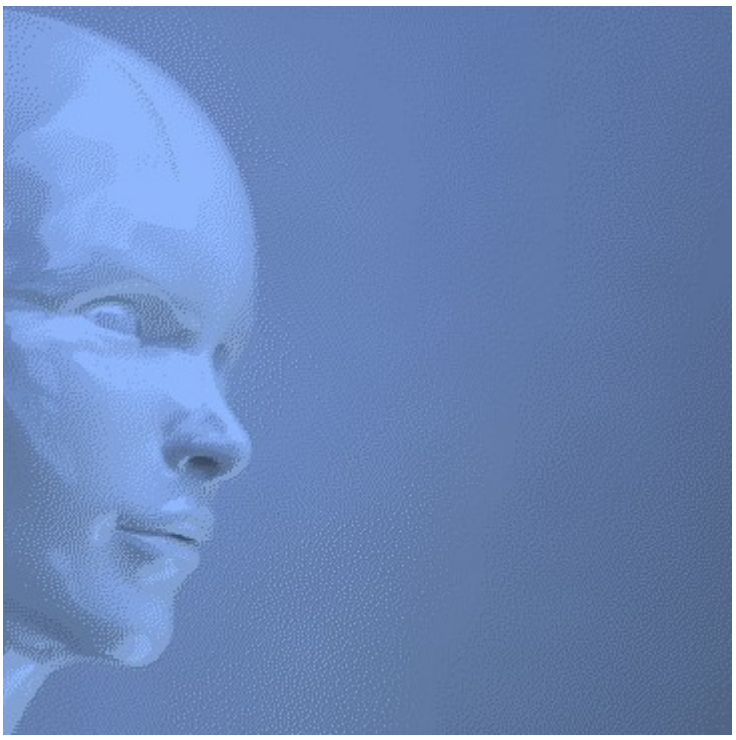
The Logic of Language

Reverse-engineering the language center of our brain, by the utilization of Laws of Intelligence that are naturally found in the Human Language.



Faith is like a signpost. True faith shows the right way – also in science – by showing the way nature works. False religions point the wrong way. And lacking a signpost, the faithless will get lost in science.

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Introduction

The field of Artificial Intelligence (AI) and Natural Language Processing (NLP) — in a broad sense — has fundamental problems since its start because it is lacking a foundation in nature:

- AI is lacking a unifying, fundamental (=natural) and deterministic (=implementable) definition of intelligence;
- Regarding NLP, scientists have no clue how the human brain organizes its knowledge. As a consequence, Large Language Models are unable to organize changes in their knowledge structure independently.

Not a single variant of the Evolutionary hypothesis of Common Descent provides a profound understanding of natural intelligence and natural language. So, scientists have no better option than to mimic behavior in the field of AI / NLP, using behavioral/cognitive science. However, mimicking a hen's (chicken's) behavior will not produce a single egg.

Expressed as another comparison, AI / NLP is a flight simulator rather than an airplane: A flight simulator moves pixels on the screen — and it moves the cones of the speakers — but it will not move an inch.

Put in even different words:

- If one creates a logical (=intelligent) system to process a natural system — like, e.g., the human language — one will end up with Artificial Intelligence, which is just a (mis)interpretation of that natural system;
- If one considers a natural system — like, e.g., the human language — to be a logical (=intelligent) system, one will end up with an artificial implementation of natural intelligence.

Artificial Intelligence (AI) may deliver useful engineered techniques. However, engineering is limited to delivering **specific solutions to specific problems**, while science delivers **generic solutions** based on the way nature works.

AI is limited to human-written, human-selected, and human-programmed intelligence. As such, AI will never become naturally intelligent. In general, AI is limited to performing repetitive tasks. Artificial neural networks — in particular — are limited to pattern recognition and pattern generation.

My father taught me: "*Don't become a monkey who is trained to perform a trick*". Artificial neural networks do not learn anything. They are just trained to perform a trick. Neurons are not even essential to intelligence, in the same way as feathers and flapping wings are not essential to aviation.

1. Fundamental science

In this document, I propose a fundamental — scientific — approach towards a profound understanding of natural intelligence and natural language — based on the way nature works.

1.1. Fundamental choice

But first, a fundamental choice must be made, because any variant of the Evolutionary hypothesis of Common Descent is fundamentally at odds with the Christian faith:

- If man shares a common ancestor with the ape, Adam and Eve never existed;
- If Adam and Eve never existed, the Fall — high treason against God — never happened;
- If the Fall never happened, the redemption through Jesus is meaningless;
- If redemption through Jesus is meaningless, the Christian faith is nothing but an empty religion.

On the other hand, one who sincerely investigates God's creation will gain fundamental insights from God, giving them a fundamental advantage in fundamental science.

For centuries, Christians were leading in fundamental science. These scientists sincerely observed the way nature — God's creation — works. As a result, their findings could be replicated in a controlled environment, after which their findings could be applied to daily life, in fields like:

- Physics (Isaac Newton and Arthur Compton),
- mathematics (Gottfried Leibniz, Leonhard Euler, Bernhard Riemann, and Kurt Gödel),
- chemistry (Robert Boyle and Antoine Lavoisier),
- electromagnetism (Alessandro Volta, Michael Faraday, and James Clerk Maxwell),
- genetics (Ronald Fisher and Gregor Mendel — who is called "the father of modern genetics"),
- computer science (Charles Babbage — who is called "the father of the computer" — and George Boole — who is called "the father of computer science" or "the father of modern logic").

By replicating their findings in a controlled environment — after which their findings are applied to daily life — these Christian scientists provided a Return on Investment to taxpayers, which we still benefit from today.

However, those who choose any variant of the Evolutionary hypothesis of Common Descent — or any other hypothesis denying God as the creator of the universe and life — will not be able to replicate their findings on the origin of the universe and life in a controlled environment. Let alone apply them to daily life because their findings do not describe the way nature works.

1.2. Fundamental truth

There is only one truth in fundamental science: **the way nature works.**

Nature works in only one certain way, enshrined in natural laws. One who investigates the way nature really works will be rewarded with their findings being replicated in a controlled environment and eventually being applied to daily life. In this way, taxpayers will have a Return on Investment in their funding of science.

1.3. Fundamental science is able to close the loop

All natural phenomena that are scientifically understood, obey laws of nature. And they all close the loop, like the following illustration of electromagnetism.

The field of electromagnetism is a science because it closes the loop:

- We can convert motion to electromagnetism, and convert electromagnetism back to motion;
- We can convert light to electromagnetism, and electromagnetism back to light;
- We can convert magnetism to electricity, and electricity back to magnetism.

1.4. AI / NLP fails to close the loop

In primary school we all learned a similar sum:
- Given: "John **has** 3 apples."
- Given: "Peter **has** 4 apples."
- Logical conclusion: "Together, John and Peter **have** 7 apples."

The school teacher then wrote:
- 3 apples + 4 apples = 7 apples

However, the result of the sum — "7 apples" — lacks a reference to "John and Peter". So, from this result alone, it is impossible to generate a readable sentence:
- "Together, John and Peter **have** 7 apples."

Hopefully, mathematicians will come to the rescue, by closing the loop scientifically:
- J = 3
- P = 4
- J + P = 7

Unfortunately, the mathematical result "J + P = 7" lacks a reference to "apples". So, from this mathematical result alone, it is impossible to generate a readable sentence. It would require an engineered solution to come to:
- "Together, John and Peter **have** 7 apples."

This is just one example of my scientific challenge to beat my reasoning system, based on natural intelligence. A generic solution to this particular example is described in Block 3.

Natural intelligence and natural language are not scientifically understood. Therefore, the field of AI / NLP itself is not scientific, because scientists are falling short of closing the loop for a childishly simple sum:
- From readable sentences,
- through natural logic (natural intelligence),
- with the result expressed in readable — word by word constructed — sentences again.

It may seem like Large Language Models (LLM) can solve reasoning problems, from readable sentences — through natural logic (natural intelligence) — with the result expressed in readable sentences again. However, LLMs only have a limited, engineered reasoning capability. When reasoning problems are combined, LLMs will start to lose context.

We must investigate the way nature works regarding natural intelligence and natural language, after which we will be able to develop algorithms — based on natural intelligence — that will not lose context when reasoning problems are combined.

1.5. Self-organization

The following 'scientific' paper states: "*Self-organization refers to a broad range of pattern-formation processes in both physical and biological systems*".

However, no distinction is made between a **static** 'organization' — which is limited to pattern formation — and a **dynamic** organization, which requires natural influence to stay alive.

Self-organization is often misunderstood as the origin of natural intelligence. However, self-organization is the result of Natural intelligence.

Distinction:

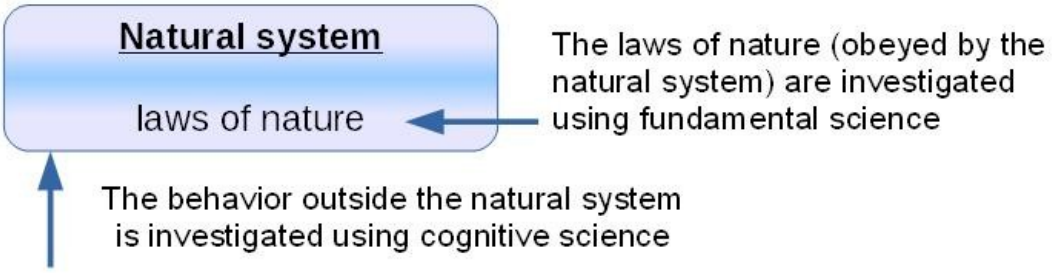
- Natural pattern formation — like fractals and the formation of snowflakes — is a static process, based on rules or laws of nature;
- Swarming of birds is a dynamic, temporary process, based on the bird's instinct. Instinct is an innate mechanism of survival. In case of no danger, swarming is practiced as an emergency drill, while it also improves bonding;
- Self-organization is a dynamic, continuous process. It is a result of natural intelligence;
- Any other organization — like a company or a pack of wolves — is a dynamic, continuous process of multiple intelligent actors.

So, organization and self-organization are a result of natural intelligence rather than being the origin.

1.6. Laws of nature

Intelligence and language are natural phenomena. All natural phenomena obey the laws of nature. And laws of nature are investigated using fundamental science.

The field of AI and NLP is investigated using behavioral/cognitive science. As a result, it is unable to close the loop of natural intelligence and natural language. So, we need to investigate natural intelligence and natural language using fundamental science. To illustrate the difference:



2. The fundamental approach of Thinknowlogy

Science relies on the assumption that we live in an ordered universe that is subject to exact, deterministic, and consistent laws of nature. So, everything in nature is bound by natural laws and proceeds according to natural language. As such, natural intelligence is enshrined in natural laws too.

According to the biblical worldview, laws of nature are created by God to make his creation run like clockwork in a unified, structured, and deterministic [1] way. Assuming that God has enshrined intelligence in laws of nature, too, these laws of intelligence will operate in a unified, structured, and deterministic way. Being deterministic (=implementable), these Laws of Intelligence might be implementable in artificial systems — through a process of reverse-engineering — based on God's intelligent design of nature.

1 deterministic: "the doctrine that all facts and events exemplify natural laws"

2.1. Sources of natural intelligence

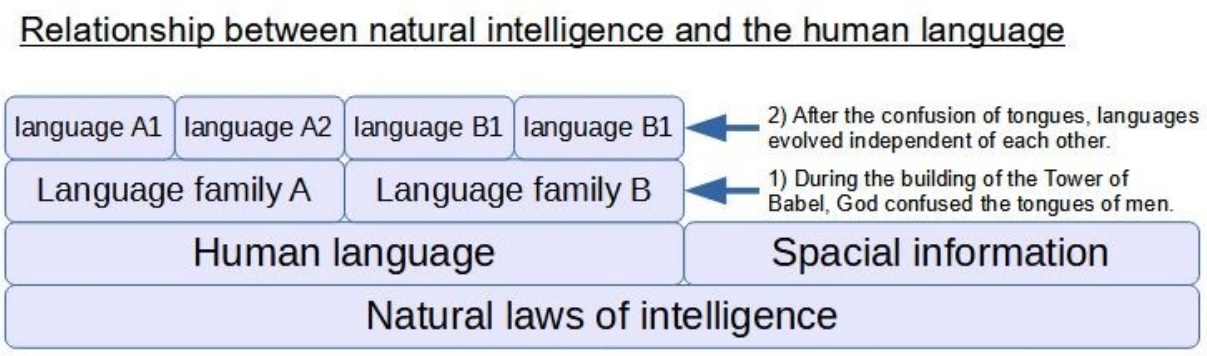
I have identified the human language and spacial information as sources of natural intelligence, which means that these sources of intelligence provide concrete logic to our brains, by which our brains can organize their knowledge and spatial information:

- Natural language is providing concrete logic for organizing knowledge objects;
- Spatial information is providing concrete logic for organizing spatial objects (utilized in, e.g., self-driving cars).

I focus on the human language.

Because all natural phenomena are designed in a unified way, natural intelligence and the human language might be related. If so, it must be possible to identify the natural laws that are obeyed by language. After identification, it must be possible to reverse-engineer the way nature works regarding knowledge. In other words: how the human brain is organizing its knowledge.

According to the biblical worldview, life and the universe were all designed once, while no improvements were made afterward. So — if intelligence and language are related — current languages must still obey the same laws of intelligence as were designed in the beginning, regardless of all their differences [2]. Then, current languages still must share the same foundation.



2 The existence of entirely different languages today is explained in the bible: "At one time all the people of the world spoke the same language and used the same words" (Genesis 11:1). During the building of the tower of Babel, God confused the tongues: "Come, let's go down and confuse the people with different languages. Then they won't be able to understand each other" (Genesis 11:7).

2.2. Natural intelligence

To contribute to science, intelligence needs to be defined in a unifying, fundamental (=natural), and deterministic [3] (=implementable) way:

Natural intelligence is the utilization of naturally occurring logic.

One's goal in utilizing natural intelligence, is to independently:

- Avoid chaos,
- Create order,
- Restore order.

Natural intelligence provides self-organizing properties, by one can independently:

- Group what belongs together;
- Separate what doesn't belong together;
- Archive what is no longer relevant;
- Plan future actions;
- Foresee the consequences that the planned actions will have;
- Learn from mistakes.

More into detail:

- Grouping (combining) of individual or separate objects, to achieve a goal that can not be achieved by either of those objects separately;
- Separating (differentiating) compound or intertwined objects, to clarify the situation, by putting them in their context;
- Archiving of obsolete information, separating current from obsolete information;
- Planning future actions, setting goals, and anticipation of changes;
- Foreseeing possible consequences: Using knowledge and experience to predict possible consequences of planned actions (own plans and planned actions of others);
- Learning from mistakes: Using knowledge and experience to determine the course of a mistake, and to avoid making this kind of mistake in the future.

These capabilities of intelligence can be applied to basic concepts like knowledge objects and spatial objects. Grouping of, for example, numbers, we call: adding. Separating of numbers, we call: subtracting.

3 deterministic: "the doctrine that all facts and events exemplify natural laws"

Deepening:
- Creation starts with grouping;
- Understanding starts with separating;
- Omitting starts with archiving;
- Governing starts with planning;
- Anticipation starts with foreseeing;
- Improvement starts with learning from mistakes.

2.2.1. Natural language as an intelligent system

Assuming that natural language is an intelligent system, predictions can be made about the intelligence that will be found in language:
1. Natural language will have self-organizing properties;
2. The sender's brain will add logical clues to the knowledge that is expressed;
3. The receiver's brain will utilize the logical clues that are added to the knowledge, enabling it to organize the received knowledge.

In all languages, there will be specific words and sentence constructions for:
- Grouping knowledge that belongs together;
- Separating knowledge that doesn't belong together;
- Archiving knowledge that is no longer relevant;
- Planning future actions;
- Foreseeing the consequences that the planned actions will have;
- Learning from mistakes.

2.3. Laws of Intelligence that are naturally found in the Human Language

Logical clues — that are naturally found in the human language — provide information to our brain on how to organize the gained knowledge. These clues include specific words for grouping, separating, and archiving (see definition of natural intelligence). By utilizing these logical clues — which I call the Laws of Intelligence that are naturally found in the Human Language — we can implement a naturally intelligent, self-organizing knowledge technology similar to the way the language center of our brain works:

- Conjunction "and" has the intelligent function in language to group knowledge (Block 3 and Block 4 of my Scientific challenge);
- Conjunction "or" has the intelligent (Exclusive OR) function in language to separate knowledge (Block 6);
- A definite article (in English: "the") has the intelligent function in language to archive knowledge (Block 7);
- An indefinite article (in English: "a") defines a structure, which has been described scientifically;
- The basic verb "is/are" defines present tense basic logic, which has been described scientifically;
- The basic verb "was/were" defines past tense basic logic (Block 5);
- The possessive verb "has/have" defines present tense direct and indirect possessive logic (Block 1 and Block 2);
- The possessive verb "had" defines past tense — direct and indirect — possessive logic (Block 1 and Block 2, and Block 5).

I am implementing grouping, separating, and archiving as much as possible while leaving the implementation of the remaining capabilities to future generations.

These Laws of Intelligence that are naturally found in the Human Language drive a set of structuring algorithms [4] in my system to independently group, separate, and archive knowledge in its knowledge base.

So, natural language provides knowledge — expressed in a certain language — as well as a logical structure of how that knowledge should be organized. This logical structure is (almost) language-independent.

4 algorithm: "any set of detailed instructions which results in a predictable end-state from a known beginning"

2.3.1. Example of reasoning: Autonomous generation of questions

Let's put the Laws of Intelligence to work. Or at least, one law:

- Given: "Every person is a man **or** a woman."
- Given: "Addison is a person."
- Automatically generated question: "Is Addison a man **or** a woman?"

How to automatically generate the question mentioned above, using Laws of Intelligence:

- A law of intelligence: Conjunction "or" has the intelligent (Exclusive OR) function in language to separate knowledge;
- Given "Every person is a man **or** a woman" and "Addison is a person";
- Substitution of both sentences: "Addison is a man **or** a woman";
- Conversion to a question: "Is Addison a man **or** a woman?".

2.3.2. The function of a word class / Part of Speech / grammatical category

Word classes / Parts of Speech (PoS) / grammatical categories are nouns, verbs, adjectives, adverbs, pronouns, prepositions, conjunctions, interjections, numerals, articles and determiners.

Word classes are essential for reasoning. Consider, for example: "All philosophers are mortal" and "All blue are mortal". Only one of both sentences is grammatically correct, while the other doesn't make sense. So, knowledge technology must always keep track of the class of each word.

Each word of a list of words is usually of the same word class. Consider, for example: "Red, white and blue" and "Red, a sister and four". Again, only one of both phrases is grammatically correct, while the other doesn't make sense.

2.3.3. Autonomy / independently

In the definition of natural intelligence, the word "independently" is used. So, we need to define that word, which is similar to the word "autonomy":

An autonomous system relies on the **consistency** of a natural source, or a **consistent** artificial source, like GPS (Global Positioning System). So, an autonomously intelligent system relies on the consistency of a natural source of intelligence.

AI does not rely on the consistency of a natural source of intelligence. Instead, a lot of human labor is required — like, for example, the fine-tuning of LLMs — and **inconsistent** artificial sources or engineered techniques are used in the background, like, for example, some reasoning or semantic techniques.

2.3.4. Free will and morality

First of all, morality and free will originate from the bible.

According to the bible, humans separate from animals by having a spirit, which provides humans a free will and a set of morals. Spirits — being supernatural — are, by definition, not bound by laws of nature. Therefore, spirits can't be captured in machines, which are, by definition, bound by the laws of nature. So, a machine will never have a spirit, free will, and an autonomously controlled set of morals like humans have.

I agree with John Searle on his Chinese room thought experiment, that computers will never have a mind and consciousness. However, I only agree to a certain extent with his claim that computers can at best simulate intelligent conversations:

"if there is a computer program that allows a computer to carry on an intelligent conversation in a written language, the computer executing the program would not understand the conversation either".

He didn't think of the possibility that Laws of Intelligence could be found in the human language and that these Laws of Intelligence can be utilized to implement natural intelligence in computers, by which these machines can reason autonomously.

2.4. Universal Grammar theory

In his Universal Grammar theory, Noam Chomsky proposes that the ability to learn a language is hard-wired in the brain, which differs from my fundamental approach:

There is no Universal Grammar, but there are Universal Laws of Intelligence that are naturally found in the Human Language, while logic / algebra / universal reasoning rules on themselves are (almost) language-independent.

When children learn a language, this universal logic in the language center of their brain is 'configured' for a language, which will be their native language / mother tongue.

My Controlled Natural Language reasoner works similarly: It implements an (almost) language-independent logic, which is configured for five languages: English, Spanish, French, Dutch, and Chinese.

Testimony: I don't have this wisdom of myself

During my young childhood, God asked me if I wanted to become rich or wise. I chose wisdom [5] because I like the stories about the wisdom of King Solomon.

A few years later, I offered my life to God, as I gave up my own life and desires and fully dedicated my life to Him. Initially, nothing special happened. I became just another Software Tester. I am talented in software testing, but my talent has its limits. I am not a genius.

Over a decade ago, God asked me if I would accept an assignment — a mission of life — to prove naturalism / evolutionism / atheism wrong. If I would accept this assignment, God would provide unique knowledge about his creation of intelligence and language. I accepted. And as promised, God gives me wisdom — insights beyond my knowledge and intelligence — as long as I work on this project. However, if I use the given wisdom for my good, it will be taken from me. I was explicitly ordered: "Give everything away. Keep nothing behind".

While I was criticizing the current approach to AI and NLP on LinkedIn for not having a (natural) foundation, nor a (natural) definition of intelligence, someone asked me what definition I used. Then I had to admit to myself that I didn't have a definition of intelligence either. So, I prayed and asked for an answer. Ten minutes later, I was able to write down a unifying, fundamental (=natural) and deterministic (=implementable) definition of intelligence, provided by God. Later I also discovered how this definition is related to language through Laws of Intelligence that are naturally found in the Human Language.

5 If I had chosen wealth, I had to give this wealth away like I give away the results of my wisdom now. When God asks for something like this, it doesn't mean you can keep that gift for yourself. When God gives such a gift, you should use it to the glory of God.

Appendix: Genesis hidden in the Chinese language

The Chinese language is the oldest, continuously written language in the world. It was first written over 4,500 years ago. And some Chinese characters seem to refer to first book of the bible (Genesis). A few examples:

The Chinese character for "to create" consists of four components, and seems to refer to the creation of "Man" – later called: Adam:

- Dust or mud: God has created Adam from dust;
- Mouth or breath: God breathed into the nostrils of Adam;
- Movement or life: Adam became alive;
- Able to walk: Adam was directly able to walk (and to speak).

"*Then the LORD God formed the man from the dust of the ground. He breathed the breath of life into the man's nostrils, and the man became a living person.*" (Genesis 2 verse 7)

(See on YouTube: "Genesis hidden in the Chinese language? Part 2")

The Chinese character for "to covet, to desire" consists of two components, and seems to refer to the Fall:

- Two trees: the tree of life, and the tree of the knowledge of good and evil;
- A woman: "Woman" – later called: Eve – desired the fruit of the only forbidden tree.

(See on YouTube: "Genesis hidden in the Chinese language? Part 3")

On YouTube: "Genesis Code Hidden Within The Ancient Chinese Language", among all:

- The Chinese character for "first" consists of three components: alive, dust, and man. (Adam – created from dust – was the first man to become alive);
- The Chinese character for "to talk" consists of three components: dust, breath/mouth, and alive. (Adam – created from dust – was able to talk);
- The Chinese character for "naked" consists of two components: man and fruit. (After Adam and Eve had eaten the fruit from the forbidden tree, they felt naked);
- The Chinese character for "pain" consists of two components: a piece and two trees. (Pain was a punishment from God for Adam and Eve after they had eaten a piece of fruit from the forbidden tree).

On YouTube: "How Chinese Characters confirm Genesis & Bible stories", among all:

- The Chinese character for "flood" consists of four components: eight, united, earth, and water. (Noah, his wife, and their three sons with their wives, all eight were united in their boat, while the surface of the Earth was flooded with water).