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Quadronimic Interpretation of English-Language Digital Discourse

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***Abstract*---**The paper focuses on the English-language digital discourse (EDD) and considers it in terms of Descartes' square. Despite the incongruence of the medieval philosophical paradigm with the modern stage of posthumanitarian studies, it is the quadronymic and clearly delineated frame, "perspicuae veritates" (according to R. Descartes), which can balance a diverse phenomenon of digital discourse. There are three main aspects of the study considered further: English-language digital discourse and its quadronymic potential, which is interpreted in three main perspectives: in terms of discursive impulse and discourse response; within hyper- / hypodynamic levels of English-language digital discourse and the English-language digital textual space (EDTS). Quadrominic interpretation of English-language digital discourse results in the following findings: symmetry of discourse construction; logic and sequence of discourse representation and its parameters; slot representation of discourse paradigmatic parameters; identification of interdependencies, conditions and parameters of discourse within quadrants.

***Keywords*---**Descartes Square, discursive potential/impulse, English-language digital discourse, quadrants, slots, textual space.

Introduction

English-language digital discourse (EDD) is a type of English-language institutional communication reflecting digitalized communicative event, which mediates social and digital space of the modernity within the communicative pattern "Human – Machine" (AbuSeileek & Qatawneh, 2013; Lyons, 2018). Both, oral and written forms of communicative interaction among discourse participants are related to defined digitalized texts (e.g. textual basis of acquisition languages, scripts, codes and commands of the Machine etc.) (Lazebna & Prykhodko, 2021). The **goal** of this study is to correlate the Cartesian square with the English-language digital discourse (EDD) (Lazebna, 2020). Quadronimic interpretation of English-language digital discourse results in the following findings: symmetry of discourse

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construction; logic and sequence of discourse representation and its parameters; slot representation of discourse paradigmatic parameters; identification of interdependencies, conditions and parameters of discourse within quadrants (Aaker et al., 2012). With the help of descriptive **methods**, logical and mathematical interpreting instruments, we can distinguish quadrants, slots, which represent the rational grain for the EDD interpreting (Kamp & Reyle, 2019).

General discussion

Rene Descartes is an outstanding mathematician and philosopher. In his philosophy, R. Descartes considers the unity of rational and spiritual, and, moving away from the idealized representation of a human-being in the Middle Ages (e.g., Virtuvian Man, L. da Vinci) (Figure 1), he argues for the need to develop a methodology for finding truth (Descartes, 2020). Descartes Square is the technique used for decision making, which was created by R. Descartes in the 17th century.

Figure 1. Virtruvian Man by L. da Vinci

In modern posthumanist philosophy, a Man goes beyond his central position in the universe. This is no longer a man-centered universe (according to L. da Vinci), but a man-technocentric universe. The Man does not direct the universe anymore, but rather exists in the technocratic surrounding (Uricchio et al., 2017; McGinnis et al., 2007). The role of the Man changes from the Author to the Consumer, and, possibly, the Man becomes the Hostage of the surrounding technocratic world (Figure 2).

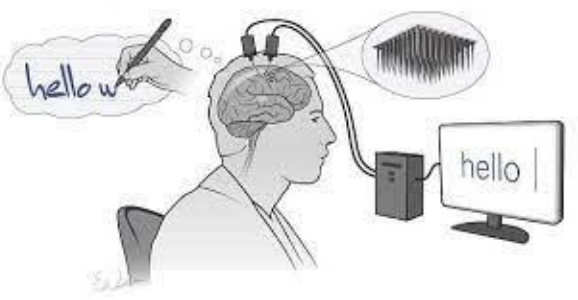

Figure 2. Posthumanistic Man

A Man's constant interaction with digitized objects, technologies, and his indirect existence in the technocratic environment necessitates a rethinking of the modernist limitations between a Man and a Machine, society, and nature (Sudarmo, 2021). There is a need for a litmus test to characterize digitalized, and sometimes technocratic metadiscourse in terms of microanalytical analysis of text-generating and speech-reflection studies (Cornia et al., 2020; Guo et al., 2016). This need is caused by the contemporaries, who mediate their communication by combining verbal and nonverbal codes (creolization, multimodality), multilingual complications of text structure, graphic text design, attracting grammatical simplifications to establish new semantic connections, and applying phonosemantic techniques of speech arrangement (Lazebna, 2021).

The anthropocentric paradigm of scientific research is gradually being transformed into posthumanitarian studies. The socio-cultural plane of such transition is the discourse, the phenomenon studied by scientists in the field of philosophy, sociology, psychology, culturology, linguistics, etc (Hartono et al., 2021). The digital nature of English-language digital discourse moves from its personality-oriented substrate towards a status-oriented goal. This type of discourse is supported by two "Atlanteans", which are a Man and Machine. They determine the communication between anthropic and automated agents.

The theory of posthumanism in discourse studies brings to the foreground sociolinguistics and applied linguistics (Coole & Frost, 2010). Introducing The New Materialisms. New materialisms: ontology, agency and politics, pp. 1-43; (De Freitas & Curinga, 2015). New materialist approaches to the study of language and identity: assembling the posthuman subject. Curriculum Inquiry, v. 45, n. 3, pp. 249-265].

Despite the incongruence of the medieval philosophical paradigm with the modern stage of posthumanitarianism, it is the quadronymic, balanced and clearly delineated frame or "perspicuae veritates" is the obvious truth according to Descartes (2020), which can not be wrong and questionable. Within the Cartesian square we can distinguish quadrants, define certain slots, which are the same rational grain for directing the interpreting the English-language digital discourse, which is a verb creative socio-digitalized interactive background the contemporaries and their activities (Bays, 2015). Quadronimic interpretation of English-language digital discourse and its paradigmatic parameters represents the following advantages:

- Symmetry of discourse construction;
- Logic and sequence of discourse representation and its parameters;
- Slot representation of discourse paradigmatic parameters;
- Identification of interdependencies, conditions and parameters of discourse within quadrants.

Considering Descartes Square, we can see four quadrants with certain conditions to follow (Figure 3).

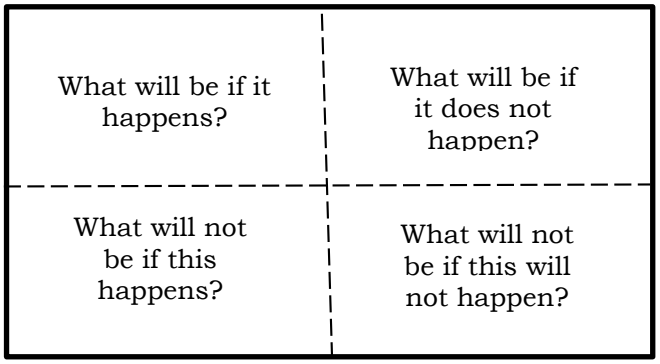

Figure 3. Descartes Square. Efficiency of decision-making

That is, the Descartes Square reflects certain combinatorics in four quadrants:

I + + (fulfillment of both conditions)
II - + (fulfillment of one condition)
III + - (fulfillment of one condition)
IV - - (non-fulfillment of any of the conditions)

Quadronymic potential of discursive impulse and English-language digital discourse response

The paradigmatic parameterization of English-language digital discourse will take place within the quadronymic approach (according to Descartes Square), so it seems possible to locate the Descartes Square on the graph along the abscissa (y) and ordinate (x) axes (Glavaš et al., 2018; Brychcín, 2020). The abscissa axis (y) will denote the Potential Discursive Impulse, in other words, constitutive features (features of discourse institutionality and type) and categories (genre-stylistic, substantive, formal-structural), which will be considered as potentials of the discourse (Carpenter, 1992). The y-axis (x) determines the Potential Discursive Response, in other words, the conditions of communication (organization of communication, methods of communication, participants in communication) and communication goals (communicative situation, sociolinguistic goal, communicative goal) represent reactive responses of discourse.

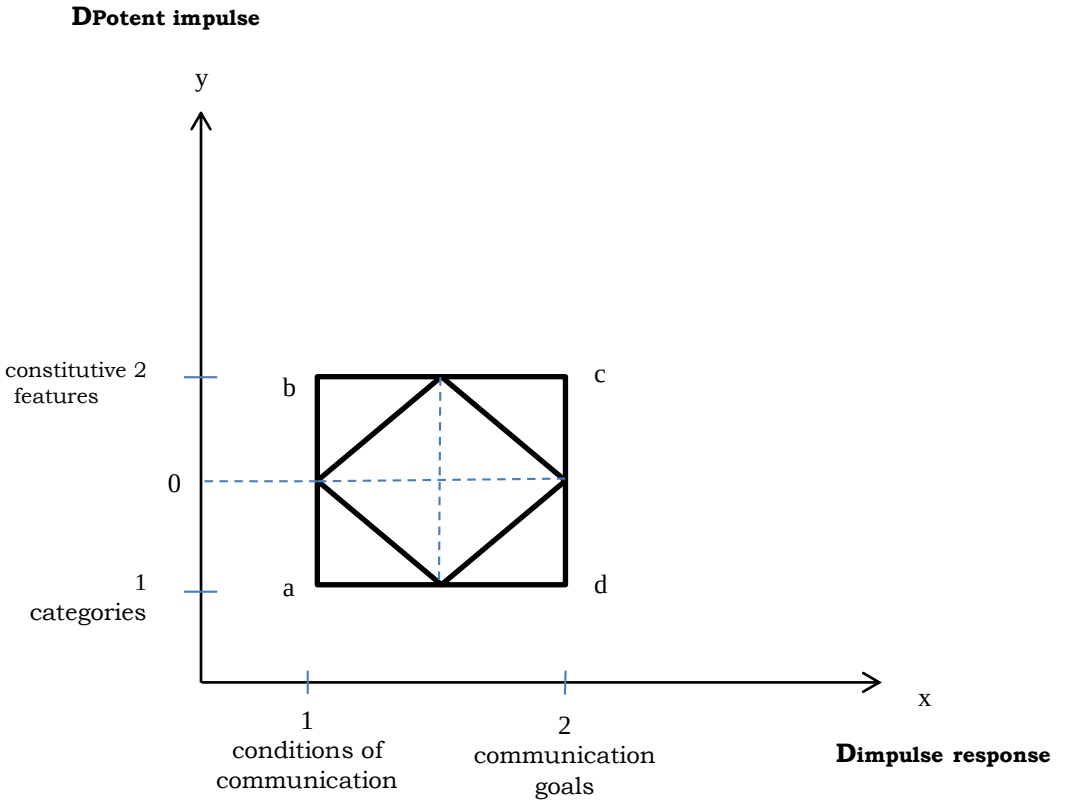

Figure 4. Square of discourse impulse and response

D Potent impulse ⟶ ab
(potential discourse impluse)
D Impulse response ⟶ bc, cd, da
(potential discourse response)

The square *abcd* is a graphical representation of English-language digital discourse. According to the location of the discursive constituents on the axes, the sides of the square identify the constant (cons) and variable (var) parameters:

ab = const
bc = var
cd = var
da = var

That is, the side *ab* denotes the constant parameters of English-language digital discourse, and the sides bc, cd, da represent variables. Assume that the 4 quadrants of the potential discursive impulse correspond to the conditions of the quadrants within the Descartes Square:

DPimpulse I + + (fulfillment of both conditions)
II - + (fulfillment of one condition)
III + - (fulfillment of one condition)
IV - - (non-fulfillment of any of the conditions)

The combinatoriality of the parameters will be implemented in four quadrants as follows:

I ab +bc+cd+da
II ab+bc+cd
III ab+bc+da
IV bc+cd+da

The first quadrant represents the complete combinatority of potential discursive impulse and response.
The second quadrant shows partial combinatority of potential discursive impulse and response.
The third quadrant demonstrates partial combinatority of potential discursive impulse and reactive response.
The fourth quadrant identifies no discursive potential.

Accordingly, the four quadrants of the potential discursive impulse correspond to the four quadrants of the Descartes Square (Table 1).

Table 1
Descartes quadrants vs Potential discursive momentum quadrants (DPimpulse)

Quadrants of Descartes	Quadrants of DPimpulse
I ++	I ++
II -+	II -+
III +-	III +-
IV --	IV --

Quadronymic potential of hyper- / hypodynamic levels of English-language digital discourse

The Cartesian square can also be projected onto the hyperonymic and hyponymic levels of the English-language digital discourse. The hyperonymic level of English-language digital discourse includes: signs and symbols generated by IT-technologies, logic and mathematics.

The hyponymic level of English-language digital discourse includes: models of communication “Man – Machine” (semiotic combinatorial models, and technical codes). The main identifiers of hypero- / hyponymic levels are Signum (sign), and Verbum (word). Graphical delineation of the hyper- / hyponymic levels of English-language digital discourse is presented in squares and four quadrants:

- Hyperonymic level: a b c d (f S ∪ V) function, sign and symbol
- Hyponymic level: e f g h (r f S ∪ V) implementation of the sign and symbol function

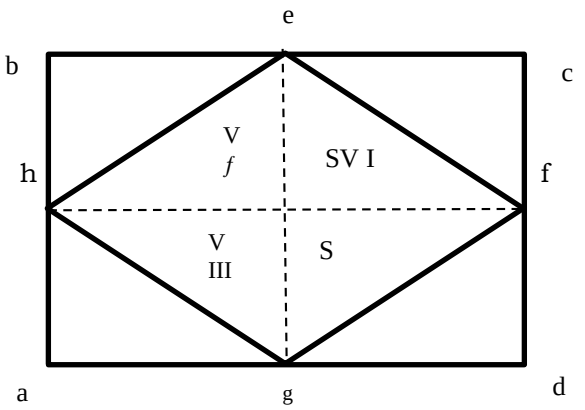

Figure 5. Square of hyper-hyponymic levels of English-language digital discourse

The quadronymic potential discursive impulse is developed in four quadronymic potential discursive responses.

Quadrant I: the complete combinatoriality of momentum and response
Quadrant II: partial combinatorics
Quadrant III: partial combinatorics
Quadrant IV: the pulse is not realized due to its absence

The first quadrant of the reactive response is equal to the first quadrant of the potential pulse:
Quadrant I: e c f i = I Quadrant D Potent
The second quadrant of the reactive response is equal to the second quadrant of the potential pulse:
Quadrant II: g i f d = II Quadrant D Potent
The third quadrant of the reactive response is equal to the third quadrant of the potential impulse:
Quadrant III: a h i g = III Quadrant D Potent
The fourth quadrant of the reactive response is equal to the fourth quadrant of the potential impulse:
Quadrant IV R: h b f i = IV Quadrant D Potent.

Therefore, quadronymic potentials of discursive impulses and responses are interdependent. The lack of complete combinatoriality of any impulses and responses partially realizes the discourse. A partial combinatority of impulse or response generates the realization of discourse. The absence of impulse of response prevents the discourse from further development. The quadronymic potential of discourse within Descartes' square is proved, coinciding with the conditions predetemined in Descartes' quadrants:

I + + (fulfillment of both conditions)
II - + (fulfillment of one condition)
III + - (fulfillment of one condition)
IV - - (non-fulfillment of any of the conditions)

The specificity of the interaction of hypero- / hyponymic layers correlates with the main identifiers of hypero- / hyponymic layers, Signum and Verbum within their functions and implementation of these functions:

f S ∪ V (Signum and Verbum combination function)
r f S ∪ V (implementation of Signum and Verbum combination function)

The following interaction and / or dominance of Signum and Verbum constituents is revealed:

I Quadrant R: S ∪ V is a complete combinatoriality of sign and word
II Quadrant R: S sign (dominant)
III Quadrant R: V word (dominant)
IV Quadrant R: f function

According to the paradigmatic parameterization of the discourse hypero-/ hyponymic layers within the quadronymic approach:

- The quadronymic potential of the hyperonymic layer of the discourse is equal to the quadrant of the potential momentum and the response of the EDD in the first quadrant;
- The quadronymic potential of the hyponymic layer of the discourse is equal to the quadrant of the potential impulse and the response of the EDD in the II and III quadrants of the discourse development.

Descartes square as an interpretive frame of English-language digital textual space (EDTS)

Quadronymic potential of EDTS

Descartes' square can also be projected on EDTS, which is defined as the written process and the result of interaction of EDD participants, reflected in the texts, which mediate communication "Human - Human", "Human - Machine", "Human - Machine - Human" and their variants directly or indirectly with the help of programming languages, modes of their encoding and decoding (Guzdial & Ericson, 2016).

Quadronymic potential of macro- / microlevel of EDTS

EDTS macrolevel texts include texts on innovative technologies (robotics: development of chatbots and animated social agents, IT technologies, cybersecurity, natural language processing) (Indurkhya & Damerau, 2010). Another group of texts comprises texts on innovative technologies, which reflect the communication “Human – Machine”: scripts and corpora of chatbot texts (such as Alice, Eliza, Mitsuku, Rose), as well as dialogues “Human – Machine” of the Cleverbot chatbot.

EDTS microlevel texts also include two most common types: Scratch, Python, and Squeak programming language bases (lists of commands, basic concepts, symbols, labels, and general semiotic base described by modern English) and tool/set texts

for Natural libraries and programs. Language Toolkit or NLTK, Machine Learning, which reflects the communication "Human – Machine". Within the quadronymic approach to EDTS, we define the Square of macro- / microlevel EDTS and its quadrants.

EDTS macro level: square a b c d
EDTS microlevel: square e f g h

The square *abcd* is a macro-level linguosemiotic text representation:

- Unified texts on innovative technologies;
- Specialized texts on innovative technologies (communicative focus: "Human – Machine")

The square *e f g h* is a microlevel linguosemiotic textual representation:

- Bases of programming languages Scratch, Python and Squeak;
- Texts of the tool / set of libraries and programs Natural Language Toolkit or NLTK, machine learning (Machine Learning);

Quadrant I: complete combinatorics of macro- / micro-level linguosemiotic text representation
Quadrant II: partial combinatorics
Quadrant III: partial combinatorics
Quadrant IV: lack of combinatorics of macro- / micro-level linguosemiotic textual representation

Table 2
Quadrants of Descartes vs Quadrants of macro - / microlevels of EDTS

Quadrants of Descartes	Quadrants of EDTS
I ++	I ++
II -+	II -+
III +-	III +-
IV --	IV --

The macrostructure of EDTS is represented by: messages on forums, blogs, articles and sections of technical manuals, etc.
The microstructure of EDTS consists of programming languages and the transition of speech to coded in the space of EDTS.
Within the quadronymic approach to EDTS, we determine the square of the macro- / microstructure of EDTS and its quadrants.
EDTS macrostructure: square a b c d
EDTS microstructure: square e f g h

The quadronymic potential of the macro- / microstructure of EDTS is realized in four-level lingual and coded text-generating representations:
Square *abcd* comprises macrostructure of EDTS:

- Messages on forums, blogs, articles and sections of technical manuals, etc.
- Specialized texts on innovative technologies (communicative focus: "Man - Machine")

The square *e f g h* is the microstructure of EDTS:

- Programming languages
- Transfer of speech to encoded communicative flow.
  And quadrant: complete combinatority of macro- / microstructures
  Quadrant I: complete combinatorics
  Quadrant II: partial combinatorics
  Quadrant III: partial combinatorics
  Quadrant IV: no macro- / microstructure

Table 3
Quadrants of Descartes vs Quadrants of macro- / microstructures of ADTP

Quadrants of Descartes	Quadrants of macro- / microstructures of ADTP
I ++	I ++
II -+	II -+
III +-	III +-
IV --	IV --

Perspectives of the study

Hypothetically, the quadronymic potential of EDD is projected on its linguosemiotic quadrant (natural (English) language and programming languages). EDD quadrants can be compared with Serpinsky's Carpet, which is a set of fractals. Its recursiveness can be embedded in the programming languages (Lazebna et al., 2019).

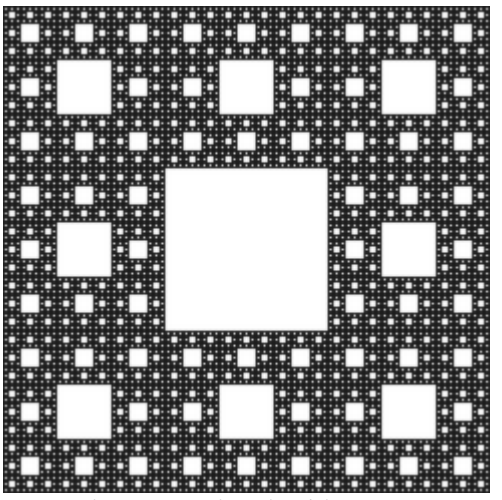

Figure 6. Sierpinski carpet

For example, in the Python programming language, Serpinsky's Carpet will look like this:

```
axiom = "YF"
rules = {"X":"YF+XF+Y", "Y":"XF-YF-X"}
iterations = 1 # TOP: 10
        angle = 60 x
        [habr. com]
```

Hypothetically, we can separate 9 equal squares out of the whole square and remove the central part of the square. After endless repetition of this procedure, we obtain a subset of the squares.

Conclusions

- EDD and EDTS within their quadronymic representation correlate with Descartes' Square, its four quadrants and their meaningful composites.
- The combinatoriality of parameters in the First Quadrant is complete, in the Second and Third – the combinatority is partial, and the discourse is not developed in the Fourth Quadrant.
- Each of the paradigmatic parameters of EDD is developed within the Descartes Square and its quadrants.

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