

---

## **Modeling for Crime Busting**

### **• The restatement of the question**

With the rapid development of the economic , the gap is wider and wider between the rich and poor in different levels , economic class criminal case takes up an increasing proportion in all cases , and people's degree of education is higher , thus the means of committing a crime are more skillful . In this background , we get this case.

Supposed the organization which we are in called ICM is investigating a conspiracy to commit a criminal act . The investigators are highly confident they know several members of the conspiracy , but hope to identify the other members and the leaders before they make arrests .As far as the information we get , it implicates a firm which contains 82 employees , and some of them are planning a conspiracy which embezzle and theft via the online fraud to defraud the consumers capital . As a employee of ICM , the mission of us is to bring these criminals to justice according to the information what we have known , making the economic of our firm safer . And try to avoid the harm from our customers.

At the same time , the top executive told us the experience and method of the case they have experienced and hoping we can find out the criminal behind the sciences as soon as possible improve the reputation of ICM industry.

### **• Valuation of model**

The purpose of mathematical modeling is to simplify the complex and hugeness question , thus the model which we established is simple , avoiding the complex and miscellaneous formula.

In the first question , we found that the majority of data which got from the established model are in accordance with the fact , but its still cannot avoid that just extremely small data cannot meet this model . For instance , Anne isn't a criminal who known in advance , but text on this person , she is a criminal . so the model still retains some error . However , In the range of allowable error , its feasible and effective .

In the second question , owing to the data are fewer than the first question , but is more precise . Adding to this factors , we also ensure another criminal , thus our model will be more precise to describe the questions.

In the third question , semantic network and text analysis are the primary methods . Demarcating the limits more meticulous , and cutting down the investigation number .

---

## • Requirement 1

### Analysis of issue

Through the study of Problem 1 , we can interpret this relates to the number of cases of a preliminary analysis , and narrow the scope of investigation , to reduce the workload . From the analysis of problem 1 belonging to the research problem , we applied statistical and probabilistic methods to solve this problem .

Since Topic 7, Topic 11 and Topic 13 are known to reliable sources , so by these three problems , select related items to build a simple communication network , in accordance with the suspicious messages associated degree to suspect a person suspected of sort, when more than a certain degree of suspicion can people believe the investigations . So build a similar to the prisoner's dilemma game model . This model is divided into two sub models .

### Definition and description of the symbols

1、 X、 Y、 Z : Represent the main suspected information , minor suspected information and normal suspected information separately .

2、 A、 B、 C : Represent the impact of the main suspected information X , the minor suspected information Y , the normal suspected information Z separately.

3、 P : Represent the sum of the main suspected information , minor suspected information and normal suspected information .

4、 Q : Represent the indicators established in Topic 1 .

### Model and solving

By means of the major emphasis of the information 7、 1、 13 , classify those into major doubtful information 7 , minor 11 and general 13 , firstly via the excel pick up the two person who have connection in 7、 11、 13 in the extra message and statistics the everyone's appearance times respectively , we can get a chart 1 as following.

Chart 1:

---

<b>Node #</b>	<b>Name</b>	<b>7</b>	<b>11</b>	<b>13</b>
0	Chris			
1	Kristina			
2	Paige			4
3	Sherri	2	3	1
4	Gretchen	1	3	1
5	Karen	2	1	
6	Patrick	2	1	
7	Elsie	3	3	3
8	Hazel	1		1
9	Malcolm	1		
10	Dolores	4	1	1
11	Francis		2	
12	Sandy	1		
13	Marion	2	2	1
14	Beth		2	
15	Julia	2	2	
16	Jerome	1	3	1
17	Neal	3	1	1
18	Jean		3	2
19	Kristine	1	1	1
20	Crystal	1	1	1
21	Alex	5	6	3
22	Eric	3	1	
23	Wesley			1
24	Franklin			1
25	Claire			
26	Marian			
27	Marcia	1	1	
28	Dwight	2	1	1
29	Wayne			3
30	Stephanie		1	1
31	Neal		1	1
32	Gretchen	1	1	1
33	Kim		1	
34	Jerome	2	2	
35	Shelley	1	1	
36	Priscilla			2
37	Elsie	1	1	1
38	Beth	1	2	
39	Erica		1	
40	Douglas		1	1
41	Donald	3		

42	Katherine		1	
43	Paul	3	2	1
44	Patricia			2
45	Lois			1
46	Louis	1	1	
47	Christina	2	2	
48	Darlene	1	2	1
49	Harvey	3		2
50	William	2	1	
51	Dayi	1		
52	Vind			
53	Chara			
54	Ulf	4	2	3
55	Olina			
56	Cha			1
57	Sheng			1
58	Lao			
59	Darol			
60	Lars	1		
61	Le			
62	Mai			
63	Quan			
64	Tran			
65	Jia	1	1	
66	1			
67	Yao	8	2	4
68	Ellin			
69	Han		1	
70	Hark			
71	Cory			
72	Andra		1	
73	Carina			
74	Gard			
75	Bariol		1	
76	Cole			
77	Gerry			
78	Este	1		
79	Phille		1	
80	Fanti	1	1	
81	Seeni	3	1	
82	Reni	1		

So that

以上内容仅为本文档的试下载部分，为可阅读页数的一半内容。如要下载或阅读全文，请访问：<https://d.book118.com/075034110031011303>