On the Evolutionary Model of Intelligence

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Abstract - *Social evolution is the process that has created and continues to develop not only the society, but human being self. Evolution is almost alone known and comprehensible natural mechanism of intelligence. It would be false do not to check if the same mechanism is used in the human brain. There are some phenomena known but incomprehensible in psychology: Sigmund Freud's concept of unconscious mind (1895), Carl Gustav Jung's concept of transformation (1912) and his psychological functions (1921). In this work we are trying to build the common theoretical model of evolutionary process for both sociological and psychological levels which could explain these phenomena.*

Keywords: evolutionary computation, model, transformation, clan, elite, intelligence

Some AI approaches are simultaneously hypotheses about the mechanism of the natural intelligence. One of such hypotheses is the concept of social evolution founded 1852 (few years before Darwin) by Herbert Spencer [1, 2, 3]. The task of creation of people and human society is certainly an intellectual and creative one. It seems likely that much of this work was done not by the Darwinian mechanism of biological evolution but rather by the Spencer's mechanism of social evolution.

The most important principle of Spencer's sociology is the likening society to an evolving organism. The further step is to assume the identity of the principles of information processing in society and in a single organism (brain, mind). We will use the social evolution theoretical model described in [4] in order to check if such mechanism can be modelled and used in the human brain.

There are few terms from this work we must define and explain in order to make this work independent from the referred one.

1   Clans, Elite, Basis

One of the central terms in our conception is "clan" which is defined as a set of people united by a particular model of the real world they share and with which they attribute their identity. We suppose only the casual groups of people (i.e. – passengers of one bus) do not correspond to this definition. Nation, party, corporation, team, even family have a shared by all members model they bear. Bearing of such model is often the aim and the sense of the clan's existence (confessions, scientific communities or schools). The assumption that groups rather as individuals are units of selection is popular [3].

Clans build a hierarchy – members of clans are most not people, but other clans. We can define the term "rank" of a clan. Let us assign to a clan which members are people (family, team) the rank 1. The super-clan of this clan has the rank 2 – i.e. company can consist of a set of teams – and so on. A man can be considered as a clan of the rank 0.

The hypothesis we discuss in this work is, that the last sentence presents not a degenerate case as it is often in mathematics. Furthermore, we can speak about the negative ranks of clans. The term "clan" corresponds in this case with the popular in AI term "agent".

Clan can take in its super-clan either the position of elite or the position of simple member. Elite – is a clan, claiming one type of command in its super-clan. The set of all clan members, regardless of affiliation to the elites, called a basis. The dichotomy basis/elite can be good illustrated by the Serenity prayer: "God, grant me the serenity to accept the things I cannot change, the courage to change the things I can, and the wisdom to know the difference." [5]

The work [4] presents the hypothesis that social evolution will be provided not so much by the competition of clans for survival, as by the competition of elite for command. Vilfredo Pareto was talking about constant cycling and change of elite; he called history the "graveyard of aristocracies" [6].

The informational sense of this phenomena is based on the assumption, that no clan can adapt to the environment (adaptation is the main term in any evolution theory) if it has no adequate model of this environment. So the competition of elite for command will contribute to creation the more adequate model of the real world if namely the elite bearing the more adequate model of real world will win.

But only the basis can play the role of arbiter between elite because no elite can be objective. It makes democracy the best form of power. Basis can't evaluate the models of elite; it evaluates rather the elite self. The survival and progress of people is caused with following phenomena: basis selects

most just the elite with more adequate model. Why? We shall discuss it below.

2   Unconscious Mind

The most important discoveries in psychology have been made at the turn of the 19th and 20th centuries by Sigmund Freud (1856-1939) and Carl Gustav Jung (1875 – 1961).

In the center of these discoveries is situated the concept of unconscious mind. At present, the idea of the mind, as an iceberg in which consciousness is only a small top is almost universally accepted. But no one understands why and what for the mind is so constituted. From the point of view of computer science, building of information system in which most of information including vital is hidden from the user and can be accessed only by using of special psychoanalytical techniques seems absurd.

However, this phenomenon becomes absolutely clear, if we assume that the structure of the psyche like the structure of human society. The last has a highly hierarchized, multi-level system of communities: countries, parties, nations etc. Above we have defined the term "clan", as the total for all of them. This justifies the use of the outdated term "subconscious" for our purposes.

Definition: The subconscious mind of a clan is the conscious mind of all its sub-clans.

Let us show it on the simplified, two-layer model of society: the country and the people who inhabit it. Consciousness of a country is the information that circulates in the media officially approved by the government. Obviously, this information may differ far and away from that which people owned individually. The more totalitarian the ruling elite of the state is the more intense is the level mismatch.

According to the ideas of psychoanalysts' jokes hint of repressed in unconscious contents without naming them directly. A political joke evoked in the Soviet Union stronger laughter than a sexual one.

Example: "On the agenda of the collective farm Communist party meeting, there are two issues: the building of the shed and the building of communism. Due to the lack of wooden boards the meeting moved immediately to the second question." Obviously, we are talking here about a prohibited, taboo subject: the socialist economy is inefficient.

The collapse of the Soviet regime was caused mostly by repression of this fact. It shows how ignoring some contents of the subconscious can be fatal to the system. The example of China shows that timely informed content of the subconscious could not only save the system, but also to ensure a sharp jump in its development.

One can assume, that intelligence can be bound with the possibility to make the unconscious conscious.

3   Process of Transformation - make the Unconscious Conscious

Carl Gustav Jung highlighted the process of "transformation" – transport of unconscious contents to the conscious mind. He said: "Until you make the unconscious conscious, it will direct your life and you will call it fate." We suppose that process of transformation and process of social evolution are two manifestations of the same process.

One can suppose that this process must be cyclical, because for adaptation to the environment one needs always new and new ideas about the changing real world be launched and implemented. Let us look for phases of this cyclical process.

Jung described [7] together with the well-known dichotomy of extraversion (E) vs. introversion (I) two further dichotomies: intuition (N) vs. sensation (S) and feeling (F) vs. thinking (T). The last four phenomena he has called "psychological functions" [8].

Aushra Augustinavichiute [9] was the first, who supposed, that psychological functions of Jung are not pure „psychological" phenomena, but belong to the fundamental natural laws of information processing in systems of some kind. She showed that the activity of psychological functions is arranged in a cycle which she compared to the Carnot cycle of energy transformations in the internal combustion engine. The four "psychological" functions correspond to four evolutionary phases described in [4, 10].

Hypothesis: We highlight in the life of elite four phases: emergence of an idea (hypothesis, model) and the elite around it (N); elite struggle for public acceptance (F); rise to power and the implementation of the bearing model of the elite in the life of society (S); institutionalization of this model and embedding it into the existing system of public institutions (read - discovered earlier models, T).

Why we have just four phases of our process? It can be the result of two further dichotomies (dichotomy seems to be a very important system-forming concept in our research domain):

•   Bottom-up vs. top-down processes. The structure of clans is hierarchical and information flows in such structure can be directed upwards or downwards.

•   Idea-oriented vs. system-oriented processes. A process of the first kind refers on the new born idea: the generation, development, implementation of it. A system-oriented process refers rather on the place of the new idea in the existing system of old ones.

4 Four phases of the transformation (evolutionary) process

Before we start discussing these four phases of information processing we would like to make two important suggestions and give one example.

1.   After reading of sections 4.1-4.4 one can make the conclusion our work is dedicated to philosophy, psychology, sociology or history. This conclusion is absolutely false. This work is dedicated exclusively to the computer science because the natural mechanism of information processing is our only research subject.

2.   In the focus of our research is the term "model" [11]. All information processes we discuss have some models of real world as their processing objects. Normally will be used several other words in order to express this concept. So a new born model on the phase "N" is called "idea". On the phase "F" can be used the term "ideological position". At phase "S" it can be called "aim". And on the phase "T" the terms "conception", "tradition" or "institution" can be used.

And now we consider an example of elite developing. The basic idea of Karl Marx: "The bourgeoisie exploits the proletariat." When Georgy Plekhanov translated "Communist Manifesto" in Russian language and established in 1883 the group of "Emancipation of Labor" (the early years consisted of four or five people), it was a typical N-elite, implementing this idea. Social Democrats quarreled hoarse, then shook hands and went home. Then came a time when the Mensheviks and the Bolsheviks ceased bowing in the streets of Geneva and met, crossed to the opposite sidewalk. They no longer spent time trying to prove something to each other, but actively promoted their ideas among the masses. This means that these elite moved into "emotional" F-phase. By October 1917, the Bolsheviks were turned by Lenin into a cohesive fighting S-elite. They seized power and not just avoided to say hello with their opponents, but killed them. Stalin then turned Communists in oiled machine - T-elite, and the elite of these elite became nomenclature - the ruling elite of the Soviet state. Behind the bipolar view of the world (the USSR and Warsaw Pact countries against the U.S. and NATO) was hidden possibly the confrontation between two T-elites: nomenclature and "gentlemen". Gentlemen elite won.

4.1   N: Intuition - the Creation of Ideas and Elite around Their

The N-process is idea-oriented bottom-up process. Its content is the generating and developing of an idea, but not the implementation of it. Jesus Christ and early Christianity is a good sample of a young elite creating and developing around a new model of the real world.

"Since intuition is essentially unconscious process, the essence of its very difficult to comprehend consciousness" - writes Jung [7]. That is, intuition can be a very initial phase of transformation, yet almost completely submerged in the unconscious.

This process dominated i.e. in times of appearance of big world religions: about 3000 BC – gods of ancient Egypt; about 1500 BC – the pantheon of gods of ancient Greece (and later - Rome), Judaism; about the time of Jesus Christ; between 1400 and 1775: Renaissance, Reformation and Enlightenment. The common feature of all those movements is the intellectual and spiritual nature of those. The most of ideas are related to the term "sense", i.e. "sense of life". Therefore ideas have for a society not pure the utilitarian meaning – to feature the possible changes and developments of system. They provide the unity of the society too. There are national ideas, idea of God and so on. But the information processing is the main function of phase "N". The big world religions won, because they mirrored the reality more adequate as early pagan beliefs. The N-time is a time of active exploration. The period 1400-1775 was the "Age of Discoveries" too. The ships of Columbus, Magellan and Vasco da Gama were plugging the seas.

As an example of N-periods, we can consider also small (only 15 years) and significantly less well-known period. Plekhanov creates the "Emancipation of Labor" group in 1883. Within the 15-year period, close to the beginning of which is this date arise social democratic and labor parties in Spain, France, Switzerland, Austria, Sweden, Italy and Holland. Also other ideas were activated. In 1881, Eugen Dühring, "genuine founder of Nazi anti-Semitism" [12], published a book entitled "The Jewish Question as a Racial, Moral, and Cultural Question." Wave of pogroms, that swept the south of Russia in 1881, led to the emergence in 1881-82 years clubs, societies and groups, aiming to revive of the Jewish people in Eretz Israel. Ideas of the Enlightenment, already victorious in many developed countries of the West, received support in Turkey, where the doctor and poet Abdullah Cevdet founded in 1889 the Young Turk movement. The relationship of these four types of elite - Communist, Nazi, Zionist and democratic - dictate a lot in the history of the next century.

4.2   F: Feeling - Battle of Ideas

The F-process is system-oriented bottom-up process. Its content is the evaluation of the new idea and comparing it with old models which must be replaced by the new one.

The Russian-speaking community in the world is going through a period of sharp polarization around the issue of Ukraine. The last such period began about 120 years ago and led to a series of Russian Revolutions (1905, 1917) and Civil War (1918). Another example would be the splitting France

on Dreyfusards and Antidreyfusards around 1995. Thus, we have now infrequent opportunity to watch the process F from the inside.

The first thing that catches the eye: polarization does not follow state or national borders. Public opinion is split in both countries: Ukraine and Russia. Moreover, in the opposite camps very often are members of the same family. This suggests that neither national nor economic interests play a decisive role; the process in question has some different nature. (It is the information processing nature.)

The second observation: the inability to convince the opponent by any logical arguments. It would lead to inanity of any discussions. But these discussions are watching by those persons who have not yet adjusted to the conflict. But for these persons logical arguments play a rather minor role. First of all, they're watching moral conduct of the parties to the conflict. Thus, the number of early Christians grew particularly cool in those periods when the Roman authorities have made them especially severe persecution. Actually, the death of the Savior is a striking confirmation of this rule.

Despite of attempts to falsify, considered information process, which has almost purely emotional basis, provides a surprisingly powerful tool for an adequate choice between two or more competing elite, and therefore - between their models of the real world. Simplifying - who cheats or uses harsh terror is obviously less sure of the rightness of their ideas, and is struggling only for obtaining or maintaining of certain privileges and wealth. It provides the foundation for the successful functioning of democracy.

The F-function provides also mechanisms for selection of the "correct" ideas. In psychology it manifests itself in emotions - inner struggle between the different ideas.

In the life of a society emotions find correspondents in all kinds of migration. The social migration and its radical form – revolution - represent the struggle of different points of view and provide the switch of a society correspondent to the dominating ideas. The period of 1775-1850 is a sample of a world F-period. It lasted from 1776 (US Independence Declaration), throw 1789 (Grate French Revolution), Napoleon wars, the revolutionary phase of Risorgimento in Italy (1815-1849), Revolutions of 1830 in Belgium, Poland, France and to all-European Revolution of 1848. In cultural history it is the period of romanticism. "Romanticism is a complex artistic, literary, and intellectual movement that originated in the second half of the 18th century… The movement validated strong emotion as an authentic source of aesthetic experience, placing new emphasis on such emotions as trepidation, horror and terror and awe." [13].

Not seeing the opportunity to fight for their ideas on the old place, groups of people (Huguenots from France, Jews from Egypt) resort to geographical migration. Often this leads to the birth of some new states and death of old other. Thus, the Aegean migrations (approximately 1250 to 850 BC) founded the Hellenistic civilization and ruined the Cretan-Mycenaean culture. At the same time, Egypt has lost the role of a grate empire. In the Germanic migrations of 250 to 650 came into motion Huns, Goths, and Teutons. In their drive to the west they have destroyed the Roman Empire. A rapid growth of geographical migration began in 18 century: were colonized South and North America, Australia, New Zealand, Siberia. In the 19th century over 50 million people left Europe for the Americas.

4.3   S: Sensing – Implementing Ideas in Reality

The S-process is idea-oriented top-down process. Its content is the implementation of the new idea in the real life of a clan.

So, in the N-period will be generate ideas. In the F-period they go in struggle for the minds of people. To begin of the S-period the chaos will be continued, but the dominated idea or the dominated complex of ideas will be formed. Clever and strong guys - "sensing types" [8] - understand it. The strength of those people is based not on pure tyranny, but on the good understanding of the trends. Therefore they have the support of the biggest part of society. Hear will be used the force and violent. Such strong personalities as Charles Martel in Francia or Napoleon in France come to the end of an F-period with the inevitability of a hurricane.

Fisch [14] characterizes so the period 1850-1914 years: "The second half of the 19th century is ... less phase of great theoretical concepts and fundamental ideas than time the introduction and implementation of such ideas. From theory arises practice, from ideas - reality. Here are just a few examples. Democracy, and also a modern parliamentary, was not invented after 1848. But prior to that date, she played only a minor role in the political practice of European states, and after 1918, and even more - after 1945, at least formally, was no longer even the subject of any debate. Still less nationalism became invention in 1848. But it was after 1848, it became one of the biggest political forces. The industrial revolution in 1848 has long begun. But only then it turned into a phenomenon, which subdues all the character and style of life in Europe. Socialism and liberalism in 1848 were fully developed concepts. In politically effective movements they become in many areas only then. ... This preponderance of practice over theory, implementation and insistence over creating concepts has the effect that the era in retrospect emits less gloss than the time of spiritual flight. Practical issues are becoming more important than originality of ideas. ... The greatest merit of this behavior is that only through him great masses of people can directly benefit from initial concepts."

This is the best description of the (introverted) S-phase we have ever seen, despite of Jörg Fisch is a Swiss historian and have never worked on the concept discussed here.

4.4 T: Thinking - Law and Order Instead of Arbitrary Power

The T-process is system-oriented top-down process. Its content is the balancing and optimizing of the models system after implementation of a new model.

The napoleons provide implementation of new ideas with the strength of their authority. But they can die or be won by their enemies. They and their followers can make errors. Bismarck won the concentration of power for emperor Wilhelm I, but it results in the catastrophe of two world wars challenged by politic of Wilhelm II. Therefore all what was formerly supported with the authority of the ruler and with the fear to contradict him will be in the T-phase "institutionalized"-equipped with specific mechanisms of its realization.

The T-model can be represented by legal mechanisms, strong political principles or the patterns of behavior in certain situations. Thus, the codex Napoleons, the department structure of France and more other things was not cancelled by Bourbons (legal mechanisms). Britain was always against the "strongest man" in Europe, to ensure the conservation of European equilibrium (political principles).

The low-oriented T-countries was or are: the Mesopotamia in times of Hammurabi (about XVIII century BC) - he created the famous codex of laws and he made decisions for private persons and against the state interests. The Roman Republic was founded around 500 BC. It was designated by very strong consistency of its domestic and foreign policy, and adherence to lows and legislation. Around 450 BC in Rome was formed the Twelve Tables statute book, which was issued in twelve wooden tablets in the Roman Forum. It was obviously the T-empire. Iron logic of the policy, strength of the established rules, and presence of clear principles are its main features. Also, the Western kings, emperors and popes from 1025 to 1400 were characterized by these properties. Precisely the strength of principles and not the guns has allowed the papacy to gain the upper hand over to Germanic emperors. The modern west nations was created mostly between X and XIV centuries: British (UK, later - US), Germans. There are ca. 20 times more juries in USA as i.e. in Japan.

5 Conclusions

The evolutionary model of intelligence allows better understanding of several phenomena known but incomprehensible in psychology: unconscious mind, emotions, other psychological functions and psychological types and functions discovered by C.G. Jung. The information processing sense of some sociological phenomenon (self-identification, revolutions and wars) is with this model better understandable too.

All of these can be interpreted as assertions that this model is adequate.

In order to further proof of this hypothesis we presume to build a computer model of this information processing mechanism.

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