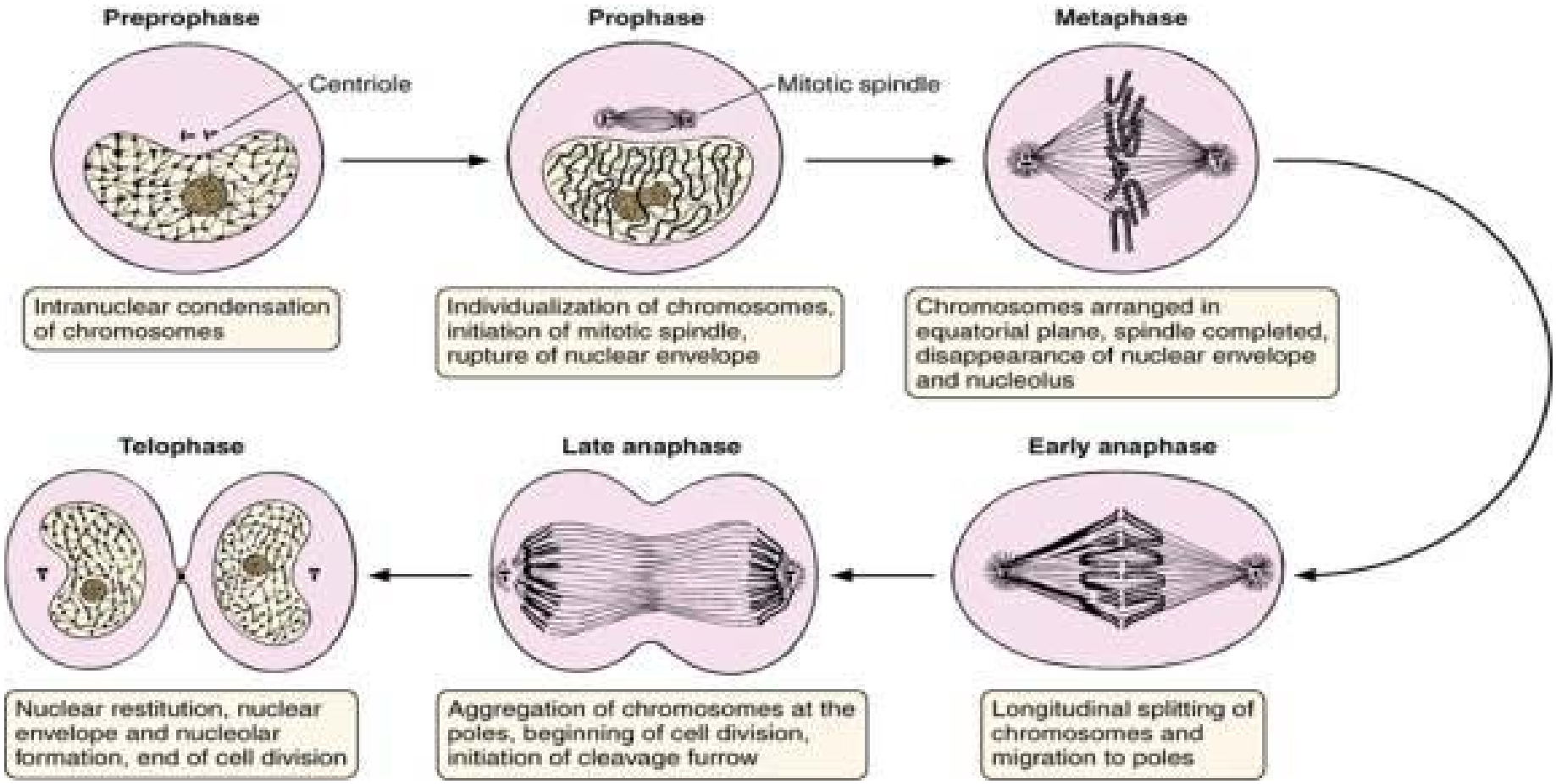
Die Datenwelt von Morgen

Barry Smith

ZiF, October 25, 2016

Old biology data



New biology data

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WLGLESDYHCSFSSTRNAEDVDISRIVLYSYMFLNTAKGCLVEYA
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How to do biology across the genome?

MKVSDRRKFEKANFDEFESALNNKNDLVHCPSITLFESIPTEVRSFYEDEKSGLIKVVKFRTGAMDRKRSFEKVVIS
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EIASARPNDSSTMRTFTDFVSGAPIVRSLQKSTIRKYGYNLAPYMFLLLHVDELSIFSAYQASLPGEKKVDTERLKR

how to link the kinds of phenomena represented here


to data
like
these?

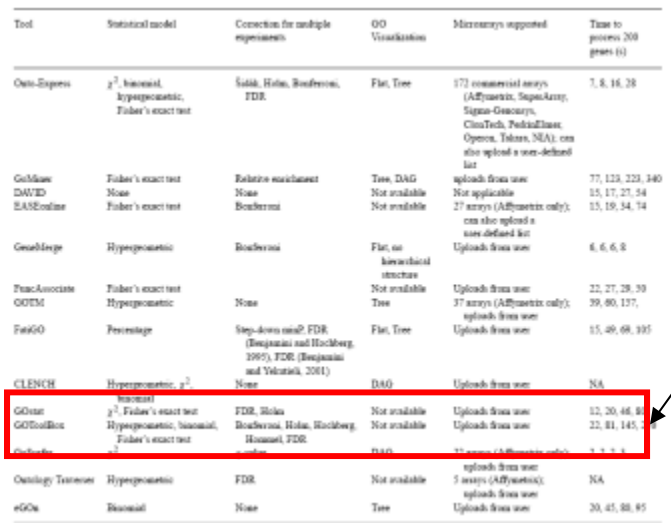
Answer

Create an ontology: a controlled logically structured consensus classification of the types of entities in the relevant domain

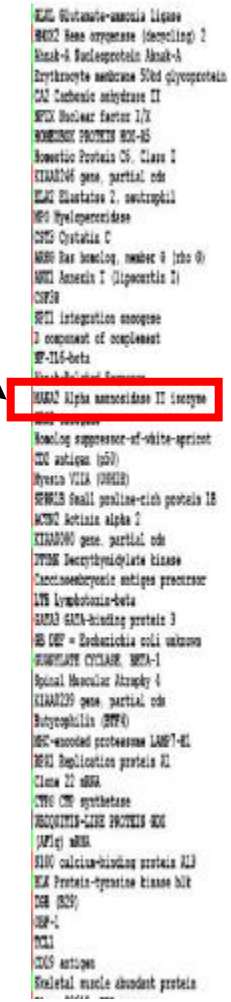
scientists in the domain use the same ontology aggressively to tag their data

tagging with common ontologies allows navigation between databases

MouseEcotope

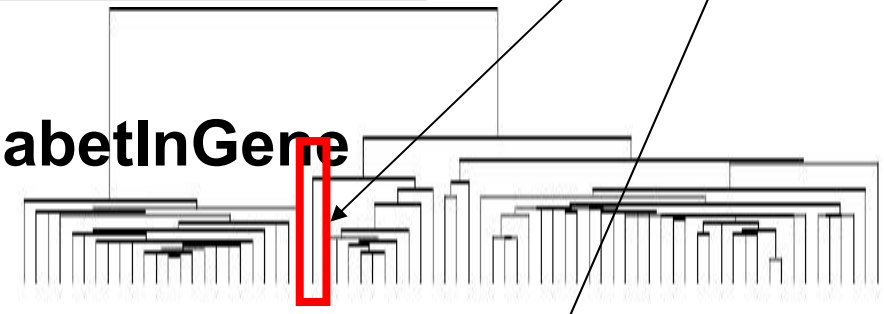


GlyProt

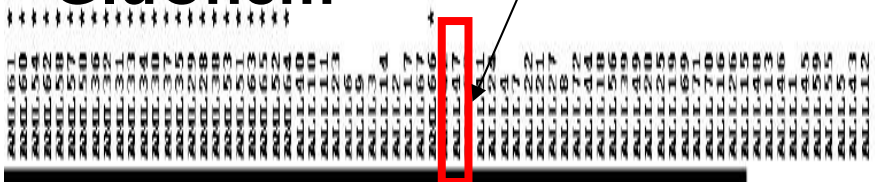


sphingolipid transporter activity

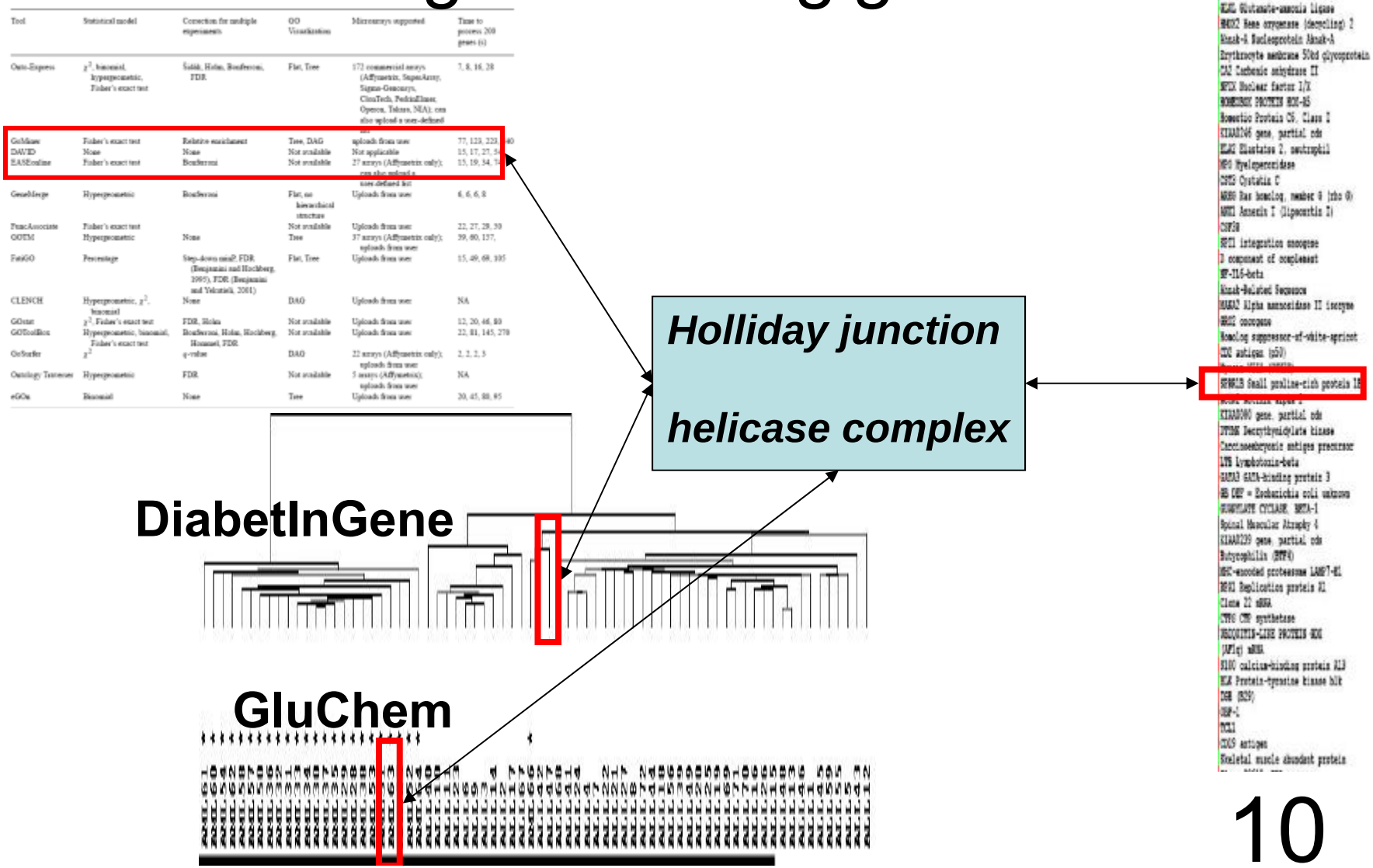
DiabetInGene

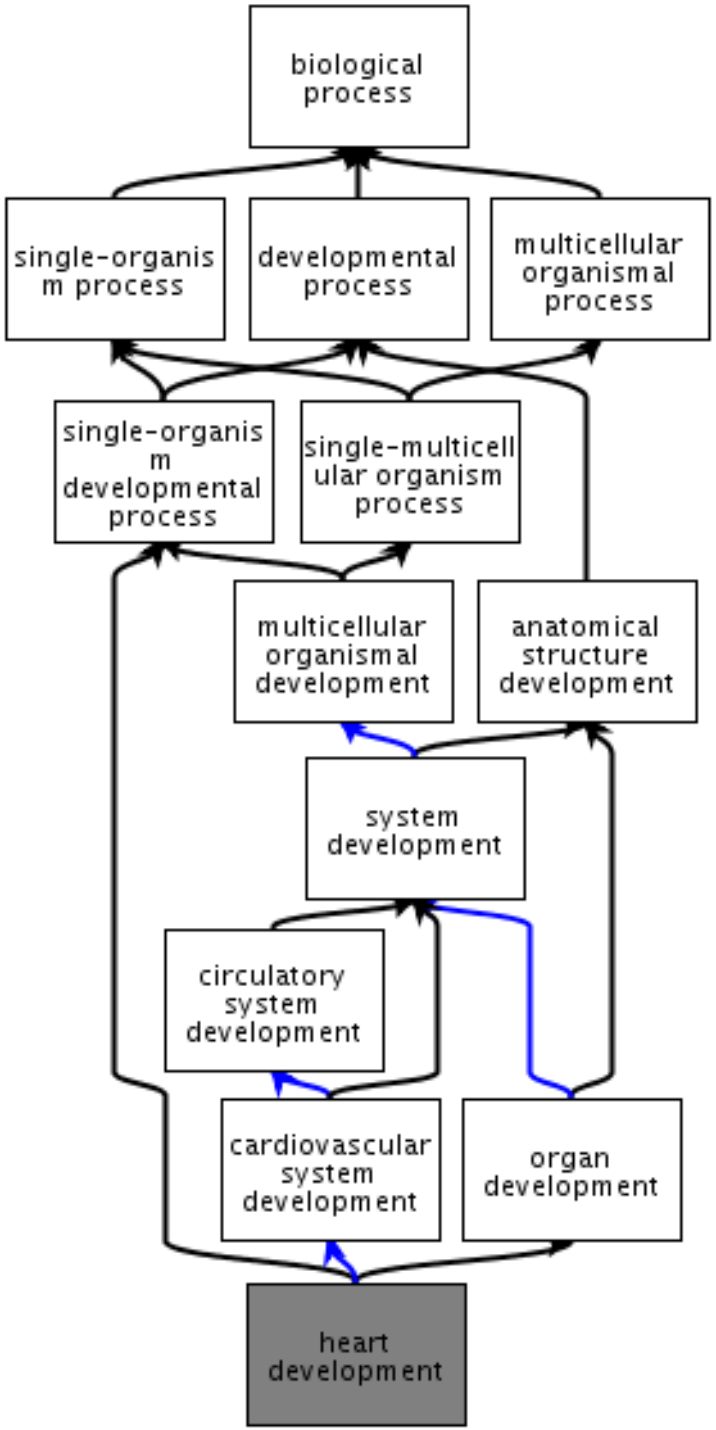


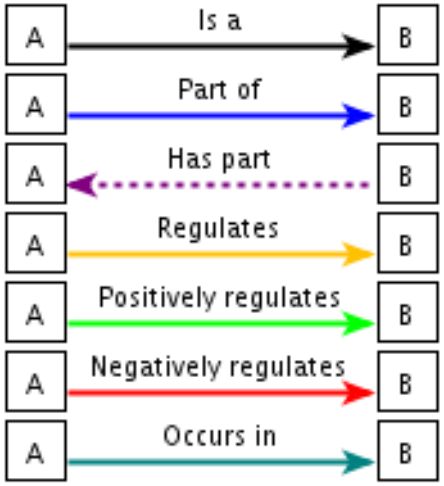
GluChem



the data involved, and the scientists collecting and using these data, are thereby linked together in a gigantic network

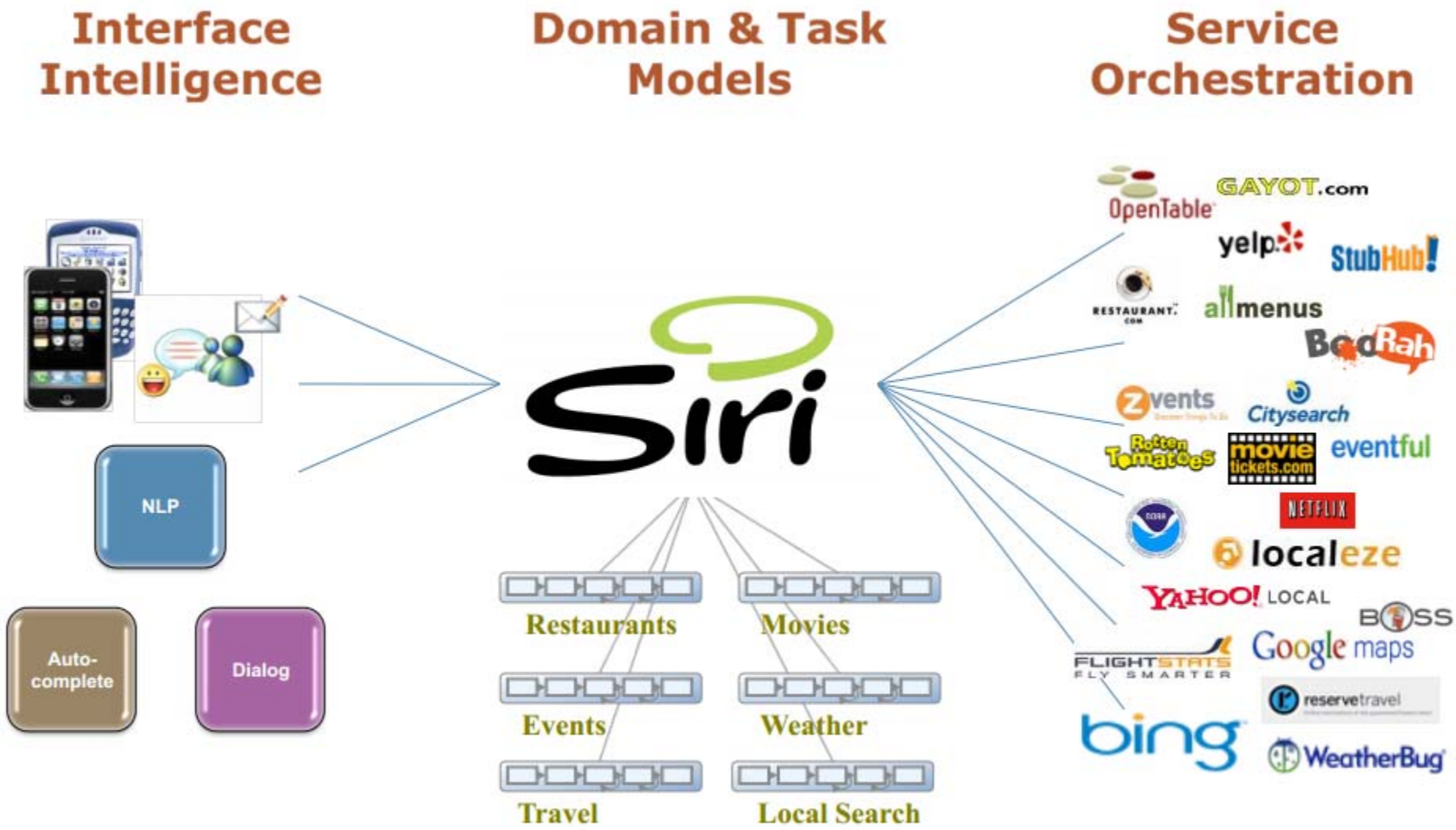




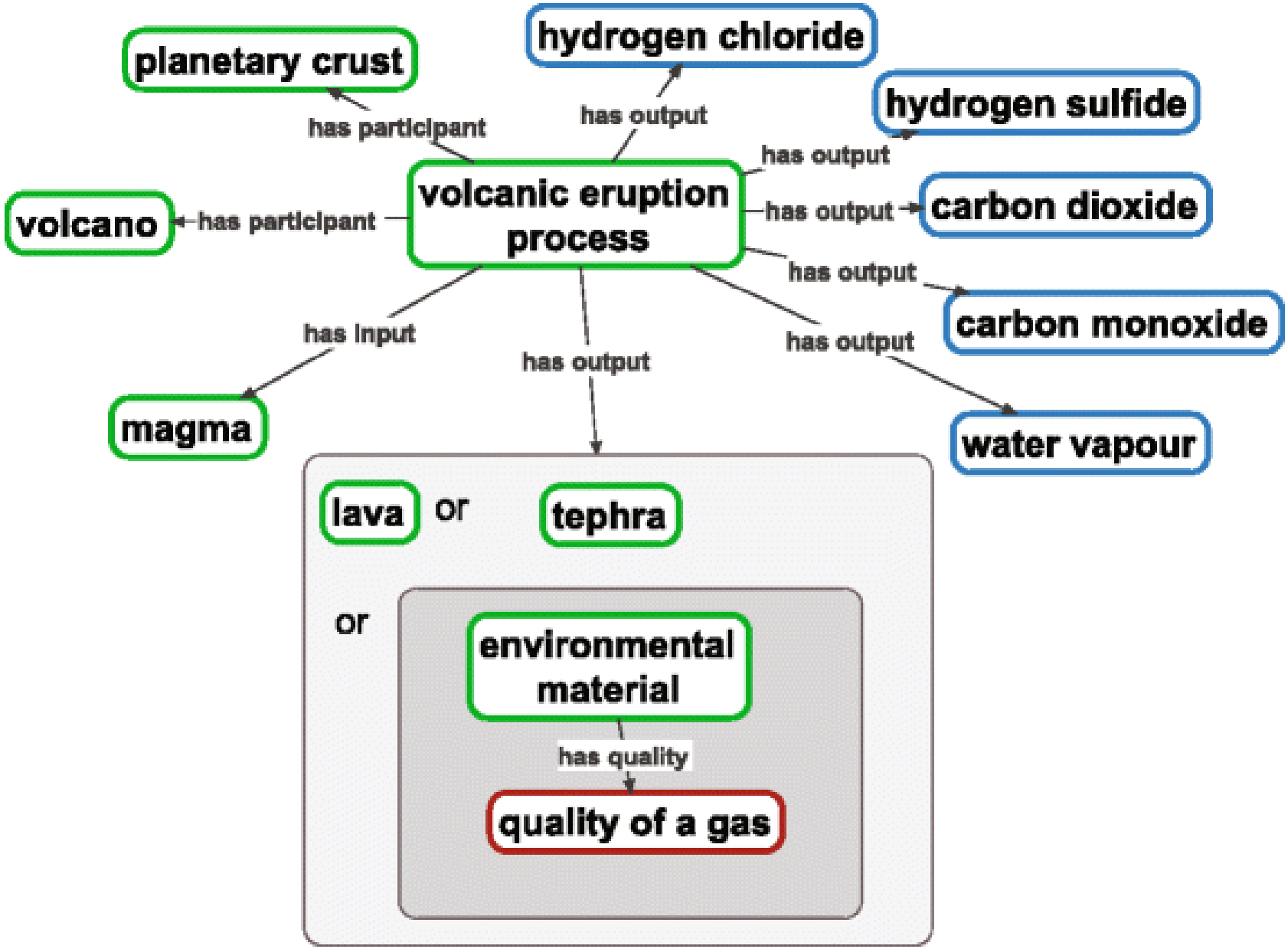


The Gene Ontology (fragment)

“Siri: An Ontology-driven Application for the Masses”, Adam Cheyer and Tom Gruber



ENVO: The Environment Ontology




UNEP
United Nations Environment Programme
environment for development
Climate Change
Disas
& Cor
UNEP Live
SDG Synergies
Or
SDG Synergies
SDGs
MEAs
Synergies
Ontologies
Sustainable Development Goals

JJ. Gibson (1904-1979)

The Ecological Approach to Visual Perception, Boston, 1975

Wahrnehmung und Umwelt: der ökologische Ansatz in der visuellen Wahrnehmung, München, 1982

Gibson: Environments comprehend systems of affordances

affordance = **Angebotscharakter**

(auch **Aufforderungscharakter**

oder **Affordanz**)

James J. Gibson, *The Ecological Approach to Visual Perception,* 1975

affordances

"The affordances of the environment are what it *offers* the animal, what it *provides* or *furnishes*, either for good or evil."

a glass of beer *affords drinking*

a chair *affords sitting*

a step *affords climbing*

a chin (in the boxing ring) *affords hitting*

a checkbox (*Ankreuzfeld*) *affords checking*

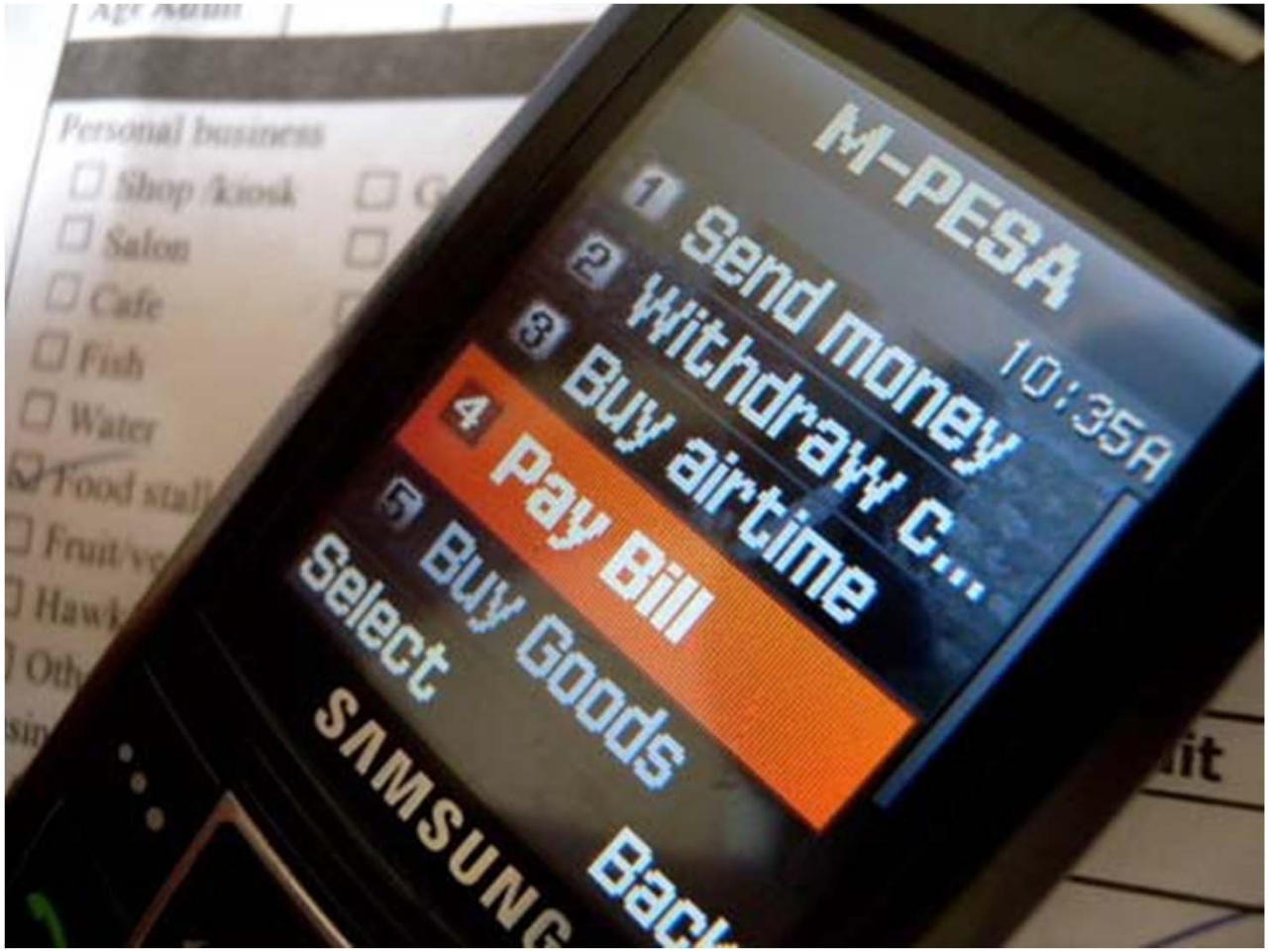
a mobile phone *affords texting*

James J. Gibson, *The Ecological Approach to Visual Perception,* 1975

Einstimmung

- **Entwicklung**: organisms evolved to fit into environments with these and those systems of affordances
- **Bildung**: for cultural organisms like human beings, we become tuned to the corresponding affordances through training, drill, learning, …
  - Cultural learning cumulates – leading to ever more complex environments

a mobile phone *affords banking*



a mobile phone *affords mating*

a mobile phone *changes family life*

Digitale Umwelten

new environments, with new kinds of affordances, through which *people* are being changed in new kinds of ways

People of old were nodes

in biological networks

in friendship networks

in workplace networks …

These networks were held together by face-to-face interactions which run at human speed and have a short half life

The consequences of single interactions rarely cumulated in such a way as to have wider ranging effects

Today everything is different

Today everything is different

SCHUFA macht Kredit möglich

SCHUFA macht Kredit möglich

… by shaping humans

SCHUFA macht Kredit möglich

… by shaping humans

… by shaping the environment in which humans borrow and save

SCHUFA is tied to a host of other networks

banking
real estate
credit cards
law
employee rating agencies

the effect of which is to make people more credit-worthy – in other words: more honest

The Uber App provides a map of your route as you traverse it

Calculates the fare and deducts it from your credit card

it then allows you to rate your driver for punctuality, cleanliness, …

Uber *customers* can then use these ratings in making bookings in the future

But then, when you leave the taxi, the App allows the driver to *rate you*, the customer and these ratings too are stored in the system and used by other *drivers* in the future

The power of data accumulation

Behind the scenes, good behavior is being rewarded and bad behavior punished

customers who vomit in the cab, or who behave aggressively, will find themselves restricted in their use of Uber in the future

Uber also digitizes safety. The App gives your daughter a photo, name, and license plate for the stranger who picks her up at 2a.m.

It shares a detailed record of her route; which likewise protects the driver, and ensures that the driver does not get lost in unfamiliar parts of town.

Uber is constantly accumulating vast amounts of information on the micro-details of cities; on prospective drivers, riders, and road conditions;

and constantly improving the ways its algorithms instantly present drivers with highly intuitive options – by digitizing transactions

Uber makes for better drivers, better cabs, safer rides, better passengers

– bringing huge advantages especially in third-world countries

AirBNB makes for better lodgings, a wider choice of lodgings, better landlords and better lodgers

Amazon.com makes for more informed consumers, which makes for better products

It also makes for cheaper products, as the information asymmetry between seller and buyer is gradually eroded

Tripadvisor makes for better food

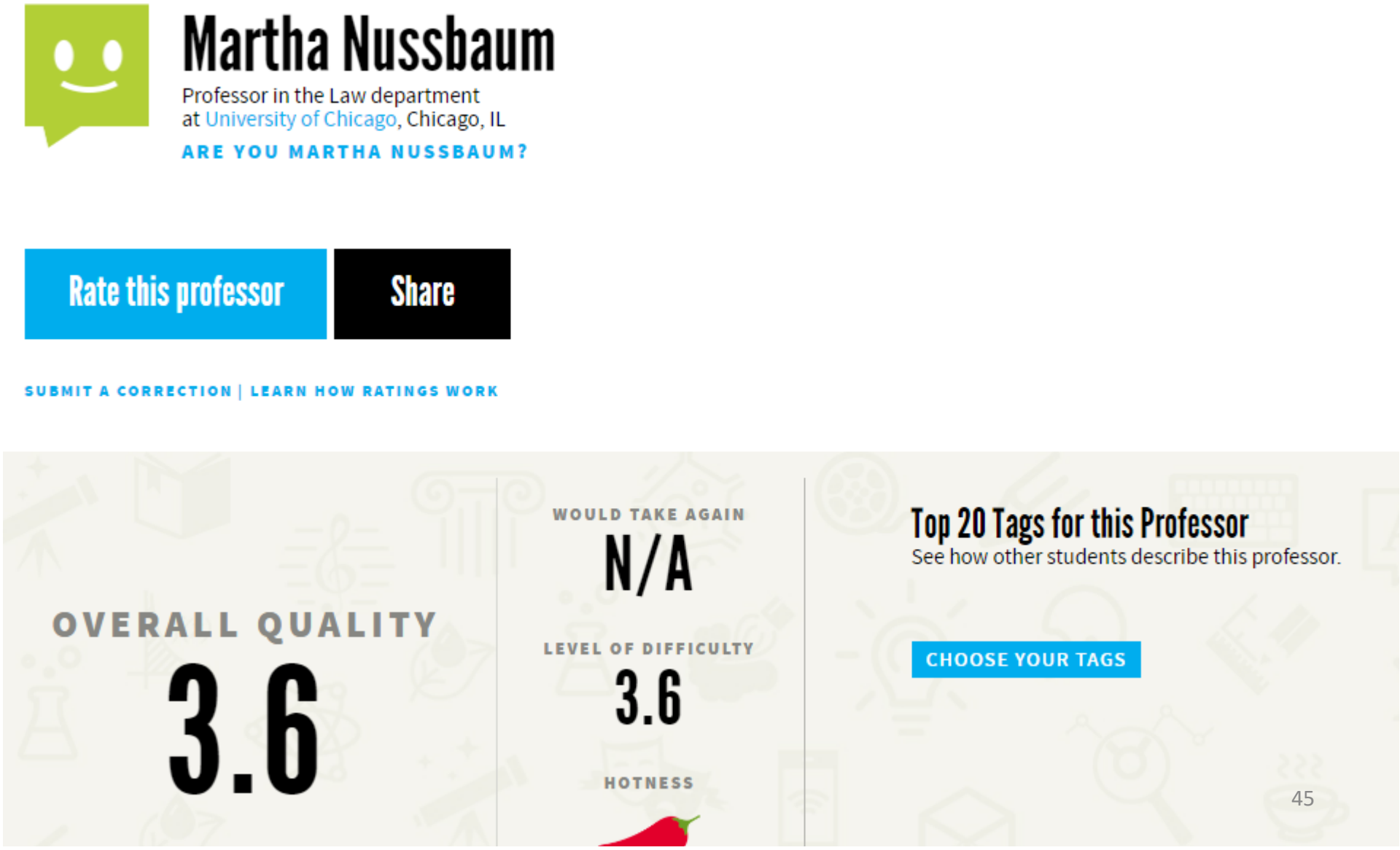
as restaurant ratings are constantly updated by ever new customers

Tripadvisor creates a constant competition among restaurants

The internet allows cumulation of the effects of single actions

Big Data creates the possibility for better consumer choices – but also for better consumers

RateMyProfessors.com



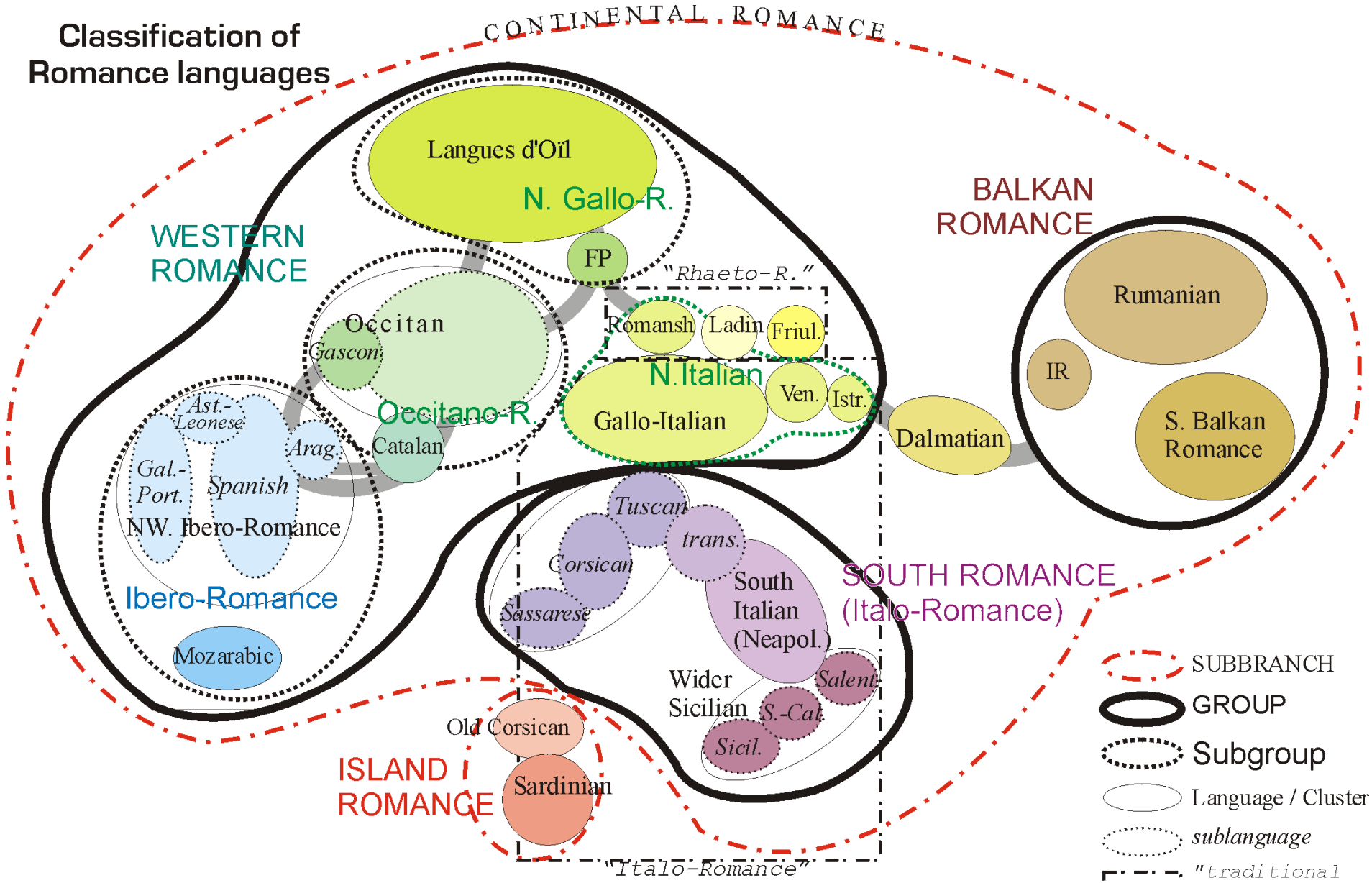
- **Recommend and Be Recommended –** In the following 3 categories: ***Professional***, ***Personal***, ***Dating***
- **Peeple Number –**Your Peeple Number is the total number of recommendations you have received in all 3 categories
- **Connections –** Find likeminded connections with high Peeple Number scores with our Nearby feature

We are trained to use language

Each person has a set of linguistic competences along multiple dimensions

Persons living in the same community have overlapping sets of linguistic competences – which are what make communication possible

These sets of competences overlap, and merge into each other



All speakers of CONTINENTAL ROMANCE share in common a certain subset of dispositions

Das Wörterbuch der Fußballsprache

Polnisch – Russisch – Englisch – Deutsch

Common languages allow individuals to be joined together into small and large communities through speech acts

“I pronounce thee man and wife”

“Would you like to dance?”

“Can you come to dinner?”

linguistic affordances

for human beings the affordances of the environment include

linguistic sounds

written signs

printed signs


FOR SAFETY
You must KNOW
German traffic signs

Nowadays they include also keyboards and screens

we have competences not only for speaking, reading and writing

but also screen (click-) competences

joystick competences

keyboard competences

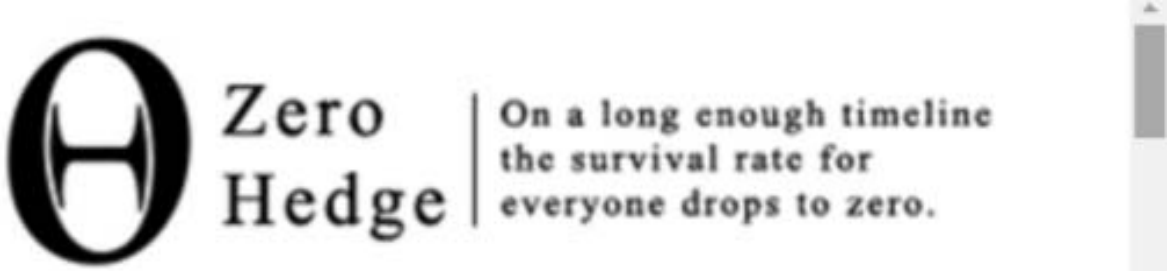
neurological re-engineering of human beings through repetitive keyboard action

goes back to the 14th century, when the clavichord and harpsichord were introduced

today repetitive keyboard action has the same importance to human action as speaking or writing

repetitive keyboard action is a principal ingredient of modern kinetic warfare

and of cyberwarfare



WWIII? A "Hybrid Geo-Financial War" Between NATO and Russia Is Dangerously Escalating

Submitted by Tyler Durden on 05/21/2016 22:00 -0400

BRICs China Cohen Donald Trump Henry Kissinger Natural Gas Poland President Obama Ukraine

speech acts and document acts now intermixed with digital acts

communities can themselves serve as affordances

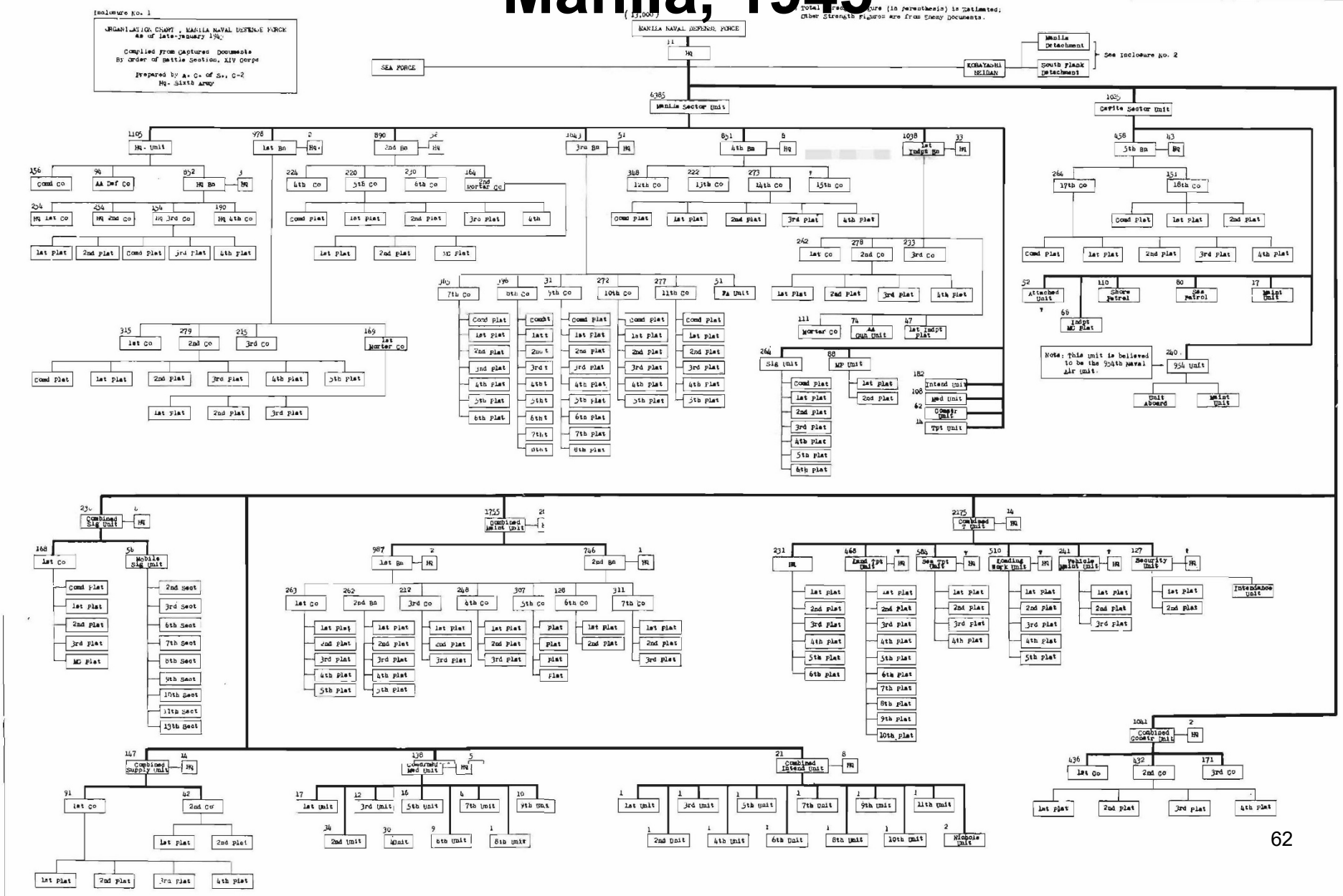
a family *affords bonding*

a group *affords joining*

an enemy encampment *affords bombing*

Some social institutions involve massively complex networks of sub-institutions held together by networks of speech acts and document acts supporting relations of authority and delegation

Org Chart: Japanese Naval Defense Force Manila, 1945



as speech acts and document acts and digital acts become ever more intermixed in every more complex and ever more hierarchical networks

this creates ever more comprehensive civil societies

Social Network Sites as Networked Publics

Networked publics are not just publics networked together,

… they are publics that have been transformed by networked media, …

The Global Jihadi Archipelago
Scott Atran

Soccer, paintball, camping, hiking, rafting, body building, martial arts training, and other forms of physically stimulating and intimate group action [Graffiti Crews] create a small cultural niche: a bunch of buddies who become a “band of brothers” in a glorious cause (Atran 2010).

The Global Jihadi Archipelago
Scott Atran

a new kind of transcultural niche that leapfrogs the limits and responsibilities engendered by previous generations within territories of origin. Here, peer communities of imagined kin—bands of “brothers and sisters” drawn willy-nilly from across more than 100 countries and many more ethnic groups—commit in ritual oaths and performance of sublime acts of terror to a new world order

The Global Jihadi Archipelago
A New Type of Transcultural Niche
Scott Atran

The internet allows cumulation of the effects of single actions

“Publicity hyped by political and media frenzy is the oxygen that fires modern terrorism (Atran 2013), filling a transcultural niche whose ecology ranges over a media landscape (where competition for resources is a struggle for control of information) and a geographical archipelago that spans the globe.”

The Global Jihadi Archipelago
A New Type of Transcultural Niche
Scott Atran

the global jihadi archipelago where information from across the world and cyberspace narrows mightily to fit the dreaming ecology of the Caliphate—a transcultural niche, which … devoted actors of the Islamic State are fighting unto death to make real.

recall Gibson: the environments in which we live provide niches, enclosures, apertures, signposts, pathways, barriers – they *afford* different sorts of actions

affordances

"The affordances of the environment are what it *offers* the animal, what it *provides* or *furnishes*, either for good or evil."

James J. Gibson, *The Ecological Approach to Visual Perception,* 1975

DDoS, October 22, 2016

The Internet is under attack. *The New York Times* reported that "major websites were inaccessible to people across wide swaths of the United States on Friday after a company that manages crucial parts of the internet's infrastructure said it was under attack.

DDoS, October 22, 2016

in a troubling development, the attack appears to have relied on hundreds of thousands of internet-connected devices like cameras and home routers that have been infected — without their owners' knowledge — with software that allows hackers to command them to flood a target with overwhelming traffic.