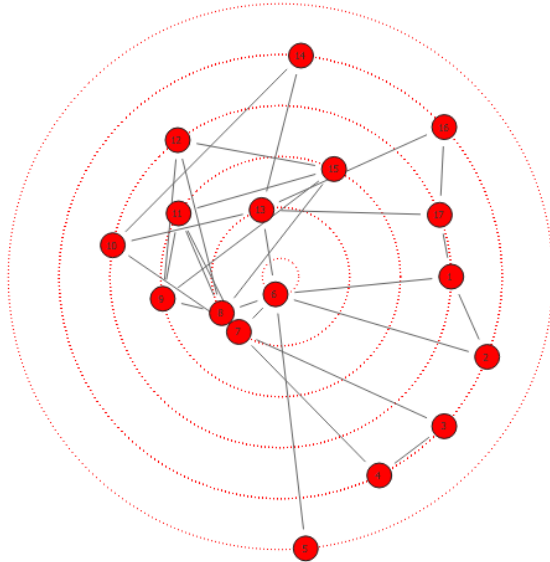
Police-affiliation



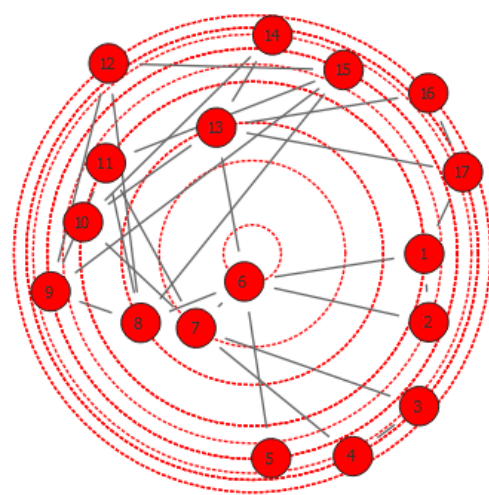
Actor\Actor	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
2	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0
4	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
6	1	1	0	0	1	0	1	1	0	0	0	0	1	0	0	0	0
7	0	0	1	1	0	1	0	0	0	1	1	0	0	0	0	0	0
8	0	0	0	0	0	1	0	0	1	0	1	1	0	0	1	0	0
9	0	0	0	0	0	0	0	1	0	0	1	1	0	0	1	0	0
10	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0
11	0	0	0	0	0	0	1	1	1	0	0	0	0	0	1	0	0
12	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0
13	0	0	0	0	0	1	0	0	0	1	0	0	0	1	0	1	1
14	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0
15	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
17	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0

Network	
Type:	Undirected
Nodes:	17
Edges:	28
Density:	0.205882

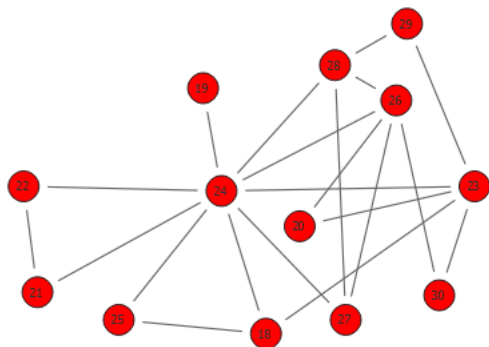
The Radial Degree of Centrality Graph



The Radial Closeness Graph



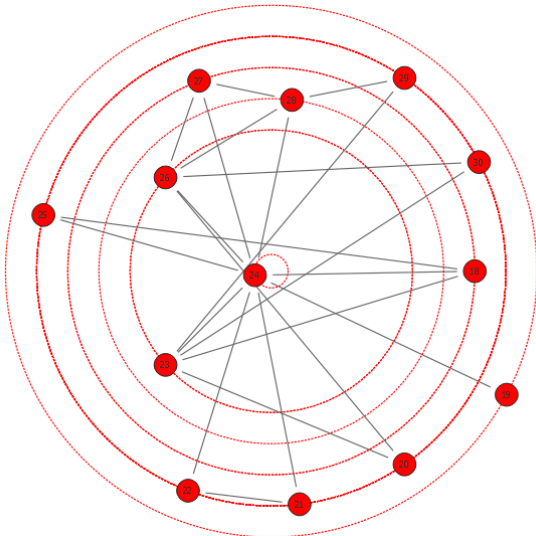
Black organization -affiliation



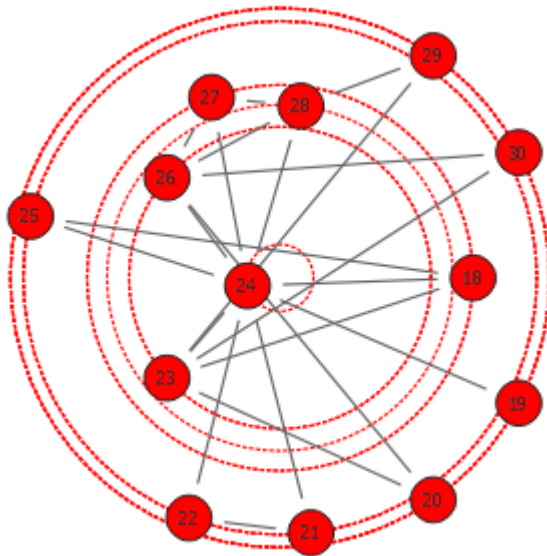
Actor/Actor	18	19	20	21	22	23	24	25	26	27	28	29	30
18	0	0	0	0	0	1	1	1	0	0	0	0	0
19	0	0	0	0	0	0	1	0	0	0	0	0	0
20	0	0	0	0	0	1	0	0	1	0	0	0	0
21	0	0	0	0	1	0	1	0	0	0	0	0	0
22	0	0	0	1	0	0	1	0	0	0	0	0	0
23	1	0	1	0	0	0	1	0	0	0	0	1	1
24	1	1	0	1	1	1	0	1	1	1	1	0	0
25	1	0	0	0	0	0	1	0	0	0	0	0	0
26	0	0	1	0	0	0	1	0	0	1	1	0	1
27	0	0	0	0	0	0	1	0	1	0	1	0	0
28	0	0	0	0	0	0	1	0	1	1	0	1	0
29	0	0	0	0	0	1	0	0	0	0	1	0	0
30	0	0	0	0	0	1	0	0	1	0	0	0	0

Network	
Type:	Undirected
Nodes:	13
Edges:	21
Density:	0.269231

The Radial Degree of Centrality Graph



The Radial Closeness Graph



IV. Discussion

- **The whole network**

in the whole network we have a total node of 30. we have one clique which is consist of: Hiaibara

Aiyomi, Conan, Genta and Metso. the density of whole network is not that low or high (The density of the network = 0.117241).

However, it seems that there is a block in the network that have high density and there will be a discussion in the coming sections.

The density in the network is not high because the whole network is consisting of two affiliations. the influencers table show that Shinichi have is the most influencer by INFLUENCE RANGE CLOSENESS CENTRALITY (IRCC) = 0.5 and (Vermouth has IRCC = 0.48).

about the centrality Gin is the most centered node after that Shinichi and Vermouth. About the closeness the graph shows there is close relation between all the nodes.

- **Police-affiliation**

From the graph Shinichi is the most important node. And that can be proof from the centrality graph. And by little deference in centrality Hiji and Haibara come after.

From the closeness graph also, Shinichi is in the center. the whole graph has density = 0.20 and it is high density compare to the whole network graph.

- **Black organization- affiliation**

- From the graph Gin is the most important node. And that can be proof from the centrality graph. And by big deference in centrality Vermouth and Vodka come after.

- From the closeness graph also, Gin is in the center. the whole graph has density = 0.27 and it is high density compare to the whole network graph.

V. Conclusion

From this social network analysis, it concluded that there are two main groups in the whole network holed by two characters Shinichi and Vermouth. These two characters are like bridge between the two groups. Farther more, it concluded that the black organization is stronger than the police because it has better density. Also, Gin the most connected member in the black organization but Vermouth is more influencing than him because it has a connection to the other the group of the whole network. Therefore, more connection does not mean more influencing.