

Theory of Informational Species and its Implications in the Power System Protection, Measurement and Control Systems

Nicolae Florean Pinte, Petru Postolache, Costică Nitu, Stelian Alexandru Gal,
Marius Nicolae Oltean, Ioan Petru Ruset

Abstract--The Theory of Informational Species is –in a way- a theory of The Mind. It is –if we want to cloud our minds with words, as some could say - the most “fascinating” technique that came about in artificial intelligence. TIS is certainly a new challenge, one which the intelligence of Applications – concrete ones - where TIS is implemented has already imposed all over the world.

Index Terms-- TIS- Theory of Informational Species; Mental Keys; Informational Species; Cultural Layers; the Shingle Code

I. NOMENCLATURE

TIS- Theory of Informational Species.

II. INTRODUCTION

The *Theory of Informational Species (TIS)* is a new technique in artificial intelligence that promotes a new way of processing information, a cultural treatment that is tailored – as much as possible, along the “pattern” of the human Mind.

III. WHAT MAKES IT DIFFERENT FROM ESTABLISHED ARTIFICIAL INTELLIGENCE TECHNIQUES?

For example:

Unlike the techniques including *neuronal networks* and *genetic algorithms*, inspired – as a model – from the “*hardware*” of the human brain or the way genes/chromosomes interweave (combine, etc.) in human genetics, TIS is based on the model of the brain *software (the Mind)*... as it “transpired” – along the years – in the *great human culture*.

It is not in the same boat as *expert systems* either. As compared to the latter, whose intelligence *borrow*s the facts and rules collected from the thinking of an expert – a human one – in the field of the application it controls, *TIS does not take anything for granted*. It does not just “clumsily” apply previously judged judgments. It seeks to understand. It seeks to have its own Mind and formulate and manage its judgments with its own Mind.

A Mind, for the “ripening” of which we started – as we mentioned above – not from copying the hardware or from memorizing preset facts and rules (previously judged), but from understanding and applying – somewhat similarly to the human Mind – the first and most intimate preoccupations/productions of the human Mind, such as: *metaphors, meanings (mental keys), dreams (mental keys language), etc.*

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And the enumeration of differences can go on.

A. *How has TIS come about?*

We need to say, right from the start, that we have not “looked for trouble” regarding this theory.

No one sat in an office, studying and trying – purely theoretically – to find a new theory. TIS has not come about by us waiting for it. It came about out of the blue, from a *Need* – the *Need* to have the information transmitted in highly informationally parasite fields *survive* and *regenerate*. It so happens that the beginnings of TIS saw the light of day in the energy field, at a time when we were confronted with a technical issue at the level of a digital collection, measurement and control installation of the oil temperature in a high-power electric transformer basin (like the ones equipping high voltage power stations). Concretely, the technical issue affecting the application at large was related – as you are probably anticipating – to the temperature information (that we were circulating between the analyzed phenomenon – oil heating – and the central module of the installation, set in the command room) being affected by the electromagnetic perturbation. The presence of the perturbation (informational parasites) was “distorting” the information, and from here, the digital installation positioning wrong commands was only one step away. The most serious situation was when – the installation being

Nicolae Florean Pinte, SC Pintel Intelligent Systems SRL, Bucuresti, Romania, (e-mail: floreanpinte@yahoo.com)

Petru Postolache, Universitatea Politehnica Bucuresti, Romania; (e-mail: petrupostolache@yahoo.com)

Ing. Costică Nitu, Universitatea Politehnica Bucuresti, Romania, (e-mail: cnitu_upb2001@yahoo.com)

Stelian Alexandru Gal, CN Transelectrica SA Bucuresti, Romania, (e-mail: Stelian.Gal@transelectrica.ro)

Marius Nicolae Oltean, SC Smart SA- Sucursala Sibiu, Romania, (e-mail: marius.oltean@smartsb.ro)

Ioan Petru Ruset, Siemens S.R.L., Romania, (e-mail: petru.ruset@siemens.com)

tricked by these parasites – ended up suddenly setting off the transformer.

We were in a deadlock, in a need. And, as the saying goes, “*Need teaches man*”, we also turned to *Need*.

The first advice *Need* gave us was: think of a way to treat the information by which it can *survive (be recognized)* informationally.

Then, it was still *Need* that told us: it would be good if the lost information, affected by the electromagnetic perturbation, could be informationally *regenerated*.

These were the first pieces of advice (TIS concepts) placed in our path by *Need*. There were others too, other new concepts (e.g. *Informational Species*, *Random Leap*, *Mental Leap*, etc.). We obediently implemented these concepts –step by step– and later on, when we noticed in other applications as well that we conceptually use the same ingredients (concepts), we actually realized that we were facing a new way to approach and treat information, a new theory that we called TIS.

That is how TIS came about. And it is not surprising that it originated from here, from these lands, from where the West and the East break – or, if you like, interweave. From here, where we still preserve – in pure unaltered state– the *cultural matrix* of old, “primeval” thinking, which I’d daresay is deeply archetypal.

B. How is information seen in TIS?

Well, my dears, since we are speaking of fundamental changes in the way we approach artificial intelligence, know that, for several years now, the classical information has decided to create – by means of TIS – another perception in the eyes of the world; it has decided to change its “status” and become an *Informational Species*.

...So, how come you can turn a lifeless piece of information, e.g. the information (numerical value) 37, into a *Species*? a more reluctant person could burst.

Let us not become agitated in advance and look carefully at our process. Consequently, if we were to look at this number, 37, mathematically, we come and ask you: Is there another one like it along the entire number axis? Absolutely not. 37 is unique. 36 and 38 are its neighbors, it is true, but there is not another one like it.

Very well, but if we said 37°C, we would still be saying 37 as informational value. How do you individualize the mathematical 37 from 37°C? someone might intervene, just as hastily, if not even more hastily.

To the same person we should answer: 37°C is more – culturally speaking – than 37; 37°C also adds the heating as phenomenon to its “structure”.

If so – the commentator adds – then what is the difference between the 37°C temperature of a tea kettle, the 37°C temperature of a high-power transformer and the 37°C temperature of a living organism?

It does not let us go, it seeks to punish us. The only one that wins here is you, as you can already see the way 37 is culturally transformed, little by little.

What could we answer? We could say this: dear, the 37° of a kettle is one thing – as it becomes hot or cold in a minute-,

the 37° of a high-power transformer is another thing (a body with thermal inertia that does not become heated and then cold overnight), while the 37° of a human body (fever), whose thermal evolution is more unpredictable, is yet another thing. So, even this 37 – as information – is unique in the world. It has always been unique. It is all the more individualized as we have it see the world, the phenomena, things, etc. that are left to wander around.

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Consequently, TIS informs us that, when we relate the information to a phenomenon, we are actually pouring the information – willy-nilly – in a matrix of the phenomenon features.

We dress the plain information – willy-nilly – in a cultural layer.

C. How do we go, in TIS, from information to Informational Species?

The book answer is short: by *culturally dressing* the information, the information core (*Data_i*).

We dress the information in three *cultural layers*, just like a three-layered onion:

- **the first** of the Whole of the Meaning / Key of the Meaning / Skeleton of the Meaning cultural form;
- **the second** of the Application Whole / Application Emphasis Whole/Consciousness of the Whole;
- and **the third** of the Phenomenon Features Frame / Cultural form of the phenomenon features frame.

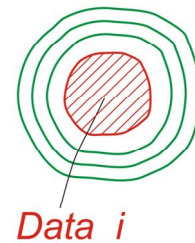


Fig.1. Informational Species

Once dressed in cultural layers, the information (Informational Species) will be recognized among other possible information (informational parasites, etc.) it lives with – either as a must or by its own will – in the Application information field.

Moreover, based on the layers – especially the one of the *consciousness of the whole – the Main Application Program* will be able to regenerate what is lost – the affected parts – of the information whole (Informational Species).

Now, the TIS bible TIS [1] describes these layers in great detail, in hundreds of pages; here, we’ll only limit ourselves and strive to make you see a bit the way the *Species cultural layers* can be seen in applications.

IV. FEATURES LAYER (SPECIES' THIRD LAYER).

This is the layer by which the Species is intimately tied to the Application phenomenon; more precisely to the phenomenon features it is made of. Thus, it is made out of the phenomenon features, but not just any features, but those that *are born and die together with the phenomenon*. Conceptually speaking, the elephant's trunk is a good example of such a feature. It is born and dies together with the elephant (the phenomenon).

What are features good for, in general? Well, if we did not have features, how could we differentiate ourselves? How would we know what belongs to whom? So, this is the role of phenomenon features in TIS: informational recognition. [Thus, it is enough for us to see the trunk (one of the features that are born and die together with the elephant), even if we do not see its body, to know it is an elephant.]

Now, in order to see the features layer at work, let us go back to the phenomenon control (oil heating) that we mentioned at the beginning of the article, where the Main Application Program was making wrong decisions, based on the informational value of the electromagnetic parasite instead of the real oil temperature value.

What was it that that classical Program did not know, thus being fooled? It did not know how to recognize the information, how to tell the difference between information and parasite. It did not ask itself this question, in order to make the first steps towards information recognition: "*In the end, whose temperature are we measuring and controlling? The temperature of a kettle – that becomes hot and then cold in the blink of an eye – or that of a massive body with high thermal inertia, whose heating curve as a totally different feature as compared to that of the kettle? It is slowly variable in time* (see Fig.2). The transformer temperature cannot increase just like that, like the kettle, from, let us say, 20°C to over 85°C (the transformer set-off threshold). We are not dealing with a kettle. Consequently, that 85 which is too in a hurry is nothing but... a parasite". It did not ask itself that and it was fooled.

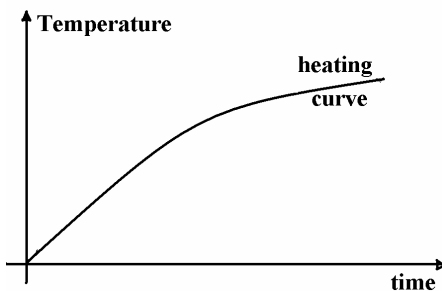


Fig.2. Heating curve of a massive body with high thermal inertia

Thus, "*slowly variable in time*" is one of the features of the transformer heating, which is just right to weave into the Informational Species features in this Application. It is for these features that we look in the colorful crown in the informational field in order to recognize our Species. How do we look? By means of Species validation criteria that these features account for. For example, the criterion related to

"*slowly variable in time*", is, as mathematic expression, as follows:

$$| \text{Data}_{i+1} - \text{Data}_i | \leq \varepsilon \quad (1)$$

Be careful, though, how you read this criterion. We are not reading it only mathematically, but also in **time**: in facts of the Good Perception Dimension [1]. The *slowly variable* is in *time*! Figure 3 fully clarifies things for you in relation to what we are trying to draw your attention to.

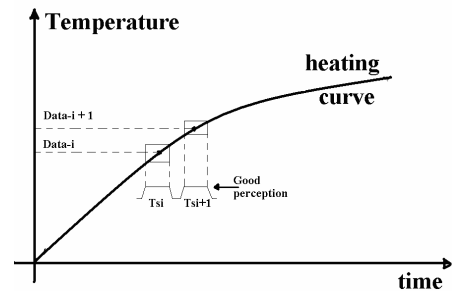


Fig.3. Clarifying aspects on the feature "slowly variable in time"

Now that you have seen at least one facet of this features layer, do not think that the Species has been enough in the *good functioning* of the digital thermometry module. The Species is not alone in TIS Applications. Everything would go down the drain without the *wise verbalization* of the Main Program actions. It is not the place here to talk about its "*we can do it like that too*" (*lenience*), or about the *random Leap* it allows for the Species in *wandering here and there* in the informational field. All that we can put here is the *picture* of one of the hundreds such modules populating the national power system.

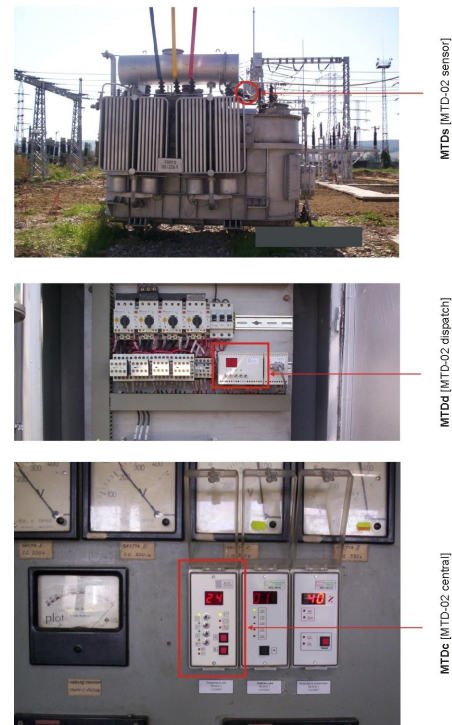


Fig.4. Digital thermometry module, type MTD-02

V. CONSCIOUSNESS OF THE WHOLE LAYER (SPECIES SECOND LAYER).

How is the consciousness of the whole from the conceptual point of view?

Saying that, in a military squad, each soldiers knows his place within the group in question (they know each other, they know each other's position in the group, so they know who is after whom, i.e. they know he whole of the group) is, in TIS, the same thing as saying that soldiers have a *Consciousness of the Whole* of the group. If we spread them and then ask them to resume their positions, they will immediately stand one behind the other, without fail, according to the *Consciousness of the Whole* of the group.

This layer of the consciousness of the Species' whole is, in fact, the battle horse of any TIS Application. We did not say it or showed it in the previous Application, because we chose to show its entrails in another Application, one that has no inhibitions, one that bathes – with pride by now – in the eyes of the world.

We will cut a long story short and ask you (as good engineers who know the measurement principle of an axis rotation, of that principle through which we count, in a time span, the number of landmarks – magnets, for example – of the disk mounted on the rotating axis, that pass by a fixed display) what happens if, for various reasons, the display is displaced a little or if one of the magnets breaks/becomes demagnetized (in a word, missing)?

The question is: Is the electronics calculating the rotation wrong?

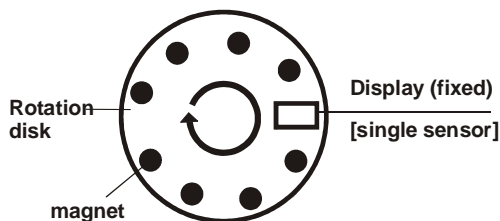


Fig.5. Classical rotation measurement method

It is wrong, of course it is wrong. The anonymous magnets, lined up along the disk circumference, do not have a consciousness of the whole, through which, when a magnet is missing, another magnet reaching the disk to tell it – the electronics – what member of the whole is missing and based on which the electronics can then count in the missing magnet by *placing one itself*.

In TIS, on the other hand, it thinks – *thank God* – at the level of a whole. In TIS, disk magnets create a Whole, more precisely an Informational Species, that has the consciousness of the whole, a Species whose organites (individuals) are aligned like a military squad asked to dance in a circle.

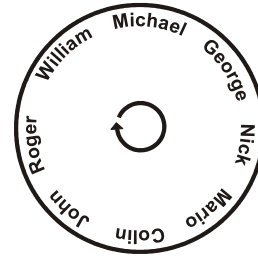


Fig.6. "Dance of the 8"

In relation to the classical method, here is how you can have a group of eight informationally different individuals, with only four magnets, individuals that are interrelated in the consciousness of the whole, none other than the now familiar *Linear Code 3* – part of the Linear Code n family - (Shingle Code), a code brought to light [1] – even if you do not believe it – right here, on Romanian soil.

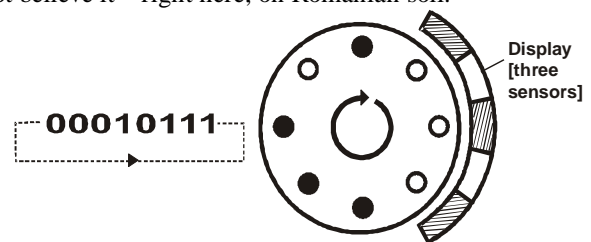


Fig.7. Linear Code 3

Please mentally rotate the disk, let us see if we have eight informationally different individuals that know each other, unlike the eight magnets of the classical method, which do not even have *anything to do* with each other. Thus, by rotating them, we have:

000 , 001 , 010 , 101 , 011 , 111 , 110 and 100 .

So it is correct. Now, as far as how much they know about one another, suffice it for you to notice the way each individual of the code steps, with almost its entire length, on the one in front of and behind it, respectively (on its neighbors, on the one in the *past* and the one in the *future*).

Linear Code n is described in detail in [1]. It has all the advantages of the good old *Gray Code*; in addition, it uses a lot less informational matter (e.g. only 4 magnets instead of 12!) than the Gray code need to encode 8 individuals. What can you do, "everything is fleeting".... and "supremacy" all the more so.

In the image below, you will find another application of the Linear Code (the above-mentioned Species), i.e.: *Collection transducer of the plot switcher position, type TDKP-19V*. This Application has crossed the Tisa River, even the Atlantic Ocean, an Application that fully benefits from TIS-developed artificial intelligence techniques.



Fig.8. Transducer type TDKP-19V

VI. MEANING LAYER (SPECIES FIRST CULTURAL LAYER)

The *Meaning layer* is the most special, intimate and innermost *layer/cultural garment* of the Species. It is the Species “night gown”. It is a layer which, in order to be weaved, needs a *Mind*, a route along the *two way roads* in the *Consciousness and Unconsciousness of the Mind (TIS Mind)*. What we underlined at the beginning – that the *TIS Mind* seeks to understand (as much as possible), some of the deepest/finest productions of the *human Mind (metaphors, meanings, dreams, etc.)* and then to apply them – it happens here, down these roads, *along the borders between the worlds, between the Consciousness and the Unconsciousness of the Application TIS Mind*.

Basically, the Species *consciousness of the whole* cannot be formed without this layer. And when phenomenon *features* are not exactly “*showing off material*” (in *validation criteria*), the Application’s fate lies in the hands of this layer, the only one that gives us a helping hand.

It is here, in the construction of this layer, that we mainly turn to those concepts laid on the TIS frontispiece (i.e.: *mental keys, mental leap, key language, etc.*), concepts/“skills” that the TIS Mind can *understand, taste and understand, it can move from one idea to another, from one meaning to another, it can build on its own new meanings of the Species whole of observables*.

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The limited room here unfortunately does not allow us to analyze these concepts enough. But those anxious of you can turn to TIS [1], there they’ll find *in detail and in-depth analysis* all TIS concepts.

VII. CONCLUSION

The *Theory of Informational Species* is, somewhat, a theory of the Mind. If we were to become drunken with what others say, it is the most “fascinating” technique occurred in artificial intelligence.

In brief, what is certain is that TIS is a new challenge in artificial intelligence, one in which the intelligence of

concrete Applications it is implemented in has already become known on the world stage.

VIII. REFERENCES

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Patents:

- [2] Nicolae Florean Pinte – Absolute numerical motion transducer, Patent no. RO 121492B

IX. BIOGRAPHIES



Nicolae Florean Pinte was born in Băbeni (Romania), on June 15, 1964. He graduated from the Bucharest Institute of Polytechnics in 1988. He worked at ICPE (Research and Engineering Institute for Electrical Engineering) in Bucharest between 1995 and 2000. Since 2000, he has been Executive Manager at Pintel Intelligent Systems Bucharest. He has 7 patents for automation inventions. He is the author of TIS (Theory of Informational Species- Irecson Publishing House, Bucharest, 2007) and of more than 20 technical papers.



Petru Postolache was born in Chisinau (Republic of Moldova) on June 28, 1940. He received his M.Sc. degree in electrical engineering in 1966 and his Ph.D. degree, both from the Bucharest University of Polytechnics, where he has also worked since 1966. He also teaches at the National University of Zair (UNAZA) and the Valahia University of Targoviste. He published 138 scientific papers. Mr. Postolache is a IEEE member, president of CS5 of CNR-CIRED, president of CT35 ASRO (CEI/TC82), president of CT 173 ASRO (CEI/TC25), member of CT31, CT 162 and CT 178 from ASRO. He is also a founding member of SIER and IRE, president of “Medium and High Voltage” (MIT) of SIEAR, member of APER, member of SRE-AGIR and series editor of “UPB-Scientific Bulletin, Series C, Electrical Engineering”.



Prof. Eng. **Costica Nitu, Ph.D.** teaches Automatics and System Engineering at the Bucharest University of Polytechnics and, has a large scientific research and teaching activity, consolidated by 178 scientific papers, 25 guides and textbooks, three patents for inventions and 34 scientific research contracts. His main interest areas are:

- Algorithms and process management equipments;
- Identifying, modeling and management of environmental process;
- Reliability of human operator- computer systems;
- Systems and equipments for energy consumption reduction.



Stelian Iuliu Alexandru Gal was born in Jimbolia (Romania) on July 2, 1947. He received his M.Sc. degree in electrical engineering and his Ph.D. degree in 1995, both from the Timisoara University of Polytechnics. His professional experience included IRE Sibiu as design engineer, technical manager, and manager. Between 2002 and 2006, he was director in C.N. Transelectrica S.A. and between 2006 and 2009 General Manager of the same company. He also worked as lecturer within the “Lucian Blaga” University of Sibiu, and he is the author of more than 30 technical papers and of a series of books. He is a member of CIGRE, SIER, A-LST-R (Romanian Live Working Association) and LWA (Live Working Association).



Marius Oltean was born in Târnaveni (Romania) on August 19, 1961. He graduated from the Timisoara University of Polytechnics in 1986. His professional experience includes Heavy Water Factory in Drobeta-Turmu Severin and IRE Sibiu since 1990. Since 2001, he has worked within SC Smart SA - Sibiu Subsidiary as technical manager and manager. He is the author of more than 20 technical papers and more than 30 technical presentations delivered in various congresses and conferences. He is also a member and secretary of

A-LST-R.



Ion Petru Ruset was born on June 29, 1964. He has a B.Sc. in general electrotechnics from the University of Timisoara, Faculty of Electrotehnics in 1989, PhD study for General Electrotechnics at Timisoara University. He has seventeen years of experience in the HV substation transformer 400,200MVA, primary equipment, and automation and protection systems. Between November 1998 and June 2007, he was Technical Manager of the Romanian National Transmission Company - Transelectrica, Service for

Transmission Grid Romania – Smart Timisoara. Since July 2007, he has been the Head of PG/PTD in Siemens s.r.l. Romania.