The Theory of BioMedical Knowledge Integration(BMKI)

(Hanfei Bao)

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**the positive and negative expressions,

**the linguistic semantics of time,

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**the semantics of the reference event,

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**the examples of operation for single event,

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（2）Accuracy

（3）benign nature and malign nature of a disease

（4）material nature and poetic nature

10. the theory of the background space of knowledge

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（2） the knowledge background of general knowledge

（3） the knowledge background of the laws of Newtonian mechanics

（4） the background space of the formal systems is not absolutely closed

（5） the potential nature of the knowledge background space

11. Problem resolving

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12. the informatics of knowledge expressions

（1）the cognitive characters of the symbolic objects

IV.The three worlds in complexity

1. Two different schools in Artificial Intelligence: object independent of or inseparated with environment?

the articles of three experts of artificial intelligence

（1）D.C. Marr: about Ⅰtype and Ⅱ type problems

（2）P.J. Hayes: about formal systems

（3）D.C. Daniel: a puzzle of AI: the story of priests and man-eater

the point is: the difference in nature of the mental systems and physical systems

the reciprocal transformations between the two intelligent models

2．The general or simple physical world

（1）The philosophies of the general structure and mechanism

（2）The philosophies of the general systems

（3）The philosophies of the general informatics

（4）The philosophies of the general medical logic

（5）The general philosophies in the organism system jam

3．The complex physical world

The complex structures, mechanisms and the complex informatics

complexities and the strategy to deal with them

A discussion on certainty

(a) the uncertainty of a concept

(b) the uncertainty of a dynamical system

⊙the non-determining systems

⊙the determining random systems——chaos systems

（c）fault tolerant ability and certainty

a discussion on cycles

On the Hypercycle Theory

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the supplements to the philosophy of hypercycle theory

to raise up to the space based on a higher dimension set

The spatial configuration of protein molecule: free and non-free energy

4．The complex **organism world**

1. The organism structures, mechanisms and their informatics

（1）The informatics of the tractor in a rocky mountains

The informatics of the free individual and the attached one

The reductionism never returns rationally some times

2．the organisms challenging the human cognition

（0）The general logic is challenged by the biomedical knowledge

to challenge the three fundamental stones: the laws of identity, contradiction and excluded middle

（1）the incompleteness of information leading to the confusion in diagnoses

（2）the complicated relations between the informatics of reductionism and wholism

(3) If the axes XYZ are not straight line

Ⅴ. The impacts of the philosophies of the general, complex and organism systems on the future medicine

0. Dimension and Space

(0) The space theory of BMKI

(a) The ideal and physical spaces; The single and compound spaces

(b) The number of dimension of space：The understanding of fractalist, space of integral number of dimension, the physical meanings of differential coefficient, the invariance in a variance towards real number axis and structure axis

(c) One dimension against another:

Interruption of the even potential (IEP) makes the difference; the creativity capacity of IEP: new quality of movement formed; the creativity capacity of IEP: an instance

(d) the principal components of a physical space

1. The non-life complicated system

complexity philosophy, complexity dimensions, structural dimensions, Non Euclidean Macro-Micro transformation Law

the substance's "will" and the mind's will

(0) State analysis and structure analysis

(1) Fibonacci series of number and the structure dimension

2. The organism complicated system

simplicity and complexity

what are the organisms viewed by reductionism

what are the organisms viewed by biochemistry

The types of the complexity

the causes which make the complexity

cause type Ⅰ

cause type Ⅱ

the combination patterns of SNP of genes

(0-0-1) Mathematics——The beautiful maid of biology

(0-0-2) The wisdom of "the flea mathematician"

(0-0-3) Where are the homogeneities in biology

(0-1) The difference between the static-and-dynamic views of physiology and Newtonian mechanics

(0-2) Self-regulation function of the organism and the biologic equivalence, physiologic curve often with a non-zero-diameter

(0-3) The mathematics of the ant's antenna and the climbing vine

(0-4) Physics is for ever the teacher of mathematics

(0-5) Hard physics against composite explosion: the strategy of the organisms for existence

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VII. The integration of knowledge

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5. The general discussions: the goals of BMKI

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7. Substantial integration and rational integration

8. Two basic principles of knowledge integration: reasoning and mapping

（1）The non-rational principle in reasoning

（2）Beacon-compass-strategy of BMKI

9．The integration of general systems

10．The integration of formal systems

（1）The description of the quasi-formal structures

(a) The quasi-formal description of the necessary attributes of biology-tree structures

11．The integration of the quasi-formal structures of hypertension

（1）the certainty and stability of quasi-formal structures

12．The Temporal Synchronous Integration(TSI) of the sub-circles of the organisms

13．About BMKI: The discussions on BMKI on INTERNET

many frontiers presented by BMKI

Ⅷ.Engineering of Medical Knowledge

1. The crisis of knowledge employment by human brain

2. Based on logical thinking or imagery thinking?

(1). The analysis of the influences of the daily context

(2). The context-dependence of the frame

(3). The analysis of the independence and associativity of the different types of knowledge

the awkward in the concept definition

(4). To view the general logic from BMKI

(4.1).the reasoning of conceptual level and the reasoning of physical level

(4.2).the original sense law and the original attribute law

(4.3).the complete-field-and-middle-excluded law

(4.4).the original recognition law

(4.5).the original error law

(4.6).the original context law

(4.7).the law on the event with all original senses being true

(5). Artificial intelligence and neural networks

3. ooooooo

4. The immaturity in the theory of the medical knowledge engineering and the challenges in the practices

（1）**the complex structures are a nature of biomedical information**

Current Informatics is not enough to describe the biomedical structures

5. The different granular demands between thinking logic and computing logic

6. The cognitive tendency of an artificial intelligent system

7. A discussion on the "engine" of medical cognition

8. The integration of rational and non-national biomedical knowledge

9. The levels of medical knowledge engineering

（1） The level of data: EMR, data mining, knowledge discovery

（2） The level of terminology or concept：SNOMED,ICD

（3） How to enhance the computability of SNOMED: meta-dimension analysis of the linkage and modifies of SNOMED

（4） The level of event:HL7, clinical pathways

（5） The level of conceptual system, i.e. ontology and semantic network:

(a) FMA,UMLS,GALEN, the research of the top level ontology of Traditional Chinese Medicine(TCM)

（b） The development of the structure-oriented ontology

（6）The level of semantic web：the global efforts by W3C, the methods exploration for realizing semantic web

（7） The ontology researches of TCM

IX. Welcome the new medicine

The medical interpretations, judges or diagnoses, decisions, data mining and knowledge discover, etc based on wider range and mass data storage, longer history or procedure, more granular levels, denser reciprocally reasoning, calculating and mapping

1.From Data-Based Medicine to Function-Based Medicine

2.Most biological knowledge operators are "black box"

3.The biological structural algorithmic operators

4. The light descriptions of the mathematic concepts and their bio-medical semantics

(0) the repellency of observation-measurement for definition attributes

（1） The repellency of the observation-measurement of attribute

（2） The definitional attribute set and the semantic OR set

（3） Absolute attribute, relative attribute and its background space

（4） Physic-mathematics: the generalized adjacent relationship

（5） The volume of the stones from Taihu Lake and the regression of a measurement to the lower-dimensional space

Glossary