Report

NEW DIRECTIONS in MILITARY and SECURITY STUDIES: ARTIFICIAL INTELLIGENCE and MILITARY DECISION MAKING PROCESS

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Abstract- The nature and range of threats to security have extremely changed that caused a following reaction which is the transition in the nature of the war as well. Under the changing circumstances of operational environment and in the face of new security environment which is more complex and ambiguous than before, modern armies have started to look for alternatives or for better options to surpass the challenge of transition in the new era. In order to comprehend the security environment better and find out new or alternative ways for solutions, International Conference on Military and Security Studies (ICMSS-2015) launched in Turkish War Colleges Command, Istanbul on March 10th and 11th. This report is prepared to mention the importance of the military decision making and present the summary of one of the workshops which is "Decision Making and Artificial Intelligence" for the purpose of helping the research in the field of the study.

Keywords- Decision making; artificial intelligence; security environment; threat; future.

1. Introduction

The nature and range of threats to security have extremely changed that caused a following reaction which is the transition in the nature of the war as well [1]. Under the changing circumstances of operational environment and in the face of new security environment which is more complex and ambiguous than before, modern armies have started to look for alternatives or for better options to surpass the challenge of transition in the new era [2],[3]. During the Cold War, competition between the two superpowers has turned into a deterrence capability while the new era has questioned the viability of the deterrence concept which made the new security environment even more challenging and more unsecure [4]. Therefore adapting the army for future security challenges has become mandatory other than necessary [5].

In order to reach the ideal model, there is a need to focus on the new security environment from varied fields of study to enlighten the path for the armies or security forces of the future [6]. Moreover, revolution in military affairs and impact of the emerging technologies require a change in vision, structure and capability to ensure that the army can respond to the challenges of the future and beyond. For that purpose, International Conference on Military and Security Studies (ICMSS-2015) launched in Turkish War Colleges Command, Istanbul on March 10th and 11th. The conference drew officers, academics, entrepreneurs from defense industry, strategists, decision makers

and innovators from across 18 countries. Other than the sessions, four different workshops *Knowledge Management & Information Systems, Knowledge Development, Decision Making & Artificial Intelligence and Leadership & Mission Command* were held during ICMSS 2015.

"Decision Making and Artificial Intelligence" was one of the workshops among others (WS-3). This report is prepared to present a summary of the feedback received from participants at the workshop, 'Artificial Intelligence and Decision Making (AIDEM)" delivered at the ICMSS 2015 conference. In the first part of the report, previous works and problems of the area are explained, in the second part there is an evaluation of the AIDEM approach and some new directions for decision making, in the third part, article gives further thoughts for decision making and enlightens the way for future. Finally in the fourth and fifth part of the study, outputs and conclusions of the workshop are presented for future research in the area. In the end of the study, there is an appendix which gives information and critics about the workshop and how AIDEM workshop was executed.

The questionnaire and feedback forms used at the workshop asked participants to comment on artificial intelligence and decision making topics. Moreover, for the report, comments (in sections two and three) have been organized under the general categories of 'positive or most useful aspects' and 'least useful aspects and ways of improving'. Thematically similar comments have been grouped together into one representative comment, followed by a number in brackets to indicate the frequency with which this comment was made. Furthermore, the workshop topics, results and submitted papers are available on the www.harpak.edu.tr/ICMSS website.

2. Previous Works and Problems of the MDMP (Literature Review)

The importance of taking effective decisions is easy to comprehend, however it is hard to achieve a good and sound decision in the end of the decision making process each time. Moreover, it is also controversial what a good decision is. According to Merriam Webster Dictionary, a decision can be defined as "the act of reaching a conclusion or making up one's mind" [8]. Another definition says that it is "a position or opinion or judgment reached after consideration" [9]. Oxford Dictionary defines decision in different levels that in comparison with tactical decisions, that affect the day-to-day implementation of steps required to reach the goals, strategic decisions are "chosen alternatives that affects key factors which determine the success of an organization's strategy"[10]. These definitions explains that decisions are the outputs of a mental process either it is analytical or intuitive.

Military Decision Making Process (MDMP) is a similar process in comparison to civilian applications [11]-[12]. According to FM 5-0 Operations Process [11], "MDMP is an iterative planning methodology that integrates the activities of the commander, staff, subordinate headquarters, and other partners to understand the situation and mission; develop and compare courses of action; decide on a course of action that best accomplishes the mission; and produce an operation plan or order for execution. The MDMP helps leaders to apply thoroughness, clarity, sound judgment, logic, and professional knowledge to understand situations, develop options to solve problems, and reach decisions [13]. It is a process that helps commanders, staffs, and others think critically and creatively while planning [11]." One advantage of using such a model in military decision making is that, it produces the best Course of Action (COA) in the end of the process. These step by step processes also decrease the likelihood of missing points as commanders reach their decisions. This has a crucial significance that overlooking some important information may result in failure of the mission.

One of the disadvantages of the MDMP is that it may be implemented in a variety of situation. This may seem a good qualification at some levels, but being versatile may not work all the times [14]. It may complicate the decision making process at tactical levels while it may ease at operational or strategic levels [15]. So there should be a different approach for lower levels of command. The advantage of this process is that it provides leverage for inexperienced commanders and staffs to understand the situation and figure out the problem if they have enough information.

3. About the Workshop and Participants

The idea of the AIDEM workshop was to create a framework for the field of military decision-making and artificial intelligence. 27 participants were attended to the workshop. 11 number of feedback forms also received from participants. Participants at the workshop described their job role(s) as given in Table 1.

Table 1. Participant's Profile

Job Role	Number of Participants
War College Students	12
Academics	4
Researchers	2
Other Military Staff	2
International Attendees	7 (3 USA, 1, Italy, 1 Mali, 2 Azerbaijan)
Total	27

One of the aims of the workshop was to bring together the decision makers, commanders and participants in academia and army, to share knowledge and experience about the content of the workshop, to promote awareness on the Military Decision Making Processes (MDMP), to increase the collaboration among participants and institutions, to present the current research, applications and implementations regarding the topic, and to discuss the topic in details for future developments. There were different decision support methods used in articles such as Multiple Criteria Decision Making, Artificial Neural Networks, Analytical Hierarchy Process, Pareto Principles, Game Theory, Decision Support Matrix, Recognition Prime Model, and Threat Evaluation and Weapon Assignment (TEWA). For that purpose, 11 articles of which the abstracts and authors are presented in the workshop in the appendix.

Positive and useful aspects of the workshop are given below:

(1) There were participants from different parts of Turkey and the World. Discussions and working with partners from other areas improved the quality of the studies.

(2) AIDEM was evaluated and discussed from different perspectives of military and civilian aspects as well.

(3) Four professors attended and delivered short speeches about the subject. Participants were able to talk and ask to them about the papers and their marks about the essays.

(4) The importance of the feedback was highly valued by the attendees.

(5) The format of the execution was successful in terms of the research and presentation techniques during the workshop.

(6) Having participant introductions in the middle of the workshop rather than at the beginning was a change which helped to prevent the biased approaches.

(7) Definitions and the problems faced in the field of AIDEM, such as data in collecting, analyzing, storing, securing, sharing and destroying; time requirements and constraints in environment, techniques, collaborations, interoperability, implementation, expertise, etc.

(8) During the workshop, participants were able to clarify the problems and define the questions which were answered mostly;

- Is AI Techniques enough to solve problems intelligently?
- How AI can be applied to solve military decisions and applications?
- What are the problems for the both sides?
- How IDSSs can be built up for Military Applications?
- Are they reliable for real applications especially for military applications?
- What needs to be done to analyses data nowadays?
- What are the critic applications for those?
- How they can be applied for command control and decision?
- What are the points to be discussed for further analysis, design and applications?

- Is there any need to establish an institute/ unit/department for an IDSS in military establishment?
- How the data is stored, shared, and analyzed securely for establishing IDSS?

(9) The workshop was enjoyable and informative for all the participants.

4. Productive Results and Alternative Paths

Decision-making is one of the central activities of management and is a huge part of any type of implementation [16]. However, making a decision without planning is fairly common, and does not often end well. Planning allows decisions to be made comfortably, simple and in a smart way. That is one of the reasons that modern armies use decision making processes for their planning and execution.

One of most common assumptions about decision making is that decisions should be as rational as possible. According to Vasilescu, "people make decisions by identifying and comparing options to determine which one produces the optimal outcome for a given set of circumstances [17]." In actual combat situations, this is exactly what is happening on the battlefield. This can be considered as a mental shortcut of the commander to ease and fasten the decision making process. Vasilescu [17] says that in most cases, decisions of high level decision makers are a combination of rationality and intuition. But it is important to keep in mind that since the constant changing operating environment and unfamiliar conditions, experience becomes less pertinent and intuition less dependable day by day.

For modern war in which environment is uncertain and things are too complex to understand from only one dimension, MDMP eases the commander's decision making [18]. That is why commanders should comprehend how, when and where to use MDMP (in order to execute a successful mission) and integrate their visions into it. Rather than cyclic planning, decision making, and plan development, 24-hour-a-day and 7-day-a-week planning and decision-making process have become more relevant. This process requires networks and AIDEM structures to compensate the time pressure that shortens the life of a specific plan. So, decision making in uncertainties is the essence of military success.

Wartime decision making may differ from the peace time especially in terms of the conditions. Decisions made during the execution set the rhythm and the tempo of the operation. Therefore, hasty decisions based on commander's intuitions and experiences become more relevant. Commanders should always keep in mind that battlefield is not a place for the second. AIDEM systems support commanders and staff in this respect.

Traditional command and control (C2) and planning approaches are not agile enough in the face of contemporary challenges [19]. Hence military organizations should be supported by improved information systems to enable them to cope with dynamic situations and achieve victory [20]. An appropriate C2 approach and the command's ability to choose the most suitable option among all possible approaches, directly shapes planning and decision making-processes [21]. Other than that, all decision-making processes involve elements of risk and reward. For every decision there are risks that must be taken. Many organizations are structured so that major decisions are taken at the highest levels. This is because decisions at the top can have major effects for the whole organization [22]. However, if the strategic level decision fails, tactical level decisions cannot reverse failure or turn it into a success. In that case, it is defeat or victory for the army. At tactical and operational levels, the risks are smaller in which commander is closer to the victory or still has chance to correct the wrong decision.

Other than the positive sides, decision making may have some negative sides that should be kept in mind. For example; time may be limited according to the different levels of command. Tactical levels will probably have shorter time, which will require a faster decision making process than the operational and strategic levels. Decision making requires both rational and intuitive skills as well as leaders' decision-making styles and modern organizational structure. However, most of the armies have classical organizational structures which are more hierarchical than modern types. Also, the

analytical process of decision-making does not provide the necessary means to respond effectively to crisis response planning and decision-making, therefore it offers the implementation of intuitive process with some modifications. At this point, it is also possible to model the problem as a mental simulation (intuitive processes) instead of a long and exhausting planning process. However, this may change according to the problem and relevant conditions.

Regardless of the military systems adopted by different national armies, there are common features of MDMP, such as framing the problem, analyzing the mission, determining courses of actions and decision making [23]. If military leaders are facing a time urgent (extreme) situation, even the shortest delay in these phases may result in fatal outcomes. Faced with an extremely complex situation, it may take a lot more than the required time to reach a good and sound decision with the decision making process. At this point, artificially intelligent systems may hasten the decision making process [24]-[26]. So, for military spheres AIDEM approach for operation planning and MDMP should be evaluated and put into practice with more concrete facts other than abstract thoughts. So, in the next part research will light the torch towards a clearer path for future applications of the decision making.

5. For Future Works and Studies

There are various ways of assisting the decision making process such as simplifying the planning, organizing the planning, and rational instruments that helps to choose the right decision, as operations research and quantitative decision making tools, and integration of Artificial Intelligence (AI) systems into the multifaceted nature of combat systems [27]. In the near future, robotic armies and unmanned vehicles will be commanded in battle [28]. In this context, regarding command, control and information technologies, C4ISR technologies, which are compatible with network centric capability, should be prioritized. Furthermore, autonomous command and control technologies in land, navy and air force vehicles, real time data integration and data fusion, cyber defense, strategy and tactics improvement, protected core, and national nets should also be prioritized. Moreover, decision makers use rational processes when they are not under heavy time pressure, conditions are relatively stable and goals are clear, they do not have a great deal of relevant experience or the problem is computationally complex. So, game theory may serve as a rational decision making tool if it is used appropriately.

Above all, developing new technologies are important for more sophisticated AIDEM, however it is also fundamental that national software and hardware be used in order to be secure from or less affected from threats. Human-education-technology synergy may be provided for a sufficient cyber defense [29], and a national cyber army and a cyber-defense supreme board may be formed to protect AI systems from enemy attacks [30].

AI systems have many advantages to decision making processes and may be used as a supporting tool for MDMP as well. As a Turkish saying, “A smart man is not bitten twice from the same hole” which points out AI systems help to improve the institution’s culture and provide an institutional memory that keeps away the organization from making the same mistake again. AI makes computers more useful by letting them take over dangerous or tedious tasks from human, understand principles of human intelligence, and get benefits of real intelligence [31]. However there are also some disadvantages that should be kept in mind and some serious obstacles that must be achieved before full usage of AI systems.

As Hall [32] mentioned that “computers will give commanders an unprecedented ability to see the enemy, the terrain and themselves”. But, AI applications require expert officers and open discussions and lines of communication among the headquarter personnel. Lack of improved computer systems and open communication channels may delay decisions which may be a reason for losing the chance of winning the battle in late stages. Although there are many improvements, human-factor is believed to remain the main determiner of even the most sophisticated AIDEM systems. No matter how much automated decision making systems are developed, intuitive skills will be necessary to close the gap between the computer systems and the human.

Even the most advanced AIDEM systems still use rational algorithms and cannot include intuitional (naturalistic) decision-making processes. The multifaced nature of AI systems shows the range and diversity of its success. However that nature of AI systems makes it difficult to integrate the computer systems in the military sphere. That is also another reason why battlefield decision making requires not only success but also more talent than automated thinking.

On the other side of the coin, modern technologies are improving very fast that makes it more unsecure every day. That is why; being too much dependent on technological tools, such as AI systems is also a weakness that may be exploited by the enemy easily. Also, there may be a bias problem in framing the problem which may result in wrong conclusions that may direct the AI programmers (software) towards unwanted ends. So, military leaders should have sufficient experience to guide the rational model.

6. Outputs of the Workshop and Recommendations

As the results of the AIDEM workshop, there are many factors that should be considered and put into words which are not possible only through this activity. So, as a contribution to the research in the area, we have reached the results which are presented below:

a. Observed, gathered, collected, stored, and shared data should be analyzed applying AI techniques and technologies to achieve better decisions and outcomes.

b. There have been many cases and applications successfully achieved by AI techniques and technologies, even if for military purposes. It should be emphasized that there is no enough cases in the literature to take a good example for military applications.

c. AI is an extremely important tool for decision makers. However, using only AI systems or leaving the final decision to the machine may result in deaths or loses of friendly forces. So, commander should be aware of the risks.

d. Decision makers should not expect too much from AI systems. Beside, it may be dangerous to trust only AI techniques while decision making due to bad or missing data that may mislead the system to a wrong decision or conclusion.

e. Decision support systems should be used for decisions not only for strategic level but also tactical and operational levels to get their benefits.

f. AI techniques and technologies should be mostly considered as a supporting tool.

g. Threat evaluation and weapon assignment systems categorize the steps of decision making processes for air support systems as Find, Fix (UAVs), and Finish (Threat and Decision). AI covers important and supportive techniques during the processes. However, it should be remembered that leaders or commanders always say the last word.

h. Modern armies have their own MDMPs. Even though it is difficult and challenging, collaboration should be developed among different systems for future security challenges.

i. NATO use some decision making software within members for operation planning, logistics and command control in today. We believe that NATO should develop more sophisticated and widely used decision support tools for intelligent decision making process.

j. We need intelligent decision support systems. Military problems are about life and death (kill/destroy or not). AI systems may not be mature (improved) enough to be used for that purposes.

k. Well-developed intelligence systems for modern armies are always required, because data analysis or analytics is getting more and more difficult to handle, so new techniques and technologies should be used such as big data analytics.

l. Experienced experts are needed to analyze and evaluate the data intelligently. That is why new institutions, units or programs may put to work.

m. In order to get benefits from intelligent decision support systems, an independent unit or department needs to be established.

n. Securing data and processes should be considered more than ever against the unconventional and cyber threats.

o. Solving problems with AIDEM intelligently, more experiences, techniques and technologies, staff, collaborations with universities and companies may help to develop better solutions to establish modern armies.

p. Data is important, however processing raw data and reaching a clean dataset for logical algorithms is demanding for data scientists (other than the natural and social scientists).

q. Analyzing huge amount of available data, big data analytics should be applied to get different opportunities and perspectives about new and unknown situations and cases.

r. Data scientists might use not only AI techniques and technologies but also and other sciences to apply expertise in data preparation, statistics, and analysis to investigate complex problems.

s. AI techniques might help to simplify the decision making process and to handle data for a better decision making.

t. Decision making is a constant process. One decision may be the reason of another problem or it may require another sub-decision. From this perspective, an AI system or decision making tool may not take into account the every aspect of the problem.

u. For air force, the aeronautical decision-making process requires more AIDEM systems than traditional decision-making procedures. Also, military pilots should improve their hasty decision-making abilities in the face of instant battlefield effects and AIDEM simulators are believed to be helpful in training pilots and in diagnosing the mistakes of the pilots more accurately.

v. Most of countries' armed forces has an intention of developing a joint concept for navy, army and air forces. Developing a unique platform for armed forces is an essential process for a better defense coordination.

w. Decision making is a risky process. So, what would be the limit of the risk under different conditions? Is it a matter of logic and calculation or a matter of emotion? There should be clear instructions and orders about how, when and which AIDEM approach will be implemented to reach a decision.

7. Conclusion

Through the report, there were various comments and evaluations about the decision making process and application of artificial intelligence. With the submissions and discussions in the "Decision Making and Artificial Intelligence" workshop, it is concluded that there is no longer a question whether AI systems should be used or not in the MDMP. Once the armies and authorities have understood how crucial to develop and use intelligent systems, AIDEM approach will become indispensable and will provide the survival of the modern army in the future security environment. So, through the transitions for the future, AIDEM approaches must be improved and put into practice to the extent as much as possible.

Future decision making processes would be more challenges and beneficial with the help of not AI techniques and technologies but also big data analytic tools and techniques.

Furthermore, human is always at the center of decision making activity. That is why in the near future it is a low possibility to see completely automated systems for MDMP. But overall there is another fact that should be kept in the mind as well: Automated systems have already started to take their place in the battlefield.

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APPENDIX

	Paper Title	Author	Abstract
1	A New Approach to Military Decision Making Process: Suggestions from MCDM Point of View [13]	K. Goztepe C.Kahraman	Decision making process is a systematic way of problem solving for any scientific research area. The military decision-making process (MDMP) is a proven analytical process for designing operations, troop's movements, logistics or air defense planning. MDMP is a way of army's analytical approach to problem solving. This paper investigates the current use of MDMP and presents a new approach to MDMP from multi criteria decision making (MCDM) point of view.
2	Decision Making Process for Air Support : Threat Evaluation and Weapon Assignment (TEWA) [33]	M. Ayazoğlu	Single integrated air picture (SIAP) generated in any air defense command and control (C2) system covers a very large space and hence may include very large number of tracks (friend or foe) and assets. Although for a simple SIAP consisting of a few number of tracks and assets, real-time and dynamic resource allocation for effective defense strategy by an experienced operator may be feasible, it becomes quickly infeasible to be done manually if the number of tracks and assets are on the order of tens, as most of the cases in reality. Due to this reason, this critical mission of any air defense C2 system should be supported by a smart algorithm to help the operators in the battlefield and not to create any defense weakness by means of overloading human operators. In military operations research literature this smart algorithm is called threat evaluation and weapon assignment (TEWA) algorithm and studied extensively. In this paper, critical parts of nationally developed TEWA algorithm will be discussed with a brief history of its development.
3	The Relationship Between C2 Approaches, Planning Approaches, and Decision-Making [34]	Ş. Çıplak	The complex endeavors faced by modern armies in the 21st century are expected to emerge in increasingly volatile, uncertain, highly dynamic, and complex environments having political, military, social, economic, information, and infrastructure dimensions. Therefore, C2 Agility, which is attainable by network enabled capability (NEC), is essential for troops to survive in this new operational environment. Basically, it implies the selection of the appropriate C2 Approach and the transition from one to another. Furthermore, the selected C2 Approach determines the planning approach and decision-making way of commands. This study analyzes the relationship between a certain C2 Approach and planning approach/decision-making process.
4	Application of Combined SWOT and AHP: A Case Study for Military Decision Making [35]	Ü. Ahlat	Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis examine both internal factors (strengths and weaknesses) and external factors (opportunities and threats) of current situation of an organization. In decision making, SWOT analysis does not provide effective tool because of its deficiencies in assessing decision alternatives. SWOT analysis with multicriteria decision making technique which is called Analytic Hierarchy Process (AHP) can replenish the deficiency in decision making. In addition, using the combined SWOT and AHP, it could enhance effectiveness of decision making. In this study, the application of combined SWOT and AHP in military decision making will be dealt.
5	Crisis Leadership: What Organizations Need More Than Sole Management [36]	S.Ozkaynakçı I.Cakan	Comparing with the history, present day leadership is far more challenging than ever before. Impacts of crises, due to borderless communication and easiness of travel around the globe, are more noticeable for larger population and geography. Today's crises are more everlasting and costly. This makes crises far more challenging for leaders. In this paper, giving the definitions and types of crises, the

			importance and key features of leadership in crisis is examined with the examples from history and the military.
6	Decision Making with Game Theory: A Game over Hearts and Minds [37]	V. Dizdaroglu	The importance of productive and effective decision making is easy to comprehend, however it is challenging to achieve a sound decision every time. Decision making requires both rational and intuitive skills as well as leader's decision styles and modern organizational structure. From this point of view, this paper will explain one of the most crucial problems, insurgency, that states face today. Using game theory, research will enlighten if it is a better decision to go with hard power or soft power to finish the insurgency efforts. Ultimately, game theory will show one of the most important underlying dynamics, which is to gain the hearts and minds of the population, to be more successful in counterinsurgency efforts.
7	Aeronautical Decision Making: The Effects on Pilots' Decision [38]	I.Cakan S. Ozkaynakcı	Decision theory or the process of decision making is an approach for problem solving. In the aeronautical dimension, especially in some exact cases such as emergency the most important thing is to make decision in a short time. Ability to make good decision can be developed by training but it cannot be said that all the good decision-makers have received training. In some cases, decision-makers make good decisions in the light of their experience and observations. Naturalistic Decision-Making may be used by pilots at decision points. If a pilot carries out good decision-making process, the risk of flight will be reduced. The ability to make a good decision is based upon good judgment. Various factors may affect judgment. Pilots must be aware of the situation and changes that occur around them.
8	An Analytical Approach to Leadership Education: Applications of SWOT, AHP and Pareto Principle [39]	M. N. Buhur Ü. Ahlat E. Bingül	Leadership education is one of the most popular projects to boost the performance of any given organization. However, there is plethora of leadership models in literature. Given that more than half of the world still uses conscription as a military system, it becomes more popular and important to find the best leadership model to be taught to prospective leaders of those armies. Therefore, firstly, we have applied SWOT analysis to understand conscripted armies in and out. Secondly, we have converted SWOT matrix into a hierarchical structure. Thus, we were able to use Analytical Hierarchical Process (AHP) to solve the model. Finally, we have analyzed the results under lights of well-known Pareto Principle.
9	A Decision Making Strategy for Acquisition: An Illustrative Example of a Land Combat Ground Weapon System Acquisition [40]	M.U. Yalnızoglu A.C.Ellialtı E.Savur	The main purpose of this paper is to present a decision making methodology by a comparison on an illustrative example of land combat weapon system. The main emphasis of this paper is not placed on the system, but on the Cost Benefit Analysis (CBA) of the acquisition process. The study shows that particularly manufacturing its own weapon system is more beneficial for Turkey, especially by using domestic resources. Turkey should continue its efforts to develop its domestic defense sources.
10	The Impact of Changing Nature of Operations Over Decision Making: The Need to Separate Planning Processes Between Deliberate and Crises-Response Planning [41]	S. Özcan	Armed forces conduct operations within operational environments characterized by complexity, uncertainty, and continuous change. Military planners use planning and decision-making processes to cope with this confusion. This paper asserts that with changing operational environment there is a need to separate the planning in advance and planning in crises and executing phase. Our study states that the analytical process of decision-making does not provide the necessary means to respond effectively to crises response planning and decision-making and offers the implementation of intuitive process with some modifications.

11	Application of Artificial Neural Networks to Predict the Tendency among Turkish Army Soldiers to Commit Suicide [42]	I. Akın B. Yıldız	Suicide is the result of an act initiated and committed by a person with full knowledge or expectation of its fatal outcome. Suicide, which is difficult to predict and prevent, remains a leading cause of death worldwide. Each year, many soldiers commit suicide in various units of the Turkish Army. As expected, the suicide rate among members of the Turkish Army is higher than it is in the general population due to several risk factors. The primary objective of this study is to develop an artificial neural network (ANN) model, with a variety of factors that can predict the likelihood of suicide among Turkish Army soldiers. Built and based on the operating structure of the human brain, ANN is a system that learns the input-output relations using real examples. In this study, there are two significant results. First, a multilayer perceptron (MLP) model can predict the tendency among army soldiers to commit suicide. Second, the ANN model is expected to calculate a higher correct classification using logistic regression analysis (LRA) and discriminant analysis (DA). The ANN applications have many advantages, such as generalization, fault tolerance, adaptation, parallel operation, and needlessness for making assumptions.

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