

Logical models and strategies in management of active systems

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Abstract – Intellectual agents have steadily matured in moving from the research laboratory to industrial application over the last ten years. Numerous systems have been deployed or are under advanced development with strong industrial support. These systems suggest important lessons for both industry and researchers. From an industrial perspective, these examples reflect trends in both business and technology that make agents an increasingly attractive commercial tool. From a research perspective, these examples identify important gaps in intellectual agent that merit the attention of academicians. In this paper we will see strategies models witch are realised by intellectual agent into the Automatic Control System of Technological Process (ACS-TP) of agency travel example.

Keywords – System, Intellectual agent, Goal, Logic.

I. Introduction

The tourist agency is one of industrial systems, characterized by his hierarchic structure and closed ACS-TP with coordination management from a highest level is integrated witch it represented by their office in all the most important touristy region in the country, the role of a receptive agency is to deal with the customers of the Tour operator . It represents the turn operator on your holiday place. The typical functions of a receptive agency are for example: the Transport of the customers of the airport to the hotel, the organization and execution of excursions or transmission of information on your holiday place. This agency they work with many hotels in deferent's regions.

II. Structure of the active system agency

In this schema the global model of agency system function are considered, witch are composed of thus elements:

- System administrator Head office agency (GA) a person hired to maintain and operate a computer system and/or network in the main agency .he is the first person who receives the information(data base) from the tour operator about the number of clients, names of hotels , the region the date of arrival, airport name and region;
- Data Base: is a structured collection of records or data that is stored in a computer system. The structure is achieved by organizing the data according to a database model. The model is a hierarchical model. Is a data model, in which the data is organized into a tree-like structure, which allows repeating information using parent/child relationships: each parent can have many children but each child only has one parent. All attributes of a specific record are listed under an entity type. In our model the parent entity are the regions offices and the children are the means of transport (Bus, minibus...) and the conductors;

- DSS: decision support system;
- Logical models: is a representation of an organization's data, organized in terms of a particular data management technology;
- Processor command (PC_i);
- Administrator Regional AR_{R_i} : regional office administrator who receive the command from the head office, is connected with the whole systems, shares the same data base (numbers of clients, destination, arrival, airport),each branch will be responsible of all the movement belonging to his area ,region ,arrival ,departure of clients depending of course of the data which receives concerning the number of the clients, the time, the hotels where they will live or they will leave home the airport of arrival;
- Vehicles: means of transport(Bus ,microbus ..) which are used by the park ,indeed there is different case of use:
 - Case Departure: in this case the transport service will secure the transfer of clients from the hotels to the airport;
 - Case Arrival: in this case the transport service charges the transfer of clients from the airport to their hotels;
 - Excursion: the trip that organizes the agency and the excursion is realised by the vehicles of the transport service.
- Chauffeurs (C_i): is an individual who operates any self-propelled vehicle (Bus, minibus) receiving the order of mission (departure, arrival, and excursion) and he execute the task given to him;
- A_i : Airport clients Arrival;
- H_i : hotels of the clients.

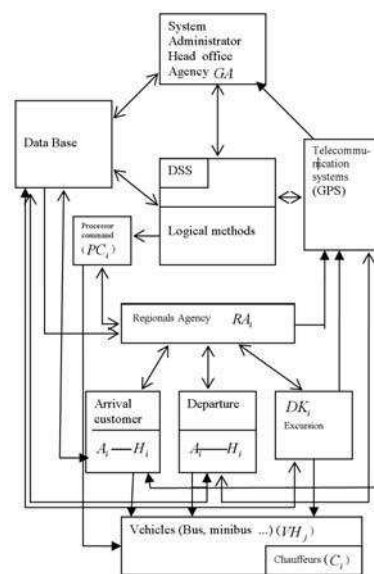


Fig1: schema of Agency system structure

III. Intellectualization and adaptation in formation of management strategy of the system structure

Control structures (CS) allow to realise the management of executive ACS-TP mechanisms and robots in real time. Using the touch information about an object condition these CS-processors form an image model situation in the operative environment of information model of ACS target space. Here different behaviour variants are playable, and the optimum accordingly gets out.

Ability of intellectual processors to form model of behaviour on the basis of external situation estimation and the target task provides the generation of action plans for purpose achievement. They carry out the task of intellectual agents within the limits of the artificial intellect concept [2].

Receptive agency systems have hierarchical structure where functionally closed ACS-TP with coordination management from a highest level is integrated.

Accordingly there are such levels:

1. Touch – in a code of movements of the executive mechanism which copes by ACS or the operator;
2. Command – tactical which generates operating signals according to a situation on the basis of decomposition of management strategy;
3. Strategic – change of management strategy concerning the purpose of system functioning at influence of external factors.

For the modern technological and administrative and managerial systems based on network computer facilities and hardware and software it is inherent a selection of functional goal-seeking boxes.

Under a goal-seeking block the closed system is understood with expressly certain roles in the structure of IACS, as here:

- operator to ACS, operator-administrator, operator-manager, expert, top level goal-seeking manager of administrative hierarchy;
- processor to ACS, neuro-processor, processor with fuzzy logic with proper PZ;
- programmatic intellectual agents;

For their professional preparation of training it is necessary both the special on-line tutorials and computer trainers with the certain logically mathematical filling of knowledge bases and data bases which are concerted with semantics for the certain level of vocational orientation. For the construction of such systems (with the certain level of intellect) knowledge's of the analysis systems and information technologies, artificial intelligence, systems of support making a decision are needed. Relating basis for these directions is the use of methods, which are based on clear and washed out logical theories and fundamental grounds of mathematics, algebra, management theory.

IV. Logic Models

Logic models are narrative or graphical depictions of processes in real life that communicate the underlying assumptions upon which an activity is expected to lead to a specific result. Logic models illustrate a sequence of cause-

and-effect relationships a systems approach to communicate the path toward a desired result.² A common concern of impact measurement is that of limited control over complex outcomes. Establishing desired long-term outcomes, such as improved financial security or reduced teen-age violence, is tenuous because of the

Limited influence we may have over the target audience, and complex, uncontrolled environmental variables. Logic models address this issue because they describe the concepts that need to be considered when we seek such outcomes. Logic models link the problem (situation) to the intervention (our inputs and outputs), and the impact (outcome).

The logic model is a general framework for describing work in an organization. Since work is often packaged in programs.

In its simplest form, the logic model analyzes work into four categories or steps: inputs, activities, outputs, and outcomes. These represent the logical flow from:

1. inputs (resources) to
2. work activities, programs or processes, to
3. the immediate outputs of the work that are delivered to customers, to
4. Outcomes or results that are the long-term consequences of delivering outputs.

One of the most important uses of the logic model is for program planning.

Planning Process

The logic model was characterized initially by program evaluators as a tool for identifying performance measures. Since that time, the tool has been adapted to program planning, as well. The application of the logic model as a planning tool allows precise communication about the purposes of a project, the components of a project, and the sequence of activities and accomplishments. Further, a project originally designed with assessment in mind is much more likely to yield beneficial data, should evaluation be desired.

Rather than just consider inputs (e.g. budgets, employees) or just the tasks that must be done. By placing the focus on ultimate outcomes or results, planners can think backwards through the logic model to identify how best to achieve the desired results (goal).

The value of any logic model is that it provides: A tool for outcomes planning and performance management that depicts the "chain of events" linking outcome goals to outputs, activities and inputs.

Formal logic is logic that deals with the form or logical structure of statements and propositions and the logical implications and relations that exist or come about because of those logical forms. In particular, formal logic is concerned with the forms that yield or guarantee valid inferences from a premise or premises to a conclusion. Formal logic is a subset of formal systems. Today formal logic is usually carried out in symbolic form, although this is not strictly necessary in order to have a formal logic. Formal logic can be distinguished from informal logic, which is logic outside of or apart from a formal logical system or theory.

The behaviour facts in problem environments of logic systems of intellectual agents are represented by

calculation formulas of predicates. The difficult facts turn out by association of the simple facts by means of calculation operations of predicates. The description of systems occurs by ensemble of Well-formed formulae (WFF); calculation of first order predicates and accordingly has such levels:

- Ensemble of initial axioms which make the description of the problem environment;
- Ensemble of target WFF which describe the purpose of the intellectual agent (neuro-processor) functioning or the operating processor of the robot or ACS;
- Ensemble of theorems which is deduced from initial axioms and already deduced theorems which enter into the composition of the knowledge base.

V. Structures of logical formal Theories

As bases of development intellectual agent conception.

Structure of formal theory [1], as a mean of situation description appearance by the intellectual system:

- alphabet;
- set of formulas;
- set of axioms;
- Rules of conclusions constructions (result, consequence).

Then – the host language of theory, as a metatheory, comes forward as a mean of interpretation of sense and vehicle of the probed theory.

A set of the F formulas of theory is set in alphabet $A = \{A, B, C, \dots, a, b, c, \dots, \alpha_i\}_{i=1}^m$, which is finished, and the denotations of formulas behave toward Meta language $\{D_i \equiv F_{D_i}, \dots\}$.

A set of the G axioms of formal theory is Subset of formulas, is set by list and attributive rule of their selecting.

Rules of inferences construction from set of formulas $\{A_1, \dots, A_m\} = \{F_{A_i}\}_{i=1}^m$ and formulas $B \in F_B$, to set their communication, that is build a new formula in form:

$$\left(A_1, \dots, A_m \xrightarrow{T} C \right) \text{ Or } \left(T : \frac{A_1 \dots A_m}{B} \right);$$

Where (A_1, \dots, A_m) – reference, C – conclusion, T – theory.

During the sensitive interpretation of formal theory we have:

- formulas are answered by assertion;
- the axioms – formulas are richly in content truth;
- Inference rules.

The formal grammars Li set the rules of words construction in the formal language of definite theory.

Assertions in theory are divided on:

- Proof $(A_1, \dots, A_m, C \xrightarrow{T} C)$;
- A conditional proof is a proof that takes the form of asserting a conditional, and proving that the antecedent of the conditional, that is list of hypotheses:

$$\Gamma = (\Gamma_1, \dots, \Gamma_k) : \left(\Gamma \xrightarrow{T, L_i} C \right)$$

- The logical formal theories determine a plausible structure of assertions, rules of their construction in Metatheory, thus:
- identically will note the veritable utterance as T, where (t, T – true – truth);

- identically false assertion as F, where (f, F – false – falseness, fallaciousness);
- Variable values depending on terms.

The logical communications determine the rules of construction of complex assertions with estimation of their truth:

- \neg : \neg And – objection of assertion A;
- \wedge : (AND \wedge C) – logical cut of assertions;
- \vee : (AND \vee C) – union of assertions;
- \supset : (AND \supset C) – Implication of assertions;
- \equiv : (AND \equiv C) – equivalence assertions;

thus evidently, that the deep sense of logical structure utterances does not open up from point of view DSS decisions acceptance, and necessary expansion of notions in structure of theories.

On the basis of [2] the correlations are included in the logical providing DSS and intellectual agent-management, which are constituents of the intellectual system of automated management from the n-level hierarchy.

According to function the levels follow (Fig. 2.):

- Object Management in the technological structure of the management.
- The system of gathering data based on D_i senders and information measuring system (IMS).
- Executive system of machineries (BM_1, BM_2) with processor of forming commands in obedience to plans and strategies management.
- DSS-Decision Support System with knowledge base and logical processor;
- Linguistic processor dialog;
- Intellectual agent (IA_1): the IACS operator which is goal executive.
- Intellectual agent (IA_2): goal formative

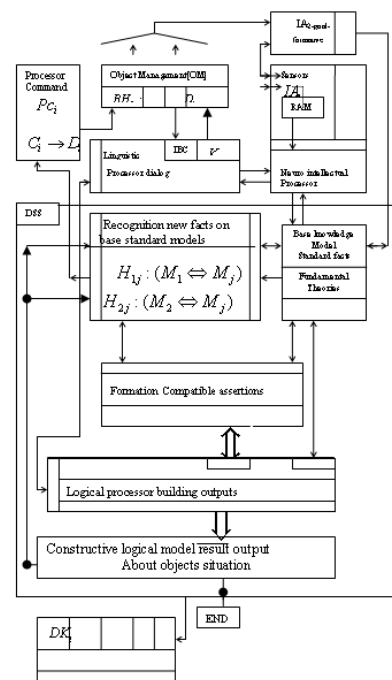


Fig.2 Procedures of syllogistic outputs in IACS

To realize full automated systems role (IAi) - perform cognitive neuro processor with appropriate software and hardware according to algorithms target operation.

Conclusion

The article discussed the logical methods in ACS TP, describes the system structure of tourist Agency and their functionality then showed the elements of logical theories, which are necessary for building decision support systems and intelligent agents to use in management of Agency System.

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Розробка інтерактивної інформаційної системи визначення імунного стану людини

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Abstract – This paper presents the information-expert system for diagnostics and prevention of immunity system designing and development for the subsequent introduction. The method of the diagnostic is based on the method of thermal imaging diagnostics developed by Russian immunologists on the basis of the research in acupunctural reflexodiagnostics methods of the professor V. Vogralik and M. Golovanova. System designing and development, based on this method, make accessible the prevention of the immunodeficiency to broad mass because can be introduced in any medical establishments for the preliminary estimation of a common status of the patient's health and recommended for diagnostics and prevention of the immunodeficiency at home. The further development - the design of its version for introduction on PPC, smartphones and some other.

Ключові слова – information-expert system, methods automation, system designing, system development.

I. Вступ

На сьогоднішній день актуальною проблемою суспільства є проблема профілактики і діагностики імунodefіцітних станів, і у тому числі синдрому набутого імунodefіциту людини (СНІДу)[1]. Тому важливим є питання про дослідження методів експрес-діагностики стану імунної системи людини. І вивчення можливості автоматизації даних методів за допомогою сучасних комп'ютерних технологій, а також проектування і розробка інформаційно-експертної системи для подальшого впровадження. Система діагностики повинна відповідати вимогам швидкого проведення і високої точності діагностики із застосуванням доступних медичних приладів індивідуального користування.

II. Аналіз предметної області

Імунологічні методи досліджень стану імунної системи людини характеризуються широким спектром і великою різноманітністю. Більшість із них базується на лабораторних тестах властивостей крові пацієнта і

є громіздкими. Актуальним є питання про пошук альтернативних методів діагностики. Одним із таких методів є метод тепловізійної діагностики, який і обрано базовим методом для розробки інформаційно-експертної системи. Теоретичною базою цього діагностичного методу є відкриття В.Р. Вограліком, М.У. Вограліком і М.В. Головановою закономірної зміни ІЧ-випромінення мікрозон покривів тіла в області акупунктурних точок, що кореспондують патологічно змінений орган, обумовлені змінами мікроциркуляції і окислювальних процесів в тканинах в області акупунктурної точки, відповідним зміні цих показників у хворому органі [1].

Експрес-метод тепловізійної діагностики полягає в тому, що в певних біологічно активних точках грудної клітини, що відповідають за проекцію переднього серединного каналу і в точках внутрішньої поверхні стоп, що відповідають за проекцію каналу селезінка-підшлункова залоза вимірюється теплове випромінювання приладами відповідного типу – тепловізорами або пірометрами. Після цього проводиться аналіз температурних показників і інших індивідуальних даних пацієнта (таких як стать, вік, наявність простудних захворювань, параметри загального аналізу крові), на основі яких розраховуються часткові і загальний інтегральні показники температурних відхилень. По отриманим показникам визначається стан і рівень активності органів імунної системи людини [2].

III. Розробка і програмна реалізація моделі системи

Для реалізації комбінованого методу діагностики було створено інформаційно-експертну систему для кількісного та функціонального аналізу імунного стану людини на основі визначення клітинних станів через загальний аналіз крові та функціональних станів на основі технології тепловізійної експрес-діагностики.