

Supporting Communications in Global Networks

Kevin Duh & 歐陽靖民



Supporting Communications in Global Networks

Machine Translation

Kevin Duh



6000

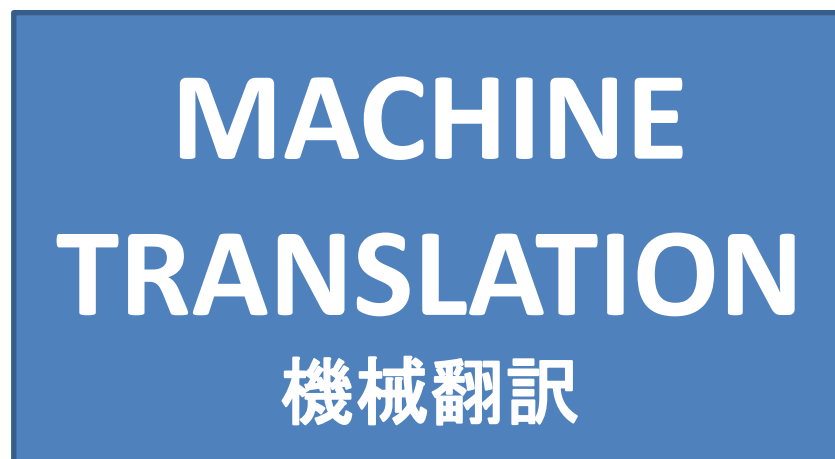
Number of Languages in the World
世界中の言語の数



Transportation Telecommunications Translation

Image courtesy of: [nasa.gov](https://www.nasa.gov)

There are 6000 languages in the world.



世界には6000の言語があります。



**Warren Weaver,
American scientist (1894-1978)**

When I look at an article in Russian, I say: "This is really written in English, but has been coded in some strange symbols. I will now proceed to decode. [1947]

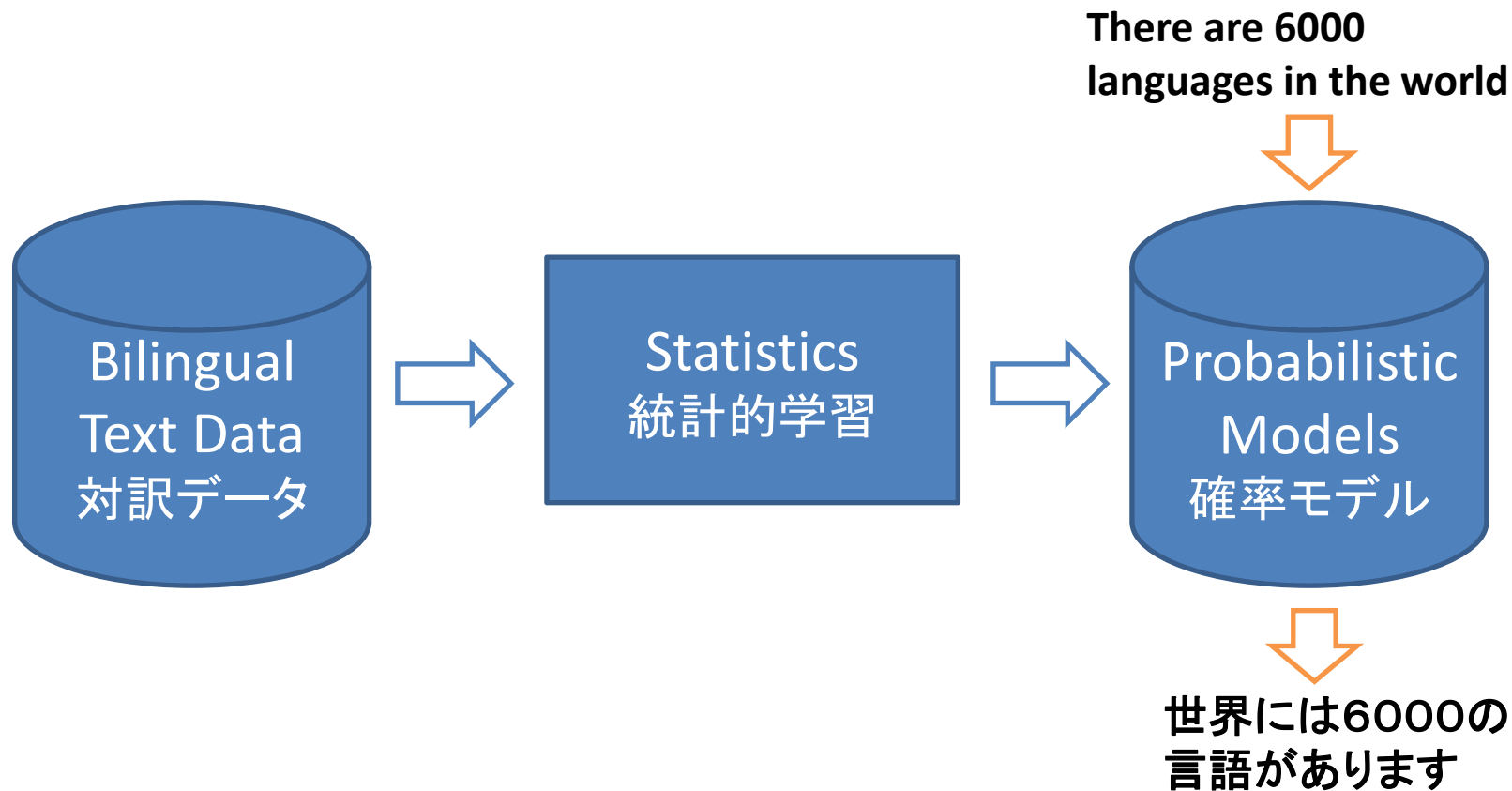
**Rule-Based
Machine Translation**
(1960—now)

Manual encoding of
linguistic knowledge
into rules

**Data-Driven
Machine Translation**
(2000—now)

Exploiting Statistics
from Large Data

Architecture of Data-Driven Machine Translation



Architecture of Data-Driven Machine Translation

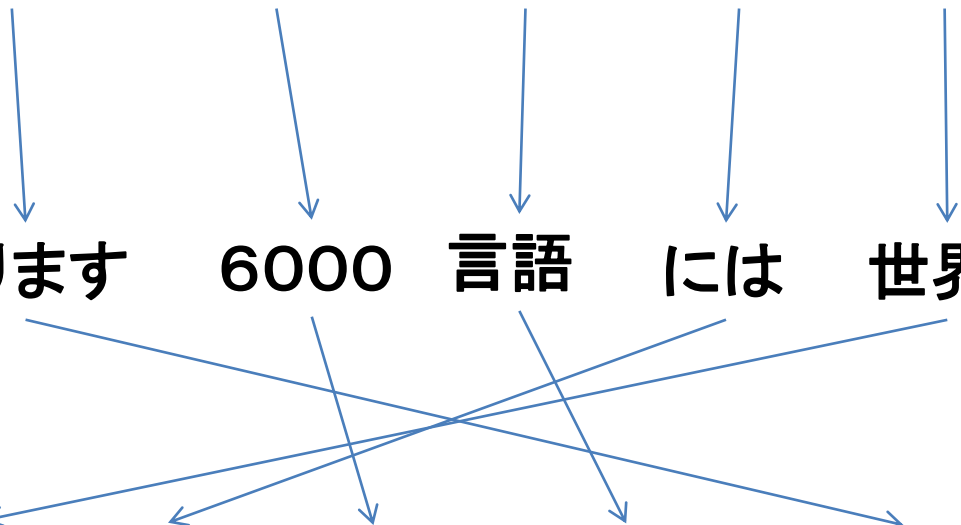
There are 6000 languages in the world

あります 6000 言語 には 世界

世界 には 6000 の 言語 があります

Word Translation
Model

Fluency Model



How to build these models?

Exercise:
Let's build one now!

1a) evas dlrow-eht

1b) ⊕ △

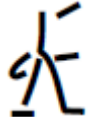

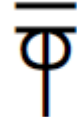

2a) dlrow-eht si detcennoc

2b) ⊕  



3a) hcraeser si tnatropmi

3b)   

4a) ew eb-ot-mia tseb ni dlrow-eht

4b) ⊕    

1a) evas dlrow-ehť




1b)  

Frequency

 dlrow-ehť 3



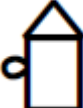
 dlrow-ehť 1

2a) dlrow-ehť si detcennoc

2b)   


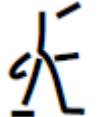



 si 2

3a) hcraeser si tnatropmi

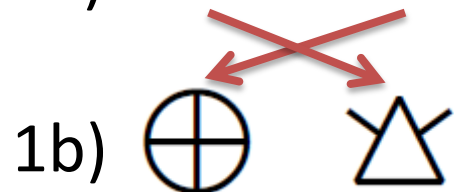
3b)   

 si 1

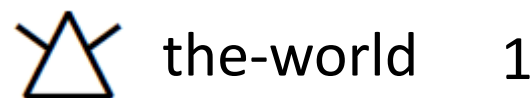
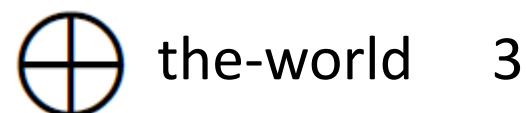
4a) ew eb-ot-mia tseb ni dlrow-ehť

4b)     

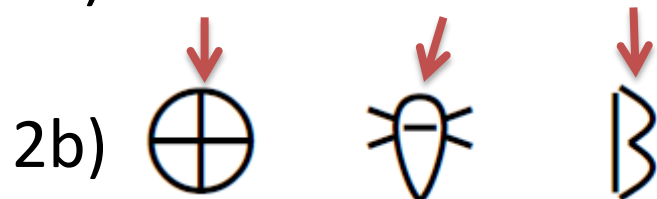
1a) save the-world



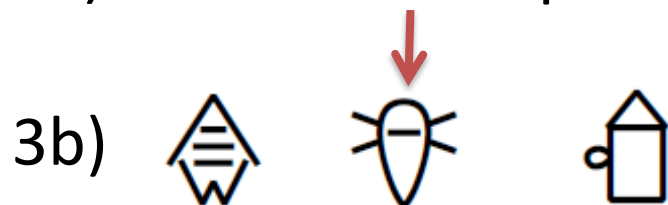
Frequency



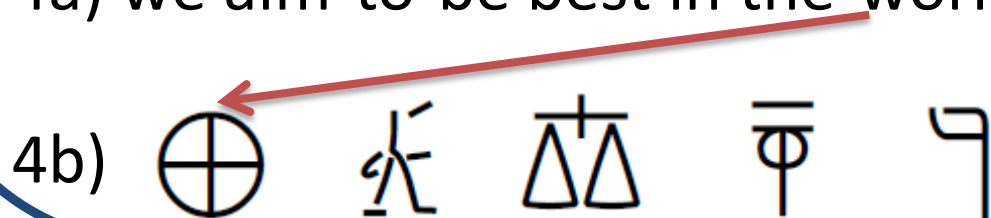
2a) the-world is connected



3a) research is important



4a) we aim-to-be best in the-world



1a) save the-world



1b) 世界 を救え

Frequency

世界 the-world 3

2a) the-world is connected



2b) 世界 は 繋がってる

を救え the-world 1

は is 2

3a) research is important



3b) 研究 は 大事

繋がってる is 1

4a) we aim-to-be best in the-world



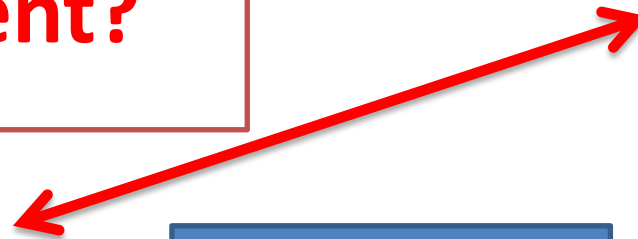
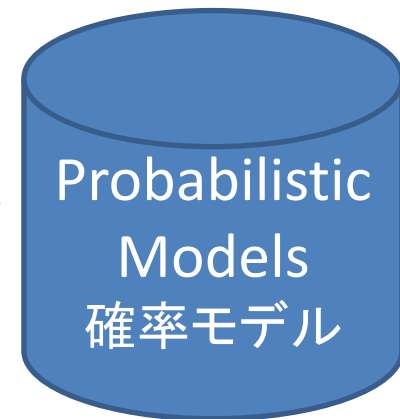
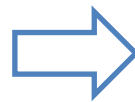
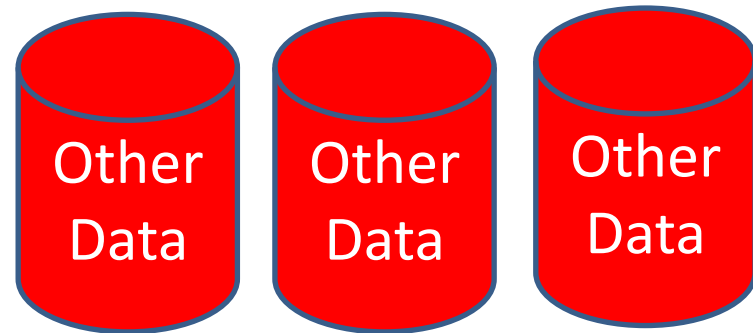
4b) 世界 一 を 狙う

in practice, it's not that easy

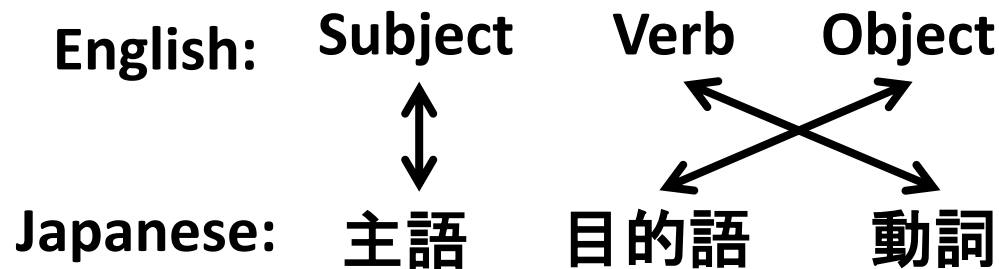
Recent Research Efforts

Duh+(2010), "Analysis of Translation Model Adaptation"
Duh+(2011), "Bayesian Adaptation of Alignment Matrices"

**What if data is
insufficient?**



Recent Research Efforts

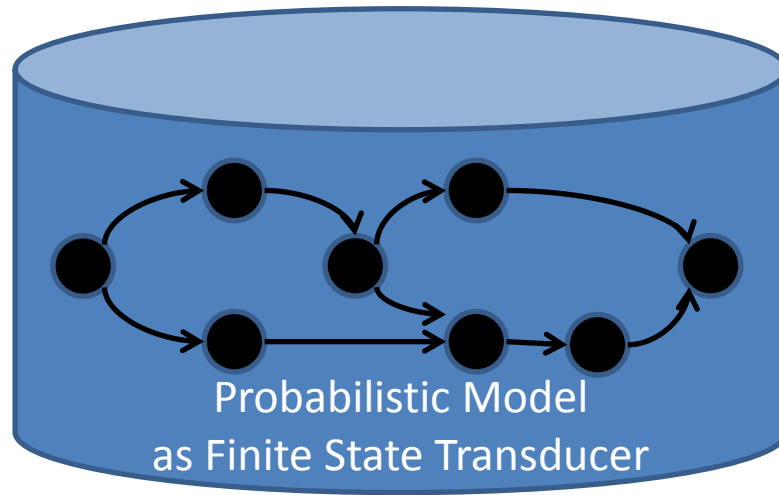


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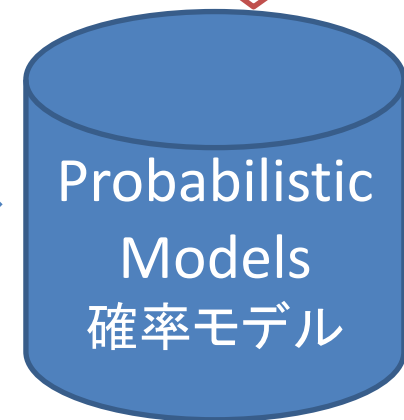
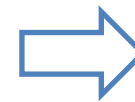
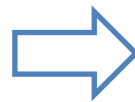
How to use Japanese-specific knowledge?



Recent Research Efforts



**Can we
translate faster?**



Using technology from Speech Recognition:
Hori+(2007), "Efficient WFST one-pass decoding w/ on-the-fly rescoring"

Killer Application for Translation?

Three General Scenarios



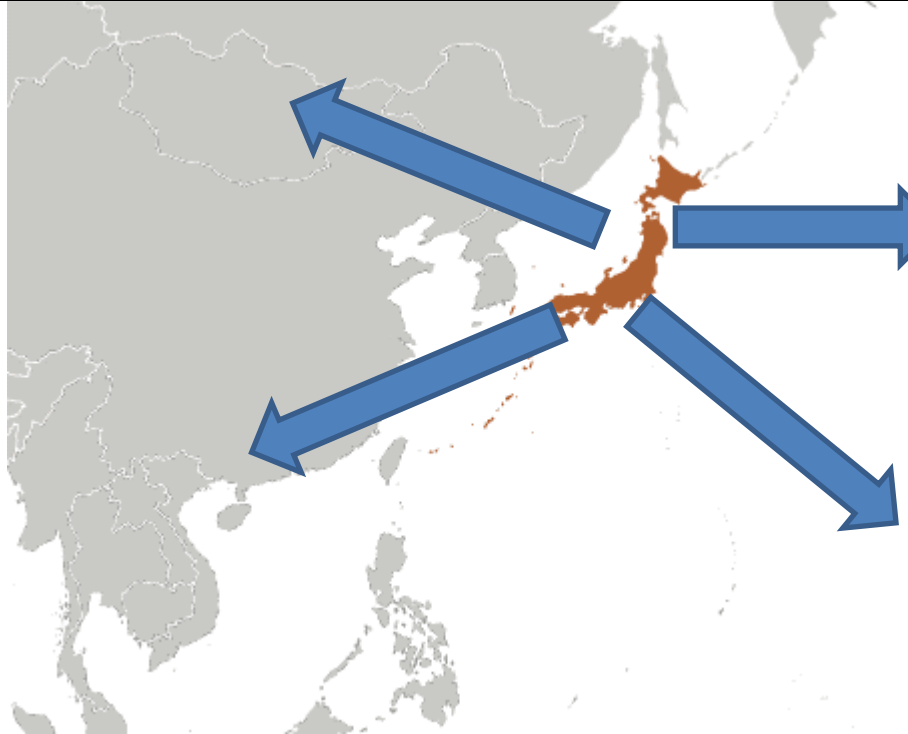
Translation

26 May

The entire world is your market.

Export Things:

Cars
Electronics
Machinery
Steel
Chemicals



Export Culture:

Movies
Manga
Apps
Music
...



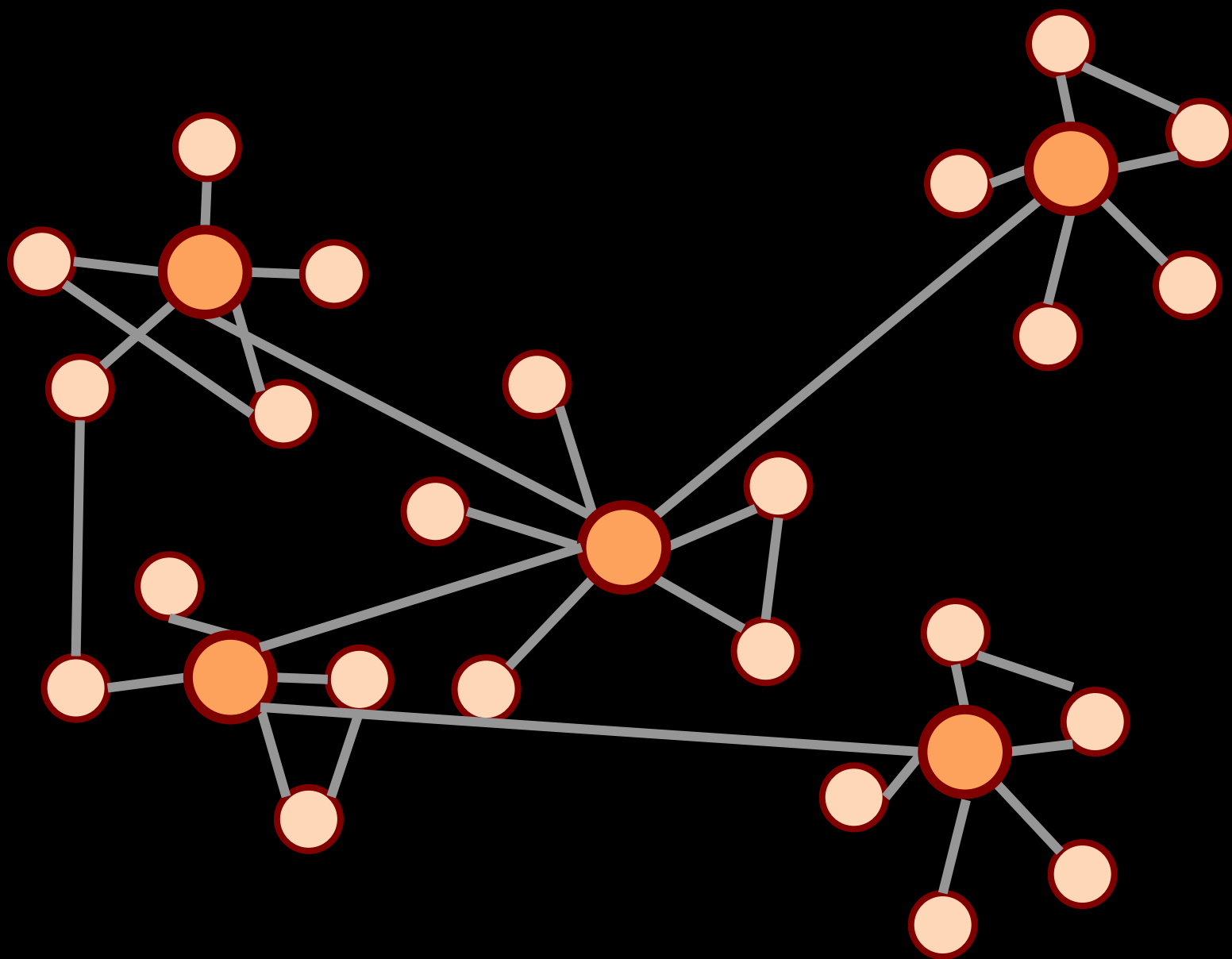
Real-time Conversation– now



How will you use translation technology?



あなたなら、
翻訳をどのようなコミュニケーションに使う？



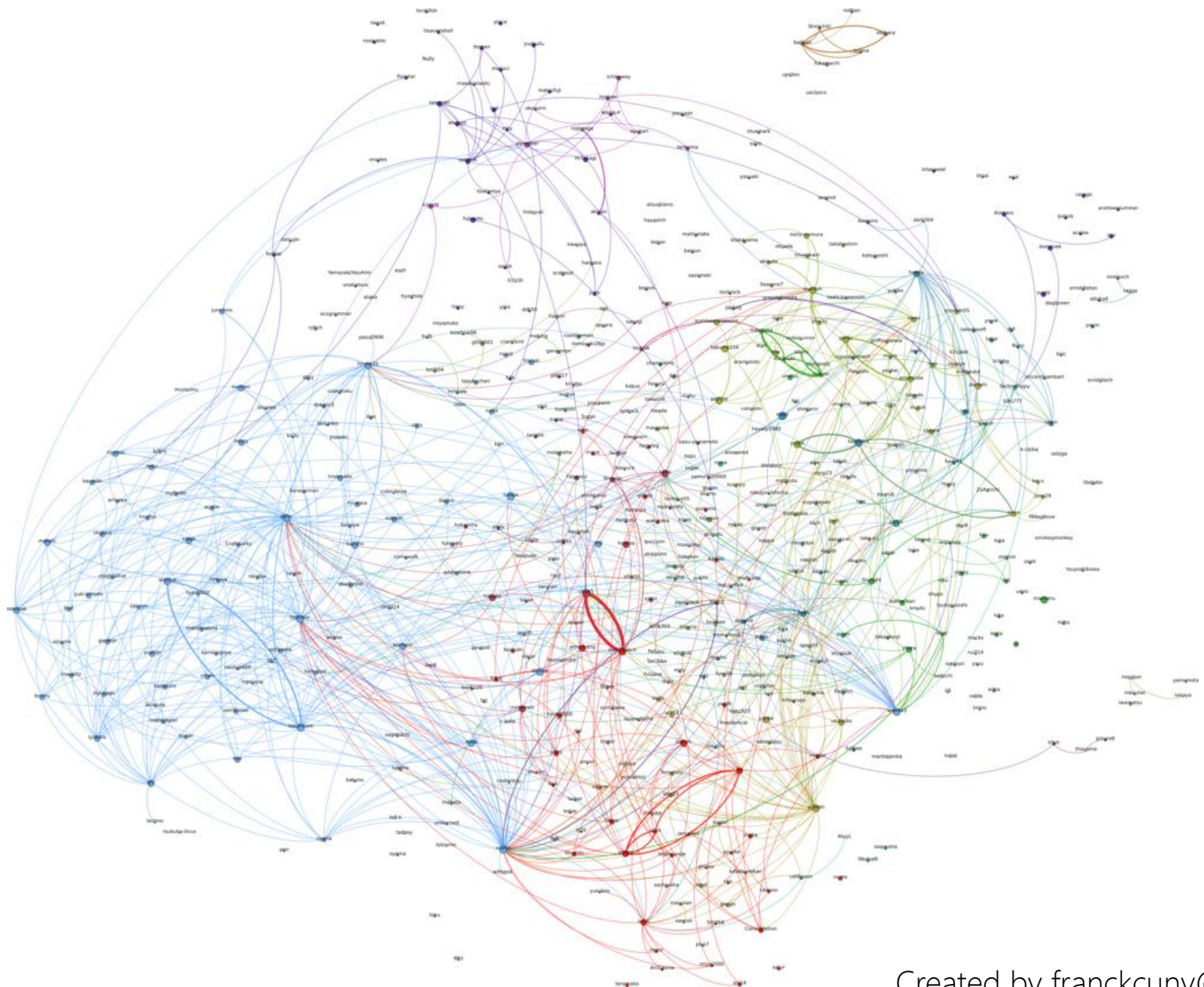
Supporting Communication in Global Networks

Social Network Mining

歐陽靖民



Japanese Programmers on GitHub



Created by franckcuny@Flickr

Social Network Analysis

Methods and Applications

Stanley Wasserman and Katherine Faust



Six Degree of Separation



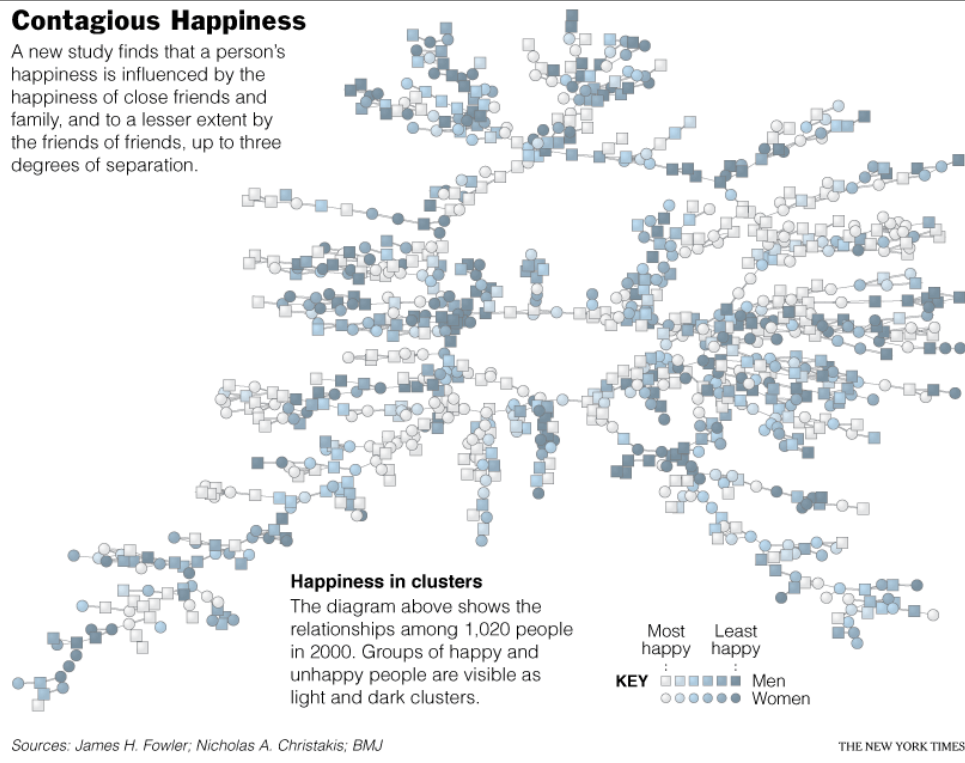
Stanley Milgram
American Social Psychologist
1933-1984



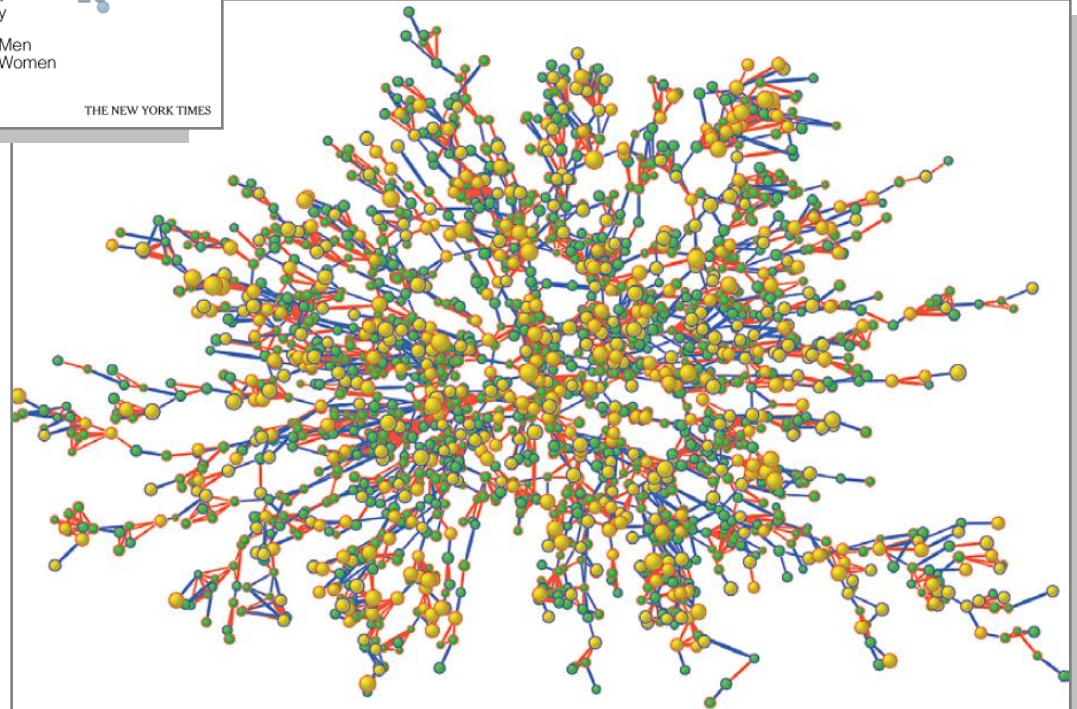
BBC recreating the experiment in 2009
(From Nairobi to Boston)

Contagious Happiness

A new study finds that a person's happiness is influenced by the happiness of close friends and family, and to a lesser extent by the friends of friends, up to three degrees of separation.



Happiness and Social Network (Fowler and Christakis, 2008)



Obesity and Social Network (Christakis and Fowler, 2007)

The Age of Online Social Networking



The image shows the Facebook homepage from around 2008. The top navigation bar is blue with the Facebook logo on the left. On the right, there are input fields for 'メールアドレス' (Email address) and 'パスワード' (Password), with a 'ログイン' (Log in) button. Below the login fields is a checkbox for 'ログインしたままにする' (Keep me logged in). The main content area on the left features a blue header with the text 'Facebookを使うと、友達や同僚、同級生、仲間たちとつながりを深められます。ケータイ、スマートフォンからもアクセスできます。' (Using Facebook, you can deepen your connections with friends, colleagues, classmates, and acquaintances. You can also access it from your mobile phone or smartphone). Below this text is a graphic of a world map with orange person icons connected by dashed lines, representing a global network. On the right side of the main content area is the 'アカウント登録' (Sign up) section, which includes a sub-header '情報の公開範囲は設定で管理' (Manage your privacy settings). The registration form contains fields for '姓 (ローマ字):' (Last name), '名 (ローマ字):' (First name), 'メールアドレス:' (Email address), 'メールを再入力:' (Re-enter email), '新しいパスワード:' (New password), '性別:' (Gender) with a dropdown menu, and '生年月日:' (Date of birth) with year and month dropdowns. A green 'アカウント作成' (Create account) button is at the bottom of the registration form. At the very bottom of the page, there is a small link: '著名人、バンド、ビジネスのための' (For celebrities, bands, and business).

500,000,000 Active Users
30 billion content shared



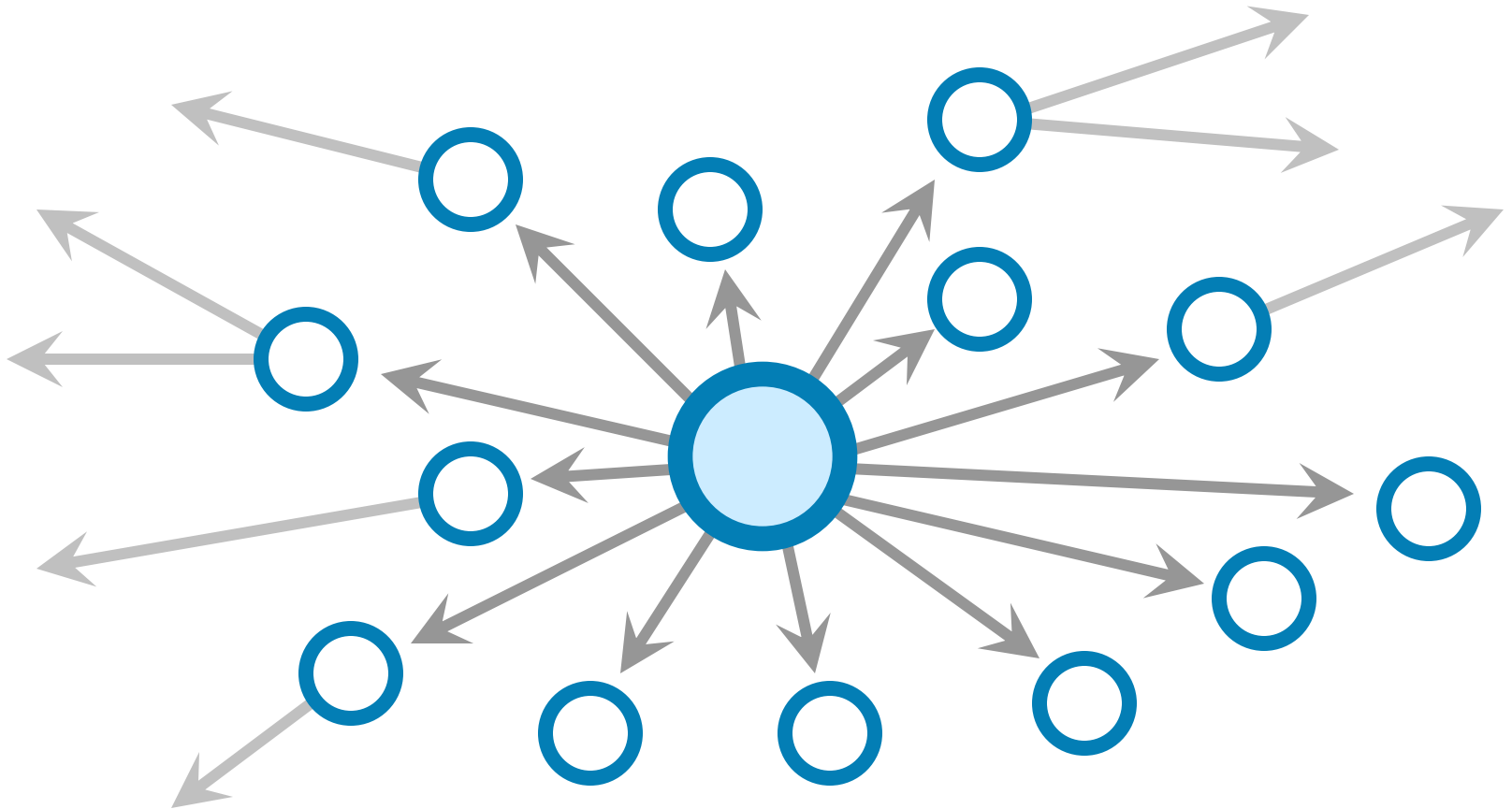
The image shows the Twitter homepage from around 2011. The top navigation bar is blue with the Twitter logo on the left. On the right, there are input fields for 'Username' and 'Password', with 'Remember me' and 'Forgot it?' links. The main content area has a blue header with the text 'Follow your interests' and 'Instant updates from your friends, industry experts, favorite celebrities, and what's happening around the world.' Below this is a search bar labeled 'Search Twitter'. On the right side of the main content area is the 'New to Twitter? Join today!' section, which includes input fields for 'Full name', 'Email', and 'Password', and a yellow 'Sign up' button. At the bottom of the page, there is a row of profile pictures of various users, including celebrities and public figures. Below the profile pictures, there is a section for 'Languages' with links to 'English', 'Français', 'Deutsch', 'Italiano', '日本語', '한국어', 'Русский', 'Español', and 'Türkçe'. At the very bottom, there is a footer with links to 'About', 'Help', 'Blog', 'Mobile', 'Status', 'Jobs', 'Terms', 'Privacy', 'Advertisers', 'Businesses', 'Media', 'Developers', 'Resources', and a copyright notice '© 2011 Twitter'.

200,000,000 Users
65 million tweets per day

Social Network Mining

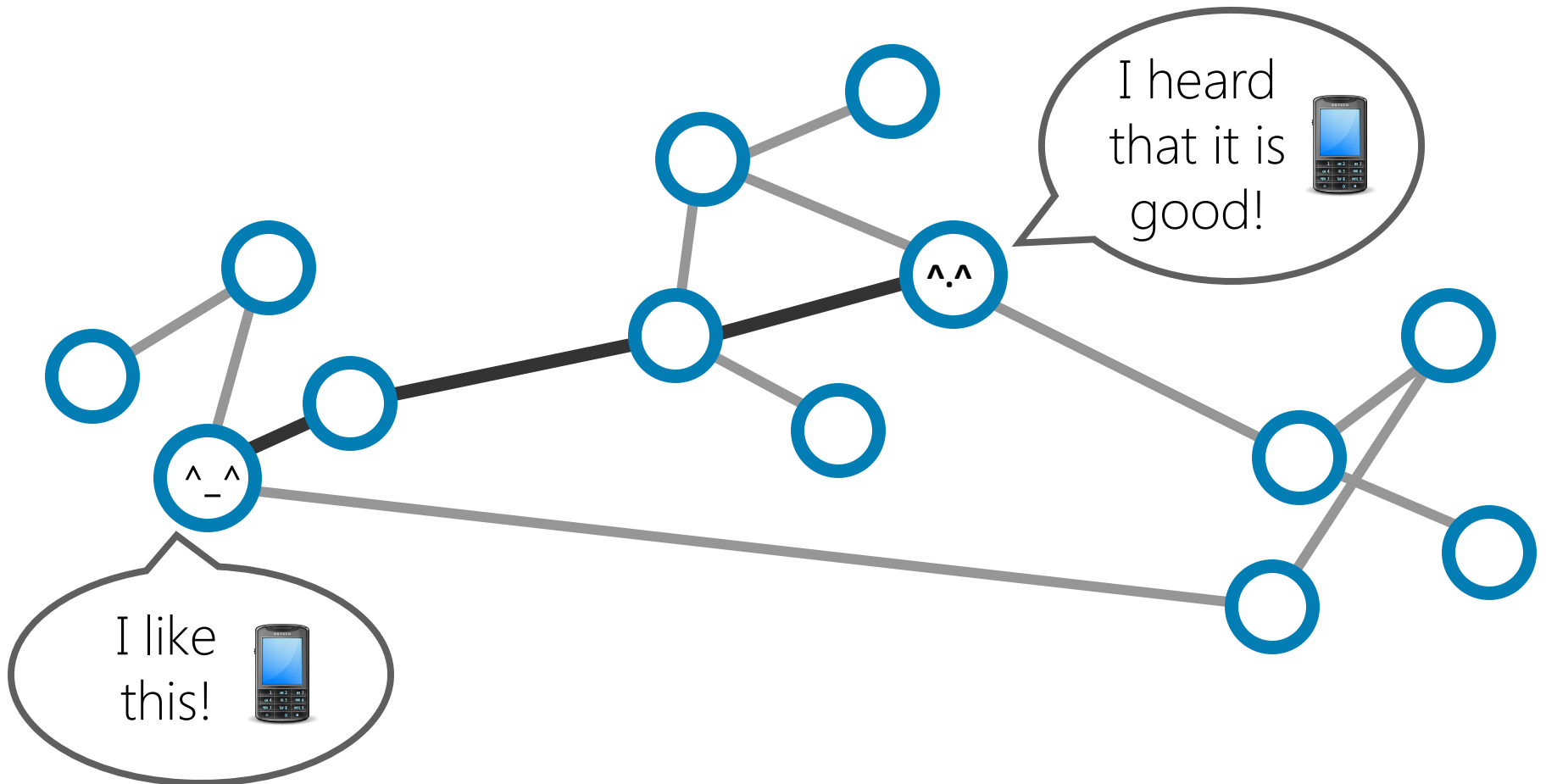
Why social network mining?

Identifying **influential users** in a network



Why social network mining?

Understanding how **information spreads**



Why social network mining?

Making Social Recommendations

The screenshot shows the NTT Docomo smartphone product page. The browser address bar displays www.nttdocomo.co.jp/product/foma/smart_phone/index.html. The page title is "ドコモ スマートフォン ...". The main content area is titled "製品一覧 ※1※2" and displays a grid of six smartphone models:

- F-12G**: 2011夏モデル. 使いやすいにも機能にもこだわった防水コンパクトスマートフォン. 2011年7月～8月発売予定.
- Optimus bright L-07G**: 2011夏モデル. 世界最高輝度ディスプレイで全てを明るく鮮やかに。スタイリッシュ&アクティブスマートフォン. 2011年6月発売予定.
- MEDIAS WP N-06G**: 2011夏モデル. 薄く、軽く、美しい。瞬撮対応の防水最薄スマートフォン. 2011年6月～7月発売予定.
- P-07G**: 2011夏モデル. 美しいデザインと使いやすい大画面 マイ・ファーストスマートフォン. 2011年7月～8月発売予定.
- AQUOS PHONE SH-12G**: 2011夏モデル. ツインカメラと3D液晶で「撮る・観る」が楽しめるダブル3Dスマートフォン. 発売中.
- AQUOS PHONE f SH-13G**: 2011夏モデル. 新スタイルなカンタン充電！お出かけ充電対応防水カジュアルスマートフォン. 2011年7月～8月発売予定.

On the right side, there is a sidebar with a list of categories: データ通信, コンセプトモデル, ブックリーダー, デジタルフォトフレーム, キッズケータイ. Below this is a section titled "担当者に聞く 2011年夏モデル" with a link "担当者に聞く 2011年夏モデル" and a description: "ドコモ スマートフォンのオススメポイント、開発エピソードを掲載しています。". At the bottom of the sidebar is a search bar labeled "製品を検索する".

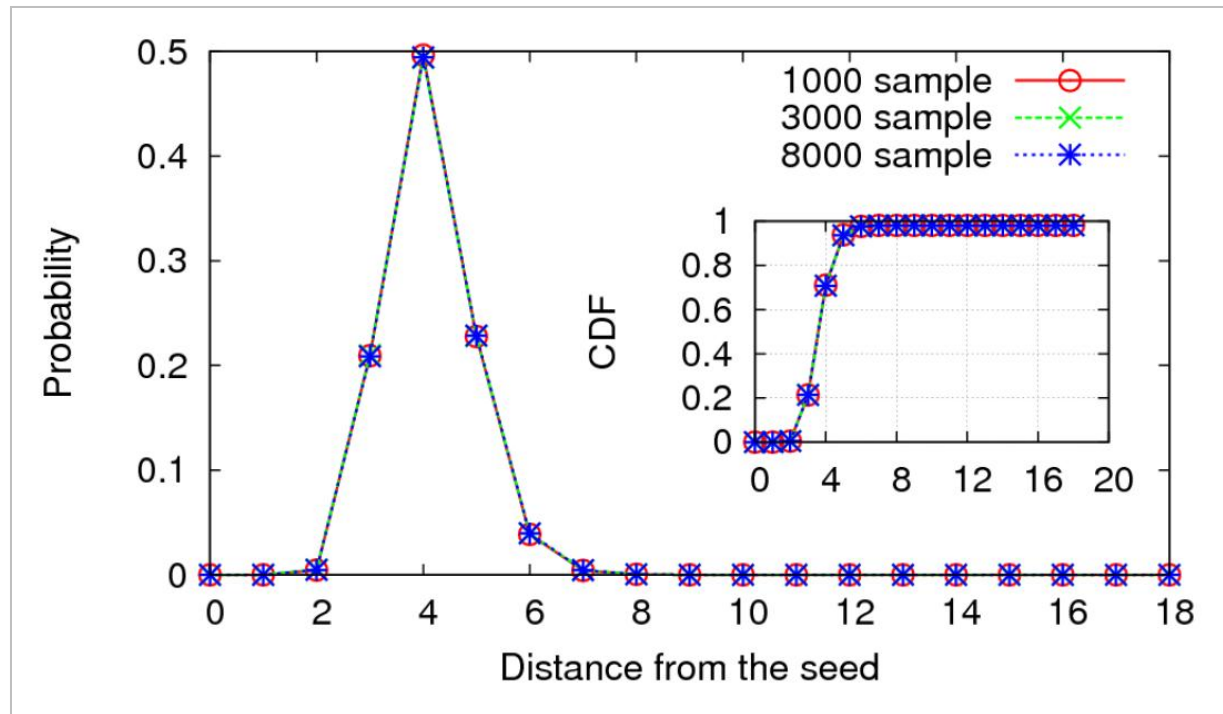
A speech bubble points to the product grid with the text: "30 of your best friends have already bought this!"

Understanding Social Networks

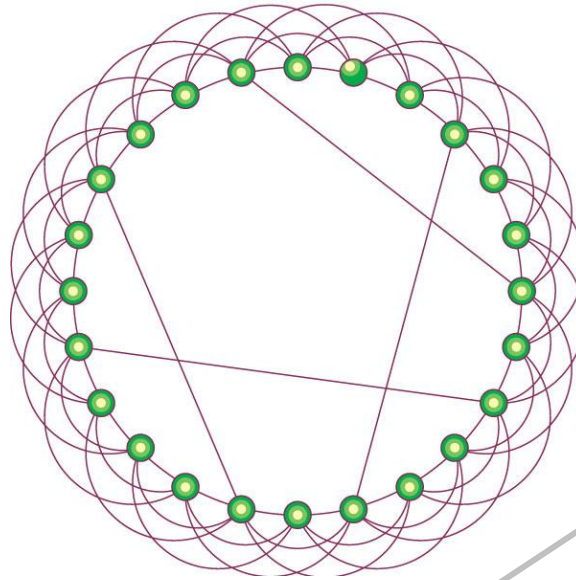
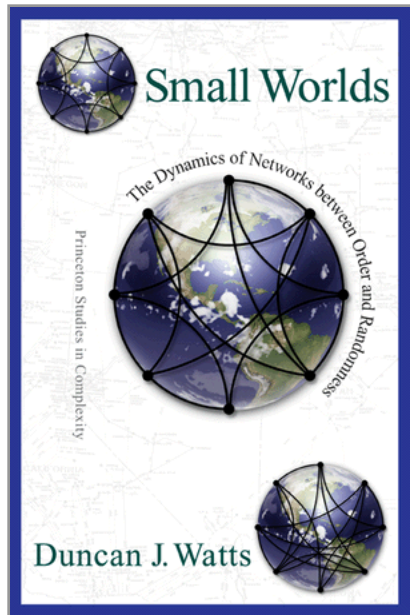
Measuring a Social Network

Example: Studying Twitter

Four Degree of Separation in Twitter



Modeling a Social Network

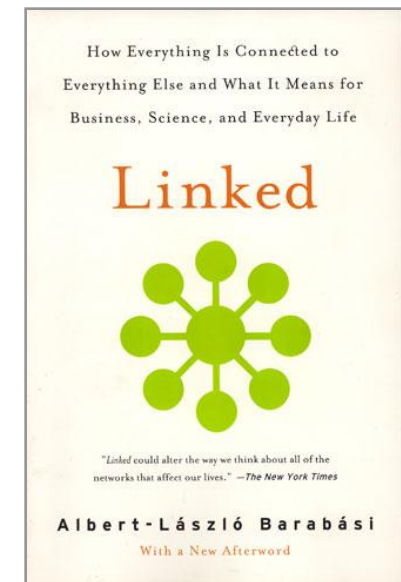
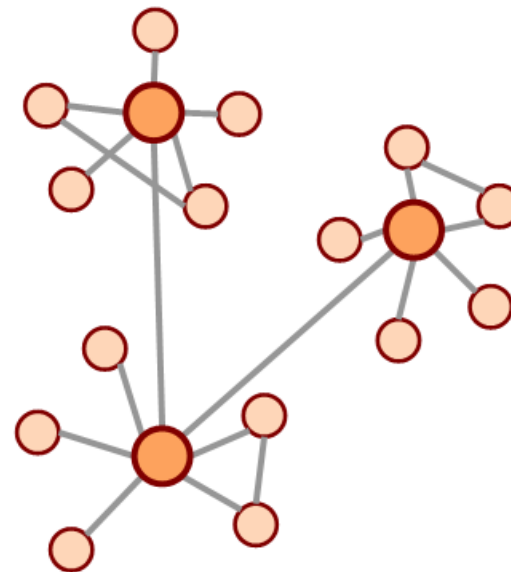


'Exploring complex networks'
(Strogatz, 2001)

Scale-free Networks

Small World Networks

'Emergence of scaling in random
networks'
(Barabási & Albert, 1999)

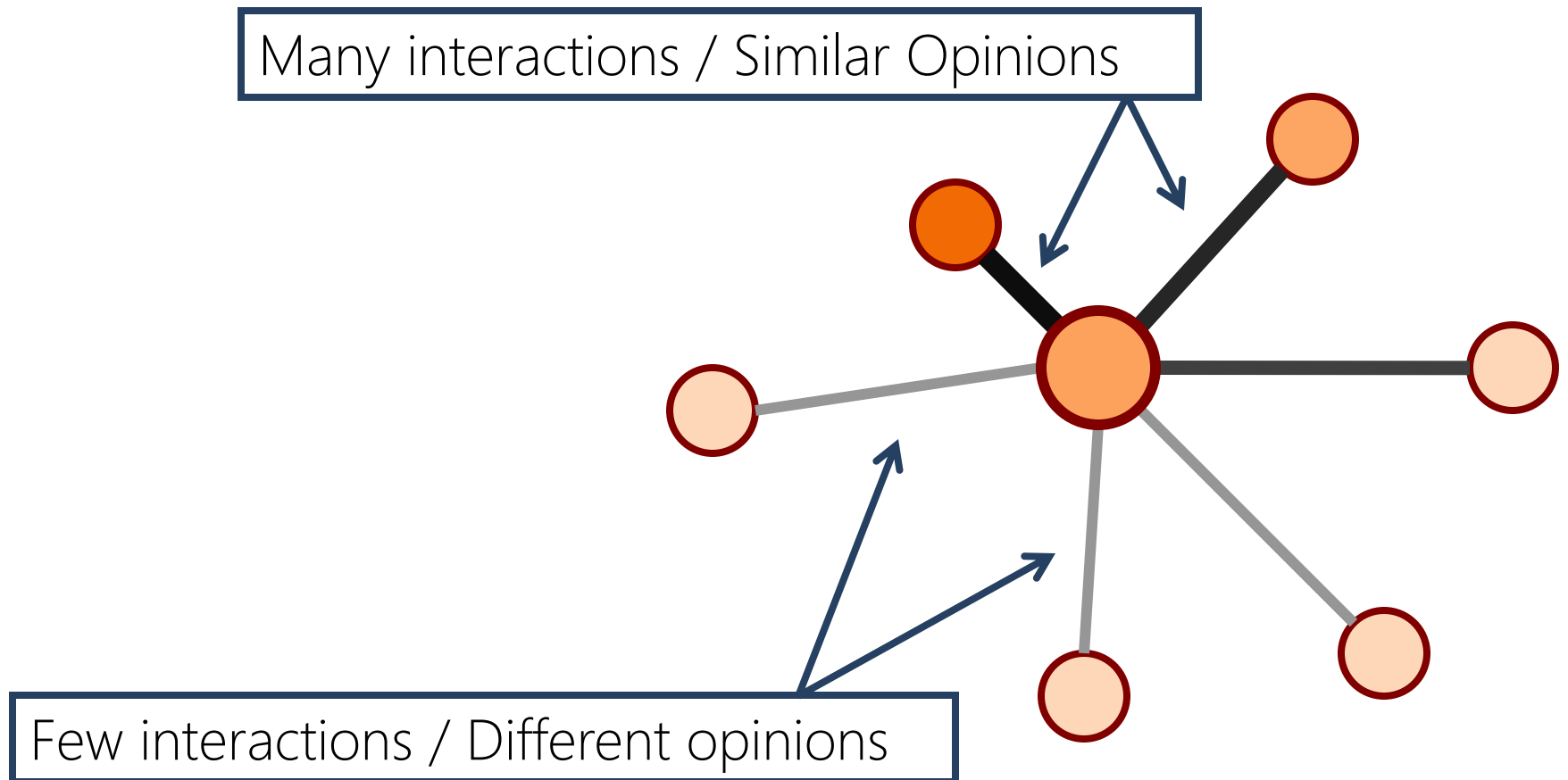


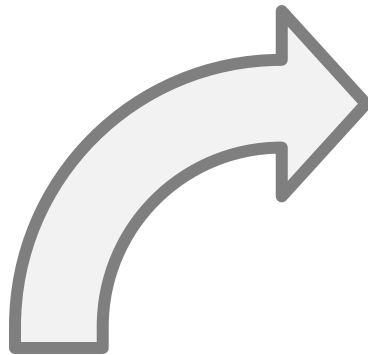
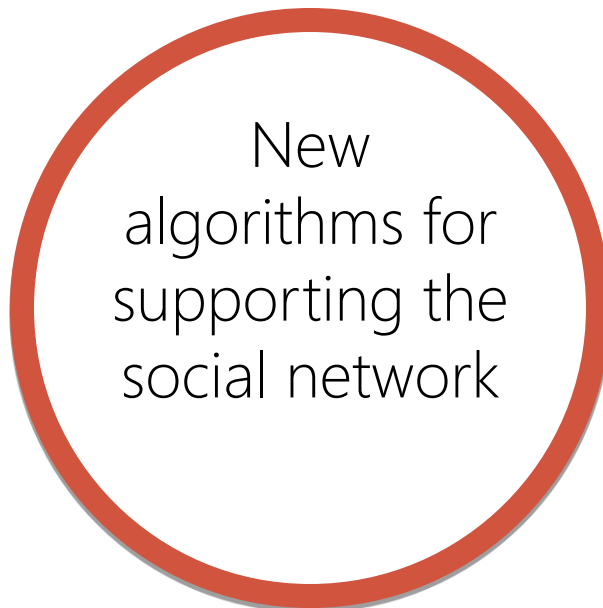
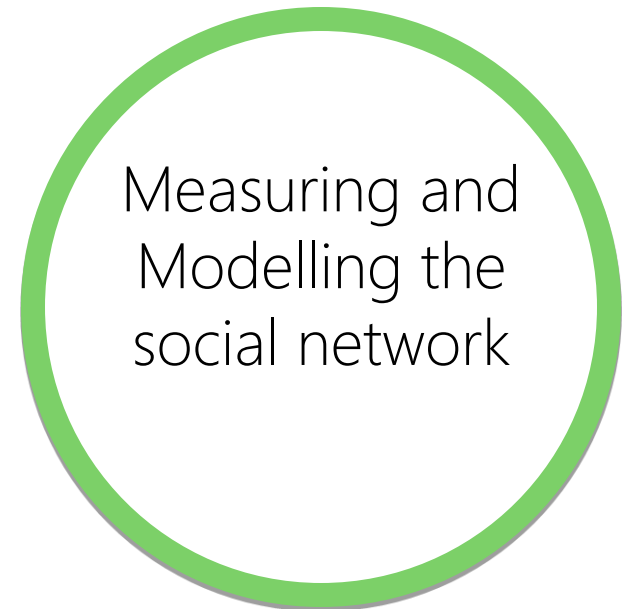
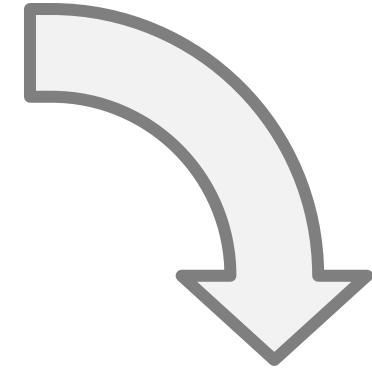
Supporting Users in Social Networks

Social
Information
Overloading

Supporting Users in Social Networks

Learning the relations among people





Our Research

Research Question

How **trust relations** shape
user opinions?

How **trust** can be used to predict
user opinions?

CARS

BOOKS

MOVIES

MUSIC

COMPUTERS
& SOFTWARE

ELECTRONICS

GIFTS

HOME &
GARDEN

KIDS &
FAMILY

OFFICE
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Cuisinart Brew Central DCC-1200 12-Cup Coffee Maker

Reviewed by [newtownbeans](#) (POPULAR AUTHOR) - [Top 1000](#)

Author's rating: ★★★★★☆

The Cuisinart Brew Central Coffeemaker, Model DCC-1200 is a solidly built and efficient electric coffee maker that brews really fresh and aromatic coffee. It is a bit larger than most coffee makers, measuring approx. 14x8x8 inches and it is available in ... [Read the full review](#)

Compare prices for [Cuisinart Brew Central DCC-1200 12-Cup Coffee Maker](#)

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Web of Trust

music trusts:

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2. [Montepenny](#)
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5. [Mike Bracken](#)

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whom music trusts](#)

music is trusted by:

1. [deadmilkboy](#)
2. [foshizzle](#)
3. [Montepenny](#)
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Web of Trust

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Good To The Last Drop

Cuisinart Brew Central DCC-1200 12-Cup Coffee Maker

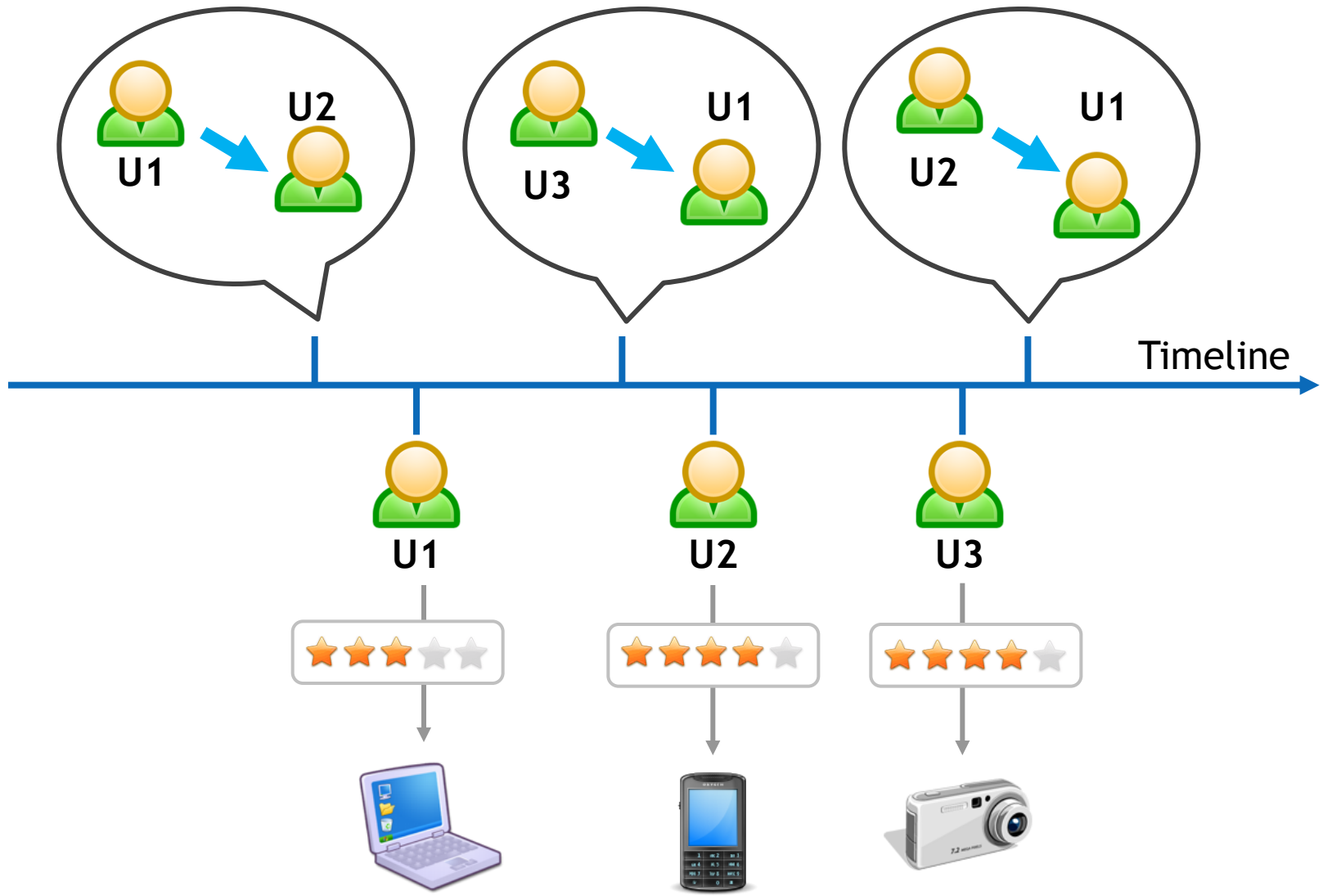
Reviewed by [newtownbeans](#) (POPULAR AUTHOR) - [Top 1000](#)

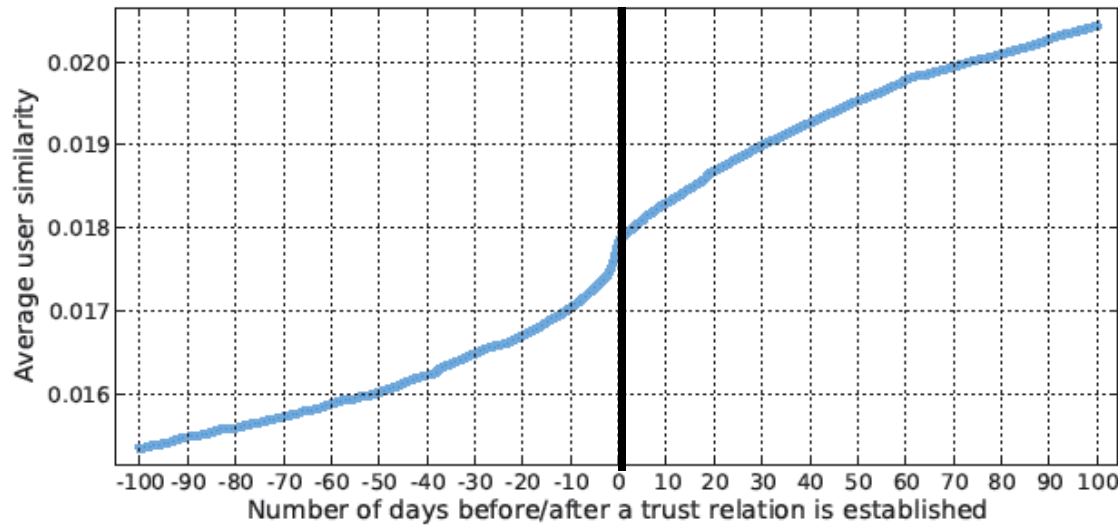
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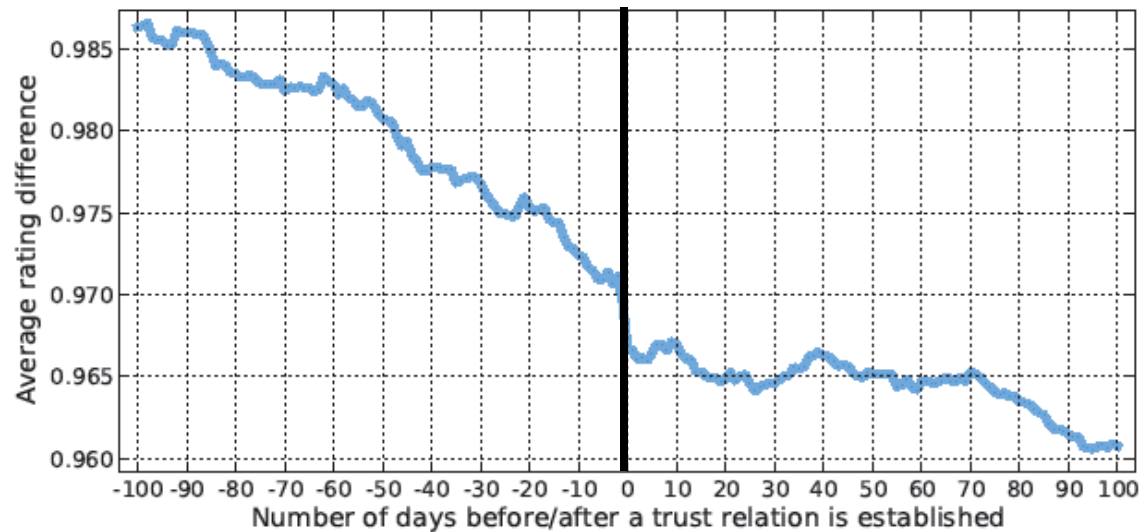
Trust Relations



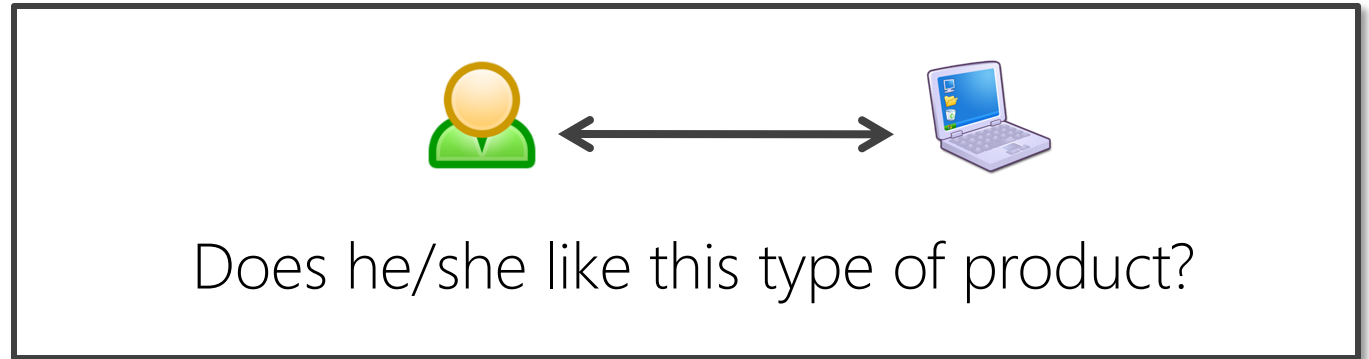
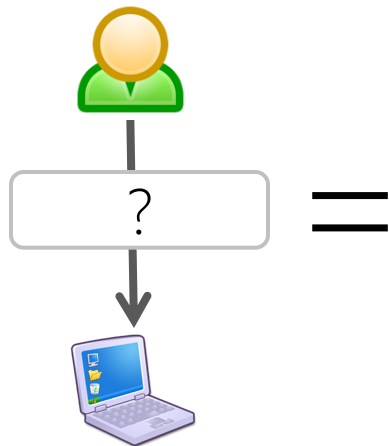


Similarity between users increases before and after trust

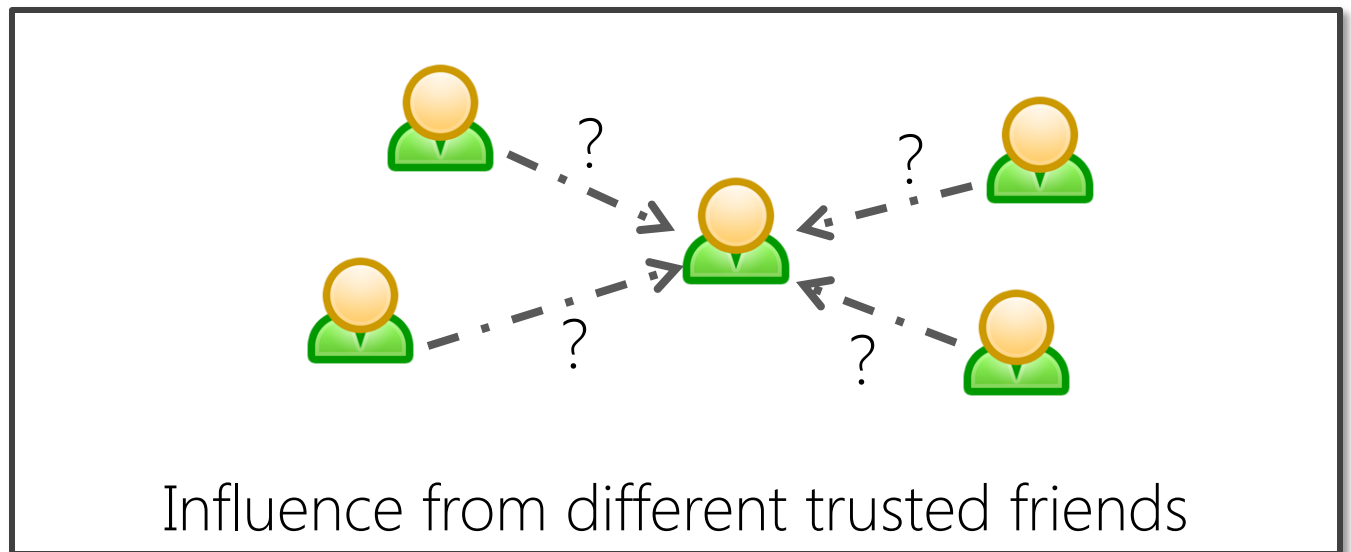
Difference in ratings decreases before and after trust



Estimating strength of relations + Predicting user ratings



+



Summary

Supporting Communication in Global Networks