

True or False Judging Machine

2019/04/07,12

This is toward full computerization in not only routine works, but also intellectual one. Deep learning conquered **pattern** recognition, while difficulty may be **language recognition**. Then author employed **Predicative Logic Translation**. This is a primitive and sloppy trial.

[0]: Our Task is only Decision on True or False.

Our dairy tasks are perpetual decision making on its good, or bad. After all, it's true or false decision. Then CPU could do the judging? Also author reply yes. Note our actual task in general is very concrete special problem, but not general something abstract (This is task of researchers general). In general, an element of truth is stored in **encyclopedia** and we are to **search a hitting article** in it. Then each truth elements are logically combined to yield the final problem's logical value of true or false.

[1]: Set Theory and Propositional Logic.

(1) **Set = Categorizing** the Most Fundamental Concept in General Recognition.

It's **collective elements uniquely and exactly defined**, for example, natural number is defined.

$\{0, 1, 2, 3, \dots, n-1, n, n+1, \dots\} \in \mathbb{N}$. $\langle \in \mathbb{N}$ means *belonging to N* \rangle ,

\Rightarrow : **dog** $\notin \mathbb{N}$. \rightarrow **dog is not a member of N**,

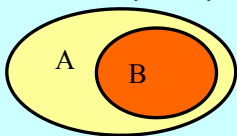
{All people in the law} may be reasonable set definition, Then disable people who can't recognize law could not be punished in the law in general. **{All Fake Actions}** could be a set, if we define those definitely in a law article. [Such definitions become important in this report.](#)

The essence is that any elements in a set must have **definite condition** which can be examined to be true or false. Such condition statement "a is P" is called **proposition**.

(2) **Derived Set** by $\{ \cup, \cap, \subset, \square^c \}$. **Subset, Union, Intersection, Complement**.

Relation and mutual interaction between **two different sets** becomes very important in general discussion.

(a) **Subset ($B \subset A$)**



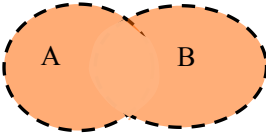
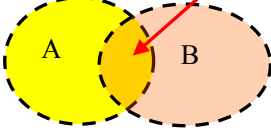
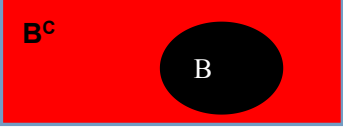
Each circle is **collective dots (a set)** within the circle. Then note any element in B is also element of A. Now A is a set of **true propositions** on all something x (x is a set), that is, A is a set of propositions, while B is within A. [Then any proposition in B is also true.](#)

\Rightarrow : This is nothing, but **Proving Principle** in **(Predicative) LOGIC** in general.

example) {False tax offering is criminal} \rightarrow {A offered false tax, so A is guilty}.

{Mass dynamics follow Newton Equation} \rightarrow {Satellite orbit is calculable by the Equation}.

These are derived set form A and B by conjunctives.

<p>(b) Union(A ∪ B)</p>  <p>C = (A ∪ B) is also a set. The elements belong to A or B</p>	<p>(c) Intersection(A ∩ B)</p>  <p>Elements belong to both A and B.</p>	<p>(d) Complement(B^c)</p>  <p>Elements belong to not B. Note B^c ∪ B is whole of all.</p>
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(3) **Simple Proposition Logic.**

http://www.777true.net/Logic-the-most-simple_but-supreme-way-for-recognition.pdf

It's defined as a **minimum sentence**, and true or false of which is possible to determine.

A sentence = **subject(noun) + predicative(verb, objective, adjective).**

example)

* Lying is telling *something true is not true.*

* heated ice turns to water.

(4) **propositions with connectives {∧=and, ∨=or, ⊃(if...,then...), not} are also proposition**

Statements in general is long sentence of many simple propositions with connectives of

{and, or, not, "if..., then, ..." = induction}. **1 ≡ true, 0 ≡ false** in below table.

<p>Induction the truth table. A ⊃ B: A and B are propositions, then it means, <i>if supposing A, then result is B.</i></p>	<p>(A ⊃ B)</p>	<p>B = 0</p>	<p>B = 1</p>
<p>A = 0</p>	<p>A = 0</p>	<p>(A ⊃ B) = 1</p>	<p>(A ⊃ B) = 1</p>
<p>A = 1</p>	<p>A = 1</p>	<p>(A ⊃ B) = 0</p>	<p>(A ⊃ B) = 1</p>

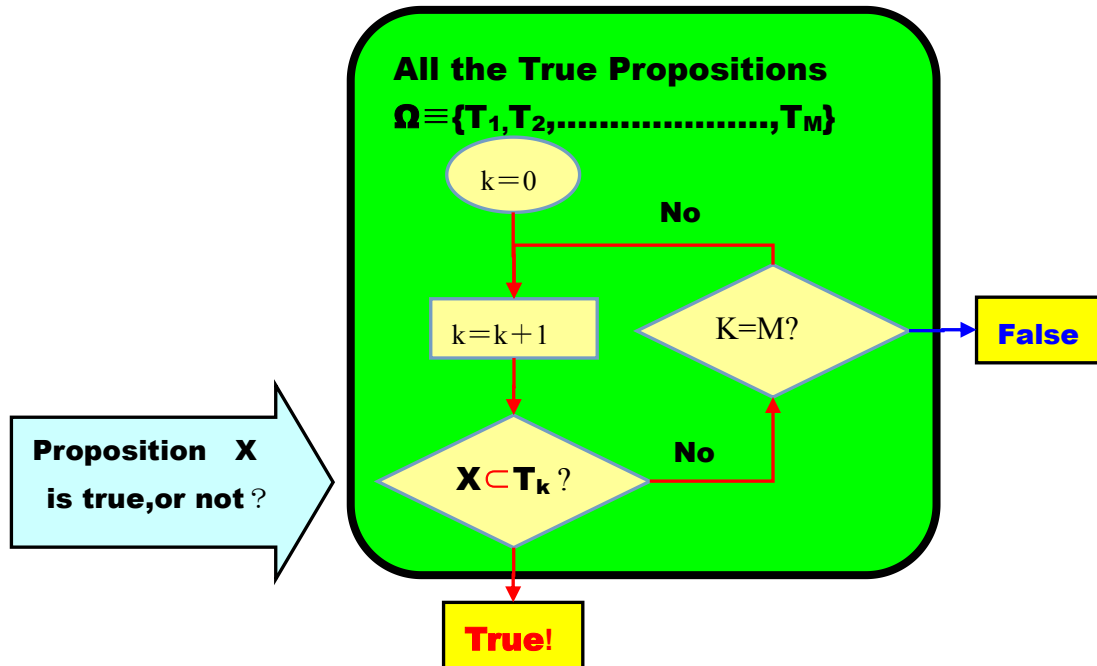
☞: Be most careful !! Only in case that supposition = true, and conclusion = false, then induction become false. Proof is only case of {A=B=1}

<p>A ∧ B A and B</p>			<p>A ∨ B A or B</p>		
	<p>B = 0</p>	<p>B = 1</p>		<p>B = 0</p>	<p>B = 1</p>
<p>A = 0</p>	<p>(A ∧ B) = 0</p>	<p>(A ∧ B) = 0</p>	<p>A = 0</p>	<p>(A ∨ B) = 0</p>	<p>(A ∨ B) = 1</p>
<p>A = 1</p>	<p>(A ∧ B) = 0</p>	<p>(A ∧ B) = 1</p>	<p>A = 1</p>	<p>(A ∨ B) = 1</p>	<p>(A ∨ B) = 1</p>

<p>Not A = A^c.</p>		<p>☞: negation is to turn its truth value. Thereby, if we found failure, we must turn state at now.</p>
<p>A = 0</p>	<p>not A = 1</p>	
<p>A = 1</p>	<p>not A = 0</p>	

example) * a=b, b=c, then a=c. → ((a=b) ∧ (b=c)) ⊃ (a=c)

(5) **Proving Machine the General.**



(a) $X \subset T_k$?

This was mentioned in [1](2)(a) Proving Principle.

It is task of searching X's elements in T_k . This could be established technology.

Note elements in a set is uniquely and exactly defined <deterministic>

The details are mentioned in [2](3).

(b) In the actuality, implementing all $\{T_k\}$ is hard to be complete. In a meaning, **global inter-network** had already established something $\{T_k\}$. Of course there are also many false. However manual searching can extract a truth.

(c) M sequential is very large to take long time for searching.

Thereby something **parallel running method** is suitable.

[2]:**Predicative Logic.**

(1)For example,

I am stupid,

He accuses police's brutality,

They turned nation independent from the suppression.

A sentence is constituted from subject(noun),predicative(verb),object(noun),predicative

(adjective,adverb)},By total telling,those are **subject(noun) + predicative(verb with**

object(nouns),adjective,adverb},Thereby notation Pa is established,where a is subject, P is

predicative.It means a do action P with supplemental objective nouns{ $b,c,d,..$ }

(2)**Pabc,** example) " a " ordered " b " to go " c ",where $P=order\ to\ go$

Large alphabet is predicative symbol,small one is subject(noun=individual symbol).

See APPENDIX-1.

(3)**SEARCHING { $P_k a_k b_k c_k$ } in law article set{ $P^{(\alpha)}_k a^{(\beta)}_k b^{(\gamma)}_k c^{(\delta)}_k$ }.**

example) a_k **frauded** b_k to **steal** c_k by **giving fake goods.**

P_k =frauding to steal ...by giving fake goods

=frauding to steal ...by telling lie you could get big profit by investment the fake.

Our task is to search a law suit's fitness in the law article the general description.

Law article of fraud crime(k) the general description:**{ $P^{(\alpha)}_k a^{(\beta)}_k b^{(\gamma)}_k c^{(\delta)}_k$ }**

$P^{(\alpha)}_k = \{P^{(1)}_k, P^{(2)}_k, P^{(3)}_k, \dots, P^{(kMp)}_k\}$:every kind of frauds(k) in the law

$a^{(\alpha)}_k = \{a^{(1)}_k, a^{(2)}_k, a^{(3)}_k, \dots, a^{(kMa)}_k\}$ =people in the law:

$b^{(\alpha)}_k = \{b^{(1)}_k, b^{(2)}_k, b^{(3)}_k, \dots, b^{(kMb)}_k\}$ =people in the law:

$c^{(\alpha)}_k = \{c^{(1)}_k, c^{(2)}_k, c^{(3)}_k, \dots, c^{(kMc)}_k\}$ =valuable goods etc in stealing crime in the law.

Thus constituting conditions of fraud criminal is $\{k_{Mp} \times k_{Ma} \times k_{Mb} \times k_{Mc}\}$ dimensional space.

Individual symbol are rather simple nouns,While **predicative symbol** P is verb with many adverb,adjective,noun,..but not a simple world.

☞: This method of simple predicative logic judging could be applicable in general.

(4)**Translation from Natural Language into Predicative Logic.**

Those **enormous data storing** should be a kind **learning by CPU**.It is **translation** from natural language into predicative logic.This is a essential task to establish system.

(5)And **categorizing** to store is necessary.

It is a design of index..

Following are supplement on predicative logic.

(6) **individual variable** defined by a set and universal = \forall and existential = \exists quantifier,

* $x \in \Sigma (q_1, q_2, \dots, q_M)$.

Set Σ is ensemble of many elements **exactly defined by something conditions**.

* $\forall x \in \Sigma, Px, \dots$ all the elements in Σ are P(something predicative).

Example) *all Σ nation people = x must follow the constitution.*

* $\exists x \in \Sigma, Px, \dots$ there is at least one x in Σ , which is P(something predicative).

Example) *some of Σ nation people = x break the nation law.*

(7) Predicative Logic with **conjunctive** { \wedge = and; \vee = or, \subset , \rightarrow = if A...then B; \neg = not }

$(Pa) \wedge (Qb) = a$ is P **and** b is Q.

$(Pa) \vee (Qb) = a$ is P **or** b is Q.

$(Pa) \subset (Qb), (Pa) \rightarrow (Qb) =$ if a is P, **then** b is Q.

$\neg (Pa) = a$ is **not** P

Thus predicative logic can be **any type** of ordinal long message by conjunctive.

(8) **Expansion Theorem** by conjunctive { \wedge = and; \vee = or }

$\forall x Px = (Pq_1) \wedge (Pq_2) \wedge \dots \wedge (Pq_{2M})$

(q₁ must follow the constitution) and (q₂ must do the same) ... and (q_{1M} must do the same)

$\exists x Px = (Pq_1) \vee (Pq_2) \vee \dots \vee (Pq_{2M})$

(q₁ breaks the law) or (q₂ breaks the law) ... or (q_{1M} breaks the law)

☞ ; Each **simple** predicative logic Pq_k is deterministic due to fixed noun(q_k),

After all, any predicative logic can be transformed into **simple propositions** with conjunctive { \wedge ; \vee and bracket () }.

Non simple predicative logic $F(W_1, W_2, \dots, W_k, \dots, W_M)$ could be judged in following way.

* simple predicative logic: $W_k \equiv \mathbf{P a b c}_k \cdot \langle k=1, \dots, M \rangle$.

These truth value had already been determined in (3). Then **proposition logic** F's value can be determined in general.

[3]: True or False Judgment in General in **Predicative Logic Format**.

So called Predicative Logic is a completed science, which could be applicable in language processing such as true or false judgment. **To tell from beginning, the 1st task of Logic is judgment on "true or false"**. Storing raw data by natural languages has been going on, however the processing is hard in general, while predicative logic format would be effective to simplifying.

I : **A Sentence judged to be true or false in Causality Logic.**

Supposition A concludes Result B; $A \subset B$

These are mathematical theorem to Scientific, Technological Laws in general, which could be stored in CPU as an universal encyclopedia.

example) Earthquake q is caused by explosion, n is natural one, then the cause difference n and q is found by observing seismic wave recorder. Top peak in q , while later peak in n .

$Xq, Np \rightarrow Dqp$.

These can be CPU search-able by **index D** (earthquake kind discrimination in the conclusion proposition of B). See also [2](3).

II : **Historical Events the Facts in General.**

$A_1p_1q_1e_1f_1g_1$; $A_2p_2q_2e_2f_2g_2$; ; $A_n p_n q_n e_n f_n g_n$

These are document-able gotten by **assured** testimonies. f, g are time and place.

These can be stored in CPU and search-able by **index A**.

In actual implementation, categorizing with index for all possible events is first task.

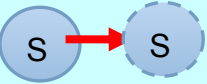
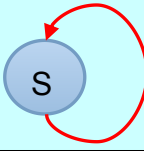
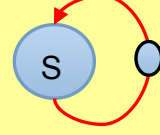
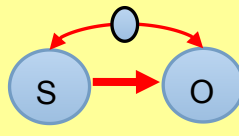
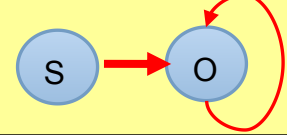
III : As we mentioned before, translating natural language in to predicative logic would be essential in actual implementation.

Postscript: Yankee the murder robbers go home !!!

In collapse of politics, author happened to think of **total manualization** (computerization) from Business to even **Politics**. Then he noticed possibility of **Judicial Judgment** by computer with **predicative LOGIC**, while in today, he found the note had disappeared. Now he express his fury against **Yokosuka Naval Base** the evil stronghold in Japan. They the hidden, but arrogant dictator has been treating us slaves exploitable animal **without law order** after the war. Thank to this happening, it had become evident that they hate establishing justice and truth society by large employing CPU not only routine works, but also elite's works which has been causing chaotic UPSIDE DOWN WORLD now heading CLIMATE HELL in growing brutal politics .

APPENDIX-1:5 pattern in English becomes *Pabc* in Predicative Logic.

Supposing a state machine=s with {input =x,output=z and the state=Y}. Input and output {x,z}and change of Y are actional(verb), objects of {x,z;Y}are defined nouns.

	5 pattern	English	P Logic
1	SVs own action going on V=CIT	<i>Lonely she smiles she sadly.</i> 	Paa ○
2	SVsC own <u>state change</u> V=IIT	<i>This becomes expensive pen.</i> 	Pab ○
3	SVO action own with target V=CT	<i>Joe the fishery has big ship</i> 	Pab ○
4	SVOO action <u>others</u> with target V=GT	<i>Kind Bill teaches poor us hard English neatly</i> 	Pabc
5	SVOC action <u>other's state</u> V=IT	<i>X the wealthy made me president as a puppet.</i> <i>The politician turned government normal</i> 	Pab ○

Subject [S]、Verb [V]、Object [O]、Complement [C] ,O=empty variable

P (action)	1,2,s-transit(own)	3,	4,Input,output	5,s-change(others)
adverb	Intransitive,	c-transitive,	give-take verb	ic-transitive
very,less	live,die,is,go,work	watch,want,try,	receive,send,give,	make,kill,save,
often	be, remain,lie,	say,hope,begin,	take,deceive,	support,help,
rarely	stay,keep,become	help.think,bring,	admire,	attack,break,
never	come,go,get,	discuss,regret,		
annually	turn,look,sound	complain		
certainly	feel,taste,smell			
possibly				

APPENDIX-2::On “Deep Learning”.

2019/04/07

Author is not expert on AI (artificial intelligence by CPU), but has deep concern with AI. As for the possibility of AI, so called **Pattern Recognition** by CPU would become genuine. Because so called **deep learning** method is essentially due to that of recognition in actual animal nerve network.

(1) Raw Pattern by Many Dimensional Vector Representation :

Digital mono-color Photograph is a typical example of pattern which is represented by many dots matrix (from 1 to n) with light intensity variables (I_k). This is a vector representation in many dimension.

(2) From eye cells (raw pattern) to Conscious one (conceptual) via Neuron Networks.

Those raw data are very high dimensional vector, while **perception** is **0 dimensional**, such as dog, cat, man, mountain, building, etc. This process is called **dimension compressing** by **weight matrix** (3). In fact, **neuron networks multi layers process** is told utilizing this principle .

(3) “p” pieces Pattern Recognition by input data of “n” components.

$$R [pxn] I (nx1) = O (px1) \quad \text{Perceiving Vector (p)}$$

Weight Matrix **Input Data Vector**

Unknown matrix elements $\{r_{pq}\}$ are $[D \equiv nxp]$ dimension. Thereby, at least learning data must be more than $D = n \times r$ to realize simultaneous algebra equation to determine unknown variables $\{r_{pq}\}$.

Inner product of following equation with **n pieces data of specified input** is to realize simultaneous equation to determine so called **characteristic vector**.

$$\begin{pmatrix} r_{11}, r_{12}, \dots, r_{1n} \\ r_{p1}, r_{p2}, \dots, r_{pn} \end{pmatrix} \begin{pmatrix} I_1 \\ I_2 \\ \vdots \\ I_n \end{pmatrix} = (1, 1, 1, \dots, 1)$$

Solution of characteristic vector is derived by making inverse matrix of $[I]$ and multiply $(1, 1, \dots, 1)$ from right side.

APPENDIX-3:Dimension Compressing in Recognition.

As is mentioned before,from sensor to conscious cells in neuron networks of multi-layers, **dimension compressing** on information signal is processed.It is growing conductivity between neuron cells by learning.Dimension compressing is operating projection to each orthogonal coordinates(each perception cells). This is similar with Observing Theory in quantum mechanics where observed state must be a vector in the orthogonal set..

A visible pattern is generally represented by **vector in higher dimension space**,something nouns might be so ?. In general,state of something may be also vector.While **predicative symbol P** may be not so.It is action toward **something state transition**.

That might be operator by **MATRIX ?**.

Note in vector,**concept of distance** between two vector{**p,q**} is possible to define.

$$d^2 = |\mathbf{p} - \mathbf{q}|^2 = |\mathbf{p}|^2 + |\mathbf{q}|^2 - 2\langle \mathbf{p} \cdot \mathbf{q} \rangle.$$

Thereby If $\langle \mathbf{p} \cdot \mathbf{q} \rangle = 0$ are **orthogonal** with each other,, d^2 becomes maximum to discriminate.

Also note in matrix,**concept of distance** between two matrix{**J,K**} is possible to define.

$$d^2 = |\mathbf{p} - \mathbf{q}|^2 = |(\mathbf{J} - \mathbf{K})\mathbf{u}|^2 \leq |\mathbf{J} - \mathbf{K}|^2 \cdot |\mathbf{u}|^2 = |\mathbf{J} - \mathbf{K}|^2 \dots \dots \langle |\mathbf{u}|^2 = 1 \rangle$$

$$d^{*2} = |\mathbf{J} - \mathbf{K}|^2 \equiv \sum_{j,k} |J_{j,k} - K_{j,k}|^2 = \sum_{j,k} |J_{j,k}|^2 + \sum_{j,k} |K_{j,k}|^2 - 2 \sum_{j,k} J_{j,k} K_{j,k}.$$

If $\langle \mathbf{J} \cdot \mathbf{K} \rangle \equiv \sum_{j,k} J_{j,k} K_{j,k} = 0$, then , d^{*2} becomes maximum to discriminate.