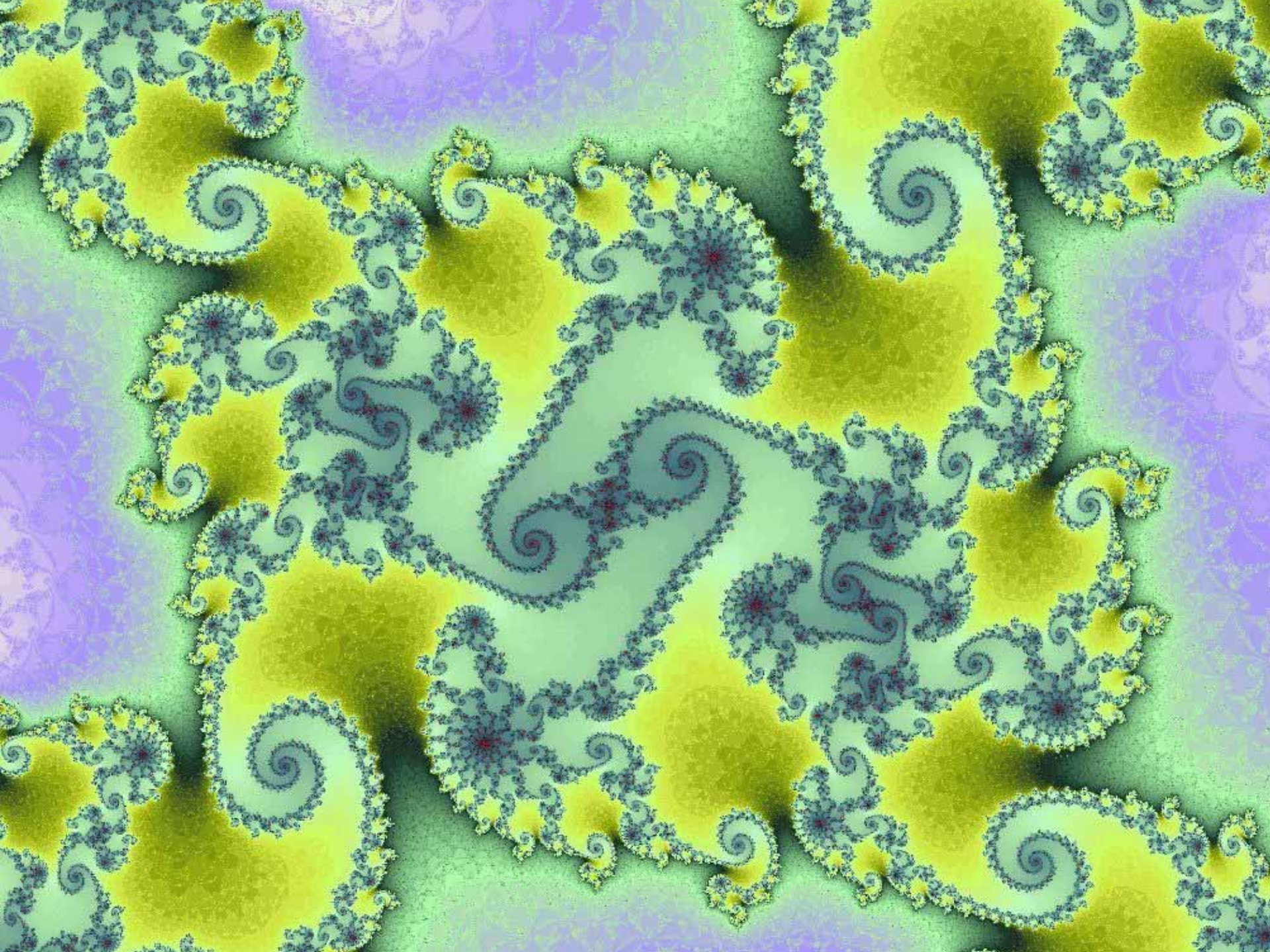
Pattern (recognition)

- Pattern Recognition as a research field is a sub-topic of Machine Learning which again is a sub-topic of artificial intelligence.
- All computational Pattern Maching and Patten Recognition is based on quantifying the pattern.
- This is limiting the understanding of patterns.

- But when talking of patterns in design it is about understanding patterns as ornaments.
- Or is it?

- The sensory apparatus is central when talking of patterns.
- Hense the ostensive and interpretation also are important.

- Even quantitative patterns are often only readable qualitatively.



- The discussion about patterns also has emerged in methodological discusions.
- Instead of prescribing methods one discusses patterns resulting in ”Best Practices”
- E.g. in education

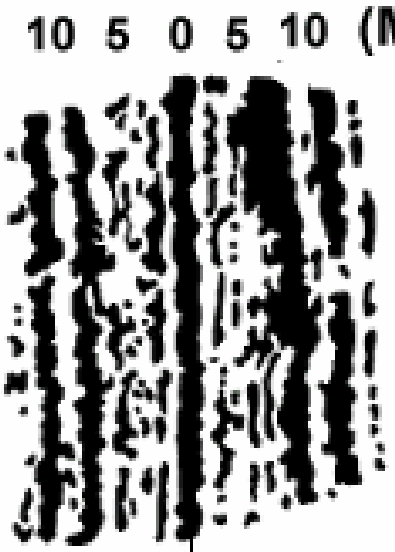
- http://ifets.ieee.org/discussions/discuss_june2004.html

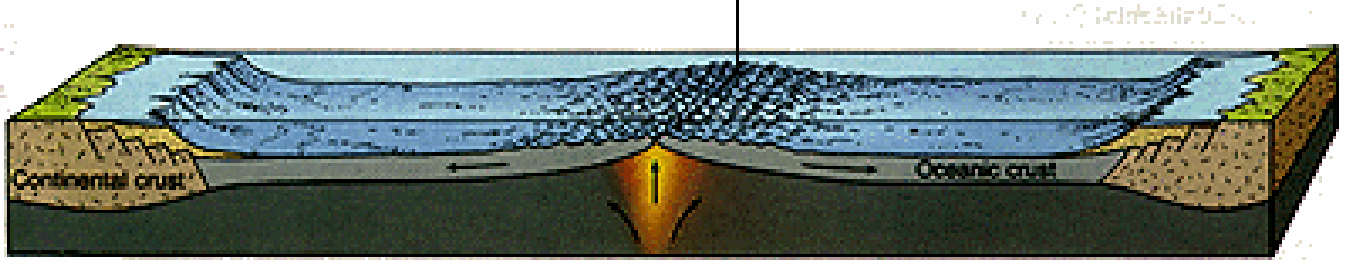
Design Patterns

- Christopher Alexander
- Design Patterns are something slightly different than what we normally think of as patterns.
- They are the patterns of parameters used to define a design
- E.G Waiting rooms in a clinic and buss stops are both part of the pattern ”A Place to Wait”
- I think the term pattern is somehow used wrongly in these very widely spread consepts.

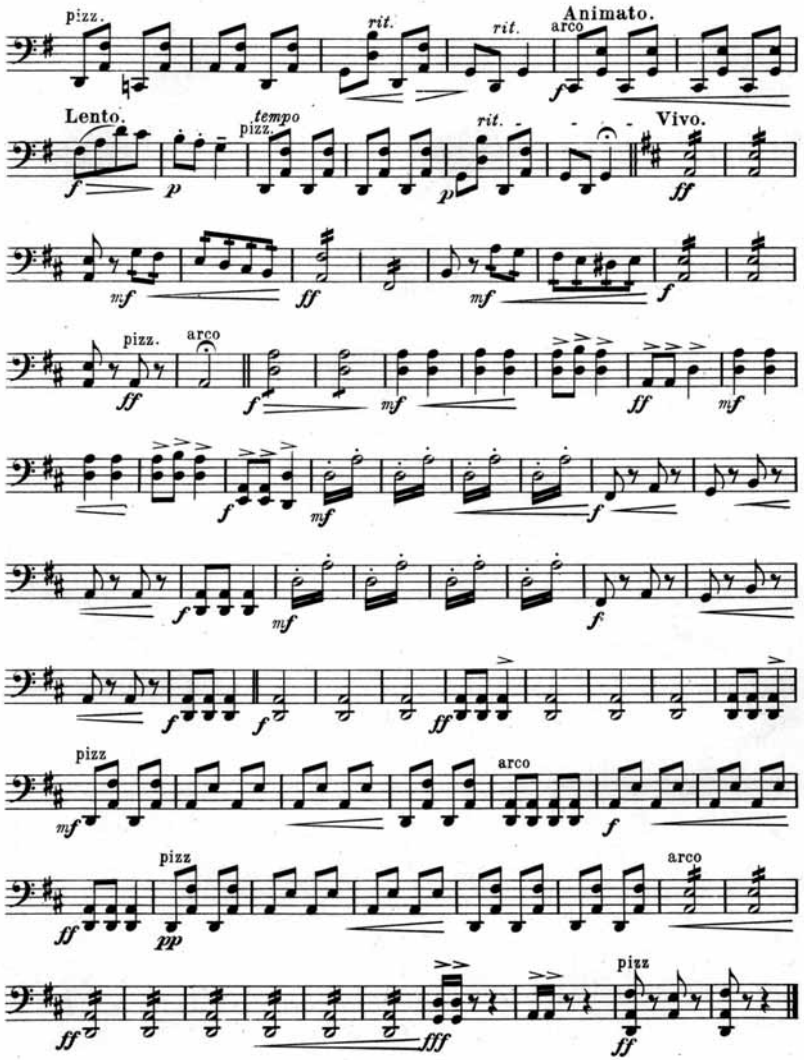
- When talking about patterns in design from a system oriented approach it is about patterns on a system level.
- These can be patterns of:
- Spatial distribution (intensity variations) e.g. magnetic ocean floor)

This pattern is a top down view of a mid-ocean ridge area. Black is normal polarity and the gaps are reversed polarity.





- Spatial shapes (e.g. weather patterns)

- Time based patterns (repetitions e.g. jellowstone or high points like the climax in a musikal composition, stock marked patterns, fading andexponensial crowth etc)

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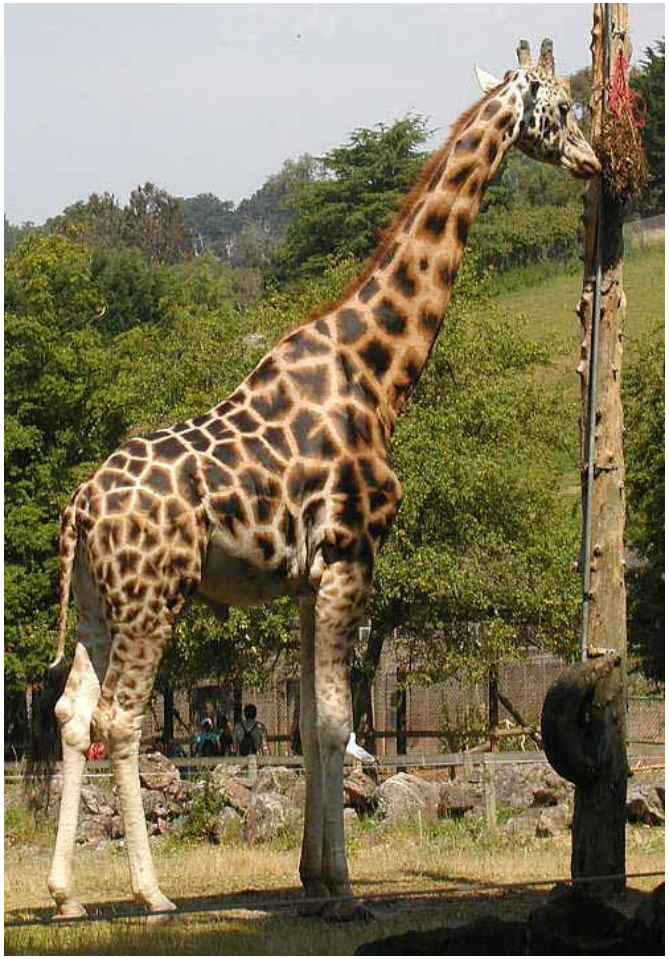
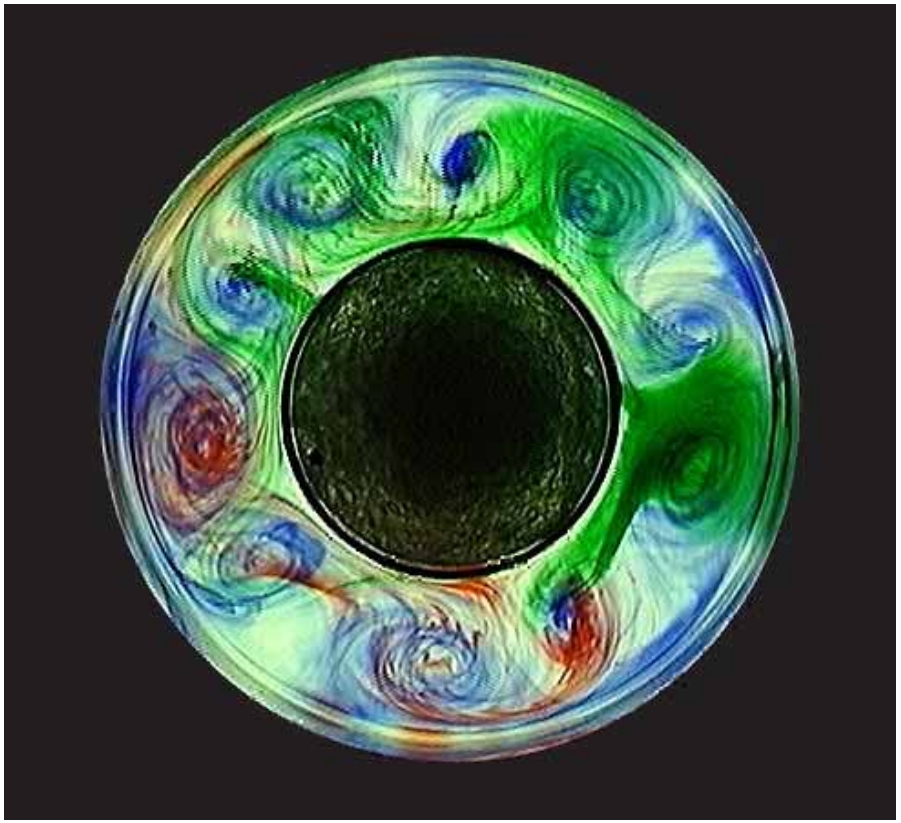
- Flow patterns (e.g. rivers meandring or flows through systems e.g. flowcharts)

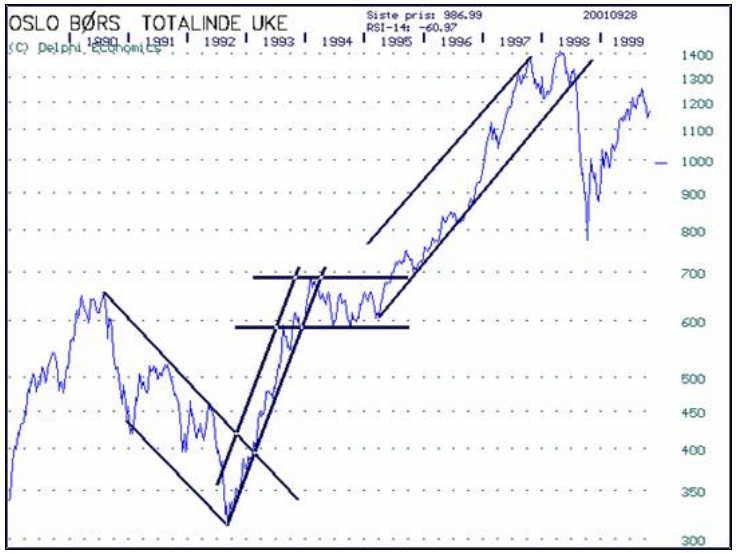
- But patterns are also about structural organisations



- Patterns are crossing the quantitative and qualitative borders.
- Often it is about visualisation of numbers.
- Very complex piles of numbers are only understandable as visualised patterns.

amira
TGS

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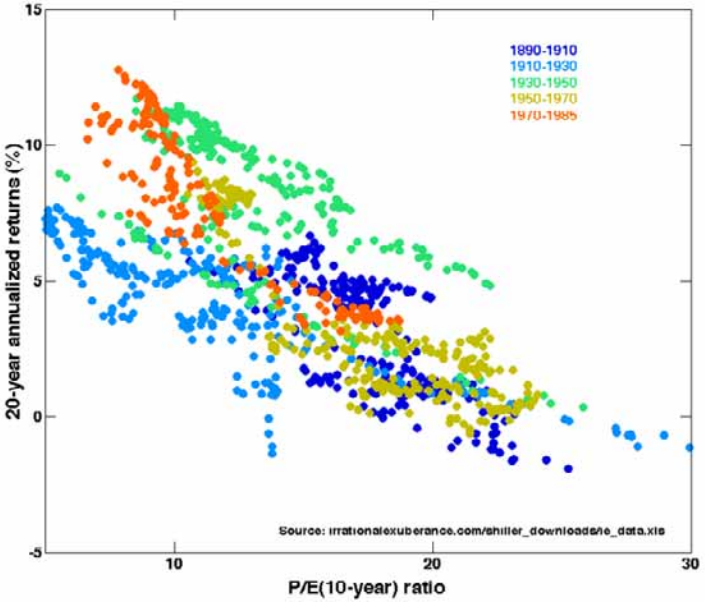
1890-1910
1910-1930
1930-1950
1950-1970
1970-1985
Source: irrationalexuberance.com/shiller_downloads/ie_data.xls
20-year annualized returns (%)
P/E(10-year) ratio
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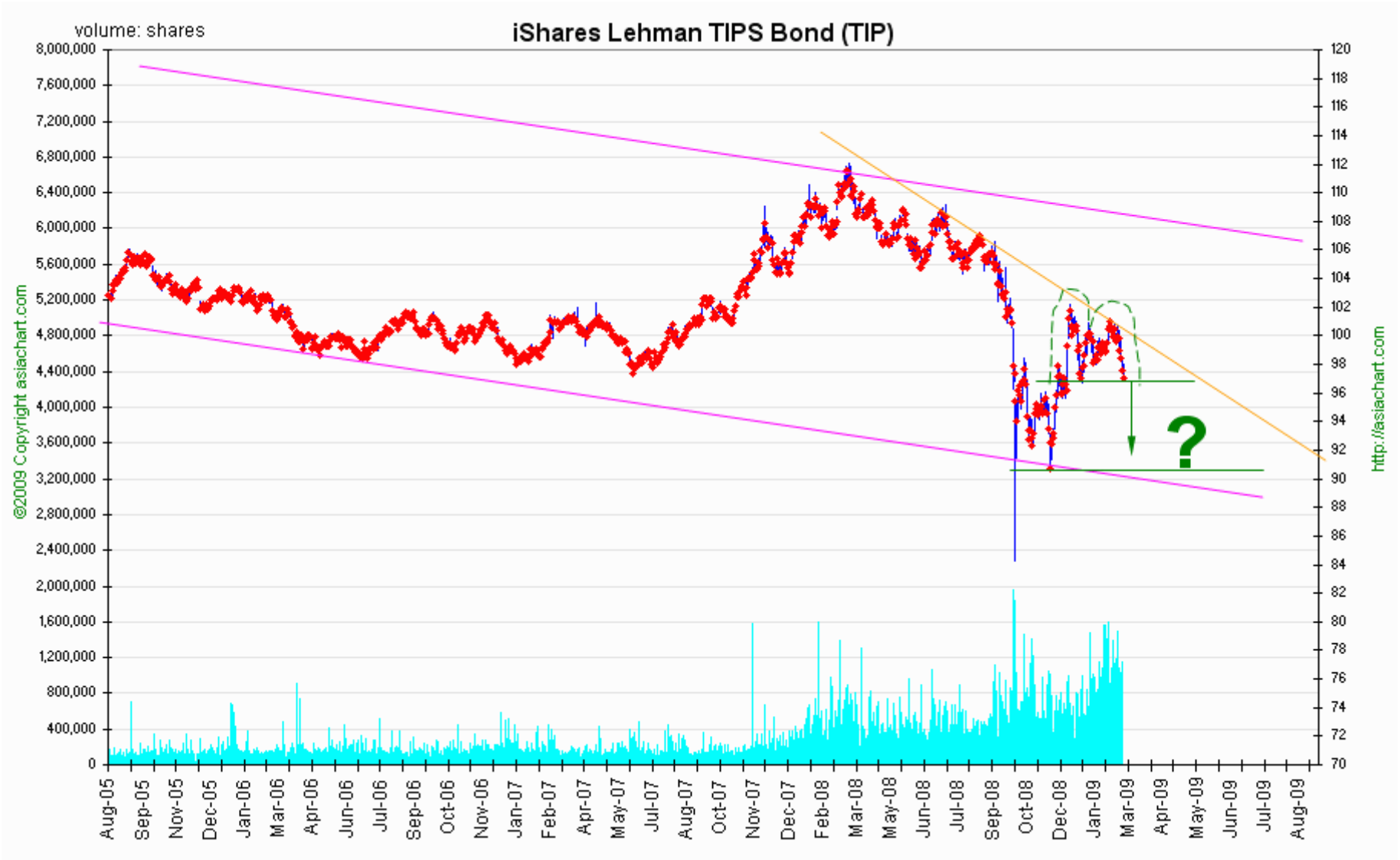
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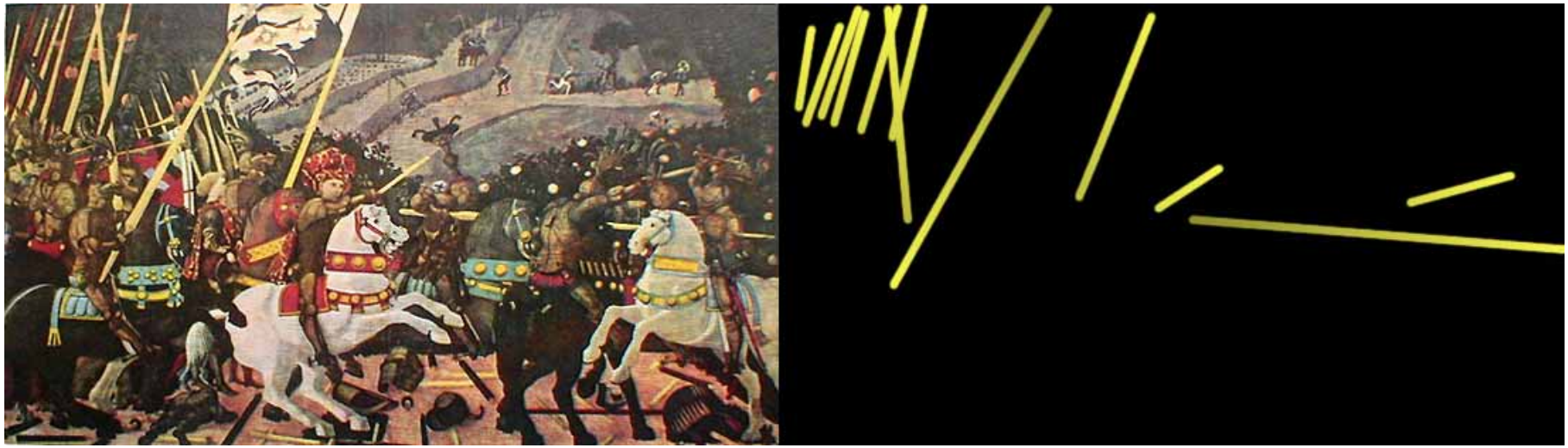
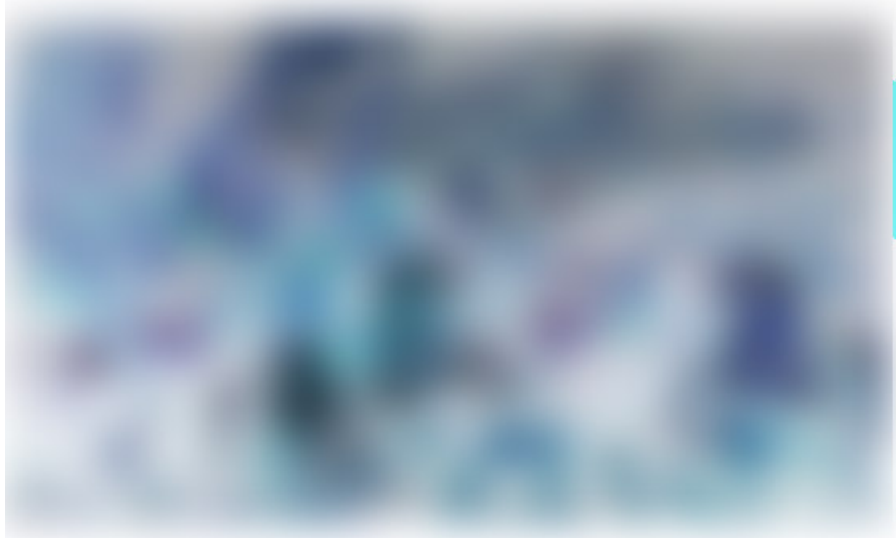
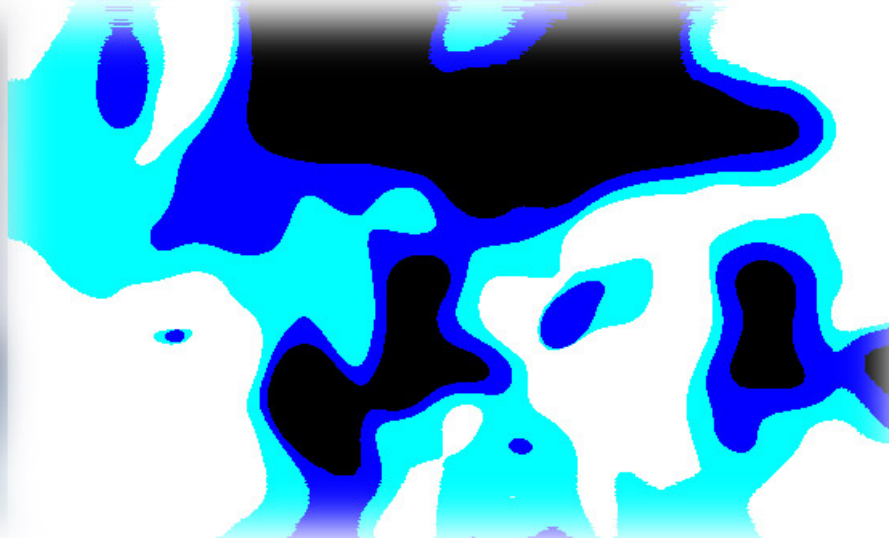
- In Machine learning an example is face recognition.
- It is based on the geometric relations between the facial features.
- But in this case the pattern is given and the relations can be calculated.
- What about recognising something as a pattern in the first place?

- The recognition of a pattern is based on one or several of the following:
- Repetition
- Visual thinking
- Memory
- Figure and Gestalt
- Prosessing and visual work

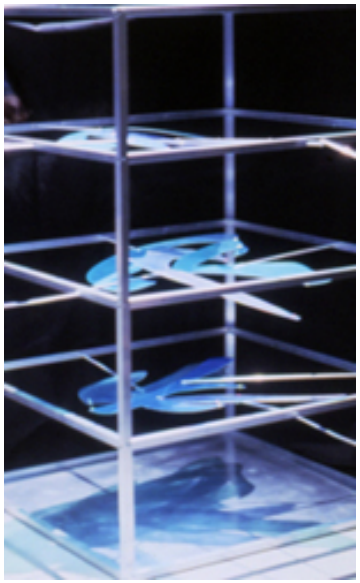
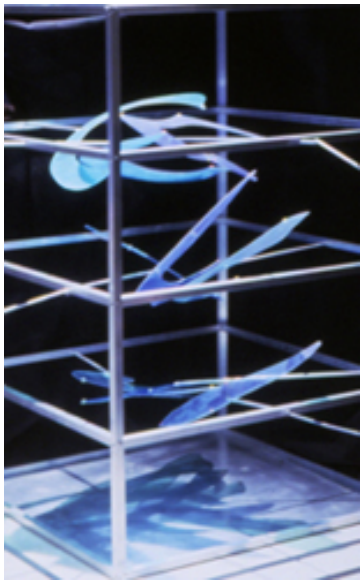
Ucello: Battle of San Romano

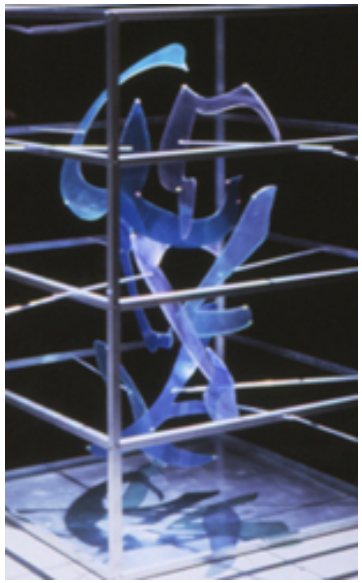
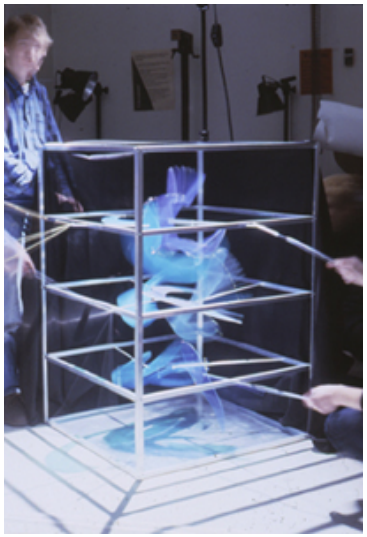
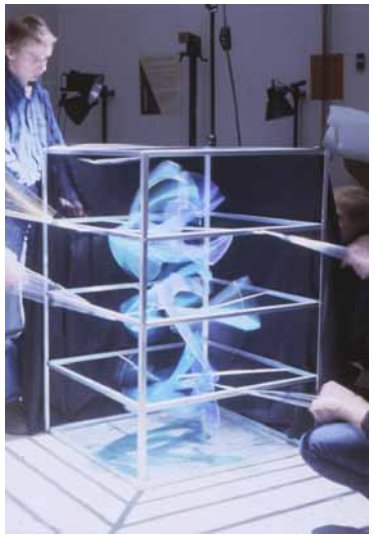
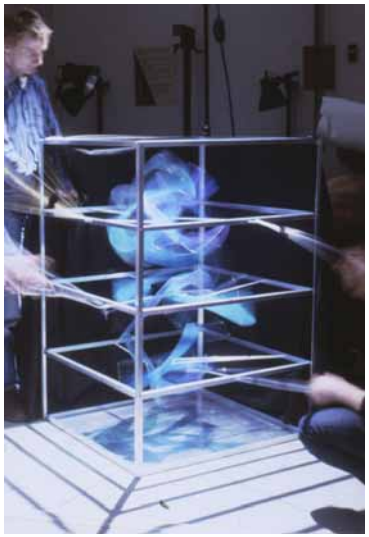
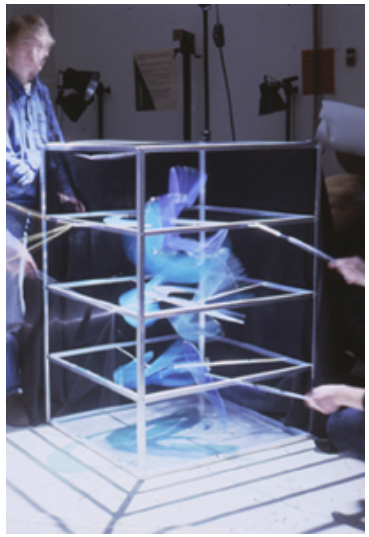


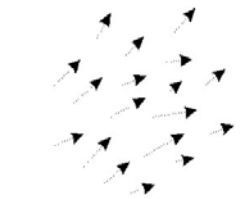




- The Ucello Example shows how a global pattern that may be hidden in the large density of details can be extracted with graphic means.
- The global pattern can be used for strategic decition making when the data field is to dense or otherwise complex.
- Think of replacing the painting with mapped city traffic or other complex dynamic data.

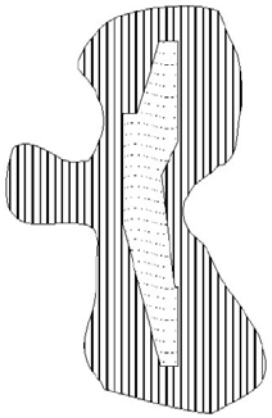





Particles
Vectors, movement, direction, density, duration

2D + time
Animation
movement
analyses

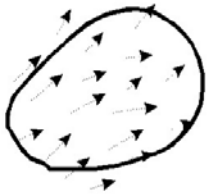


Graphical treatment blurring:
Field distribution

2D grphical
analyses

Graphical Treatment
Force Concentration

Still analyses
(one frame at
time)

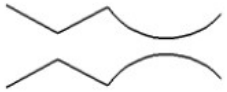


Blob surfaces
Limit engaged
spatial structure

3D Spatial
analyses

Paralell

Offset



Mirror

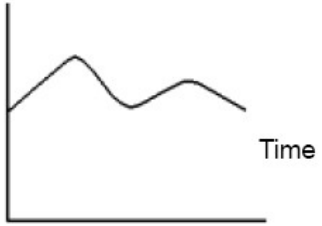
Echo

Approxima-
tion

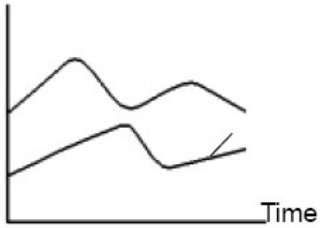
Same

Crossover

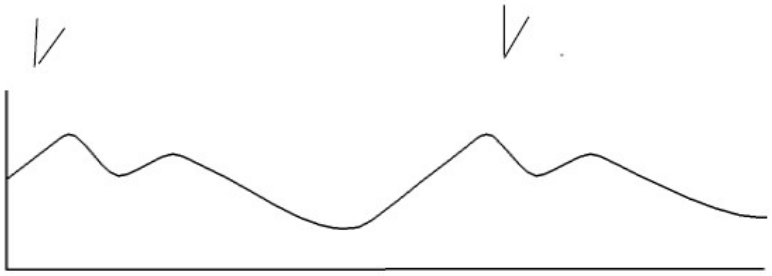
Similar

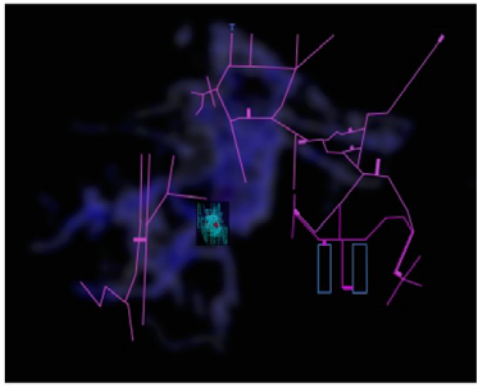


Time split

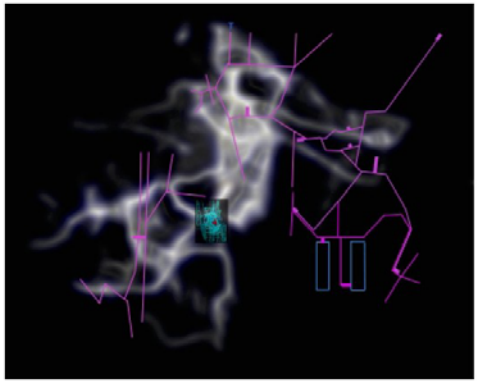


Time counter
stream

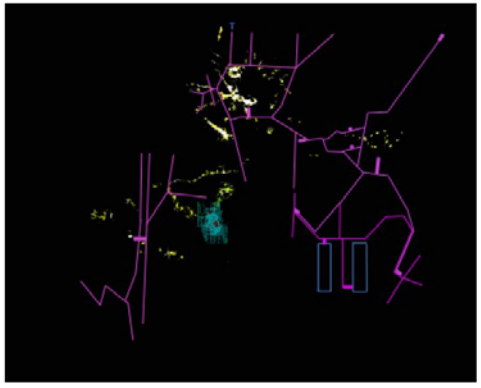




Blurred



Blurred with
edge filter



Force fields

- Unfortunately the science of pattern recognition is today linked to computation.
- But the essential question is how do we actually *recognise* a *pattern ?*
- A good clew is to look at the psychology of perseption and visual thinking as described by Arnheim
- Based on gestalt psychology

- **Gestalt psychology** or **gestaltism** (also Gestalt of the Berlin School) is a theory of mind and brain that proposes that the operational principle of the brain is holistic, parallel, and analog, with self-organizing tendencies; or, that the whole is different from the sum of its parts. The **Gestalt effect** refers to the form-forming capability of our senses (the word *Gestalt* in German literally means "shape" or "figure"), particularly with respect to the visual recognition of figures and whole forms instead of just a collection of simple lines and curves.

- Patterns are important because they are a means to indicate how things work when we do not have decisive data.

In your projects it can be about recognising patterns of:

- Areas of interrest
- Relations
- Collaboration
- Failures
- Economic flow
- Political dessitions
- Information flow through your systems
- Other systemic behaviour

The human is still better to stack cutting patterns than the machine