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Structure for Collective Intelligent Organizations

- How to construct Weavelet Lenses -

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22 pages

Introduction: Network interconnection effects ??

- At present there are about 6 billion cell phones (including smart phones) and about 2.6 billion internet users active worldwide. Does that have effects? Sure. It lowers transaction costs, makes organizations more transparent and allows *new types of collaboration* and network effects.
- Example: At disasters like the big Sichuan earthquake in central China in 2008 volunteers reacted immediately and coordinated aid and each other with TWITTER and Facebook, while it took DAYS before the officials even published that the accident took place and came to the scene.
- Example: the sudden flashmob of tens of thousands of young people eager to attend a party in Haren, NL last year, because a girl had made the mistake to invite 'everybody' on Facebook to her 16th birthday party.

  Did the partygoers organize themselves before and after they arrived by way of networking? Yes they did. So did the hooligans in the sudden 2011 London riots. Can companies and institutions do so too, or will they be outpaced and outsmarted into irrelevance?

Thus, the questions are:

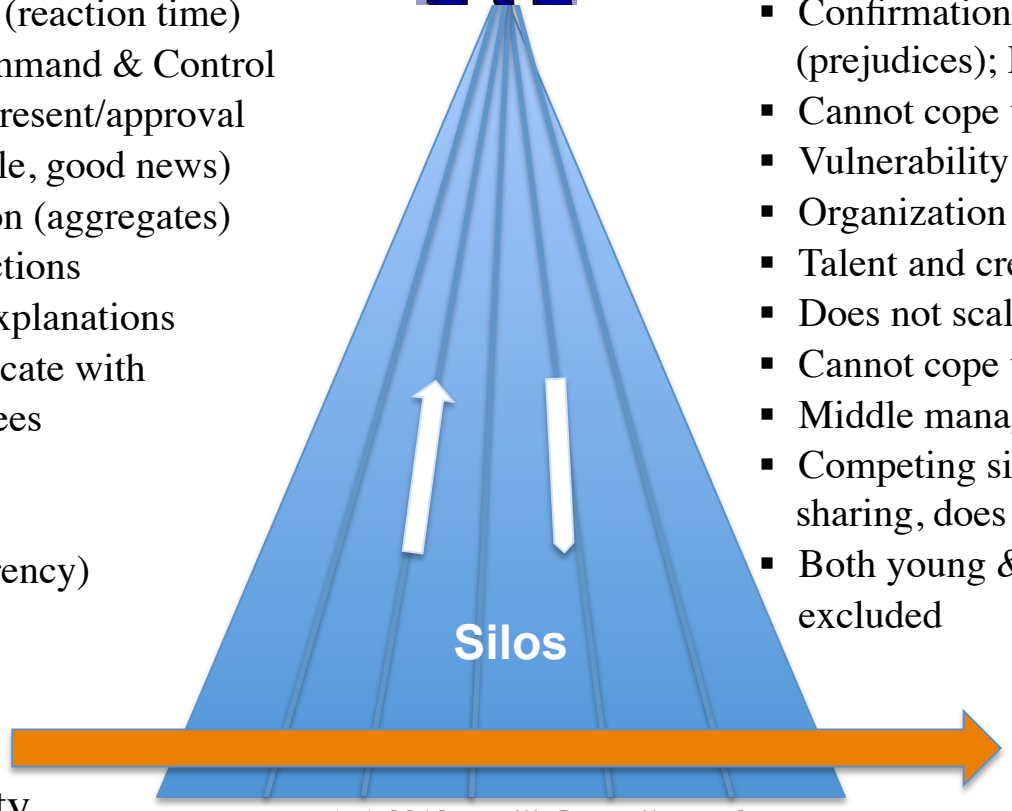
- *How do groups of people harness the power of Internet connections collectively in a constructive way?*
- *What can we learn from these success stories that will help us create even more of them?*

1.What is the Problem: the ComplexiTimes of 2013

Old hierarchical organizations can no longer cope. (Napoleons Army) Closed, Simplifications

- Too many levels of management
- Decisions Too slow (reaction time)
- Inward looking Command & Control
- Endless meetings, present/approval
- Filtering (bits, simple, good news)
- Upwards information (aggregates)
- Downwards: instructions
- No overviews, no explanations
- Could not communicate with lower layer employees

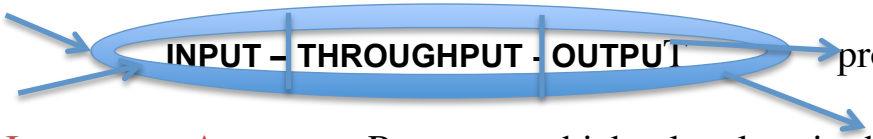
- NOW WE CAN !!
- (networked transparency)



- Central Overview (model) Too simple
- Out of touch with reality (bus. process)
- Confirmation of "working" model only (prejudices); Push R&D → market
- Cannot cope with unexpected surprises
- Vulnerability
- Organization does not Learn, innovate
- Talent and creativity wasted
- Does not scale up well
- Cannot cope with diversity
- Middle management, admin jobs ??
- Competing silos, power struggles, non sharing, does not work.
- Both young & innovative ignored, excluded

2. How have Nature and Evolution solved this problem? The Weave http://wp.me/p2guJP-7x

Living Systems Theory [J.G. Miller, 1978] is a general theory about the existence of ALL living systems that interact with their environment. They exist at 8 "nested" levels of principal components:
(* = examples on next pages)
cell, organ *, organism *, group, **organization***, community, society, and supranational systems.
humans * ?? ?? ?? New LIFE forms ??
The 20 vital subsystems and processes of all living systems arranged by **aggregation/analysis/corr/des-aggr**



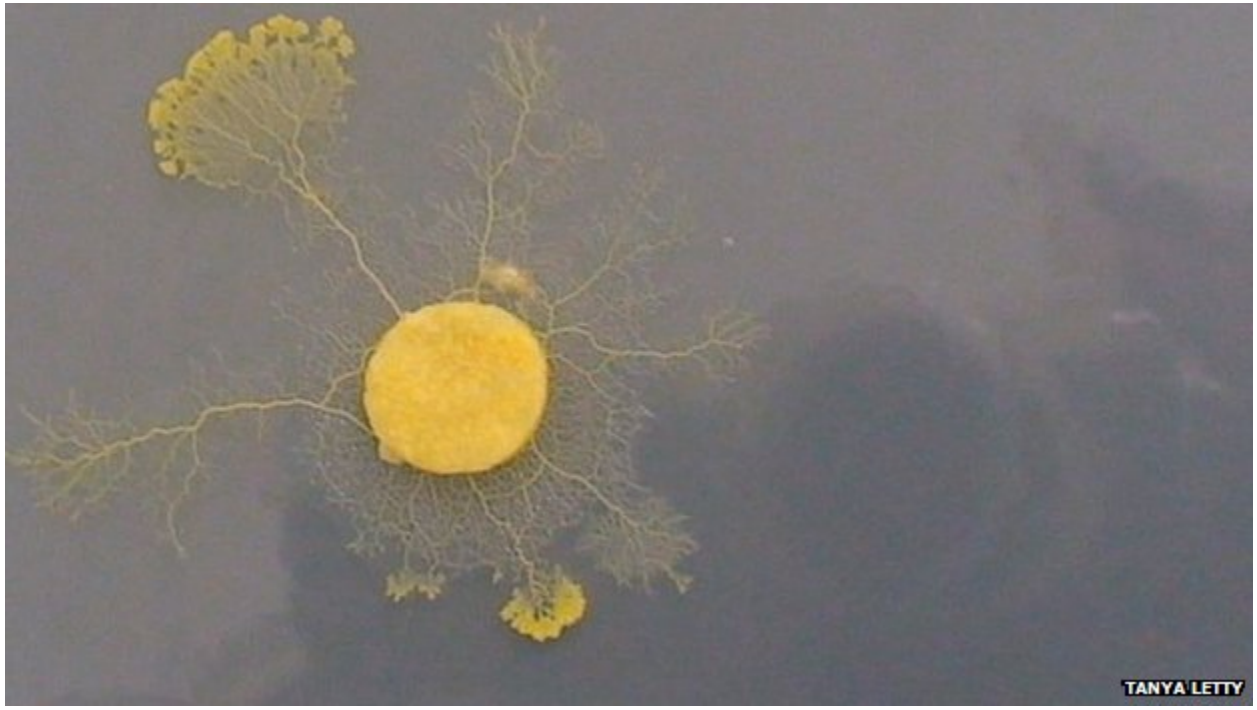
processes of energy, matter and information:

Input stage A: sensors Processes which take place in the Systems Input Stage
input transducer: brings information into the system **ingestor:** brings material-energy into the system.

Processes (FUNCTIONS) which take place in the Systems Throughput Stage B information processes:
internal transducer: receives and converts information brought into system **channel and net:**
distributes information throughout the system **decoder:** prepares information for use by the system
timer: maintains the appropriate spatial/temporal relationships
associator: maintain appropriate relationships between information sources **memory:** ??
stores information for system use **decider:** makes decisions about various system operations ??
encoder: converts information to needed and usable form
((material-energy processes: **reproducer: boundary: distributor: producer: m-e storage**: **motor:**
system supporter: provides physical support to the system))

Processes which take place in the Systems Output Stage C **output transducer:** handles
information output of the system extruder**:** handles material-energy discharged by the system, actuators.

3.1 Example of One Organism which consists of connected multitude of individual living beings (aka slime mold). Slime Mould: whole structure can move in the direction of food source(s) by extending networks of pulsating cells, which sense the environment and interconnect (by touch and vibration). Each cell can move independently. [http://www.bbc.co.uk/nature/19846365 Oct 9 2012]



Multicellular, similar behavior: organic growth of power grids, anthills, beehives, schools of fish, flocks of birds, herds, internet

3.2 Example of One Organism which consists of connected multitude of individual living beings

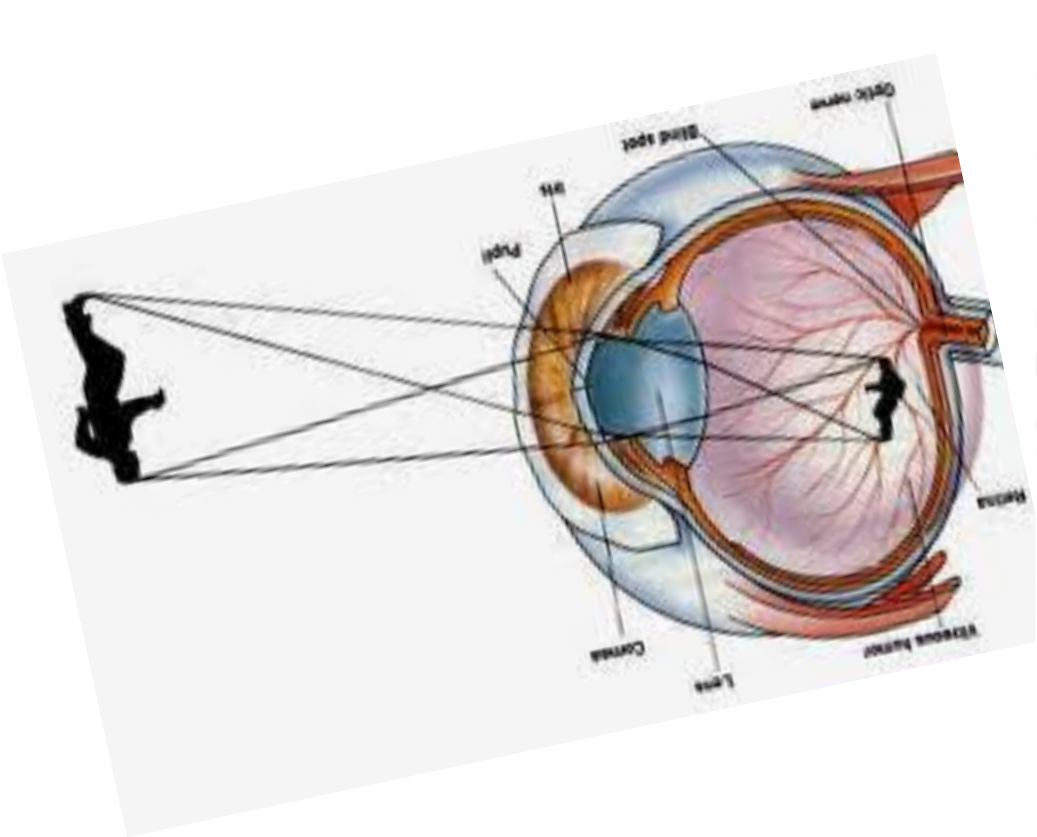
Diameter = 8 cm

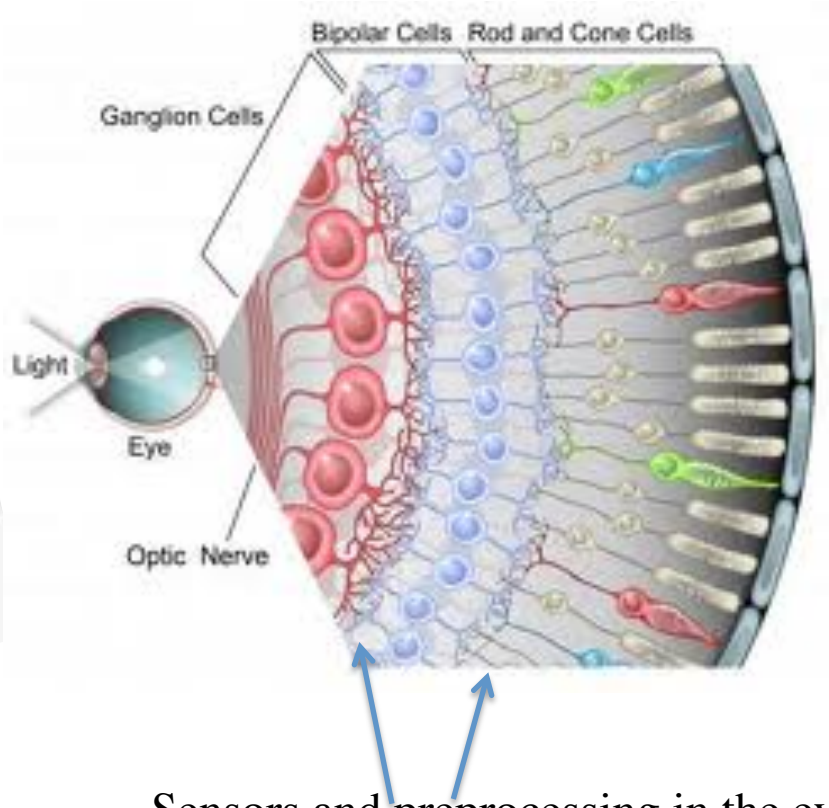
Bacteria do communicate -
by touching neighbors
and do cooperate -
both within and between
species-

4 day old bacteria colony of "Paenibacillus vortex" [5] consisting of 100 x 6 x 10 ^ 9 cooperating bacteria
Its members have genes associated with social functions like: communicating together, processing
environmental information and to synthesize chemicals for external use.

[5] Eshel Ben-Jacob et.al.

3.3 Example of One Organism which consists of connected multitude of individual living cells Human, Human Brain visual system



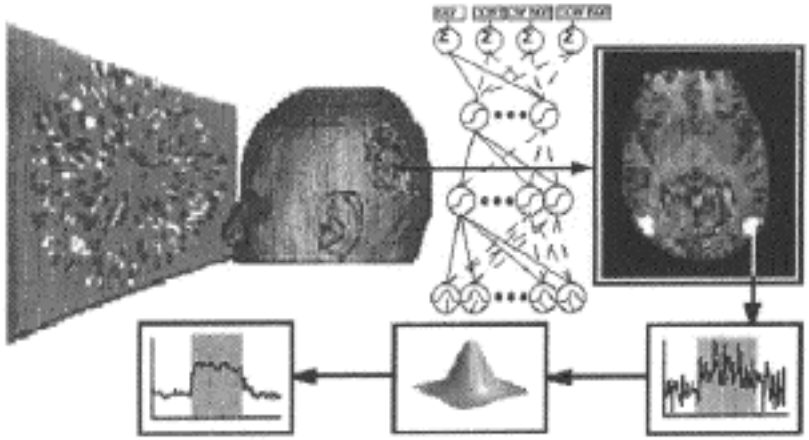


Sensors and preprocessing in the eye, for edge detection and movement det.

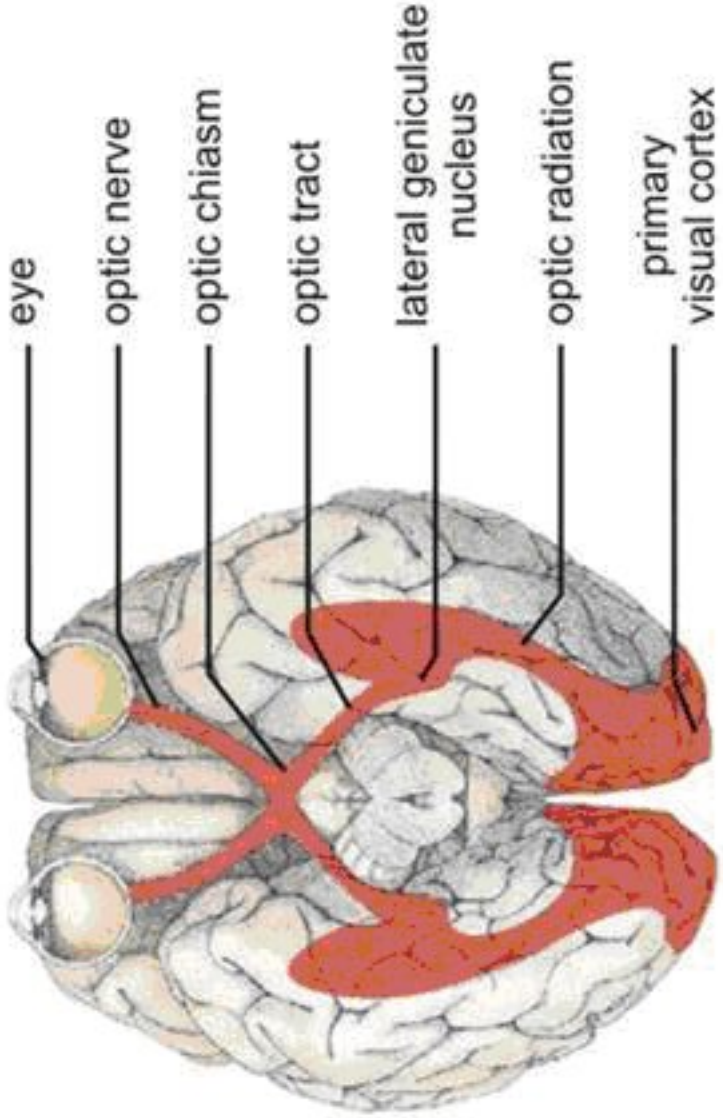
Our oldest ancestor 500 M years ago: Platynereis (Ragworm) had two eyes to swim in direction of food

Visual system (cont.)

Figure 8. Visual input to the brain goes from eye to LGN and then to primary visual cortex, or area V1, which is located in the posterior of the occipital lobe. Adapted from Polyak (1957).



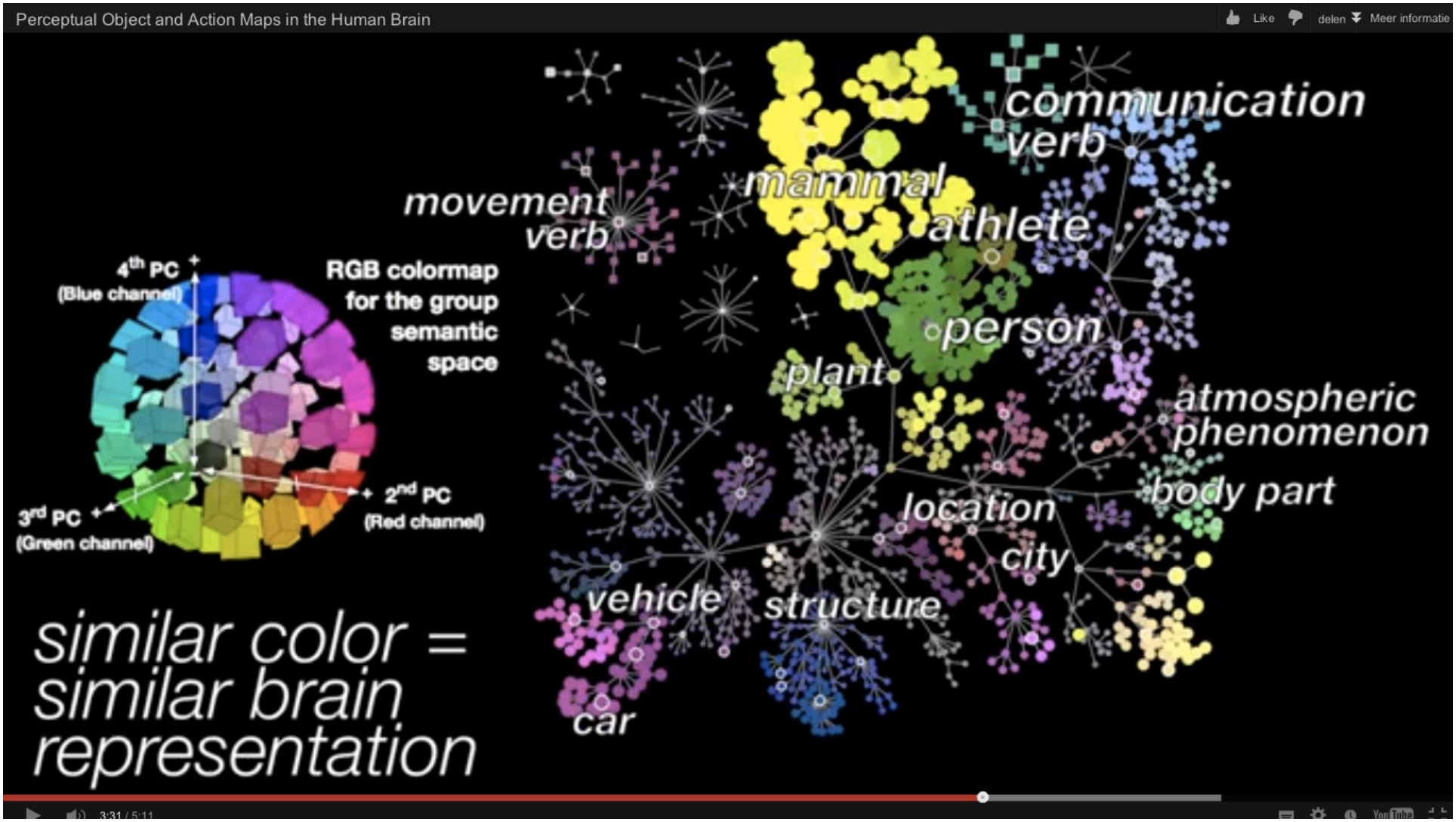
Handles Patterns instead of data



You look with the LENSES in your brain!
Two eyes result in depth perception, how?

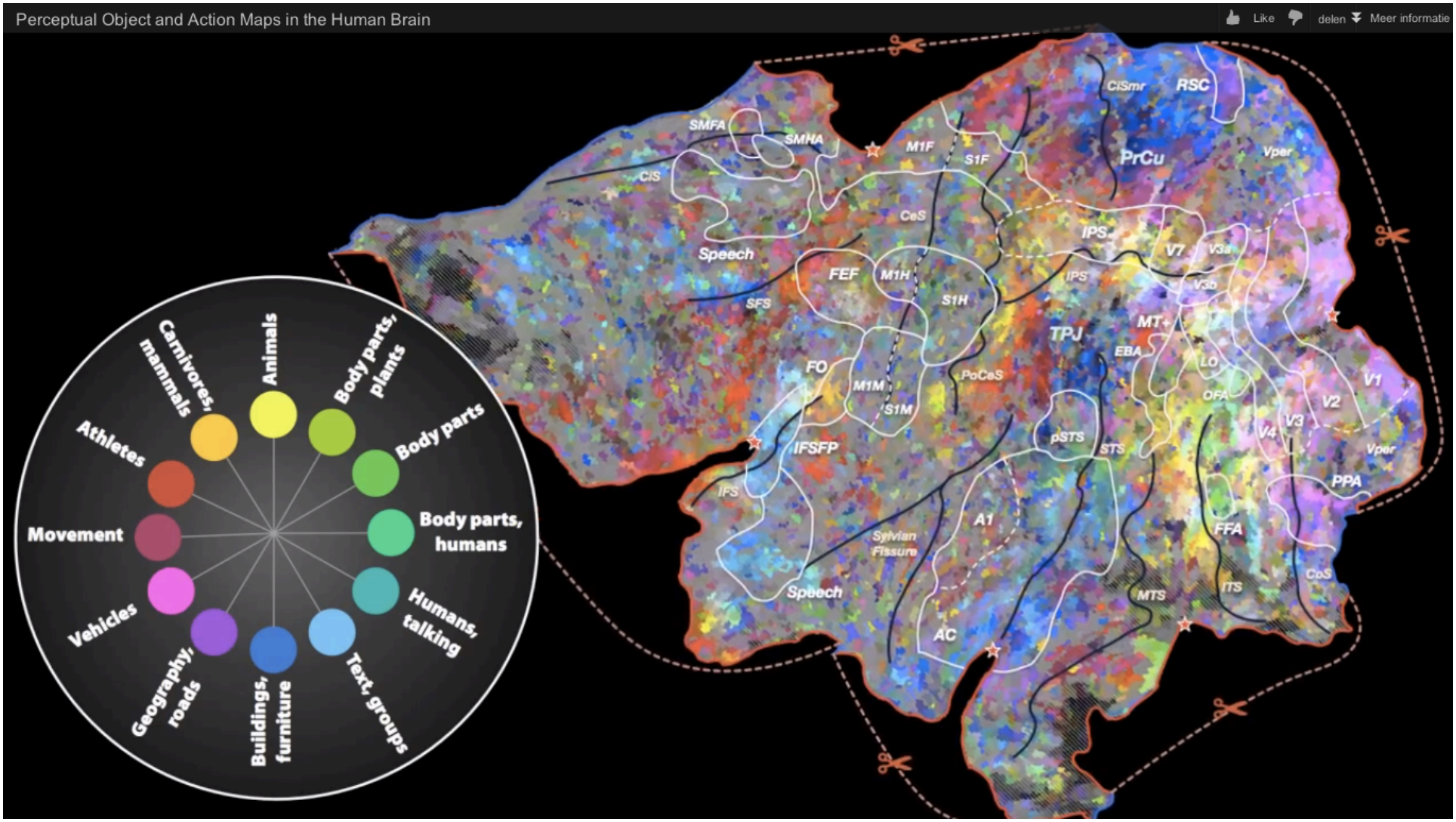
Visual system (cont.)

Aggregation and categorization by RLR into 1700 semantic clusters



[Antonio Pasolini, Maps provide "most detailed look ever" at how the brain organizes visual information; UC Berkeley, December 27, 2012]

Visual system (cont.) Visual Cortex V1/2? All over the place: 20% of Cerebral Cortex
Brain handles Patterns! Computer AI, robots do not. >> Neural networks (Kurzweil, Google)



[Pasolini, cont.] Principal Component Analysis (orthogonal transform) was used to correlate the set of observations from many study subjects into one common "Semantic Space". Whole cortex, whole body!!

The Telescope Metaphor: a better picture for ALL, by Synthesis

Issues:

- Simple
- Linear
- Static

Max. Size.
Does not scale

Issues:

- Complex
- Non linear
- Dynamic

< distance >

Virtual Lens

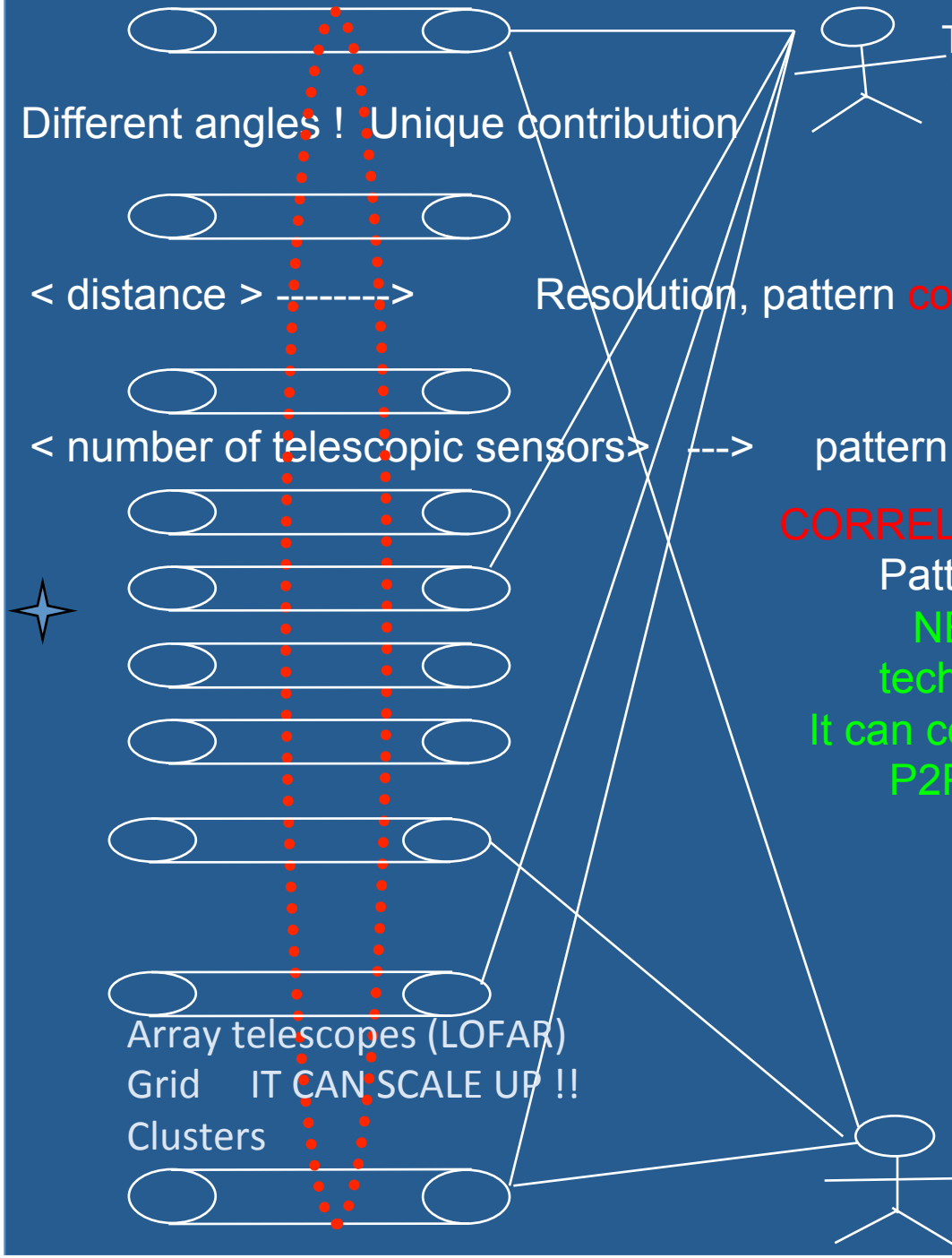
Different angles!

Cooperative can scale !

NETWORK Synergy

How patterns ???????

Earlier publication: http://www.vantill.dds.nl/democracy.html
http://www.vantill.dds.nl/synthecracy.pdf



Different angles ! Unique contribution

< distance > -------->

< number of telescopic sensors> --->

Array telescopes (LOFAR)
Grid IT CAN SCALE UP !!
Clusters

The Telescope Metaphor: a better picture for ALL by network sharing of contributions on Internet, social networks

Resolution, pattern contrast

pattern definition HDR

CORRELATION N factorial Combinations

Pattern Recognition and matching

NETWORK "Network Lenses" ??

technology and groups of humans

It can coordinate, inform, self organize

P2P collaboration, creating value

Collective intelligence ??

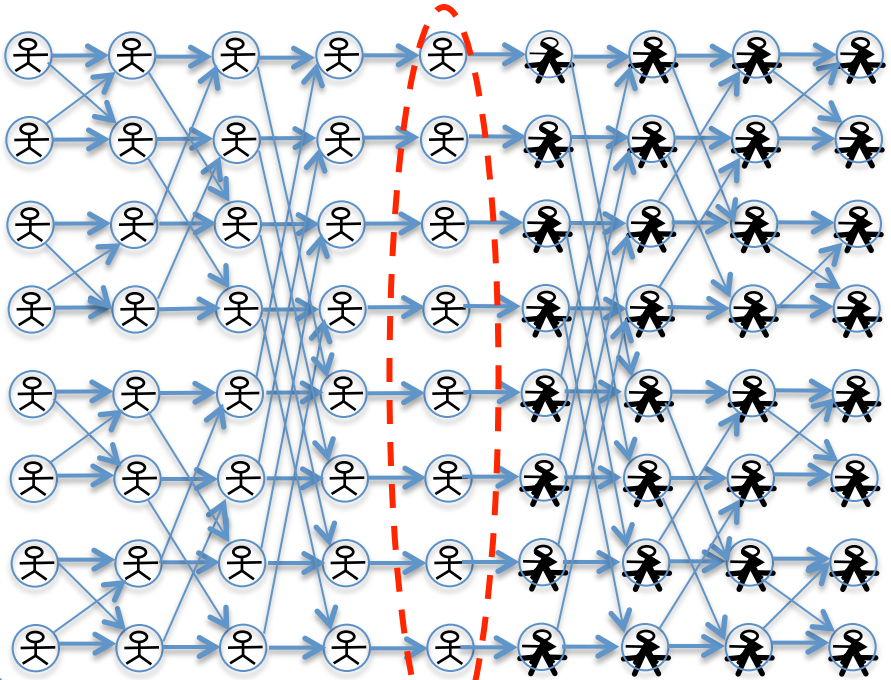
HDR = High Dynamic Range in image

New Organizational Paradigm: The Structure of a Weavelet

Fast AND slow, (pre) learned patterns are prepared to match very fast from incomplete input and act immediately.

Memory from experiences and Memory of the future: scenarios, dreaming, imagination

The Organization as a LENS
for sharing and circulation of patterns



Can cope with complexity diversity and dynamic ecologies

Aggregation from Open sensors with unique perspectives & contributions

Butterfly Structure:

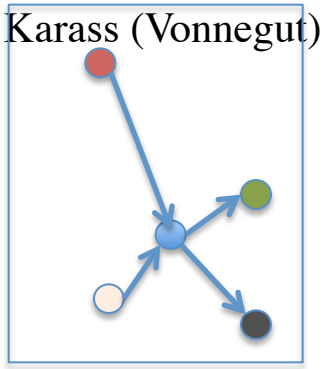
Cooley-Tukey algorithm (Gauss): Gabor wavelets, Fourier Transform, Walsh-Hadamard Tr, Karhunen-Loève Transform

orthogonal transform

patterns: "holograms"

inverse transform

Correlation, matching, decision filtering, association, memory



Disaggregation to Open actuators

All information is nowhere and every-where. Feedback loops

Decisions spread over the whole network

New Organizational Paradigm : The Structure of a Weavelet

Yes, it can scale up, self organizes. Fast parallel pattern recognition (incomplete matching)

Pluriform
Diverse

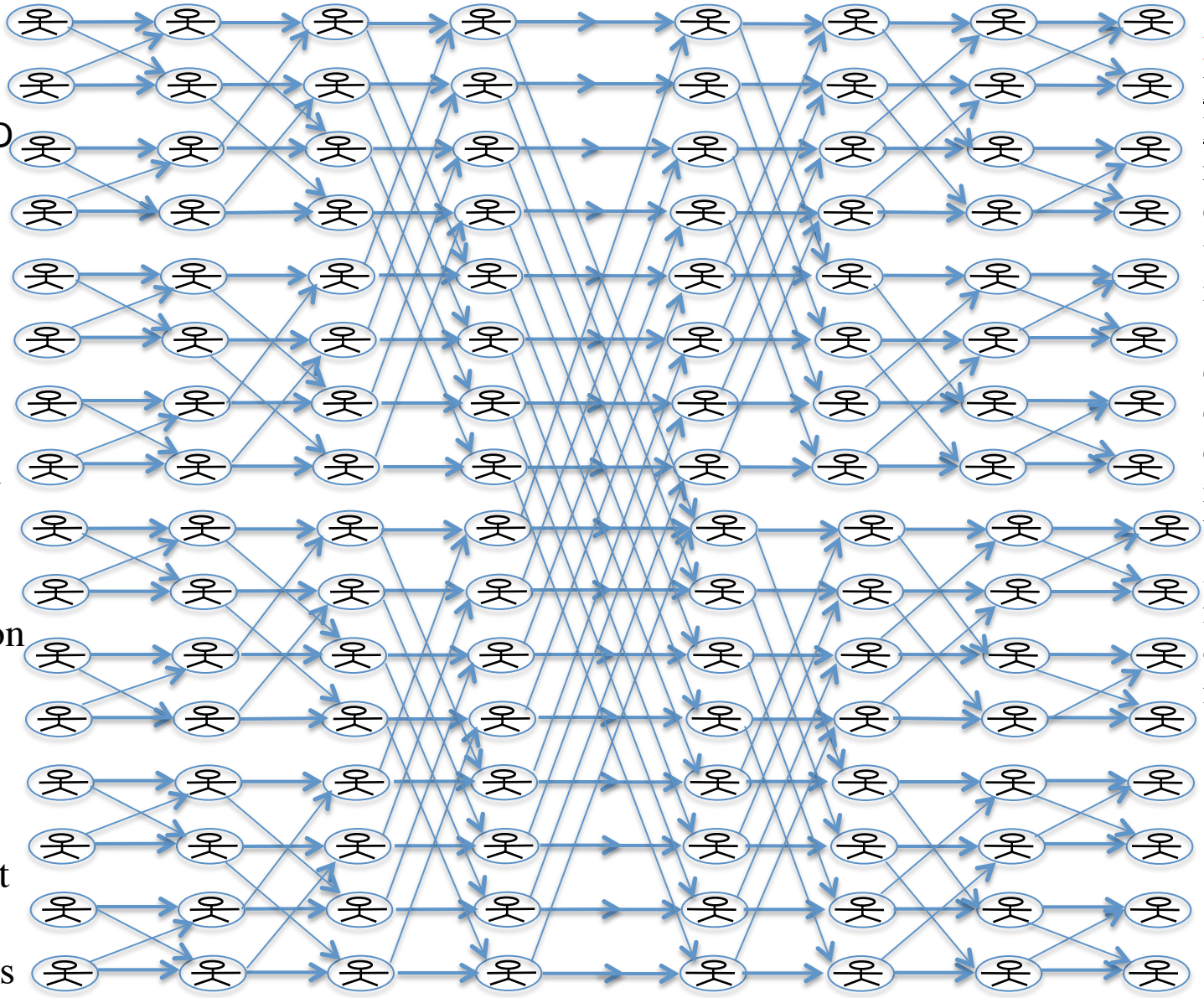
DISTRIBUTED
Transparent
Everybody
can see
everything

P2P
Connectivity
OPEN
Synthesis
Value creation

Synergy
Innovation

Very resilient

Contributions
Fractal unfolding repetition



Distributed:
Every
Karass can:
recommend,
confirm,
verify AND
notice
significant
differences
decide, act,
combine,
mix, create
bend light,
zoom in,
focus, has
overview,
feed back

Functions
as ONE
organism

What happens at the Transformed Plane?

- All of the information is available there (halfway the Weavelet) to make spatial (3D) models, for handling Depth and Proportions, and temporal (time: 4D) models of movements etc. to act upon.
- The patterns are distributed, stored and manipulated all over the Weavelet by multiple feedback loops in contact with the ecology around it. So collective and individual decisions and actions can be taken.

  Physical evidence: In optics halfway behind the lens there is the FFT Transform plane. The image is fuzzy there, while on the Focal plane it is sharp. Jumping spiders have 4 distinct photoreceptor layers in their eyes, they can judge distance to jump by processing the difference between defocused and focused layers. http://www.livescience.com/18143-jumping-spider-unique-vision.html

Temporal and Spatial Correlation

Red Square,
Circa 1950

Present-day
Red Square

Source: @foquasa on InstaGram

If you think the functions of Weavelet structures are mysterious, take a closer look at how the following organizations operate (or are preparing to) :

- Al-Qaeda ?
- Organized crime ? Mafia ? Banksters (too big to jail)?
- "Open Source Intelligence" OSInt, Transparency ??
- The Pentagon's project "Data-to-Decisions" (D2D)
- Occupy ?
- Anonymous ? The 'little brothers' are watching too !
- "Open Science" projects
- Open Access and Creative Commons
- P2P Foundation, people, Wisdom of the Commons
- Smart Communities, Netention, open source dev
- "Stymergy" instead of Hierarchy
- Google ++ & Ray Kurzweil ?
- Social Media like Twitter ++, viral success of InstaGram with for each photographer a Karass of thousands of followers and following
- Europe Spring ?
- Unions 2.0 ? Pirate Parties: Liquid Democracy loops
- Big Data, Business Intelligence
- Singularity ?? Shared minds !!
- Civil Society (Trias Internetica)
- Phyles, Commons, Cooperatives
- Nature at work ?? Will bacteria beat us?

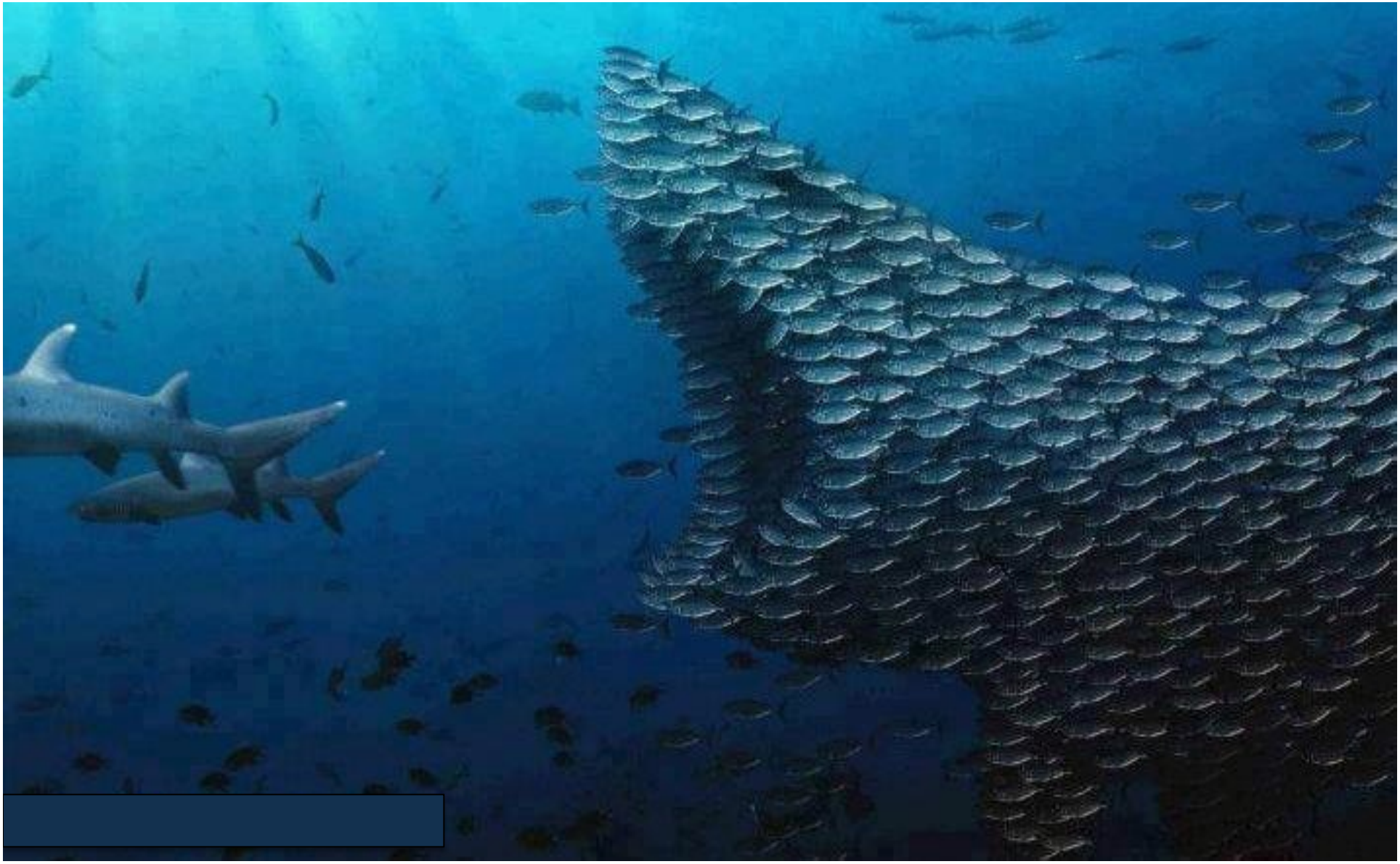
Spread

All

Over

The

Internet



Collective mind? **NATURE at work !!!**

Conclusions

We believe that weavelets - self-forming alliances of individuals, connected through channels made possible by advanced computing and communications technology – presage a sea change in the evolution of the species. These groups, interconnected in ways that mirror the patterns of living systems, can achieve fast, orthogonal transformations (like the FFT), at a level never before possible. Using distributed models of thought and action, following maps hidden in plain sight in the natural world, they will have the ability to collaborate quickly, seamlessly, and in service to the goal of bringing what Amartya Sen[1] has called "The Five Freedoms" to all present and future travellers on this beautiful, blue-green planet.

- This may be the next evolutionary leap of life forms and may bring us in the Era of Idea's [Bommerez].
- Maybe this leap is part of the Singularity.
- Remember that nature has done such leaps before. Jeffrey Sterling wrote in a recent mail message: My favorite book on the subject is Earthdance by evolutionary biologist, Elisabet Sahtouris which covers the entire evolution of life on Earth. Chapter 11 of the book is called the Big Brain experiment http://www.ratical.org/LifeWeb/Erthdnce/chapter11.html.
- Toward the end of that chapter, Dr. Sahtouris makes this observation. "Particularly interesting is the fact that bacteria invented communications systems prior to organizing themselves into nucleated cells, and that nucleated cells invented intercellular communications systems before organizing themselves into multi-celled creatures. This is how the Internet will play out its enormous role."

[1] Sen, Amartya 2000, Development as Freedom http://www.amazon.com/Development-as-Freedom-Amartya-Sen/dp/0385720270

Future research

- Weavelet-like structures and its functions can help to explain how "emergent behavior" in groups of massively interconnected animals work.
- Imagine that the recently discovered underground interconnections by fungus wires between trees in a forest would lead to a collective mind and spirit, in combination with changes in genes (changes DNA) ??
- It might give Telecom Operators, ISP's and Internet network providers incentives to defend, preserve and strengthen Internet as a "Web of Life".
- Imagine what would happen if the users of InstaGram, PhotoSynth and Layar would interconnect APPs and clouds; and form a collective intelligent Weavelet?!

Challenge 1. Will weavelet-like organization structures enable society to create new jobs and work for middle class workers with unique skills?

Challenge 2. We suspect that combinations of [pinecones, cacti, LOFAR array radio telescope math., Ben-Jacob bacteria growth, Fibonacci/ golden mean, galaxies] will show how weavelets will further unfold into 3D,4D,5D spirals. Are galaxies life forms too?

Lecture invitations and (any type of) funding for further research would be most appreciated.

Acknowledgements

This research project is dedicated to the late Aaron Swartz RIP, in the hope that it can help forward his dream of us all making the transformation from centralized systems to open P2P networked distributed cooperation, including and feeding the wide variety of long tail pluriform interests.

With thanks to the ideas of Jan Noordam (ASTRON), Karl Pribram (Holonomic Model), Michel Bauwens (P2P Foundation), Bill St.Arnaud, Martin Nowak, Sheldon Renan, Gordon Cook, Paul Budde and many constructive others in our Karass.

Thanks especially to Lisa Sterling and Jeffrey Sterling (Cascadia) for their encouragement and generous support.

Poem by
Canibus →

Knowledge, Wisdom and Imagination on The Internet are imperfect and incomplete:

All part of the Process of improvement
~ jvt