TO THE ISSUES OF BUILDING A SITUATION-MANAGING DEVICE TO ENSURE THE SAFE MOTION OF MOTOR VEHICLES

Rakhmanov A.A.
Senior Lecturer, Department of Ground Transportation Systems,
Karshi engineering-economics institute.
Workplace: Department of "Ground Transportation Systems". KEEI.
Address: Uzbekistan. Karshi. Mustakillik-225.
E-mail: akramraxmanov23@mail.ru

АННОТАЦИЯ

Ушбу мақолада мантиқий маълумотларга эга бўлган транспорт воситаларини бошқариш учун эксперт-маслаҳат тизимини ишлаб чиқиш ва тадқиқ қилиш муаммолари муҳокама қилинади. Муаммони ҳал қилиш усулларидан бири замонавий электроника, микроэлектроника, компьютер ва микропроцессор технологиялари, микроконтроллерлар ва ахборот технологиялари ютуқларига асосланган вазиятни бошқариш мосламасини ва автомашиналарни бошқаришнинг автоматлаштирилган модулини яратишдир.

Мақоланинг асосий қисмида транспорт воситаларини бошқариш тажрибаси, автоуловни (объектни) бошқариш вазифаси, шунингдек, у ёки бошқа пайдо бўлган вазиятда қарор қабул қилиш ҳақида гап боради, чунки бу вазиятда тўғри қарор қабул қилиш учун ҳайдовчидан ташқарида маслаҳат талаб қилинади.

Хиралашган тушунчаларнинг семантикасини баҳолаш учун диаграммалар ва жадваллар кўринишида лингвистик ўзгарувчилар қўлланилади. Бу эксперт маълумотларини ташкил этишнинг махсус шакли бўлиб, унинг асосида категориялар аниқланади.

Муаммонинг баёни тузилган ва ишлаб чиқилган тизимнинг тузилиши ва муаммони ҳал қилиш йўллари таклиф қилинган.

Калит сўзлар: адекват(ўхшаш, мос), информация, қабул қилиш, бошқариш, вазият, талқин, автотранспорт воситаси, математик модель, ҳайдовчи, психофизологик, электроника, микроэлектроника, компьютер, микропроцессор, технологиялар, микроконтроллер, объект, альтернатив, оператор, блок, муаммо, ахборот, коммуникация.

ABSTRACT

This article discusses the problems of developing and researching an expert-advisory system for driving vehicles with fuzzy initial data information. One way to

solve the problem is to create a situational-control device based on the achievements of modern electronics, micro-electronics, computer and microprocessor technology, microcontrollers and information technologies, i.e. Automated vehicle control systems.

The main part of the article discloses the experience of operating vehicles, the task of driving a car (object), as well as making decisions in one or another emerging situation, since the driver needs outside advice for the right decision in this situation.

To evaluate the semantics of fuzzy concepts, the so-called linguistic variables are used in the form of diagrams and tables. This is a special form of organization of expert information, on the basis of which categories are identified.

The statement of the problem is formulated and the structure of the developed system and the ways to solve the problem are proposed.

Keywords: adequate (similar, appropriate), information, reception, control, situation, interpretation, vehicle, mathematical model, driver, electronics, microelectronics, computer, microprocessor, technology, microcontroller, object, alternative, operator, block, problem, information, communication.

АННОТАЦИЯ

В данной статье рассматриваются проблемы разработки и исследования экспертно-советующей системы для вождения автотранспортных средств при нечёткой исходной информации данных. Одним из путей решения проблемы является создание ситуационно - управляющего устройства на основе достижений современной электроники, микроэлектроники, вычислительной и микропроцессорной техники, микроконтроллеров и информационных технологий, т.е. системы автоматизированного управления автотранспортным средством.

В основной части статьи раскрыт опыт эксплуатации автотранспортных средств, задача управления автомобилем (объект), а также принятие решения в той или иной складывающейся ситуации, так как водитель нуждается в постороннем совете для правильного принятия решения в сложившейся ситуации.

Для оценки семантики нечётких понятий используются так называемые лингвистические переменные в виде схем и таблиц. Это особая форма организации экспертной информации, на основе которой и производится идентификация категорий.

Сформулирована постановка проблемы и предложена структура разрабатываемой системы и пути решения поставленной проблемы.

Ключевые слова: адекватный (аналогичный, соответствующий), информация, прием, управление, ситуация, интерпретация, транспортное средство, математическая модель, водитель, психофизиология, электроника, микроэлектроника, компьютер, микропроцессор, технология, микроконтроллер, объект, альтернатива, оператор, блок, проблема, информация, общение

INTRODUCTION

The rapid raise in the number of vehicles in the country in recent years has caused a number of problems with the flow of traffic on the roads. This is especially evident in bad weather, rain, snow, fog, and the like. Such situations make drivers driving vehicles have to experience strong psychophysiological stress. These situations undoubtedly have a negative impact on the safe movement of vehicles, resulting in unpleasant road traffic accidents on the roads. Issues related to the prevention of these negative road traffic accidents are one of the most pressing and important issues today [1].

The only way to solve these issues is to create automated vehicle management systems based on the achievements of modern electronics, microelectronics, computer and microprocessor technologies, microcontrollers and information technology.

Includes elements of automated systems (mathematical models, human knowledge, etc.) and increases system efficiency. Information systems consist of a set of components (components), i.e. they are software, technical, legal, informational, organizational, mathematical and linguistic.

Information and communication technologies produce information for human analysis in solving problems and make decisions based on it to perform any action. Three main principles of information technology are used to solve problems:

- interactive computer mode;
- integration with other software products;
-flexibility of the change process in terms of data and task setting.

Adequacy of information is also important for drivers. That is, it is determined by the main quality indicators: adequacy of information, timeliness, accuracy and semantic volume. In this study, it is possible to solve the required problem through an existing situation-management system that best meets the existing problem-solving requirements.

Main part. Experience in the use of motor vehicles shows that the task of driving a car (object) is reduced to a decision in a particular situation, that is, in the current situation requires advice from the driver outside to make the right decision. Thus, the driver, at his request, needs a device that “advises” him on what situation to take in the situation being analyzed at the facility, and an experienced driver does it at the level of

prestige in his profession. This device does not replace the decision-making driver, although such a replacement is possible in an emergency.

It is, as a rule, not included in the control system. Recommendations to the driver Information is transmitted simultaneously from the video monitor screen or audio output device, or both, and the choice of the exact solution always remains with the driver.

It is possible to define two classes of objects that experts in the field of management automation encounter. They can be called “simple” and “complex” control objects (this division is conditional). "Simple" is a system of differential, algebraic or linear programming models in which the selected system is suitable for working with a computer and is fully compatible with the object, taking into account all the necessary quantitative factors that affect the behavior of objects. Of course, it is important to keep in mind that creating a model of a “simple” object is sometimes a very difficult task. It should be noted that there are more precise traditional mathematical methods for constructing such object models. As for "complex" control objects, they have the following main distinguishing features: [2]

1. It is not possible to express all the objectives of the selection of management decisions and the conditions that affect this choice in the form of quantitative ratios.

2. There is no formal description of the object of control or it is difficult to accept.

3. An important part of the information required for the mathematical description of the object will be in the form of suggestions and wishes of professionals who have experience working with this object.

It is not possible to build precise mathematical models of complex objects that are suitable for implementation and operation on modern computers. Here, an expert in the field of model construction is faced with the need to choose one of the alternatives.

The first alternative is to try to take into account all possible factors that affect the behavior of the object, as in the case of a “simple” object, when building a model of a complex object. Unfortunately, due to the peculiarities of the objects of this system, it is an attempt to “accept infinity”. Such a model cannot be seen for practical and technical reasons.

The second alternative is to be simple and **ABSTRACT** in the parameters for receiving objects for access to remote areas. As a rule, even in this way a unsuccessful result is achieved, the model construction object does not fit.

It is clear that an expert who has failed in both methods of solving a problem using traditional mathematical methods will try to find other approaches in creating a model of the object. In general, the search can have two directions. The first is to try to use non-traditional mathematical equipment to create a model that takes into account all the features of the object and is suitable for implementation. The second direction is to

try to create an object management model, not an object model. In other words, it is not the modeled object itself, but the human being who drives the object control process. Naturally, this equipment is worth modeling by a qualified driver (operator) who is well aware of all the features of management and works successfully "manually" with the management. Let's take a closer look at the second direction. If there is an experienced operator, then the object management model has already been created. It is an **ABSTRACT**system that exists in the form of a set of control instructions or in the memory of the operator (driver). An **ABSTRACT**system is a product of the human mind and consists of various theories, knowledge, and hypotheses. Information technology also includes elements of the material system (mathematical models, human knowledge, etc.) and increases the efficiency of the system. Information systems consist of a set of several components: software, technical, legal, information, organizational, mathematical, and linguistic. All that remains is to present these models in a form that is easy to work on a computer. This is the main difficulty of the approach. The point is that it is absolutely impossible to create a formal model for managing a complex object, as mentioned above, based on the simulation of the operator without involving information that cannot be quantified. This is due to the fact that the human operator is the main source of information needed to create a management model. As a rule, it is easy to provide such information in an informal form, at the level of qualitative description. We need to take this into account when organizing driver support communication and access data processing procedures. In practice, it has been proven that it is not uncommon for a person to think and decide only in "quantity". He thinks primarily in terms of "qualities," for which the search for a solution is primarily a search for a solution design, and here quantitative calculations play a supporting role.

The operator uses high-quality, ambiguous values such as "too much", "slightly", "too high", "far", "too close", "fast", "too slow" and so on. Naturally, logical concepts should be used in creating a management model. In addition, as a rule, for the convenience of the user (driver) with the same driver (entity), communication with the model using logical categories (if done on a computer) should also be done.

Based on the above, the object (vehicle) situation control model has the following form with the traditional form (Figure 1).

It consists of three large blocks. The key is the decision block, although other blocks are not very important for the normal operation of the model.

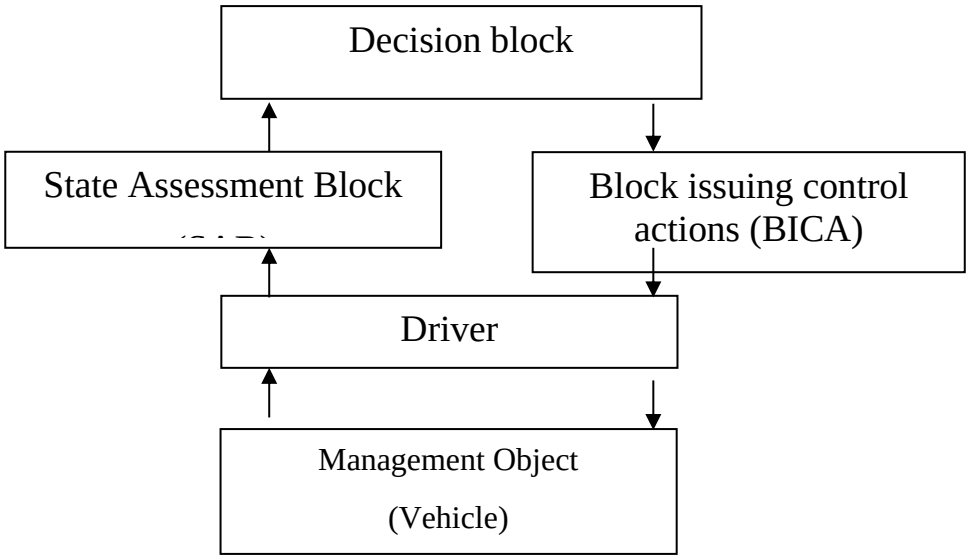

Fig. 1. Vehicle situational control model structure

The situation assessment block compiles an official description of the situation at the control facility (vehicle) based on the information received from the driver-operator. Linguistic variables are used to evaluate the semantics of obscure concepts. In fact, it is a special form of organization of expert data, on the basis of which categories are defined. Clear, quantitative data is also displayed in the block in an indeterminate set.

Next, we construct a specific superposition of the logical sets obtained as a result of determining the input data. This superposition, which is an official description of the current (input) situation, is included in the input of the BPR, where the necessary management decisions are determined on the basis of vague logical conclusions. In order to assess the situation, the transfer of management actions that are inverse to the functions of the block, the transition from the internal form of setting management decisions to a form convenient for the driver (user), ie, when necessary, linguistic approach and interpretation tasks are solved. The control object has a certain effect on the controlled process. The controlled object influences the controlled part by comparing the exact situation in order to carry out the controlled process in order to carry out the control. The interaction of the two objects with each other takes the form of information transmission. Thus, there is always a closed information loop in this system. The control system is carried out according to the state of the object, its inputs and outputs, which is controlled in accordance with the purpose. The operation of the control system occurs in situations of interaction with the external environment, which is a source of random effects. In the management process, there is an exchange of information between the manager and the controlled parts on direct and inverse

relationships. To accomplish the set goals, the control part of the system transmits control signals along the path of information transmission to the controlled object. Provides information on the status of the control process from the controlled object on the feedback path and the results of the execution of the control effect.

CONCLUSION

Based on the above, all incoming information is processed in the control part of the system to make decisions in the form of a control effect on the controlled object. The technological approach of the system allows to consider information as an object of procedures, analysis determines its value.

Analysis of the problem showed that the most optimal way to manage situations in driving is traditional. A vehicle management model with an appropriate situation is an ambiguous driving model.

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