



Six degrees of messaging

Study of instant messaging shows worldwide personal links.

Yet more evidence has turned up to show that we are only six steps removed from almost anyone else on the planet.

Eric Horvitz, at Microsoft Research in Redmond, Washington, and Jure Leskovec, who was an intern at the time, crunched through masses of data, logging a month's worth of global 'instant messaging' conversations using Microsoft Messenger — software that facilitates chat, in a similar way to e-mail, but in a more instantaneous and less formal fashion. The researchers then counted how many messages were sent and from where: in total they tallied up a whopping 255 billion messages sent in the course of 30 billion conversations among 240 million people during June 2006.

No personal or identifiable data could be seen, and the researchers had no access to message content, although they could correlate messages with information about age and gender logged by users when they registered for the service. "We didn't probe individuals," says Horvitz, "we were looking at patterns."

The resulting figures produced a neat map of communication hotspots across the world, and allowed Horvitz and Leskovec to trace the extent of separation between Microsoft Messenger users. They found that the average shortest number of jumps to get from one random user to another was 6.6; spookily close to the infamous six degrees of separation demonstrated practically in a group of 64 people by Stanley Milgram, at Harvard University, in the 1960s.

Horvitz says he was surprised that their analysis so closely matched the 1967 result. He wonders whether the number six is a basic constant for social interactions. "Do we have a natural harmonic for social communication?" he

25 asks. “This is my conjecture — more work needs to be done on that.”

They will present their findings at the 17th International Conference on World Wide Web, in Beijing in April.

❖ Scaled up

In 2003 Duncan Watts, then at Columbia University and now at Yahoo!
30 Research in New York, did a large e-mail experiment that also confirmed the six degrees of separation idea. His study involved 61,000 volunteers, compared to Leskovec and Horvitz’s 240-million sample. Watts is impressed that the trend that both he and Milgram saw has now been confirmed on such a large scale, and without having to set up a specific experiment: “They are using communication
35 data, so the links do represent something real,” says Watts.

Horvitz and Leskovec saw a number of other trends in their data. Over long distances instant messaging between just two people, rather than groups, is more popular (the application allows up to 20 people to chat at once). People prefer to chat to the opposite sex, and tend to stick to talking with people in the
40 same age group, especially when they are young.

❖ Just for kids?

There are obvious biases in the data, with 15- to 30-year-olds being by far the biggest groups of users. Geographically, the majority of users were in North America, Europe and Japan; large areas of the developing world provided no
45 data at all. In Africa, most users were located around coastal areas, and North Korea was completely ‘dark’.

Adding to the analysis people from these ‘dark’ areas, and people who don’t use computers, might be expected to produce a larger number for the shortest separation between people. But the team points out that there are other
50 connections, such as those between grandchildren and grandparents that don’t show up in their map of instant messenger interactions.

It is difficult to say what would happen if the data truly covered the Earth’s complete social network, but both Horvitz and Leskovec expect the numbers to stand up: “I can only speculate, but I think we would see something very similar,
55 maybe a small increase in average path length,” says Leskovec, “something more towards seven degrees of separation.”

Notes

title Six degrees of messaging 「6 次のメッセージ」 “six degrees of separation” (l. 20) を下敷きにした表現。
1. Yet more evidence 「さらにたくさんの証拠」 yet は even や still 同様、比較級を強める。**1.** has turned up 「現れた」
4. intern 「見習い」
4. crunched through masses of data 「大量のデータをバリバリ処理した」
5. a month’s worth of 「…の1カ月分に値する」
6. facilitates chat 「チャットをしやすくする」
8. tallied up … messages 「2550億のけたはずれに多くのメッセージを合計した」
12. correlate … information about 「メッセージを…についての情報とつき合わせる」
14. probe 「調査する」
16. communication hotspots 「コミュニケーションが密に行われている地域」
19. jumps 「飛び移り」 ひとりのユーザーから次のユーザーへとメッセージが飛んでゆくこと。
19. spookily 「気味の悪いほどに」
20. six degrees of separation 「6 次の隔たり」 知り合いを6人以上介在させると人は世界中の人々と間接的な知り合いになれるという仮説。1967年に心理学者スタンレー・ミルグラムが行った「スモールワールド実験」によって検証された。この実験と結果については多くの異論が唱えられており、「infamous」(l. 20)にはその影響が見られる。
22. the 1967 result 「その(ミルグラムの実験によって得られた)1967年の結果」
23. a basic constant 「ひとつの基本定数」
24. a natural harmonic 「自然倍音」 倍音とは基本となる音の周波数の倍の周波数を持つ音。
25. conjecture 「推論」
42. biases 「偏り」
bias の複数形。
46. completely ‘dark’ 「まったく『つかめない』」 dark はこの場合、no data reported というくらいの意味。



Things to Know

True or False

Mark the statement as true (T) or false (F).

- () The researchers did not look at the content of the messages used in the study.
- () The study confirms that nearly everyone in the world is separated by, on average, six degrees of separation.
- () The researchers found that with long distance messages more than two people are usually involved in a chat.

Multiple Choice

Fill in the blank with the most appropriate choice.

- The researchers did not set up an experiment, but instead relied on _____ that already existed.

a testimony b publications c data

- Horvitz and Leskovec used the _____ of each of the messages as they looked for patterns.

a length b formality c origin

- If people from the developing world are added to the study, the researchers believe the number of degrees of separation would increase _____.

a slightly b significantly c unpredictably

New Options

Circle the option that would be the best conclusion for the article.

- Since the data covers only one month, how can it be reliable?
- We had better install computers all over the world, shouldn't we?
- Whether the final number turns out to be six or to seven, the world seems to be getting smaller, doesn't it?

Classification

Choose the three most relevant categories for the article.

- 1 Sociology
- 2 Horticulture
- 3 Marketing
- 4 Real Estate
- 5 Computer Science
- 6 Statistics

Words to Know

1 Complete the underlined expression taken from the article.

- 1 The waitress removed the dishes (_____) the table.
- 2 We paid only \$90 (_____) total for our theater tickets.
- 3 The beginning of many illnesses can be correlated (_____) an increase in stress.
- 4 This is (_____) far the oldest castle I've ever visited.
- 5 The scandal only added (_____) the movie star's popularity.

by from in to with

2 Complete the word in parentheses.

- 1 (reg) for Organic Chemistry [有機化学の授業に登録する]
- 2 (dem) a benefit of the new medicine [その新薬の効果を明らかにする]
- 3 (pre) outdoor activities [野外活動を好む]
- 4 (te) to be neglected [見逃される傾向にある]
- 5 (p) out the significance [重要性を指摘する]

3 Choose the defined word.

- 1 identification of being “male” or “female” []
- 2 a student who works in an office so as to get experience in an industry []
- 3 an idea or opinion that is based on a guess, as clear evidence is not available []
- 4 a situation where two things have an effect on each other []
- 5 how far something has spread in influence or area []

a extent b conjecture c gender d interaction e intern

4 Complete the table below. Then, fill in the blanks in the sentences. Use one word from each pair.

1	produce	作り出す	⇒	形容詞形	
2		分析する	⇒	名詞形	analysis
3	confirm	確認する	⇒	名詞形	
4	coastal	沿岸の	⇒	名詞形	
5	speculation	推測	⇒	動詞形	

- 1 A close () of the paper shows it was made in ancient Egypt.
- 2 On Sunday we enjoyed driving along the beautiful ().
- 3 The committee members all agreed that it had been a very () meeting.
- 4 There was much () at the office about the possibility of a merger.
- 5 We are waiting for official () of the decision.

FAQ Corner

Use the attached word list to complete the answer to each “FAQ.”

Q1 What is pattern analysis?

A Pattern analysis is a strategy that reveals the structure that a large amount of () may have. By using pattern analysis, a researcher can discover () between data points that would otherwise be difficult to find. For example, there was a terrible outbreak of cholera in London in 1854. Dr. John Snow made a () of where each person who fell ill with cholera got their water. He discovered that many of the victims used water from the Broad Street Pump. After that well was closed, the cholera outbreak went away. Until Dr. Snow discovered the pattern, nobody knew how the disease was (). Pattern analysis is increasingly useful in today’s complex world, where there is a great need to analyze data.

data map relationships spreading

Q2 What are the six degrees of separation?

A The idea of six degrees of separation is that in a human-to-human network a () of, at most, six people is all that is needed to connect any one person with any other person. For example, in a small town each person could deliver a message () to any other member. In larger communities nobody knows every other person. However, each person has a different circle of friends and (). A message could be given to someone, and they could () it to another person they know in a different circle, and so on, until the message reaches the person it was meant for. Each transfer from one circle to another in the process is a “degree of separation.”

acquaintances chain directly relay



To Summarize . . .

Complete the abstract of the article using the words below.

The theory of “six degrees of separation” is that any two people in the world, even if they are separated by continents, can be connected by using six people as (). Recently two researchers at Microsoft tested this theory. They used 255 billion instant messenger messages, the product of 30 billion () generated by 240 million people, to test the validity of the “six degrees” theory. The researchers found that the average () path from one person in the network to another was 6.6. Presumably any () on the network could meet any other person with only six introductions from one person to another. Some parts of the world were not represented in the data the researchers used. The people in such areas may well be connected to people who are on the electronic network. () originating from such areas could show the actual number of degrees of separation is seven.

conversations individual messengers research shortest