

# My AI in Peace Machine



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# Personal timeline

- Born 1962
- Mother died 1971 → Quest for understanding
- MSc studies on human oriented information systems development (Uni of Oulu)
- Language Machine project (1980s)
- PhD on using Neural Networks for Natural Language Processing (1997) (Helsinki Uni of Technology)
- Professorships in Helsinki Uni of Tech, Uni of Art and Design Helsinki, Helsinki Uni (Humanities) (2014-)
- ...

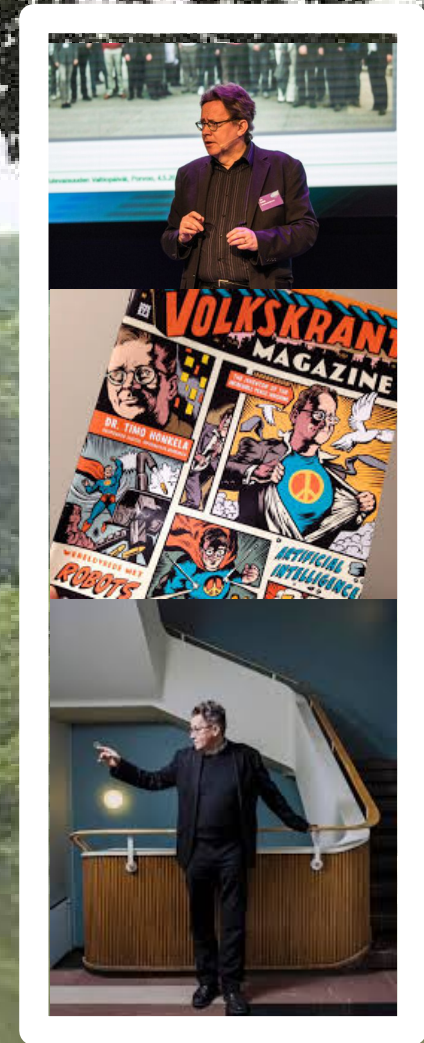
# MyData and OurData plus Quantified Self activities over the years

- Gathering eagerly track and fields statistics as a child being the last as an athlete but first in collecting and analysing data (ages 10-16, years 1972-1978)
- Actively collecting own health data within the framework of holistic health care clinic during first major health

# Some warm up questions

- Can Blind be visionary?
- Do words mean the same for all people (who speak the same language)?
- What is the role of emotions, intuition and logical reasoning when we make decisions?
- What is the role of computational modelling in relation to meaning, emotions, values, language, cultures, etc. as machine do not understanding and feel in a human way?

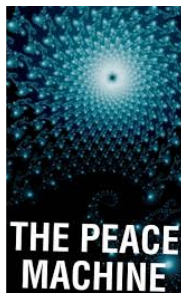
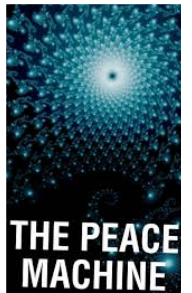
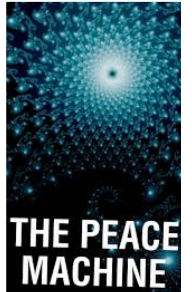


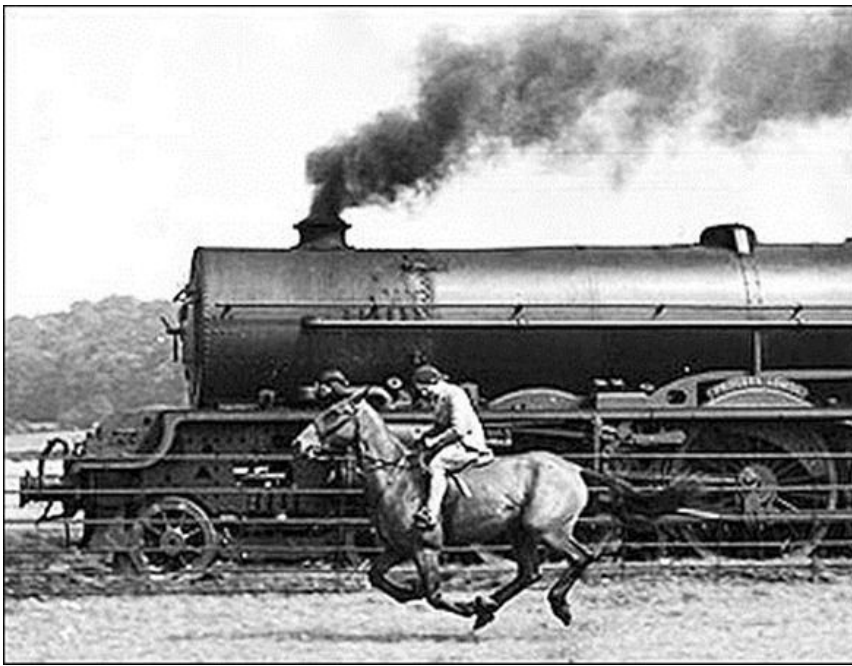


October 2017 and onwards

# Three areas of Peace Machine

- Languages, conceptual systems, communication and mutual understanding
- Emotions, identities and happiness
- Society, democracy and economy





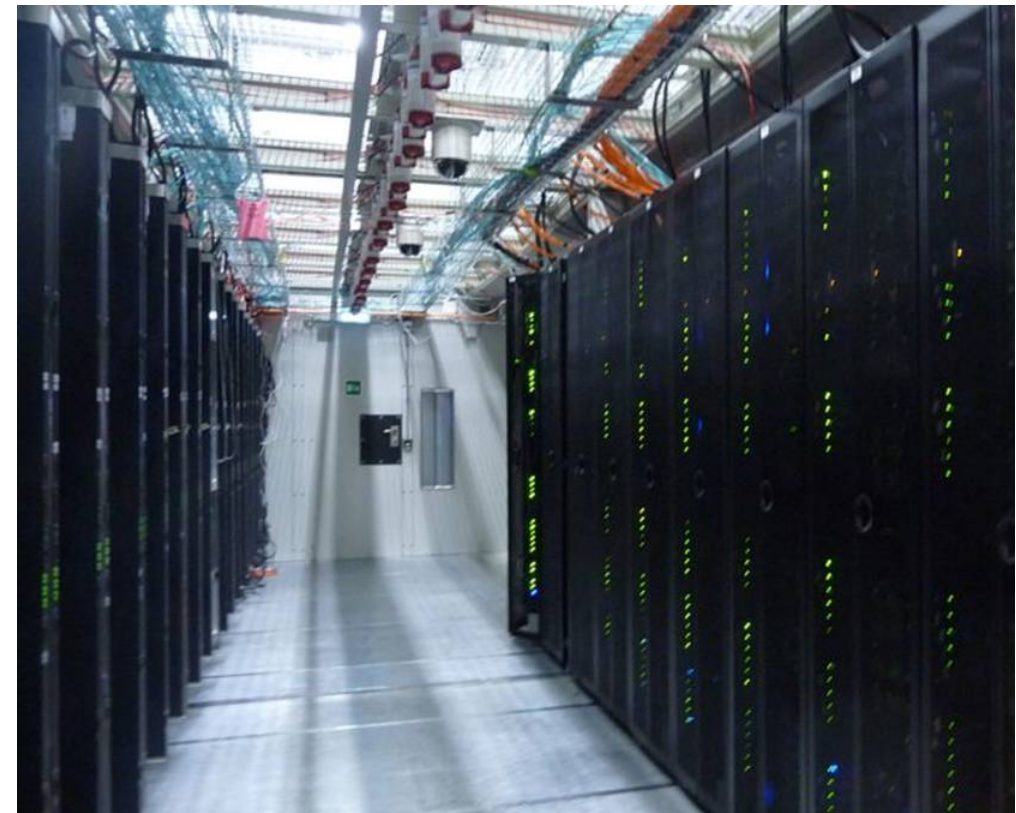
<https://www.pinterest.com/pin/509680882801748515/>



[https://en.wikipedia.org/wiki/Johannes\\_Gutenberg](https://en.wikipedia.org/wiki/Johannes_Gutenberg)

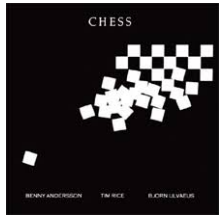
<https://www.csc.fi/>

# From invention of **printing** to **industrial revolution** and **AI revolution**





# Example on the use of modern AI in a limited context



[https://en.wikipedia.org/wiki/Chess\\_\(musical\)](https://en.wikipedia.org/wiki/Chess_(musical))

Long history of human chess, here Fischer vs Tal (1958)



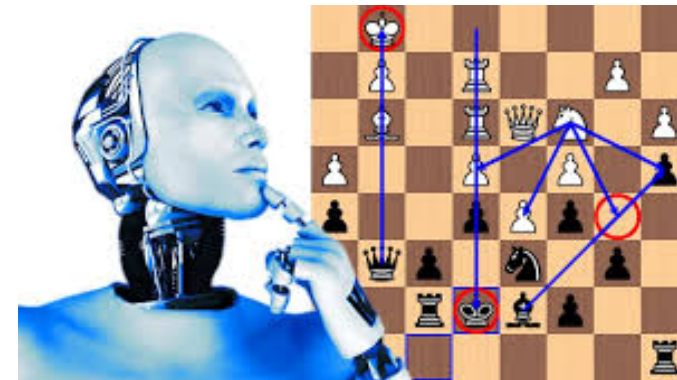
Brute force calculation & Heuristics  
("dull old AI")

Deep Blue (1997)



Multilayer neural nets & reinforcement learning:  
best, intuitive, creative.  
4 hours of playing against itself

AlphaZero (2017)



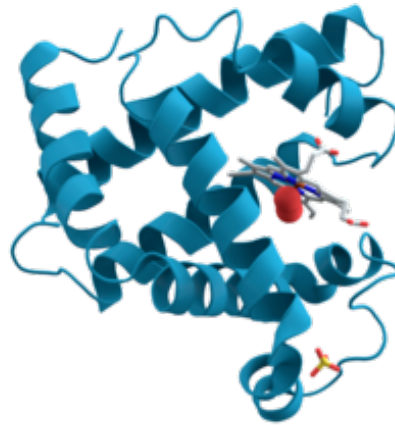
<https://www.youtube.com/watch?v=0g9SIVdv1PY>

<https://www.pri.org/stories/2018-01-05/garry-kasparov-and-game-artificial-intelligence>

# From Chess to the World



Natural and biological sciences have only very limited capacity as explanatory forces for dealing with human individuals and societies



Increasing complexity



Images: Wikipedia

A periodic table of elements, showing the standard layout with element symbols and atomic numbers. The table is color-coded by groups, with elements in the same group having the same background color.

# Aspects of human existence



Natural and biological sciences have only very limited capacity as explanatory forces for dealing with human individuals and societies

Patterns of behaviour over time and contexts, learning and adaptation, language (symbol systems, structure and meaning), communication, art, culture, history, values, identities, religions, legal systems, political systems, emotions, professions, skills, abilities to build tools, etc. etc.

Images: Wikipedia

**Perception**

**Human  
mind**

**Emotions,  
sentiments**

**Action**

**Intuition  
(experienced mind)**

**Embodiment**

**Memory  
systems**

**Rationality  
(linguistic mind)**



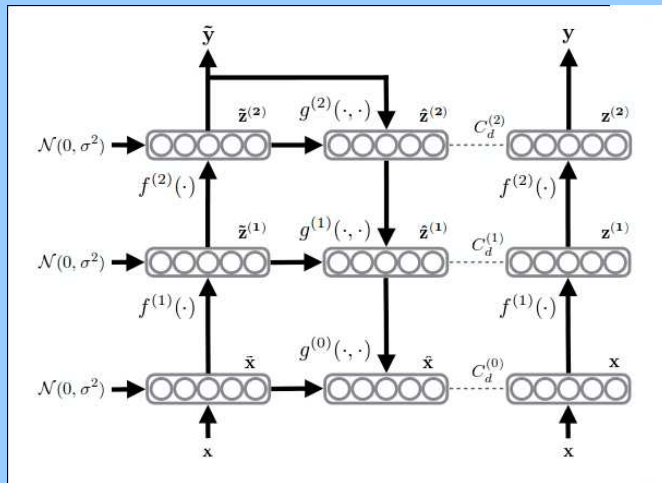
# Variety of people: professions, skills, values, identities, personalities, etc.



<https://clipartfest.com/categories/view/97c2b05418492d1354162eeca5780343bebd1002/free-clip-art-professions.html>

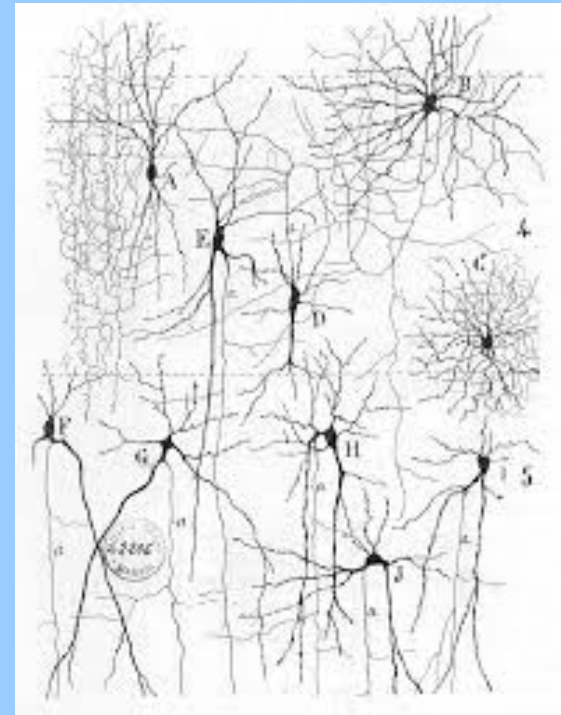


# Artificial and biological neural networks



Example: Rasmus, Valpola, Honkela. Berglund, Raiko

<http://arxiv.org/pdf/1507.02672v1.pdf>



[https://en.wikipedia.org/wiki/Biological\\_neural\\_network](https://en.wikipedia.org/wiki/Biological_neural_network)

# Between the words (partly)

(Timo Honkela 1999, translated by Owen F. Witesman)

woman

man

vegetarian

omnivore

believer

atheist

teetotaler

alcoholic

invalid

healthy

...

so many words

and many more

do we fit between the words?

to meet ourselves and the other

being human

there are not words for all colors

and what is more:

is anyone painted with only one?

# Tradition in AI:

## Representation and reasoning (1/2)

- How to represent our knowledge?
- How to reason over knowledge?
- We had (G)OFAI solution where symbolic logic was the underlying basis
- (G)OFAI failed in the 1980s not only for quantitative reasons but also for qualitative reasons

# Tradition in AI:

## Representation and Reasoning (2/2)

- Currently popular methods include multilayer perceptrons (neural networks; convolutional NN for pattern recognition) & reinforcement learning for numerical data and Latent Dirichlet Allocation for text data (analogical to WordICA)
- Data is increasingly “natural”, not formalised to be easily dealt with traditional programmed systems with fixed formal framework (explicit or implicit; cf. e.g. relational databases and SQL)

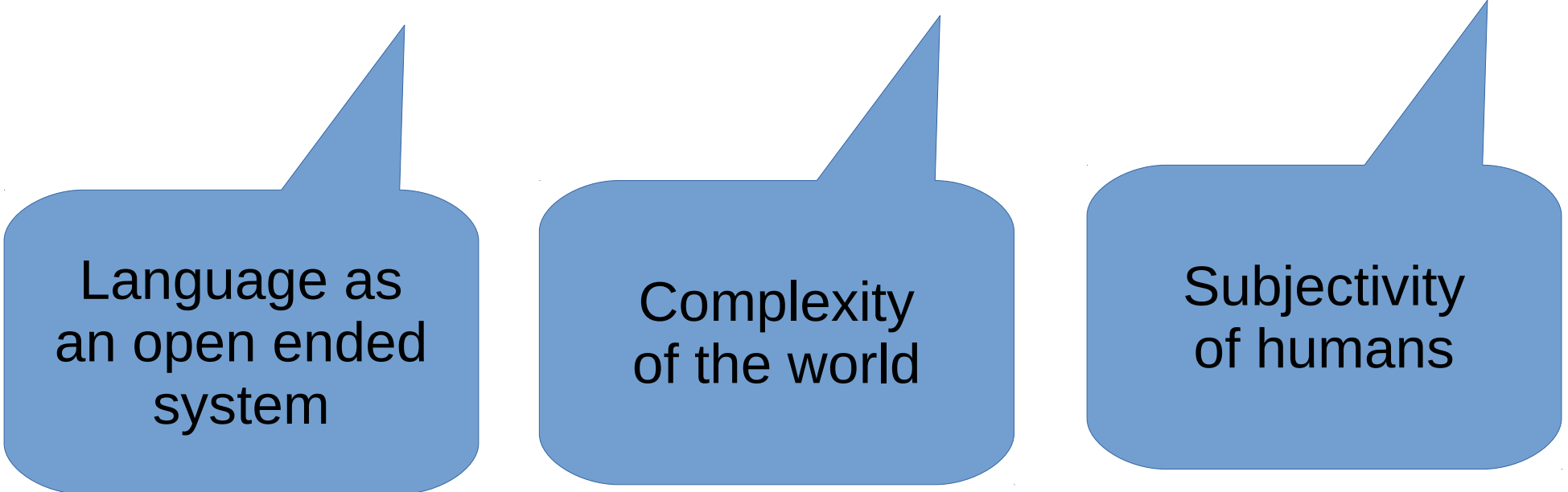
# Issues related to Ethics of AI

Transparency and accountability  
versus

True complexity of reality  
and what should be its  
representation

**Not: reduction of presentation  
can be a form of violence!**

# Theme of **explanation**



Language as  
an open ended  
system

Complexity  
of the world

Subjectivity  
of humans

Past – Present - Future

Learning from data  
versus  
intentionality



# Learning from Experience combined with Intentions

—  
Data in machine terms

Direct experience

Indirect experience

# Learning from Experience

Data in machine terms

# Numbers versus Words

- Large proportion of modern AI work is focused on numerical data
- Linguistic data is transferred into numerical (vector-space) representations through considering contextual information

# Forms of statistical machine learning

- **Supervised learning**
  - cf. potential for violence through strict categorizations
- **Unsupervised learning**
  - “Buddhist AI” → dependent though on data selection and parameterization
- **Reinforcement learning**
  - Includes possibility to incorporate goals and value

# Complexity & Emergences

# Ontology & Epistemology

# Numbers versus words: Generative processes

Past – Present - Future

Learning from data  
versus  
intentionality


# Machine learning serving intentions? (1/2)

- A commonly recognized problem is that machine learning results are based on data that is given to the algorithm
- This often leads into
  - Poor quality model if the data is not representative
  - Model that does not match the intentions or goals
    - Building future that is different from present
    - Taking into account principles, not only what has happened



# Machine Learning serving Intentions (2/2)

- Supervised learning → Old concepts kept  
Unsupervised learning → Finding novel views & systems  
**Reinforcement** learning → Building systems with goal
- Computational **creativity**: Finding novel solutions
- **Deep learning** of data that indicates what is nature and characteristics of good intentions and successful means to reach positive results
  - *Analogical reasoning* at suitable level of abstraction
    - Like a system can learn a different game,  
it can learn to build means to reach positive goals  
in new domains and different levels of abstraction



# Means for **meaning** **negotiations**

# White



# Beautiful

# Computation

# Democracy

# Fairness

Meaning and  
interpretation  
is dependent  
on person and  
on historical  
and cultural  
context



Large  
and  
vast  
meetings

# Meeting between one million people... and more

- AI gives us new opportunities to build communication among large number of people
- Local small meetings can be connected to build large scale conversations
- These meeting can take place language borders using machine translation
- ... and over cultural borders thanks to meaning negotiation systems



# Guides for emotions

# Reducing anger and fear

- Building healthy **identities**
- Developing mutual **respect**
- Reducing **categorical** thinking
- Opening horizons by adding **dimensions**
- Through building and using **wise personal assistants**



# Complexities of openness



# Personal timeline

- ...
- PhD on using Neural Networks for Natural Language Processing (1997) (Helsinki Uni of Technology)
- Professorships in Helsinki Uni of Tech, Uni of Art and Design Helsinki, Helsinki Uni (Humanities) (2014-)
- Brain cancer (2014) → lost the right side of the vision field
- AI for more peaceful and fair world (2017)



# Steps towards future with the Peace Machine

- Society (societies, internationalization)
- Book into several languages
- Implementation of different parts
- Seminars, workshops & conferences
- Research
  - Humanities and social sciences & mathematics and computer science
- Collaboration and networking

Rauhankone ry:n  
perustamiskokous  
19.9.2018 klo 17-19  
Sofia Future Farm

# Thank you for your attention!

