Problems of identification
in information systems

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CONCLUSION ALGORITHM
BASED ON THE RECONNAISSANCE DATA PROCESSING RESULTS

Abstract. As it is known, the investigation of enemy forces, time of the outbreak of hostilities, direction and the kind of activities are the tasks of military reconnaissance. For the purpose of investigation of the directions and fields of gathering of the reconnaissance information, revealing an importance of enemy activities the reconnaissance indications are determined. The reconnaissance indications are determined in accordance with tactical activities (assault, counter-offensive, defence, etc.). The formation of a base of the reconnaissance indications is offered for application these indications in the future. In the paper, the method of conclusion in accodance with reconnaissance indicators has been considered. The method of construction of the algorithms conclusion based on the results recipience of reconnaissance data processing has been offered for solution of the reconnaissance tasks.

Keywords: reconnaissance data; reconnaissance indications; database; conclusion algorithm; block diagram.

Introduction

As usual, there are next investigation tasks for military reconnaissance in the battle zone:

- information about enemy forces;
- time of the outbreak of hostilities;
- information about place and direction of the activities;
- the kind of activities.

The reconnaissance data are collected and developed, and then the decision-making is made for answer on these questions.

There are not scientific articles in the public data devoted on the especial calculations and assessments during development of the reconnaissance information and decision-making based on the obtained data and conclusions. For the purpose of investigations of the directions and fields of reconnaissance information gathering, revealing the significance of some enemy activities the reconnaissance indications are determined [1, 2]. Determining the kind of purposes (movements) the manifestations of enemy activities are the reconnaissance indications. In the main, the reconnaissance indications are determined in according with tactical actions (assault, counteroffensive, defence, etc.). For further using these indications there have been offered to create the base of reconnaissance indications (BRI). New revealed reconnaissance indications will fill up this base. After definition of reconnaissance indications, the process of gathering, development and investigation of the obtained reconnaissance information is begun in accordance with these indications. This information is compared with these indications. If there are not data connected with available indications, then there have been searched data in accordance with these reconnaissance indications [3]. After development of recconnaissance information the single result (conclusion) is formed.

The paper is devoted to development of the method of determination of the reconnaissance indications during processing reconnaissance data and obtaining the result (conclusion).

Conclusion algorithms

For the purpose of determination of the reconnaissance information processing result there has been occurred a necessity of formation of the algorithms of this process. These algorithms are created by reconnaissance information engineer subject to the various reconnissance indications, the experts' opinions, and are applied in the reconnissance expert system [4-7]. Developed algorithms realize the obtaining process of a result (conclusion) based on the object, time, place and activity, event (state) of reconnaissance information (Fig. 1). In this way the results (algorithms) output base can be created.
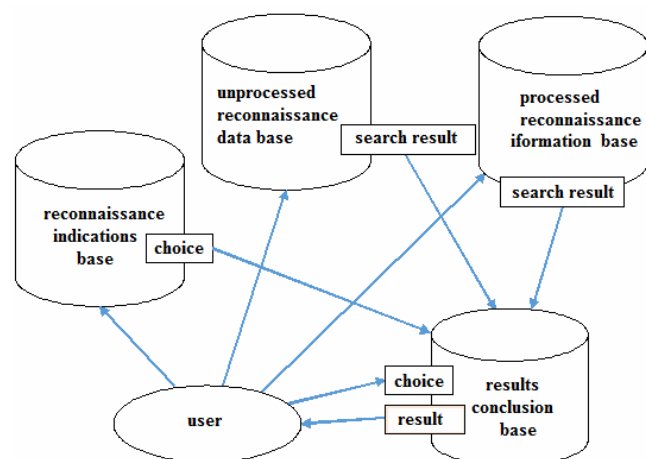

Fig. 1. Result output block diagram

In the public press there are not information about such method of reconnaissance information processing. Every time the new algorithm creation the result output base will broaden, and the result output mechanism will become easier.

In accordance with the reconnaissance date content, there has been offered a creation of below kinds of the determination algorithms:

- about enemy forces;
- about time;
- about place (direction);
- about activity.

As appropriate, another kind of algorithms can be created.

For the purpose of creation of the solution algorithm of some reconnaissance task, it is need to determine initial criteria and possible results (answers). The initial criteria can be a total number of factors defined the reconnaissance indications. The research result can be the appropriate to given task reconnaissance indications from the reconnaissance information base or from reconnaissance data base, and them total number.

Let consider below an example of the developed and offered method of construction of the logical calculation algorithm of result output.

Example: Let determine the logical calculation algorithm of the solution task of "Does enemy assault?".

Solution:

Let determine the possible results of answers:
- The enemy will attack;
- The enemy does not attack;
- The attack of enemy is possible;
- It is possible not an attack of enemy;
- The purpose of enemy cannot be determined.

Then, let determine the reconnaissance indications of enemy purpose about attack:

a) intensive movement of enemy troops, especially tank units, to direction of the front line;

b) forward movement of the new artillery and mortar batteries;

c) mopping-up minefield by enemy;

d) intensive reconnaissance and activities of reconnaissance groups;

e) forward movement of the command posts at a short distance to the front line, etc.

Next step, there has been conducted a search of the intelligence in the data and information bases which confirmed given indications. Let, four a), b), c) and e) indications of them are determined. There are not data about d) indication.

The next case is possible: there are not intelligence about these a), b), c) and e) indications in the data and information bases. Then, it is impossible to determine a probability of enemy attack.

Let construct the algorithm of this task.

The initial factors:
- the total number of reconnaissance indications is $(A) = 5$.

The search result:
- the number of discovered reconnaissance indications is $(B) = 4$.

The possible results (answers):
D- the enemy will attack;
E- the enemy does not attack;
J- the attack of enemy is possible;
F-it is possible not an attack of enemy;

R- the purpose of enemy cannot be determine, it is need to search the extra intelligence.

As stated above, if there are not any intelligence appropriate reconnaissance indications in the data and information bases, then it is impossible to determine an enemy attack (result :⇔ R). Therefore, it should be take the next term: $B > 0$.

Then, it should be determined a number of missing reconnaissance indications: $C = A - B$.

The obtained result is compared with a number of determined reconnaissance indications: $B \geq C$.

This term is based on the demand that a number of determined reconnaissance indications should be majority that to find single-valued answer. Then, let find

$$B - C = G. \qquad (1)$$

If $\qquad\qquad G \geq 0, \qquad\qquad (2)$

then $\qquad\qquad 0.5*A = M \qquad\qquad (3)$

and compare $\qquad G \geq M. \qquad\qquad (4)$

If the (4) term is realized, that is, a number of determined reconnaissance indications is equal or more than a number of missing one, then the enemy attack is uniquely determined (result :⇔ D).

If the (4) term is not realized, that is, $G < M$, then it can be adopt that the enemy attack is possible (result :⇔ J).

If in accordance with the above terms, a number of revealed reconnaissance indications is less than a number of missing one then (1) ÷ (4) procedures are repeated, and there is a result below:

$$C - B = Z; \qquad (5)$$
$$A*0.5 = M; \qquad (6)$$
$$Z \geq M. \qquad (7)$$

In this case, if the term of (7) is realized then the "enemy will attack" result is true (result :⇔ E). If the term of (7) is not realize d, that is $Z < M$, then the "enemy will not attack" result is true (result :⇔ F). Thus, in accordance with (1) ÷ (7) algorithm, the solution of given task is "enemy will attack" (result :⇔ D). The software block diagram of above example algorithm is shown in Fig. 2.

Conclusion

Thus, in the paper, the problems and method of conclusion algorithm based on the recipience of reconnaissance data processing results have been considered in accordance with reconnaissance indications. The method of algorithm formation has been offered for conclusion making based on the results of data processing and solution of the reconnaissance tasks. The software block diagram for calculation in accordance with offered algorithm has been developed.

Applying of the offered algorithm of conclusion making in reconnaissance data processing it will provide a precision of obtained results. The offered method can make easier of the assessment and results conclusion task from reconnaissance data (information). It will increase the effectiveness of reconnaissance data processing.

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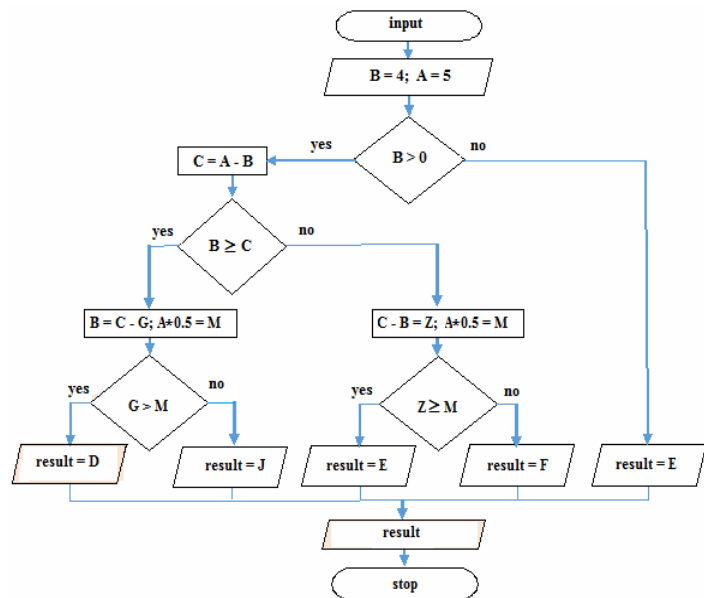
Fig. 2. The software block diagram of algorithm

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Алгоритм виведення висновку на основі результатів обробки розвідувальних даних

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Анотація. Як відомо, військова розвідка розглядає в основному такі завдання: з'ясування сил противника, час початку його дій і направлення дії, а також характер дій. З метою з'ясування напрямків і областей отримання розвідувальної інформації, визначаються розвідувальні ознаки, що виявляють значущість тієї чи іншої діяльності противника. Розвідувальні ознаки визначаються відповідно до тактичних діями (наступ, контрнаступ, оборона тощо). Для подальшого використання цих ознак пропонується створення бази розвідувальних ознак. У статті розглянуті питання і методика виведення висновку за результатами обробки розвідувальних даних відповідно до розвідувальними ознаками. Пропонується спосіб складання алгоритмів для виведення висновку за результатами обробки даних і вирішенні розвідувальних завдань.

Ключові слова: розвідувальні дані; розвідувальні ознаки; база даних; алгоритм висновку; блок-схема.

Алгоритм вывода заключения на основе результатов обработки разведывательных данных

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Аннотация. Как известно, военная разведка рассматривает в основном следующие задачи: выяснение сил противника, время начала его действий и направление действия, а также характер действий. С целью выяснения направлений и областей получения разведывательной информации, определяются разведывательные признаки, выявляющие значимость той или иной деятельности противника. Разведывательные признаки определяются в соответствии с тактическими действиями (наступление, контрнаступление, оборона и т.п.). Для дальнейшего использования этих признаков предлагается создание базы разведывательных признаков. В статье рассмотрены вопросы и методика вывода заключения по результатам обработки разведывательных данных в соответствии с разведывательными признаками. Предлагается способ составления алгоритмов для вывода заключения по результатам обработки данных и решении разведывательных задач.

Ключевые слова: разведывательные данные; разведывательные признаки; база данных; алгоритм заключения; блок-схема.