Vetrov Anatoly Nikolaevich
www.vetrovan.spb.ru
RF, Saint-Petersburg city

THE GENESIS AND THE DIFFERENCES OF COGNITIVE CIRCLE, COGNITIVE DISC, COGNITIVE CYLINDER, COGNITIVE CONE AND COGNITIVE SPHERE

The genesis of "Cognitive informatics" directly initiates the analysis of the fundamental and applied directions of the modern science: technics (spec. 05.13.00 – "Informatics, computer engineering and control" and spec. 05.13.01 – "The system analysis, control and information processing"), economics (spec. 08.00.10 – "Finance, monetary circulation and credit" and spec. 08.00.12 – "Accounting and statistics in the credit organizations"), psychology (spec. 19.00.01 – "The general psychology, psychology of personality and history of psychology", spec. 19.00.02 – "Psychophysiology (of sensory systems and model of perception)" and spec. 19.00.03 – "Psychology of labor, engineering psychology and ergonomics"), linguistics (spec. 45.03.02 – "Cognitive linguistics and intercultural communication" and spec. 10.02.21 – "Applied and mathematical linguistics and modeling") and biology (spec. 03.01.03 – "Molecular biology" and spec. 03.01.04 – "Biochemistry").

The genesis and evolution of the ways of research of the objects, processes and phenomena causes the analysis of varieties of the apparatus of the cognitive modeling technology: the first generation,- "the cognitive disk" and "the cognitive ring",- allows to realize the system analysis of the simple object, process or phenomenon using the positional and non-positional numeral (coding) systems; the second generation,- "the cognitive model" and the ways of its interpretation,- realizes the system analysis by means of the (re)constructed repertoire of parameters, echeloned on a row of portraits and stratified on a several sets; the third generation,- "the cognitive sphere" and "the cognitive cylinder",- realizes the system analysis by means of use of the (re)constructed (in volume) repertoire of parameters, which directly includes the several nested spherical sets on two spherical levels.

The cognitive modeling technology is directly connected with the creation, distribution and use of the goods, works and services in the context of the technology of single, serial and mass production of one or several assortment groups and nomenclature units of products taking into account of the preliminary, raw-materials, technological, technical, hardware, software, brainware, personnel, legal and economic preparation of the cycle of production process from a set of different reserves.

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The ways of representation of the cognitive model are significantly various: "the cognitive circle", "the cognitive ring", "the cognitive cylinder" and "the cognitive sphere" are related with the problem spheres of their use.

The ways of presentation of the cognitive model are related with the problem environments of practical use of the cognitive modeling technology: the fundamental sciences -- technics and economics; the applied sciences – psychophysiology of sensory systems, molecular biology and physical chemistry.

The general ways of representation of the means of the system analysis of the difficult objects, processes and phenomena are differentiated on: the flat ways ("the cognitive disk" and "the cognitive multilevel disk") and the volumetric ways ("the cognitive cone", "the cognitive cylinder" and "the cognitive sphere").

The formal ways of representation of the cognitive model are differentiated on: the calculus on the corteges with domains (the corteges on domains), the structural presentation (the multilevel structural scheme) and the calculus with graphs and sets (the theory of graphs and the theory of sets).

1. The presentation of the cognitive model in the view of the corteges on domains (the analytical presentation) – the calculus with the corteges on domains is used.

The cognitive model (CM) presents a linear combination of the cognitive models (CM_u): $CM = (CM_1, CM_2, \ldots CM_u, \ldots, CM_U)$.

The elementary cognitive model (CM_u) presents a linear decomposition of portraits ($PR_{u.i}$) with the determined scientific justifications ($SJ_{u.i}$): $CM_u=(<PR_{u.1}, SJ_{u.1},>, <PR_{u.2}, SJ_{u.2},>, \ldots <PR_{u.i}, SJ_{u.i},>, \ldots, <PR_{u.I}, SJ_{u.I}>)$.

The portrait ($PR_{u.i}$) presents a linear combination of portraits ($PR_{u.ii}$) and a portrait ($PR_{u.i}$) presents a linear decomposition of the kinds of properties ($BC_{u.i.j}$): $PR_{u.i}= (PR_{u.i1}, PR_{u.i2}, \ldots PR_{u.ii}, \ldots, PR_{u.iI})$ and $PR_{u.i} = (KP_{u.i.1}, KP_{u.i.2}, \ldots KP_{u.i.j}, \ldots, KP_{u.i.J})$.

The kind of properties ($KP_{u.i.j}$) presents a linear combination of the kinds of properties ($KP_{u.i.jj}$) and the kind of properties ($KP_{u.i.j}$) presents a linear decomposition of properties ($Pr_{u.i.j.k}$): $KP_{u.i.j} = (KP_{u.i.j1}, KP_{u.i.j2}, \ldots KP_{u.i.jj}, \ldots, KP_{u.i.jJ})$ and $KP_{u.i.j} = (Pr_{u.i.j.1}, Pr_{u.i.j.2}, \ldots Pr_{u.i.j.k}, \ldots, Pr_{u.i.j.K})$.

The property ($Pr_{u.i.j.k}$) presents a linear combination of properties ($C_{u.i.j.kk}$) and the kind of properties ($KP_{u.i.j}$) presents a linear decomposition of properties ($Pr_{u.i.j.k}$): $Pr_{u.i.j.k} = (Pr_{u.i.j.k1}, Pr_{u.i.j.k2}, \ldots Pr_{u.i.j.kk}, \ldots, Pr_{u.i.j.kK})$ and $Pr_{u.i.j.k} = (VP_{u.i.j.k.1}, VP_{u.i.j.k.2}, \ldots VP_{u.i.j.k.l}, \ldots, VP_{u.i.j.k.L})$.

The vector of parameters ($VP_{u.i.j.k.l}$) represents a combination of the vectors of parameters ($VP_{u.i.j.k.ll}$) and the vector of parameters ($VP_{u.i.j.k.l}$) represents a linear decomposition of parameters ($P_{u.i.j.k.l.m}$): $VP_{u.i.j.k.l} = (VP_{u.i.j.k.l1}, VP_{u.i.j.k.l2}, \ldots VP_{u.i.j.k.ll}, \ldots, VP_{u.i.j.k.lL})$; $VP_{u.i.j.k.l} = (P_{u.i.j.k.l.1}, P_{u.i.j.k.l.2}, \ldots P_{u.i.j.k.l.m}, \ldots, P_{u.i.j.k.l.M})$.

The parameter ($P_{u.i.j.k.l.m}$) represents a linear combination of parameters ($P_{u.i.j.k.l.mm}$): $P_{u.i.j.k.l.m} = (P_{u.i.j.k.l.m1}, P_{u.i.j.k.l.m2}, \ldots P_{u.i.j.k.l.mm}, \ldots, P_{u.i.j.k.l.mM})$.

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2. The presentation of the cognitive model in the view of the oriented graph, combining the theory of sets – the (re)constructed repertoire of parameters, which is echeloned on a row of portraits (PR_i) with the scientific justification (SJ_i) and stratified on a several sets at the two levels of dedicated hierarchy: a set of the kinds of properties (KP_j) and a set of elementary properties (Pr_k), a set of the vectors of parameters (VP_l) and a set of elementary parameters (P_m).
3. The presentation of the cognitive model in the view of the multilevel structural scheme – the (re)constructed repertoire of parameters, which is directly echeloned on a set of portraits (PR_i) with the scientific justification (SJ_i) and stratified on a several sets without using of any connections: a set of the kinds of properties (KP_j) and a set of elementary properties (Pr_k), a set of the vectors of parameters (VP_l) and a set of elementary parameters (P_m).
4. The presentation of the cognitive model in the view of the cognitive disk (circle) – the (re)constructed on the plane (in width and depth) repertoire of parameters, which includes a circular set of portraits (PR_v^I) with a certain scientific justification (SJ_v^I) and the mutually embedded disks at the two disk levels: a set of the kinds of properties (KP_v^J) and a set of properties (Pr_v^K), a set of the vectors of parameters (VP_v^L) and a set of elementary parameters (P_v^M).
5. The presentation of the cognitive model in the view of the cognitive cylinder (the volumetric presentation) – the (re)constructed in volume (in width and depth) repertoire of parameters, which includes a cylindrical set of portraits (PR_v^I) with the scientific justification and the nested simple cylinders at the two cylindrical levels: a set of the kinds of properties (KP_v^J) and properties (Pr_v^K), a set of the vectors of parameters (VP_v^L) and elementary parameters (P_v^M).
6. The presentation of the cognitive model in the view of the cognitive cone (the volumetric representation) – the (re)constructed in volume (in width and depth) repertoire of parameters, which includes a conical set of portraits (PR_v^I) with the scientific justification and the mutually embedded simple cones at the two conical levels: a set of the kinds of properties (KP_v^J) and properties (Pr_v^K), a set of the vectors of parameters (VP_v^L) and elementary parameters (P_v^M).
7. The presentation of the cognitive model in the view of the cognitive sphere (the volumetric presentation) – the (re)constructed in volume (in width and depth) repertoire of parameters, which includes a spherical set of portraits (PR_v^I) with the scientific justification and the mutually embedded simple spheres at the two spherical levels: a set of the kinds of properties (BC_v^J) and properties (Pr_v^K), a set of the vectors of parameters (VP_v^L) and elementary parameters (P_v^M).

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