

IS4SI 2017 Summit DIGITALISATION FOR A SUSTAINABLE SOCIETY,
Gothenburg, Sweden, 12-16 June 2017.

Fundamental Law of Information: Proved by Both Numbers and Characters in Conjugate Matrices

Xiaohui ZOU 1,2*, Shunpeng ZOU 1,2 and Lijun KE 2,

¹China University of Geosciences (Beijing) Institute of Higher Education;
949309225@qq.com

²University of California (Berkeley) Searle Research Center
zouxiaohui@pku.org.cn

*Correspondence: geneculture@icloud.com; Tel.: +86-186-1178-9581

Abstract

- Its **purpose** is to prove information law by logic, mathematics and translation. The **method** involves: the generalized bilingual logic established on both Aristotle's formal logic and Frege's mathematical logic, the linkage function established on both Turing's strong artificial intelligence using numbers and Searle's weak artificial intelligence using characters, the ontological knowledge established on both Saussure's general linguistics and Chomsky's formal linguistics. The **result** is that the basic law can be proved by digital and textual twin matrices. Its **significance** lies in that the global positioning system should be regarded as a special case of the generalized bilingual system.

Keywords

- Information Law
- Bilingual Logic
- Linkage Function
- Ontological Knowledge

1. Introduction

- The **purpose** of this paper is to prove the fundamental law of information in three verifiable ways: by logic, mathematics and translation. That **involves**: the basis of both Aristotle 's formal logic based on language^[1] and Frege' s mathematical logic based on arithmetic^[2], the basis of both Turing's strong artificial intelligence view based on digital computation^[3] and Searle's weak artificial intelligence view based on natural language^[4], the basis of both common knowledge ^[5]and expert knowledge^[6] ontologically with interdisciplinary, cross-field and cross-industry, on the basis of both Saussure's general linguistic view^[7] and Chomsky's formal linguistic view^[8], the reference between English and Chinese and its alternative bilingual^[9] to the relation of translation^[10].

2. Materials and Methods

- The main **materials or background** relates to: the generalized bilingual logic of sequence and position (the premise), the linkage function between digital and textual of conjugate matrices, common knowledge and expert knowledge ontologically with interdisciplinary, cross-field and cross-industry, and English and Chinese and its alternative bilingual. It is to establish the relation of generalized translation based on the ontology of knowledge.
- The main **specific method** of expert knowledge acquisition involves the following steps:
- **The first step**, any user can put a piece of text (a standardized expression of expert knowledge) into our sequencing positioning system software, **the second step**, the software will automatically generate a pair of chessboard generalized bilingual sequencing positioning system, and **finally**, through Man-machine collaboration, selection and construction of formatted expression of expert knowledge ontology or core terminology framework.

3. Results

- The result is that the fundamental law can be proved by digital and textual twin matrices.

3.1. The Fundamental Law of Information Proved by Both Brain and Computer

- 3.1.1. Proved by Logic
- 3.1.2. Proved by Mathematics
- 3.1.3. Proved by Translation

3.2. The Digital and Textual Twin Matrices

- **Facts speak louder than words.**
- Through a set of facts, that is, the typical embodiment, everyone can feel that the effect of the expert knowledge acquisition method based on the twin checkerboard is accurate, simple and efficient.

The English version of the paragraph through Figure 1 and Table 1, you can verify our language chessboard and its application generated knowledge chess-menu and original chess-soul.

- Representatives: Aristotle, Frege, Zou. Innovative Knowledge Contributions:

KB Administrator

Board 3.1.1. Proved by Logic

Totals: 22

Group Sentence

Representatives: Aristotle, Frege, Zou. Innovative Knowledge Contributions: Formal **Logic** for deduction with class, Mathematical **Logic** for calculation with case, Generalized Bilingual **Logic** for both class and case with characters and numbers.

Board ID

13	34	49	50	55	56	58	60	61	81	107
151	167	205	206	300	401	733	1422	1423	1424	1425

Board

and	logic	generalized	bilingual	both	aristotle	formal
frege	mathematical	knowledge	for	calculation	case	
numbers	characters	with	representatives	contributions		
zou	innovative	deduction	class			

generated knowledge chess-menu and original chess-soul

- Formal Logic for deduction with class, Mathematical Logic for calculation with case, Generalized Bilingual Logic for both class and case with characters and numbers.

The screenshot shows a web application interface for a KnowledgeBase. At the top, there is a blue header with 'KB' and a menu icon on the left, and 'Administrator' on the right. Below the header, the main content area is titled 'Group 3.1.1. Proved by Logic'. On the right side of this header, there are navigation links: 'Index > Articles > Group'. Below the title, there is a section labeled 'Totals: 11' with two buttons: 'Board' (blue) and 'Sentence' (orange). The main text area contains the following text: 'Representatives: Aristotle, Frege, Zou. Innovative Knowledge Contributions: Formal Logic for deduction with class, Mathematical Logic for calculation with case, Generalized Bilingual Logic for both **class and case** with characters and numbers.' Below this text, there are three tabs: '2(3)', '3(5)', and '1(3)'. Under the '2(3)' tab, there are three buttons: 'formal logic', 'mathematical logic', and 'bilingual logic'. At the bottom of the main content area, there is a search bar containing the text 'Innovative Knowledge Contributions' and a green '+' button on the right.

through Figure 1 and Table 1, you can verify our language chessboard and its application generated knowledge chess-menu and original chess-soul



Figure 1. This is a formal twin chessboard and its application listed as: (a) Description of what is language chessboard; (b) Description of what is knowledge chess-menu and original chess-soul.

Table 1. This is a table with chess-menu placed in three rows and columns.

Attributes	Concept	Types
Formal	Logic	class
Mathematical	Logic	Case
Bilingual	Logic	class and case

The English version of the paragraph through Figure 2 and Table 2, you can verify our language chessboard and its application generated knowledge chess-menu and original chess-soul.

- Representatives: Turing, Searle, Zou. Innovative Knowledge Contributions:

The screenshot shows a web interface for a KnowledgeBase. At the top, there is a blue header with 'KB' and a menu icon on the left, and 'Administrator' on the right. Below the header, the page title is 'Board 3.1.2. Proved by Mathematics'. On the right side of the page, there are navigation links: 'Index > Articles > Board'. In the center, there is a text box containing the paragraph: 'Representatives:Turing,Searle,Zou. Innovative Knowledge Contributions:Strong Artificial **Intelligence** based on Digital Computation by using numbers,Weak Artificial **Intelligence** based on Natural Language by using alphabet,Generalized **Intelligence** based on Bilingual Mathematics by using both characters and numbers.' To the right of this text box are two buttons: 'Group' (blue) and 'Sentence' (orange). Below the text box, there are two panels. The left panel is titled 'Board ID' and contains a grid of numbers: 13, 35, 41, 42, 44, 49, 50, 55, 59, 70, 71 in the first row; 72, 73, 75, 76, 77, 78, 81, 103, 170, 205, 206 in the second row; and 401, 733, 1422, 1423, 1426 in the third row. The number 73 is highlighted in a dark grey box. The right panel is titled 'Board' and contains a word cloud of terms from the paragraph: 'and', 'mathematics', 'based', 'on', 'digital', 'generalized', 'bilingual', 'both', 'language', 'turing', 'strong', 'artificial', 'intelligence', 'computation', 'searle', 'weak', 'natural', 'knowledge', 'by', 'using', 'numbers', 'characters', 'representatives', 'contributions', 'zou', 'innovative', 'alphabet'. The word 'intelligence' is highlighted in a dark grey box.

generated knowledge chess-menu and original chess-soul

- Strong Artificial Intelligence based on Digital Computation by using numbers, Weak Artificial Intelligence based on Natural Language by using alphabet, Generalized Intelligence based on Bilingual Mathematics by using both characters and numbers.

KB Administrator

Group 3.1.2. Proved by Mathematics

Totals: 6

Board Sentence

Representatives:Turing,Searle,Zou. Innovative Knowledge Contributions:Strong Artificial Intelligence based on Digital Computation by using numbers,Weak Artificial Intelligence based on Natural Language by using alphabet,**Generalized Intelligence based on Bilingual Mathematics by using both characters and numbers.**

3(3) 1(1) 2(1) 12(1)

characters and numbers strong artificial intelligence weak artificial intelligence

generalized intelligence based on bilingual mathematics by using both characters and numbers

through Figure 2 and Table 2, you can verify our language chessboard and its application generated knowledge chess-menu and original chess-soul.



Figure 1. This is a formal twin chessboard and its application listed as: (a) Description of what is language chessboard; (b) Description of what is knowledge chess-menu and original chess-soul.

Table 1. This is a table with chess-menu placed in three rows and columns.

Attributes	Concept	Types
Artificial	Intelligence	Strong
Artificial	Intelligence	Weak
Generalized	Intelligence	Bilingual

The English version of the paragraph through Figure 3 and Table 3, you can verify our language chessboard and its application generated knowledge chess-menu and original chess-soul.

- Representatives: Saussure, Chomsky, Zou. Innovative Knowledge Contributions:

The screenshot shows a web interface for a KnowledgeBase. At the top, there is a blue header with 'KB' and a menu icon on the left, and 'Administrator' on the right. Below the header, the page title is 'Board 3.1.3. Proved by Translation'. On the right side of the page, there are navigation links: 'Index > Articles > Board'. Below the title, there is a section labeled 'Totals: 26' with two buttons: 'Group' (blue) and 'Sentence' (orange). The main content area contains a paragraph of text: 'Representatives:Saussure,Chomsky,Zou. Innovative Knowledge Contributions:General **Linguistics** with human's natural language understanding,Formal **Linguistics** with computer's natural language understanding,Generalized Bilingual **Linguistics** with both on surfaces, but essentially only arithmetic.' Below the text, there are two panels. The left panel, titled 'Board ID', shows a grid of numbers: 42, 49, 50, 55, 57, 58, 59, 62, 78, 81, 87 in the first row; 88, 90, 126, 127, 255, 257, 300, 401, 509, 733, 1336 in the second row; and 1422, 1423, 1427, 1428 in the third row. The number 1336 is highlighted in a darker grey. The right panel, titled 'Board', shows a word cloud of the text. The words are arranged in a grid-like fashion. The word 'linguistics' is highlighted in a darker grey. The words are: on, generalized, bilingual, both, s, formal, language, arithmetic, natural, knowledge, saussure, general, chomsky, human, computer, only, but, with, representatives, understanding, contributions, linguistics, zou, innovative, surfaces, essentially.

generated knowledge chess-menu and original chess-soul

- General Linguistics with human's natural language understanding, Formal Linguistics with computer's natural language understanding, Generalized Bilingual Linguistics with both on surfaces, but essentially only arithmetic.

The screenshot shows a web interface for a KnowledgeBase. At the top, there is a blue header with 'KB' and a menu icon on the left, and 'Administrator' on the right. Below the header, the page title is 'Group 3.1.1.3. Proved by Translation'. To the right of the title are navigation links: 'Index > Articles > Group'. Below the title, there is a 'Totals: 9' indicator and two buttons: 'Board' (blue) and 'Sentence' (orange). The main content area contains a paragraph: 'Representatives:Saussure,Chomsky,Zou. Innovative Knowledge Contributions:General Linguistics with human's **natural language understanding**, Formal Linguistics with computer's **natural language understanding**, Generalized Bilingual Linguistics with both on surfaces, but essentially only arithmetic.' Below this paragraph are three tabs: '3(3)', '1(3)', and '2(3)'. Under the '2(3)' tab, there are three buttons: 'general linguistics', 'formal linguistics', and 'bilingual linguistics'. At the bottom of the main content area, there is a search bar containing the text 'essentially only arithmetic' and a green '+' button.

through Figure 2 and Table 2, you can verify our language chessboard and its application generated knowledge chess-menu and original chess-soul.

3.3. Three Kinds of Identity: Mathematical Information Law

- The truth is clear. With the aid of the corresponding analytic geometric model and the linkage function, the equivalence relation between the three types of polynomials is given by means of the three types of equations of the number, the twins, the text and the solution of the three kinds of identities. In the specific series Of the man-machine collaboration process, their constraints were also found.

All numbers and characters should be putted in one of the main twin boards as (a) and (b) with three types of identities

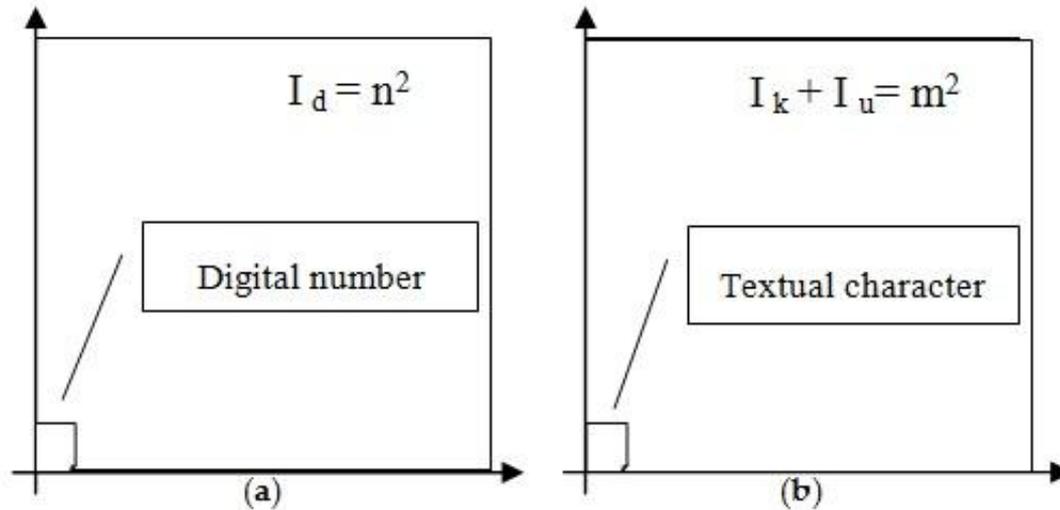


Figure 1. The same formal matrix both in (a) and (b) listed as: (a) Description of what is contained in the equation $I_d = n^2$; (b) Description of what is contained in the equation $\underline{I}_k + \underline{I}_u = m^2$.

The digital, twins, textual equations:

$$I_d = n^2 \quad (1)$$

$$I_d = \underline{I}_k + \underline{I}_u \quad (2)$$

$$\underline{I}_k + \underline{I}_u = m^2 \quad (3)$$

The above three types of identities, combined with their analytical geometric form, respectively, from the digital, twins, and textual of the three types of character system perspective, from the matrix

4. Conclusions

- The sequence and position of the digital function record, which itself is the only constant on the grid of the matrix.
- The linkage function is based on the logical and mathematical synonyms (parallel, correspondence, conversion).

Its significance lies in that

- Its significance lies in that the Global Positioning System (GPS) should be regarded as a special case of the generalized bilingual system that should be looked like the Global Hardware Positioning System (GHPS) with its Global Software Positioning System (GSPS), Global Language Positioning System (GLPS) and Global Knowledge Positioning System (GKPS).

References

- Beziau. What is “Formal Logic”? *Proceedings of the Xxii World Congress of Philosophy* 13:9-22 .2008
- Ian Chiswell. *Mathematical Logic*. Oxford University Press.2007
- Turing. *Computing Machinery and Intelligence*. *Mind*.1950
- Searle. *Minds, Brains and Programs*. *Behavioral and Brain Sciences*.1980
- Taylor, Raskin, Hempelmann. From Disambiguation Failures to Common-Sense Knowledge Acquisition: A Day in the Life of an Ontological Semantic System. *Web Intelligence*. 2011
- David S. Ludwig (VU University Amsterdam). Overlapping ontologies and Indigenous knowledge. From integration to ontological self-determination. *Studies in History and Philosophy of Science*, volume 59, pp 36-45. 2016
- Saussure. Selections from the course in general linguistics. In Richard Kearney & Mara Rainwater (eds.). *The Continental Philosophy Reader*. Routledge (1996)
- Chomsky. Syntactic structures.1957. *De Gruyter Mouton*; 2nd edition (November 19, 2002)
- ZOU. [Collaborative Intelligent Computing System: Theoretical Model with Its Application](#). AAAS.19, 2012
- ZOU. [Basic law of information: the fundamental theory of generalized bilingual processing](#). ISIS Summit Vienna 2015

thanks

