

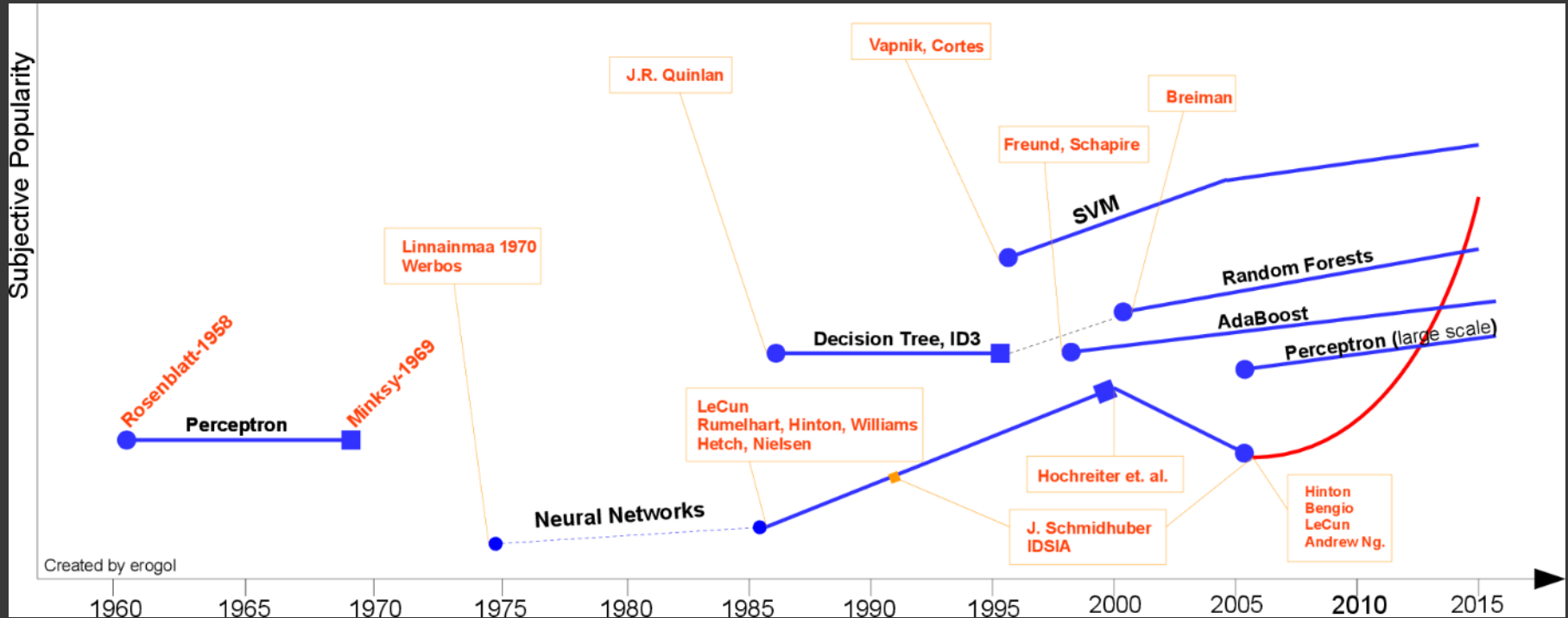


**Artificial intelligence – a research field in
rapid development**

Ole-Christoffer Granmo

March 12, 2018

History of machine learning



CAIR is an **artificial intelligence
research centre**

The CAIR team



We develop tomorrow's artificial intelligence



Superintelligence /su:p(ə)rɪn'tɛlɪdʒ(ə)ns/ ,*n*

A hypothetical agent that possesses intelligence far surpassing that of the brightest and most gifted human minds. May also refer to a property of problem-solving systems (e.g., superintelligent language translators or engineering assistants) whether or not these high-level intellectual competencies are embodied in agents that act in the world. [Lat.]

The CAIR Circle



CENTRE FOR
DIGITAL TRANSFORMATION



HOUSE OF
CAIR



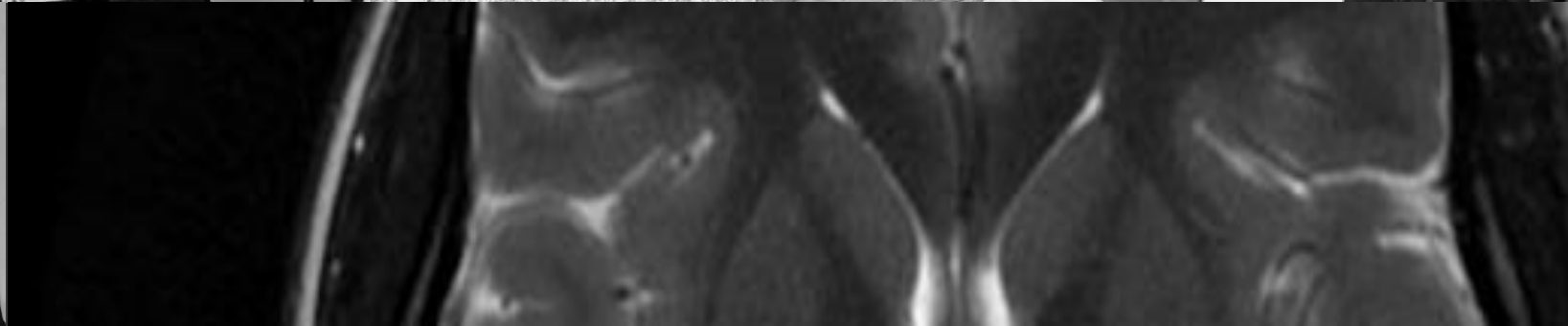
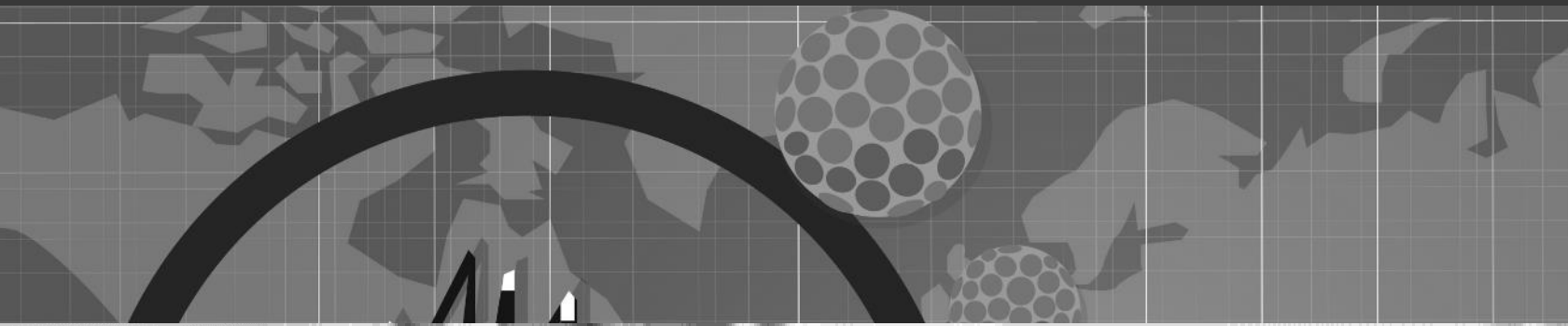
CAIR
ARENA



CAIR
EDUCATION



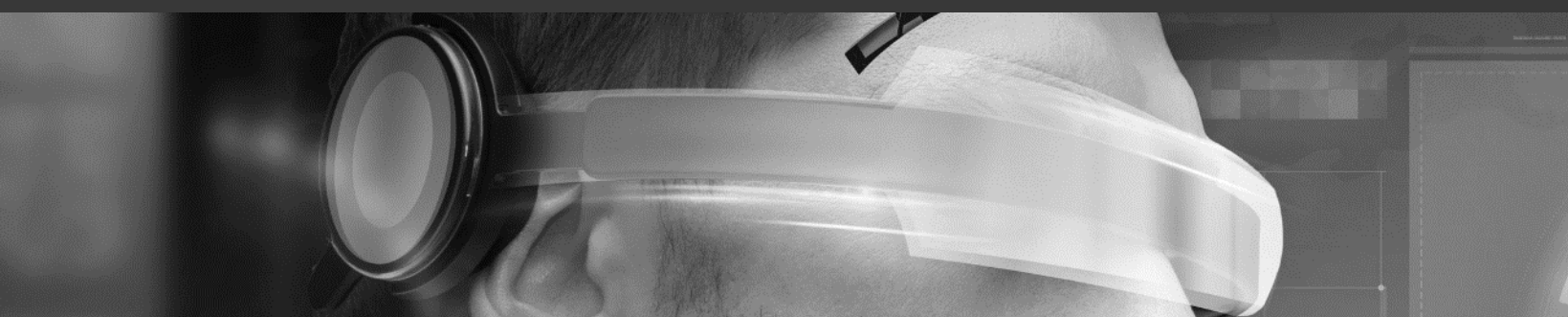
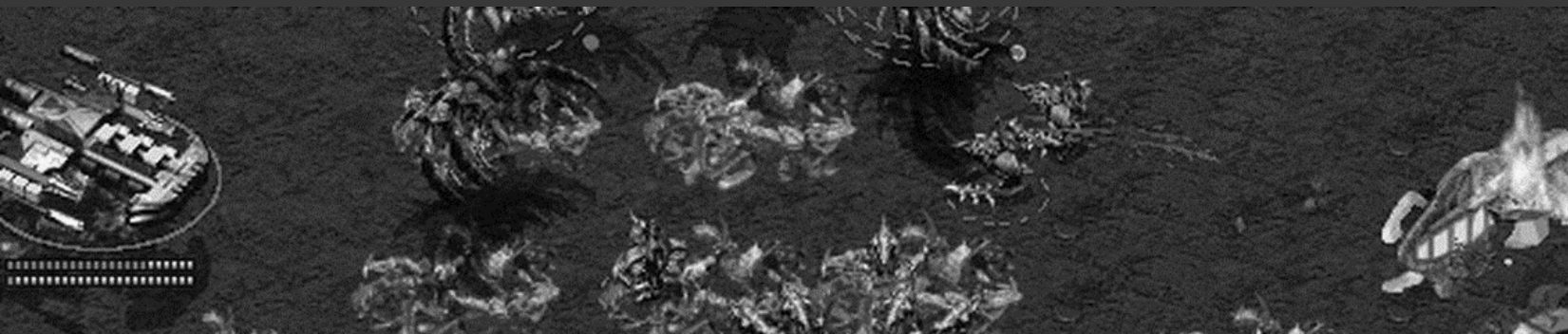
Deep information
understanding and reasoning





Machines that **explore,**
experiment and **learn**







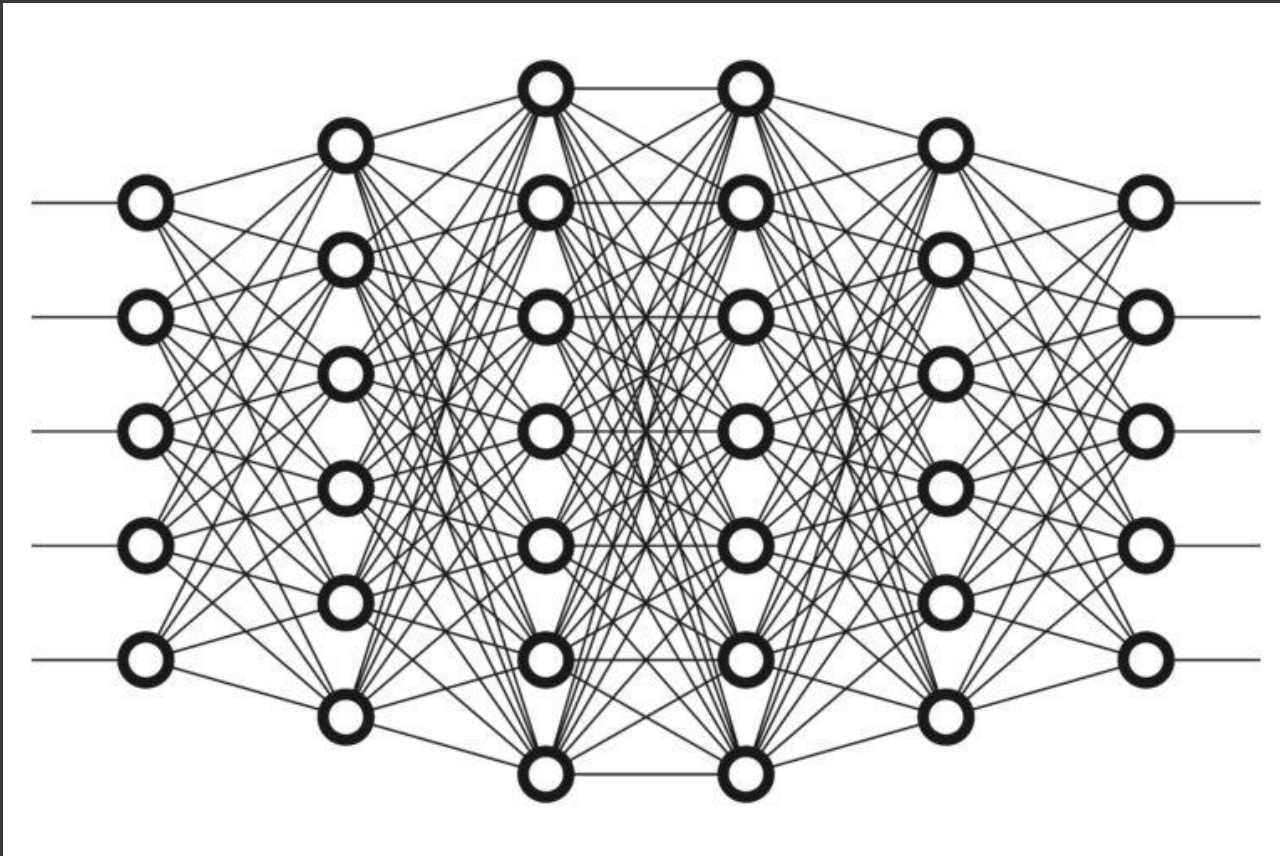
Communicating with natural language





The Tsetlin Machine

The complexity of neural networks

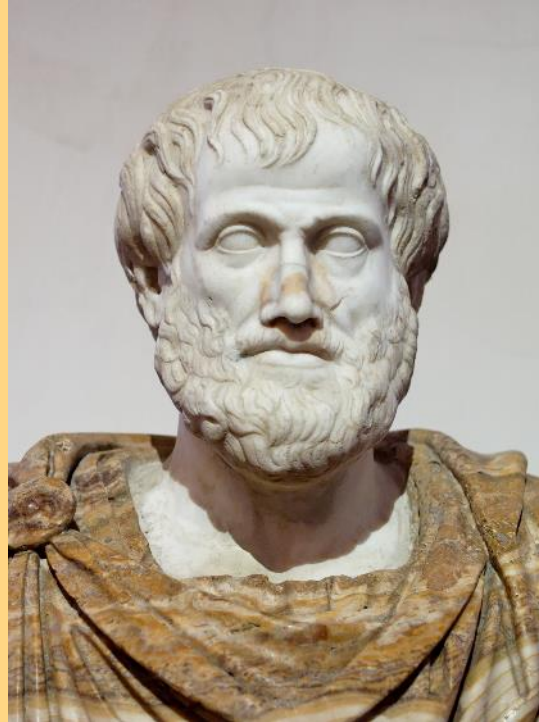


Michael Lvovitch Tsetlin



Michael Lvovitch Tsetlin (the surname is also written Cetlin, Tzetlin, Zeitlin, Zetlin; cyrillic: Михаил Львович Цетлин) (22 September 1924 – 30 May 1966) was a Russian mathematician and physicist who worked on cybernetics.

Propositional logic

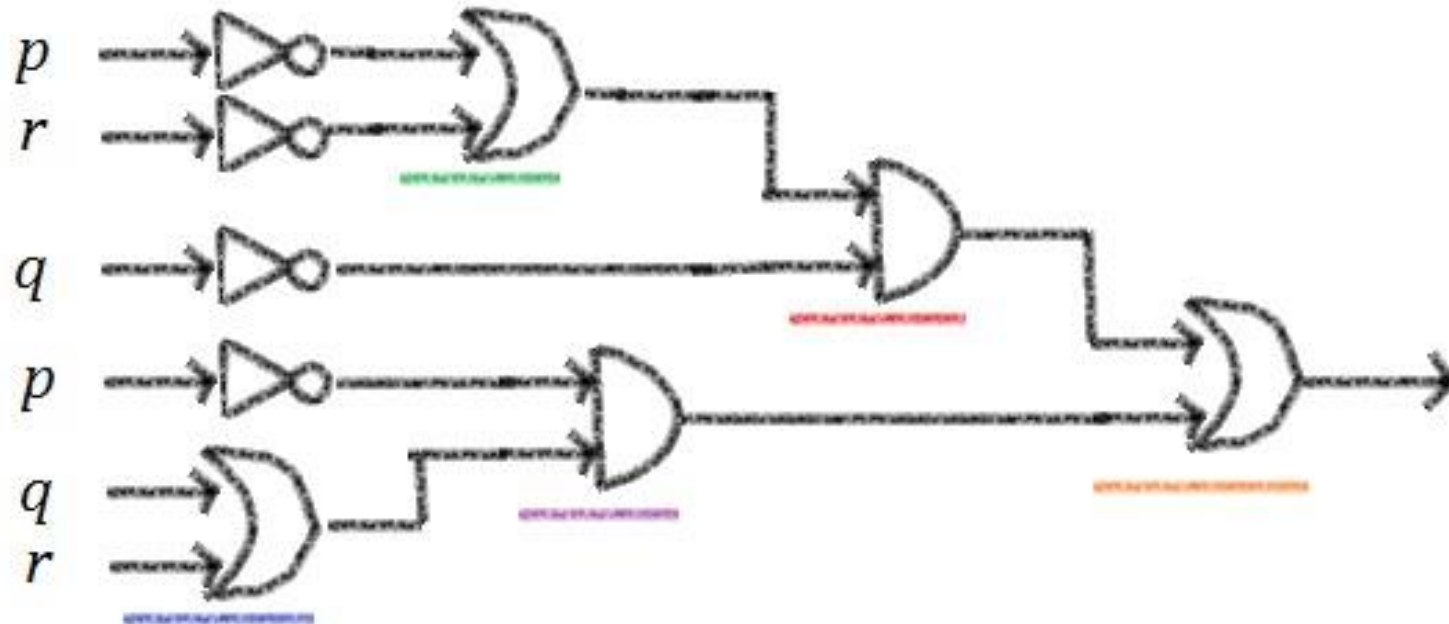


Propositional logic is the branch of logic that studies ways of joining and/or modifying entire propositions, statements or sentences to form more complicated propositions, statements or sentences, as well as the logical relationships and properties that are derived from these methods of combining or altering statements.

The Internet Encyclopedia of Philosophy

Propositional logic

$$((\neg p \vee \neg r) \wedge \neg q) \vee (\neg p \wedge (q \vee r))$$

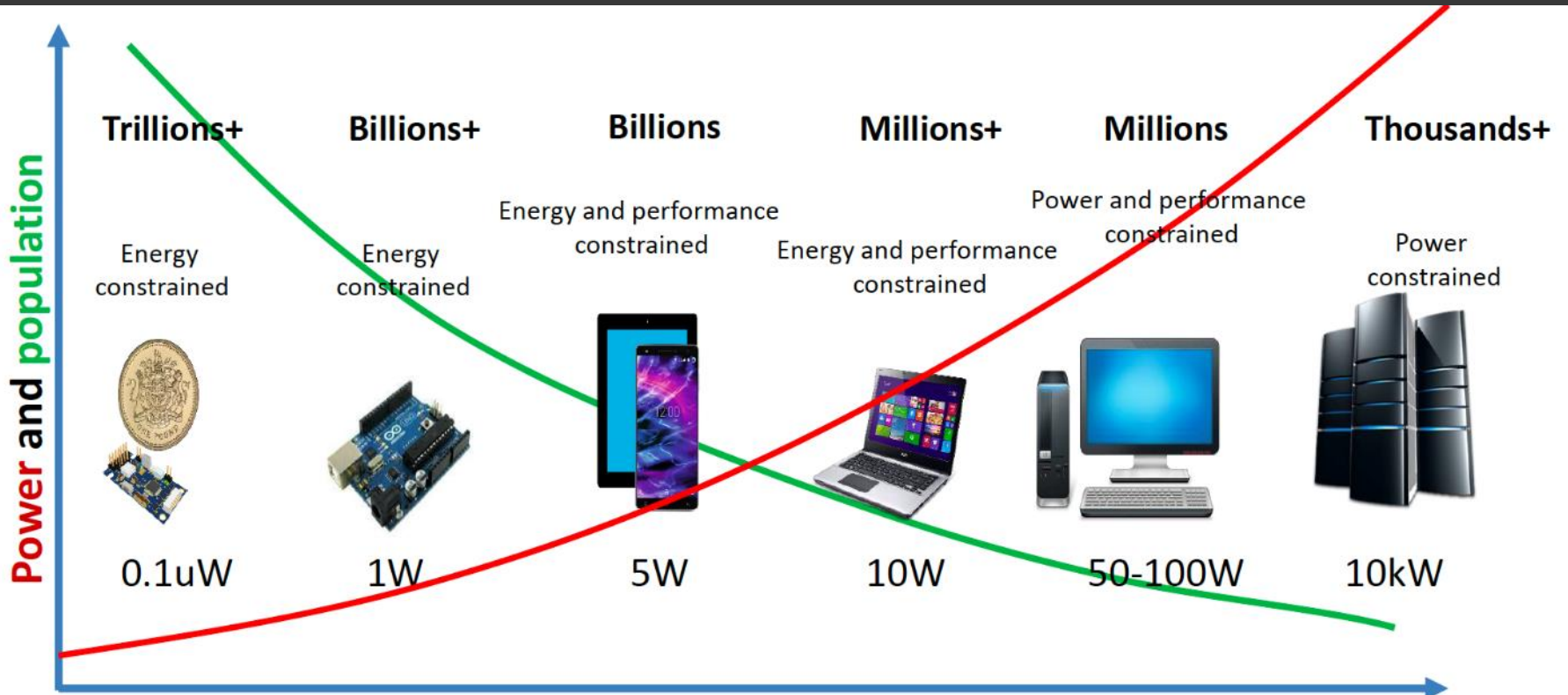


Text Understanding with Human Interpretable Rules

Method	Precision	Recall	F-measure
Multinomial Naïve Bayes	85.9±0.0	86.1±0.0	86.0±0.0
Logistic regression	86.5±0.0	87.6±0.0	87.1±0.0
Decision tree	71.1±0.0	68.4±0.0	69.7±0.0
Random forest	78.9±0.1	78.1±0.1	78.5±0.1
kNN	58.4±0.0	63.5±0.0	60.8±0.0
Linear SVM	88.0±0.0	89.1±0.0	88.5±0.0
MLP	82.6±0.1	82.6±0.1	82.6±0.1
LSTM	87.2±0.7	84.3±0.9	85.6±0.6
LSTM CNN	89.5±0.2	86.8±0.4	88.1±0.1
Bi-LSTM	87.6±0.8	83.9±1.1	85.5±0.6
Bi-LSTM CNN	88.3±0.2	87.5±0.5	87.9±0.2
Tsetlin Machine	89.7±0.0	89.7±0.0	89.7±0.0

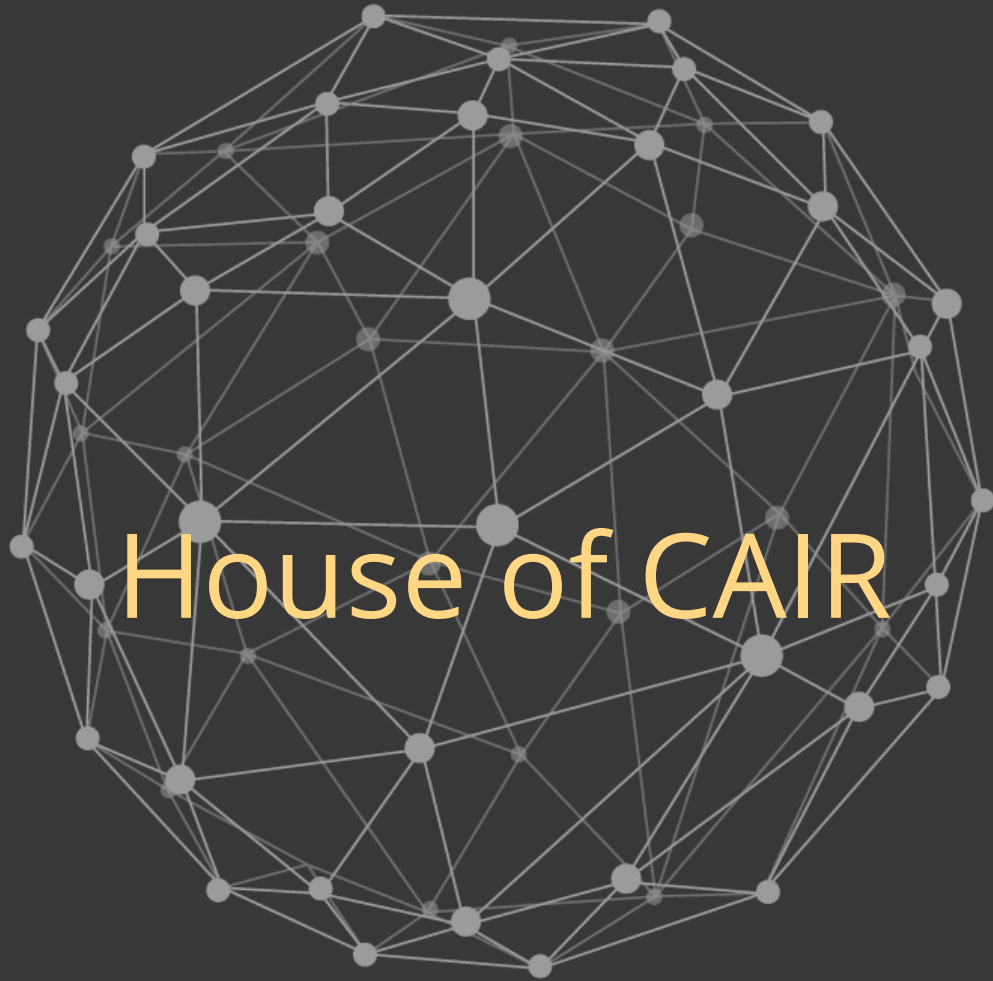
if “rash” and “reaction” and “penicillin” then Allergy

Tsetlin Machines in Hardware



Trillions of ubiquitous systems (sensors, probes, monitors, actuators, controllers) are being deployed to operate in myriad of places (organisation, human, body part, household, offices, pets) using harvested energy or micro-batteries





House of CAIR

The House of CAIR team



House of CAIR supercomputing

Fædrelandsvesnen

Nyheter Sport Kultur God Helg

Bli abonnent Meny

Nyheter Kristiansand Sogne Vennesla Lillesand Mandal Lister Setesdal Aust-Agder Økonomi KRSby



Ole-Christoffer Granmo, professor og direktør for CAIR ved UIA, og IT-ansvarlig Sigurd Kristian Brinch, sitter her foran den første superdatamaskinen som er på plass i serverrommet på campus Grimstad.

FOTO: Jacob Buchard

Bruker 20 millioner på avanserte talknuserer – vil

Machine morality: computing right and wrong

