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ALGORITHMIC APPROACHES TO UNIVERSAL ANALYSIS MODELS

The concept of analysis is being contemplated in its most comprehensive philosophical context. An endeavour is undertaken to systematise the examination and present it in the form of a systematic procedure, in essence, to construct a formal comprehensive analysis model. The generalised model combines normal data processing procedures with pairs of philosophical categories of the most generic form as components. The sequence of their application is determined. This order is based on the degree of generality of the categories. Consequently, several analysis models were acquired. Despite the observable consistency in the sequence of category application, a comprehensive analytical model has not yet been established based on this series. However, the analysis techniques that have been obtained can already be regarded as prototypes of practical algorithms, serving as the foundation for deductively deriving algorithms for actual computer programs.

Keywords: *analysis, algorithmic analysis model, analysis algorithm, generalized concepts, philosophical categories, system, element.*

Introduction

The most prevalent human action is known as analysis [1]. An analysis is necessary for any acquaintance, investigation, or study of the subject of activity or the surroundings. The primary utilitarian purpose of the analysis is to elucidate the functions of existing objects, understand their internal operational patterns, enhance the functionality of designed or manufactured objects, investigate creative works, and acquire knowledge of general philosophical ideas and applied scientific concepts.

Analysis can be regarded as a methodology, strategy, or procedure, functioning as a singular operation. We commonly regard analysis as a systematic process. The study differentiates between the notions of analysis as a systematic process and breakdown as a cognitive or tangible act. Decomposition is an impartial process utilised solely as a method. Decomposition refers to the process of

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separating or dividing something into smaller parts or isolating its components. Analysis can also be division, but it is also comparison, contrast, connection, and most typically search. Further analysis of decomposition is provided in reference [2]. When discussing material items, the process of decomposition occurs before analysis. The decomposition can occur inside imagined, mental, and conceptual systems, followed by the subsequent investigation of the resulting components.

In analytical processes, the object of study is subjected to a procedure involving the intellectual or material separation of the entity into its constituent elements or components to facilitate rigorous examination and evaluation of each part.

Problem Setting

Although analytical acts, operations, and procedures are widespread, there is currently no universally applicable formal model (or models) of analysis for any sector of activity [3]. An essential criterion for such a model is the systematic arrangement of its constituent procedures, and its methodical nature.

This paper attempts to formalize the analysis procedure and make it methodical. It is intended to build an algorithm for the application of general philosophical categories or generalized philosophical concepts as a means of analysis and to symbiotically combine it with data processing operations. The resulting structure should become a generalized model of analysis. Naturally, it will be some algorithm or similarity of an algorithm. If there is more than one such algorithm and several of them are found, then classify them and try to find a universal generalized analysis model (algorithm). In [2], an endeavour was undertaken to construct a formal comprehensive model of the algorithm, with a specific emphasis on analytical techniques.

Many everyday routine jobs are performed in various spheres of human activity with the help of computer technology. The necessary software is developed as unique to each field. But in this variety of software, there are always functions that can be called analytical. By structure or algorithm, they may coincide regardless of application areas. If a generalized analysis model is found, try to use it for the deductive derivation of practically applied algorithms that would be programmed. That is, the development of a generalized analysis model can be a prerequisite for the generation and synthesis of application software algorithms. In a similar way, the deductive conclusion was applied in works [4, 5].

Illustrations of Precise Analysis Methodologies

Research-based analytical tasks sometimes include repetitive efforts. One of the justifications for the algorithmic approach to analysis is the utilisation of computers at different stages of the investigation. Presented below is a compilation of exemplar analysis methodologies.

A. Single-object analysis.

B. Selection and analysis of a group of things.

C. Elimination of a certain individual from the population. For instance, it involves extracting a specific breed from the raw material or selecting suitable people for particular types of operations.

D. Decomposition and subsequently segregating or disposing of specific constituents. The thing, or a significant portion of it, remains intact. Examples include the process of extracting sour cream from whole milk, separating meat from a carcass, or segregating oil into its constituent components.

E. Decomposing and thereafter disposing of the surplus. Examples:

- Any fish that are not sorted in the catch are discarded.
- Animals in industrial breeding are euthanized.
- Surgical procedures involving the extraction of unhealthy tissues or organs.
- Eradication of undesirable vegetation in the agricultural area.
- Mine clearing.

F. Investigation of the unfamiliar and conservation of valuable or significant knowledge regarding identified occurrences or items. One example is the examination of celestial bodies and phenomena beyond Earth's atmosphere. The discovery of the

planets Neptune and Pluto was a direct outcome of this research. An instance of arbitrary movement over the Internet can be observed.

G. Engage in the quest for the imperceptible. The object's existence is acknowledged, but its whereabouts remain unknown. Examples:

- Geologic surveying.
- Visual perception and construction.
- Identifying individuals within a group when only limited indications or clues are available.
- Conduct a search for uncommon botanical specimens.
- Conduct a search for elusive or uncommon fauna or avian species.

H. Categorization and clustering.

I. Conduct a search for a specific object within a collection of numerous similar items. Identification of the desired object or information and subsequent choice or retrieval. An illustration can be found in the pursuit of a malefactor.

K. Observations with exposure to various effects, including mechanical, chemical, physical, or any other type.

Analysis Context

The research subject might be regarded from various perspectives.

- An object: a topic, process, phenomenon, or artefact that is regarded as a distinct entity, existing as a whole and independent from other things. Regarding the relationship with the environment. If an object comparable to the one being analysed exists, then the original object is examined and investigated through the process of contrasting or comparing it with a similar object.
- An object is defined as a multifaceted entity, comprised of various components, functioning as a collective whole or as an interconnected system.
- An object is regarded as an integral element of the entirety, as a constituent of the system, as a component of a complex entity.

Data Processing Manipulations

Data processing operations refer to the activities involved in manipulating and analysing data to extract meaningful insights and information. The analytical technique may comprise a series of elementary operations. These procedures are chosen without any specific reason but are the most frequently utilised in the process of analysis. These operations are work or compound ones within the analytical process.

- Defining (selecting, delineating, recognizing) and identifying an object (sub-object, super-object).
- Formation of an image (description, measurement).
- Comparison of the object's image with a mask.
- Saving the image.
- Classification and grouping of object images, involving maintaining a certain order.
- Sequential (or other) enumeration of object images.
- Study of applied aspects.

Categories

During cognitive and transformational processes, individuals, regardless of their awareness, manipulate overarching categories. Regardless of the subject being studied, the level of research, or the specific aspects or approaches taken, individuals inevitably employ one or more categories from a predefined list of philosophical categories. Primary mental decomposition and subsequent analysis rely on pairings of relevant categories. An intermediate objective of this task is to acquire the skill of consistently using generic categories, thereby constructing a systematic framework for their utilisation. The study investigates a collection of classifications. However, it should be noted that this set does not constitute a conceptual system, as the field of philosophical science lacks a structured arrangement of categories [6]. The categories in the suggested set can be associated with the ontology section [7], as they are the most prevalent ones in the field of computer science and programming, commonly utilised. The fundamental principle behind the suggested system is the concept of transitioning from the abstract to the concrete. To clarify, higher-level abstract categories are employed initially, followed by lower-level, more specific categories. The following are pairings of operational categories that are considered in this study.

Space and time. An individual establishes the characteristics of the space and time that an object occupies, although the coordinates and parameters of both the object and its location in space will be stated using units of measurement commonly used in the relevant field.

Process and object. By examining or creating the characteristics of an object, an individual investigates or creates the functions of the object. Functions typically become apparent or evident over a period of time. In other words, an individual engaged in such study or design takes into account the categories of object and process. An object is defined as something that remains relatively unchanged throughout a specific period of time. It could be an assortment of objects such as a geological rock, a piece of furniture, a piece of fruit, an automobile, an animal, or even a person. Simultaneously, the characteristics of the categories of statics and dynamics are examined.

External and internal. The examination of any phenomenon commences with the establishment of the internal and external categories. External refers to the information or stimuli that are received by a person's consciousness from an object through their senses or by means of measurement or fixation. The category of "internal" refers to the observer's perspective gained by delving into the inner aspects of an object, making assumptions, or drawing conclusions based on outward observations.

The external category is populated when the following conditions are met:

- Pre-trip or in-store examination of the car.
- Prior examination of the device to turning it on.
- Examination of domestic appliances.
- Introduction to an unknown region.
- Familiarising oneself with the instructions before operating household equipment.
- Examination of the patient in the process of determining the diagnosis.
- A male carefully or directly scrutinises a woman.
- A woman scrutinises a man.

External attributes refer to any descriptive information associated with an object, such as text, video, image, photo, or sound recording.

Form and content. The characteristics of these categories are already existing dimensions and, if feasible, quantified in numerical form. The process of defining the categories of form and content is a direct outcome of prior efforts involving the categories of internal and external. The process of perceiving through the senses or measuring (or fixing) took place at an earlier time.

Furthermore, the subsequent pairings of categories will be cited as a method of cognitive decomposition.

- Quantity and quality.
- Structure and function (characteristic).
- Component and system.
- Process and result.
- Action and result.
- Continuous and discrete.
- Object and image of the object.

Types (directions) of Analysis Procedures

When analysing procedures, it is presumed that the object being studied is not independent of the researcher. This assumption is believed to be excellent and is regarded as an intermediate one. Furthermore, it is important to note that the analysis of the issue and the analysis of the process will vary along the review process. Subsequently, the analysis techniques for different scenarios are taken into account.

1. Object — subject. A separate *object — subject* is available for observation. The object is regarded in isolation from its surrounding environment. In order to analyse it, many categories are employed, namely, multiple pairings of categories. In the context of research utilizing pairs of categories, it is essential to acknowledge that the interaction between categories within a pair is posited to yield supplementary insights into the object of study. However, achieving this necessitates that the researcher possesses an enhanced understanding of the subject area. The revelation of such knowledge entails the engagement of consciousness, reason, and intuition.

Space — time. The location in space is determined. It is imperative to establish a set of parameters that precisely define this location. From the

algorithm's perspective, this entails defining a set of variables that will store the values of these parameters. Furthermore, it should be noted that establishing a set of parameters inherently entails the definition of corresponding sets of variables. It is essential to establish a set of parameters that precisely define the duration of the object's existence if required.

External — internal. Refers to the visual or observable characteristics of an object. The possible forms of representation include a sketch, an oral depiction, a photo, a video, or some form of trace. The description is defined by fixed parameters. A description is provided for the accessible representation of the object's internal content, state, or structure.

Content — form. Numerical numbers that represent its parameters or bounds defines the shape of the subject. The parameters are immutable. The parameters of the subject's contents are determined quantitatively. Possible factors to consider include the material composition, specific gravity, density, and existence of components.

Quantity — quality. When creating the content of an object, the parameters of this nature are implicitly defined. However, it may be necessary to provide other sets or groups of parameters for a comprehensive description.

An analysis conducted based on the aforementioned categories presupposes that the outcomes will be documented. In terms of algorithmic and computer processing perspective, parameters are captured and saved on computer media (storage devices).

If grouping and/or classification were conducted throughout the analysis process, it is essential to include the grouping and classification task in the algorithm. Additionally, the outcomes of the classification should be stored on computer media. Classification results necessitate the establishment of a set of parameters.

2. Collection of Subjects. A collection of *objects — subjects* is available for observation. The collection has some (one or more) attributes that unite these subjects. Nevertheless, the collection does not constitute a singular entity. The collection is determined either by the number of members, by the limits of its placement, or by other criteria. From the point of view of building the algorithm, it is necessary to determine the mechanism of selection of subjects within the collection: under what conditions to perform the analysis of the first member of the collection, how to select the next member of the collection, what is the condition for completing the analysis of collection members

Scenario 1. All members of the collection are analyzed. For each of the members of this collection, the same set of four pairs of categories listed in *clause 5.1* is used. It is necessary to determine the order of access to the next member of the collection. For all members of the collection, the same parameters as in *clause 5.1* are set. Nevertheless, the values of these parameters are fixed for each member of the collection.

Scenario 2. All members of the collection are analyzed. This is where selection is done. The parameters of only those members that satisfy a certain criterion are fixed. It is possible that said members of the collection will be selected for further study or processing in the future.

Scenario 3. All members of the collection are analyzed. This scenario indicates those members of the collection that are to be removed from the collection in the future. In this scenario, the parameters of all members of the collection are fixed, but those that should be deleted are marked, or the parameters of those members of the collection that will not be deleted are fixed, those that will be deleted are marked, only the "label" parameter is fixed.

Scenario 4. A set of objects is situated in an environment that is not open to investigation. Gaining access to the next member of the collection requires effort or expenditure of resources. In this scenario, the environment must also be analyzed to the extent that it can be overcome to gain access to the next member of the collection. The pair of characteristics *quantity — quality* becomes particularly significant concerning the environment in which the collection is contained. The pair of categories *aim — means*holds significant importance regarding the whole

3. Superobject — subject. A separate object is available for observation. The object is considered

out of touch with the environment where it is located. An object is a subject that is perceived as a component — consisting of elements. Parts of the object are also available for exploration. Parts may be available for research as part of the object, or the decomposition is done and the parts are available as separate subjects or as separate objects.

For the study of the object itself, all categories are used, as in *clause 5.1,* and all procedures are performed as in *clause 5.1*. Parts of the object are considered as a collection and all categories are applied to the study of the collection as in *clause 5.2,* and all procedures are performed as in *clause 5.2.*

On the other hand, the object and its parts are studied from the point of view of the *system — element* pair of categories. These categories presuppose the existence of a certain order or organization of the interaction of elements in the object.

If we regard an object as a system, then this is a prerequisite for performing the deduction procedure to gain additional knowledge about its components. Similarly, the induction procedure can be applied, which will allow obtaining additional knowledge about the object.

For the object and its components, it is appropriate to use the analysis using several categories of *structure — function (characteristic)*. The structure of the object — the mutual arrangement of components in the object, their mutual attraction or repulsion, and their interaction — leads to an understanding of the characteristics of the object. Moreover, if the analysis of external and form allowed us to see some characteristic of the object, then it is imperative to further investigate which component of the structure guarantees the existence of this characteristic.

Each category serves as both the motive and the focus of study on the *superobject — subject*, but the priorities can be:

- If a superobject is something external, then what internal is;
- If a superobject is a form, then what the content is;
- If a superobject is a construction, then what a component is;
- If a superobject is a structure, then what its parts or elements is;
- If a superobject has a function, how its structure implement that function.

The object can be divided according to not only one scheme. There can be more than one decomposition scheme. If only, it is a feasible technical solution for this.

4. Subobject — subject. A separate object is available for observation. The object is considered out of touch with the environment where it is located. An object is a subject that is considered as part of the volume of its object, also a subject. The enclosing subject may consist of additional components that are somehow interconnected with the original one. An enclosing subject may also be available for research.

In order to examine the subject matter, all categories specified in *clause 5.1* are utilised, and all procedures outlined in *clause 5.1* are executed. If related elements of the enclosing subject are available, these elements are considered as a collection and all categories are applied in the study of the collection as in *clause 5.2*, and all procedures are performed as in *clause 5.2.* In order to examine the enclosing object, all categories specified in *clause 5.1* are utilised, and all procedures outlined in *clause 5.1* are executed.

Furthermore, the analysis includes examining both the enclosing object and the original one, as part of it, from the point of view of the pair of categories *system — element*. These categories presuppose the existence of a specific order or organization of the interaction of elements in an enclosing subject.

If we regard the enclosing object as a system, it is essential to carry out the deduction procedure in order to acquire additional knowledge about the original object. Certain attributes of the enclosing object are regarded as innate to the original one. The induction procedure can be similarly utilised to get additional knowledge about the enclosing object, if needed.

When analysing the enclosing object and the item under investigation, it is suitable to employ a pair of *structure — function (characteristic)* categories. The structure of an enclosing object — the mutual location of elements in this object, their mutual attraction or repulsion, their interaction —

leads to an understanding of the attributes of the original object being studied. Also, if the analysis of the external and the form allowed us to see a specific property of the enclosing object, then this is a cause to better find out what aspect of the structure ensures the presence of this attribute, how the original object is involved in the existence of this attribute.

Each category serves as both the cause and the focus of research on a *subobject — subject*, but the priorities can be as follows:

- If a subobject is the content, then what the form is.
- If a subobject is a component, then what the construction is.
- If a subobject is a part of a structure, then what a structure is.
- If a structure of which the subobject is a part is found, what attribute does the structure provide.

An enclosing object can be categorised based on multiple schemes, not limited to just one. There can be more than one decomposition scheme. If only, it is a feasible technical solution for this.

5. Object — process. A distinct object is accessible for the purpose of overseeing a certain process. A more detailed description of the process can be found in [5]. The process attributes include the following:

- driving element (one or more);
- player involved (one or more components) — living, non-living, or environment in which the process occurs;
- process function (as perceived by the object — characteristic of the object) (one or more);
- process quality (one or more);
- players' interaction (component);
- lead time;
- dynamics (algorithm) of the process;
- flow condition; indications or conditions of the commencement and completion of the process;
- utilised resources (one or more);
- hierarchical intricacy of the process, including a list of sub-processes in case of significant complexity of the original process.

The process is deemed disconnected from its surrounding environment where it resides. In order to study it, a number of pairs of categories are employed.

Space — time. The location of the process in space is determined. It is imperative to establish a set of parameters that precisely characterise this location. From the algorithm's perspective, this entails the need to establish a set of variables that will store the values of these parameters. It is imperative to establish a set of parameters that precisely define the time of existence of the process.

External — internal. Describes the external appearance or external manifestation of the process. The possible forms of representation include a sketch, an oral depiction, a photograph, a video, a trace, or any form of evidence. The description is fixed as a parameters. A comprehensive description is provided of the internal content, state, and structure of the process. The description is fixed as a parameters.

Content — form. The process form's available parameters (boundaries) are determined using numerical values. The parameters are fixed. The object's contents are determined by numeric values, which define the available parameters. These factors may include the material, specific gravity, density, and presence of components, etc. The application of the *external — internal* and *content — form* categories can aid in determining the following attributes: driving element, components, lead time, flow condition, and resources utilised. Although the entire set of process attributes may be defined.

Quantity — quality. Parameters of this nature are implicitly defined when specifying the characteristics of an object, although extra sets or a set of parameters may be required for description.

Process — result. These categories can be utilised to ascertain alterations in process flow conditions, resource utilisation, parameters, and real lead time. Therefore, it is necessary to define sets of variables that will store the values of adjustable parameters prior to and following the commencement of the process, from an algorithmic perspective.

An analysis carried out according to the categories listed above assumes that the results will be recorded. From an algorithmic and computer

processing perspective, parameters are logged and stored on computer media.

If grouping and/or classification were completed throughout the analysis process, it is important to include the grouping and classification work item in the algorithm. Additionally, it is necessary to save the classification results on computer media. Classification results necessitate the establishment of a set of parameters. The order in which the given categories are applied may match the order listed above. Although applied research has the potential to greatly alter this order.

6. Superobject — process. A separate object — a process — is available for observation. The object is considered out of connection with the environment in which it is located. An object is a process that is considered a composite — consisting of parts — subprocesses. Subprocesses can be available for research as components within a process. Subprocesses are available for direct observation and research, or the main process has been previously decomposed and after that, the subprocesses are available for observation and research.

To examine the enclosing process, the initial and related subprocesses, all categories specified in *clause 5.5* are utilised, and all procedures outlined in *clause 5.5* are executed. Subprocesses are regarded as a collection. A collection is defined either by the number of members, or by the boundaries of its location, or other criteria. When constructing an algorithm, it is necessary to determine the mechanism for enumerating subprocesses within a collection: under what conditions to process the first member of the collection, how to select the next member of the collection, and what the condition for completing the processing of all members of the collection is.

Furthermore, the enclosing process and the initial subprocess are examined from the perspective of a pair of *system — element* categories. These categories presuppose the existence of some order or organization of interaction between subprocesses within the process.

If we consider the process as a system, then this is a prerequisite for undertaking a deduction procedure to acquire additional knowledge about the components, namely the initial subprocess. Similarly, the induction procedure can be employed to acquire additional knowledge about the enclosing process.

When considering the enclosing process and the initial subprocess, it is suitable to employ analysis utilising a pair of categories *structure — characteristic* (or function). As previously said, the structure of an object leads to an understanding of the characteristics (or functions) of the object. Likewise, the structure of the enclosing process: the relative arrangement of subprocesses in time and space, their interaction leads to a better understanding of the functions of the enclosing process and the initial subprocess.

Moreover, if the analysis of the external and the form enables us to observe a specific characteristic (or function) of the enclosing process, this serves as the foundation for a better understanding of what aspect of the structure or, namely the initial subprocess, guarantees the existence of this characteristic.

Each category serves as both the reason and the direction of research into the *superobject — process*, but the priorities can be the following:

- If a superobject is something external, then what internal is;
- If the superobject is form, then what content is;
- If a superobject is a construction, then what a component is;
- If a superobject is a structure, then what its parts are;
- If a superobject has a certain function, then how its structure implements this function.

The initial subprocess can be derived by partitioning based on many schemas, not just one. There can be more than one decomposition scheme. If only, it is a feasible technical solution for this.

Process — action. Subprocesses may vary in their lead time. Irrespective of time, a subprocess can be seen as something indivisible, as a simple or elementary action (then just "action"). Action is a part of the process that, from the perspective of the research method, is not considered integral. A process is a series (stream, sequence) of actions. Also, subprocesses consist of a number of actions. Sets of parameters (sets of variables) are associated (assigned) to both subprocesses and actions.

Action — event. Events mark the commencement and conclusion of actions. Events are also accompanied by corresponding sets of parameters. This is because the commencement of the event needs to be recorded or assigned. That is, the following attributes can be recorded: commencement time, place of action commencement, initial conditions, prerequisites for activating (launching) the action mechanism, state of resources, composition of players, and driving element. Similarly, it is necessary to record or indicate the conclusion of an event. That is, the following attributes can be recorded: action loop time, place of the action completion, conditions for completion, conditions for deactivating the action mechanism, state of resources, composition of players, and driving element.

Action — result. A special case of a pair of categories *action — event*. In certain instances, it is possible to confine one's analysis to these two categories and the data that can be unearthed through research.

7. Subobject — process. A separate object — a process — is available for monitoring. The object is considered out of connection with the environment in which it is located. An object is a process that is regarded as a part, as a subprocess of the process, that encloses it. The enclosing process can also be accessible for research if required. Within the enclosing process, in addition to the specific subprocess under study, there may be other subprocesses that are included as components of the enclosing process. The initial subprocess, the enclosing process, and adjacent subprocesses may be directly accessible for observation and research. Alternatively, the main process has been previously decomposed, the subprocesses can then be observed and researched.

To examine the process itself, all categories outlined in *clause 5.5* are utilised, and all procedures specified in *clause 5.5* are carried out.

Subprocesses are regarded as a collection. A collection can be defined based on the number of members, by the boundaries of its location, or other criteria. When constructing an algorithm, it is crucial to determine the mechanism for enumerating subprocesses within a set: under what conditions to process the first member of the set, how to select the next member of the set, what is the condition for completing the processing of members of the set.

Furthermore, the process and subprocesses are studied from the perspective of the *system — element* category pair. These categories assume the existence of some order or organization of interaction between subprocesses within the process.

Viewing the process as a system is a necessary condition for carrying out a deduction procedure, which will enable us to obtain additional knowledge about the components. Similarly, the induction procedure can be employed to obtain additional knowledge about the process.

When analysing a process and its parts of subprocesses, it is suitable to employ a pair of categories *structure — characteristic* (or function). As mentioned above, the structure of an object leads to an understanding of the characteristics of the object. Likewise, the structure of the process — the relative organisation of subprocesses in time and space, and their interaction — leads to a better understanding of the functions of the process itself.

Moreover, if the analysis of the external and form enables us to perceive a certain attribute of the process, then this serves as the foundation for a better understanding of what aspect of the structure ensures the existence of this attribute (characteristic).

Each category serves, as both the reason and the direction of research into the *subobject — process*, but the priorities can be the following:

- If a subobject is content, then what form is;
- If a subobject is a component, then what a construction is;
- If a subobject is part of a structure, then what a structure is;
- If a structure is discovered that contains a subobject, what function does the structure serve.

The process can be derived by partitioning based on many schemas, not just one. There can be more than one decomposition scheme. If only, it is a feasible technical solution for this.

Process — action. Subprocesses might vary in their lead time. Irrespective of time, a subprocess can be seen as something indivisible, as a simple action.

8. Collection of processes. A set of objects — processes — is available for observation. A collection is characterised by a certain attribute or multiple attributes that bring together these objects. Nevertheless, the collection does not constitute a singular entity. A collection is determined either by the number of members, or the boundaries of its location in space and (or) time, or by other criteria. When designing an algorithm, it is crucial to determine the mechanism for enumerating processes within the collection: under what conditions to process the first member of the collection, how to select the next member of the collection, and what the condition for completing the processing of all members of the collection is.

Scenario 1. All members of the collection are analyzed. For each of the members of this collection, the same set of four pairs of categories is listed in *clause 5.5* is used. It is necessary to determine the order of access to the next member of the collection. For all members of the collection, the same parameters as in *clause 5.5* are set. Nevertheless, the values of these parameters are fixed for each member of the collection.

Scenario 2. All members of the collection are analyzed. A selection is executed in this case. The parameters of only those members that satisfy a certain criterion are fixed. The identified collection members may potentially be chosen for subsequent examination and analysis.

Scenario 3. All members of the collection are analyzed. This scenario indicates those members of the collection that are to be removed from the collection in the future — they should be ignored. In this scenario, the parameters of all members of the collection are fixed, but those that should be deleted are marked, or the parameters of those members of the collection that will not be deleted are fixed, those that will be deleted are marked, only the "label" parameter is fixed.

Scenario 4. A set of processes that occur or will occur in a certain environment that is difficult to access for research. Access to the next member of the set requires effort or resource expenditure. It is necessary to thoroughly analyse the environment in this situation to overcome any obstacles and obtain access to the next member of the collection. The pair of categories *quantity — quality* holds particular importance in the context of the environment where aggregate processes occur. The pair of categories *aim — means* holds significant importance regarding the whole.

If it is required to include members from any collections during the analysis, it is imperative to assign them unique numbers for identification purposes. This can refer to a collection of objects, a collection of processes, and a collection of subobjects. If a set of variables is matched to a group of parameters, then inside these variables, there must exist a variable that holds the identification number (identifier) of the collection.

Developmental Trajectories

Absolutely neutral research and analysis of an object is a seldom observed phenomenon. Every study involves an interaction between subject and object, whether it is stated explicitly or implicitly. This interaction must be taken into account during the analysis process. The interaction is influenced by factors such as the precision of measurements of different phenomena and processes, as well as the efficiency of planned artefacts and processes. Factors influencing this interaction range from the accuracy of measurements of various phenomena and processes to the effectiveness of designed artefacts and processes.

The aforementioned categories are derived from the presence of both subject and object categories, indicating the presence of both a subject and an object. The categories of subject and object serve to signify this presence.

The categories *person* and *project*, or *person* and *artefact*, encompass another set of categories, namely: *phenomena — entity*, *cause — effect*, *aim — result*, *aim — means*, *capability — reality*, *necessity — randomness*. The necessity to consider the interaction of these pairs of categories arises from an individual's subjective perception of real-world processes or the personal influence of the individual on these processes.

The subsequent intricacy of the analysis procedure is linked to the search operation. The search can be conducted utilising many parameters, em-

ploying a mask, or aligning with a certain object structure.

An additional complexity in analysis procedure arises from the creation of universal and comprehensive search models.

The object of analysis may encompass the analysis procedure itself, a decomposition scheme, or a decomposition mechanism. The decomposition mechanism can be analyzed (split) into simpler schemes, the deductive inference formula can be analyzed (split) into simpler formulas, and the composition mechanism can be analyzed (split) into simpler schemes.

The inductive inference formula can be analyzed (split) into simpler formulas.

Conducting the analysis procedure allows for the observation of the outcomes derived from the application of decomposition, deduction, induction, and composition, in addition to the applied result.

The analysis procedure may necessitate iterative decomposition to the extent of amalgamating previously synthesized components, such as in the repair of equipment or complex building structures. This procedure can be applied multiple times, often in search of a productive decomposition scheme.

In the analysis process, specific schemes from particular sciences or production areas may be utilized alongside general schemes. The practical application of analysis procedures may demand the examination of highly intricate structures, requiring expertise in delving deeper into complex synthetic entities such as the soul, brain, consciousness, blood, cells, DNA, microcosmic force fields, complex astronomical phenomena, and human nature. This may entail a synthesis of general decomposition schemes and specific applied ones.

The analysis procedure can be employed to create or enhance current decomposition schemes. If a certain decomposition scheme is already identified, the objective may involve improving and enhancing it.

The aforementioned analysis procedures already consider the duality of the categories "object" and "object image". The formation of the object image occurs within the researcher's mind, on digital and physical media, on the Internet, or on paper. It is sometimes necessary to evaluate the correlation between the formed image (information) and the prototype (object). At the algorithmic level, this implies that all parameters (and thus, variables) with the exception of identifying ones need to be replicated. This duplication applies to parameters containing the qualitative and structural characteristics of the object. Furthermore, conditions must be established to facilitate the comparison of measured (recorded) values during the analysis of parameters with the estimated or ultimately determined actual values.

Considering the potential benefits for advancing future scholarly inquiry, and with recognition of certain conceptual similarities to the work previously conducted by Odrin regarding the provision of effective instruments for researchers, it may prove prudent to explore opportunities to facilitate collaboration and integration of methodologies across relevant domains of study to more optimally address c

Conclusions

The study endeavors to construct a formal generalized model of analysis applicable to various human activities. The degree of generality is not restricted to any one domain or more specific areas of activity. The components (elements) of the generalized model encompass routine data processing operations and pairs of categories of the most fundamental nature. These basic operations include object description, data recording, classification, and search, among others. Additionally, the model considers general categories such as system and element, object and process, form and content, and structure and function, among others. Pairs of categories can be utilized in the initial phases of analysis and research of diverse objects to facilitate decomposition. The sequence of their application is predefined, based on a progression from more abstract categories to less abstract ones, ultimately moving towards more concrete categories. The models or schemes developed for the application of pairs of categories and data processing operations vary for two distinct types of objects — objects and processes. When creating analysis

models, three aspects of the objects under study are taken into account: their role as part of a specific system, their existence (function) as a system, and their status as autonomous, temporarily indivisible objects.

The study yielded several analysis models. Despite some consistency in the order of category application within this series, a generalized model of analysis has not been established. Nonetheless, the resulting analysis procedures can be regarded as prototypes of practical algorithms, serving as a foundation for the deductive derivation of algorithms for real computer programs.

It is recognized that when constructing analysis models, the consideration of the interaction between the categories of subject and object necessitates the additional utilization of a comprehensive range of pairs of categories, including phenomenon and essence, cause and effect, goal and result, goal and means, and others. The application of these categories is contingent upon an individual's subjective perception of processes in the real world or their personal influence on these processes. Consequently, in such instances, the resulting series of analysis models will be notably more extensive.

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ДО ПИТАННЯ СТВОРЕННЯ УЗАГАЛЬНЕНОЇ АЛГОРИТМІЧНОЇ МОДЕЛІ АНАЛІЗУ

Вступ. У людській діяльності найбільш поширеною є дія, яку називають аналіз. Попри повсюдне поширення аналітичних дій, операцій та процедур, не існує формальної узагальненої моделі (або моделей) аналізу, яка була б застосовна у будь-якій галузі діяльності. Існує багато повсякденних рутинних робіт, які виконуються в різних сферах діяльності людини за допомогою обчислювальної техніки. Необхідне програмне забезпечення розробляється як унікальне для кожної сфери. Але в цьому різноманітному програмному забезпеченні завжди є функції, які можна назвати аналітичними. За структурою або алгоритмом вони можуть збігатися незалежно від прикладних областей. Можливо, що є певна узагальнена модель аналізу, яку можна було би використовувати для дедуктивного виведення практичних прикладних алгоритмів, основи прикладного програмного забезпечення.

Мета статті. Робиться спроба формалізувати процедуру аналізу та зробити її методичною. Для досягнення мети здійснюється спроба побудувати формальну узагальнену модель аналізу, що може зустрічатися в діяльності. Міра спільності не обмежується якоюсь однією або декількома сферами діяльності або прикладними областями.

Методи. Будується низка моделей аналізу. У моделях як компоненти поєднуються рутинні операції обробки даних та пари категорій найзагальнішого плану. Найпростіші операції — опис об'єкта, фіксація даних, класифікація, пошук тощо. Враховуються загальні категорії такі як система та елемент, предмет та процес, форма та зміст, структура та функція тощо. Пари категорій можуть застосовуватися для виконання декомпозиції на ранніх етапах аналізу та дослідження довільних об'єктів. Встановлюється порядок застосування. В основі цього порядку береться до уваги міра спільності категорій. Побудовані моделі або схеми застосування пар категорій та операцій обробки даних розрізняються для двох видів об'єктів — предметів і процесів. При побудові моделей аналізу розглядають три аспекти досліджуваних об'єктів: як частина якоїсь системи, як система і як автономний тимчасово неподільний об'єкт.

Результати. Як результат роботи отримано низку моделей аналізу. Цей ряд став емпіричним матеріалом, об'єктом дослідження. Визначено напрями подальшого дослідження процедури аналізу.

Висновки. Із побудованої низки моделей не вдалося визначити узагальнену модель аналізу, попри те, що у плані порядку застосування категорій певна одноманітність є очевидною. Проте, отримані процедури аналізу вже можна розглядати як прототипи практичних алгоритмів, як підстави для дедуктивного виведення алгоритмів реальних комп'ютерних програм.

Ключові слова: *аналіз, алгоритмічна модель аналізу, алгоритм аналізу, узагальнені поняття, філософські категорії, система, елемент.*