DIGITAL TRANSFORMATION IN CRISIS MANAGEMENT: THE KEY ROLE OF ARTIFICIAL INTELLIGENCE

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Abstract: *In today's world, crises can occur at any time, and efficient crisis management is essential to minimize the impact on society. With the advancement of technology, digital transformation has become an integral part of crisis management. Artificial Intelligence (AI) is one such technology that plays a key role in crisis management by enabling faster, more accurate, and data-driven decision-making. This article explores the impact of digital transformation on crisis management and the key role of AI in this process. It discusses the various ways in which AI can be used in crisis management, such as predicting and mitigating disasters, analyzing social media for real-time information, and providing insights to aid decision-making. The article also highlights the challenges and ethical considerations associated with the use of AI in crisis management. Overall, this article emphasizes the importance of leveraging digital transformation and AI in crisis management to improve the speed, accuracy, and effectiveness of response efforts.*

Keywords: *crisis management, digital transformation, artificial intelligence, emergency response, risk assessment, machine learning*.

1. INTRODUCTION

Safety and security are two crucial aspects in crisis management. In this context, artificial intelligence and digitalization play an increasingly important role. In recent years, we have witnessed a significant increase in the number of AI technologies and digital solutions that can be used to cope with crisis situations such as natural disasters, aggressions, cyberattacks or global pandemics.

In this article, we will explore how artificial intelligence and digitalization can be used to improve crisis management and ensure safety and security in crisis situations. We will analyze concrete examples of the use of AI and digital technologies in crisis situations, as well as the challenges and opportunities that these technologies bring.

In a context where crisis situations can arise at any time, it is important to have efficient tools to manage and quickly solve these situations. Digitalization can be a key factor in this regard, offering the possibility to monitor crisis situations in real-time and to make quick, informed, and efficient decisions.

However, an increase in the use of technology and artificial intelligence can also bring risks, especially regarding data and personal information security. It is essential to ensure that the tools and technologies used to manage crises are secure and that data is protected.

We will also examine how world leaders and managers can use these technologies to efficiently manage crises, ensuring a quick and coordinated response to crisis situations.

Finally, we will offer some conclusions and recommendations for those who want to integrate AI and digital technologies into their crisis management strategies.

2. ARTIFICIAL INTELLIGENCE

Artificial Intelligence (AI) is a branch of computer science that focuses on developing systems capable of performing tasks that would typically require human intelligence. John McCarthy, one of the pioneers in the field, argues that "Artificial Intelligence is the study of how to make machines do things that would require intelligence if done by men." These systems are programmed to learn and improve their performance based on the data and information they receive.

AI can be divided into two main categories: weak AI and strong AI. Weak AI is programmed to perform a single specific task, such as voice recognition or facial recognition. In contrast, strong AI is capable of performing a variety of tasks and can make decisions autonomously. [1]

How does Artificial Intelligence work?

To function, AI requires data. Artificial Intelligence systems are programmed to process and analyze the data they receive and identify patterns and trends within it. Based on this information, the system can make specific decisions and take action. An example of the use of AI in the digitalization of military management is the use of machine learning algorithms to analyze data from drones and other surveillance systems to detect enemy activities and generate real-time situation reports. These reports can be used by commanders to make faster and better-informed decisions. [2]

There are several methods of training AI systems, including supervised learning, unsupervised learning, and reinforcement learning. In supervised learning, the system is trained to perform a specific task using pre-labeled and classified datasets. In unsupervised learning, the system is trained to identify patterns and trends in unlabeled and unsupervised data. In reinforcement learning, the system learns through interaction with the environment and receives feedback based on its actions.

What are the benefits that Artificial Intelligence can bring to digital transformation in crisis management?

Artificial Intelligence (AI) can bring several benefits to digital transformation in crisis management, including improving efficiency and productivity and enhancing precision and accuracy. AI algorithms can be used to automate repetitive processes and speed up decision-making processes. This streamlining can lead to improved responsiveness and increased productivity of military personnel. They are also used to analyze data with much greater precision than is possible for humans. This can lead to greater accuracy in identifying threats and opportunities, as well as improving the quality of the decisions made.

Increasing data analysis capacity: AI can be used to process and analyze large amounts of data from various sources. This analysis can lead to a better understanding of the situation and better planning of military operations. [3]

Reducing risks and costs: The use of AI can reduce the risks associated with military operations and can help identify and prevent threats before they become dangerous.

Additionally, the use of AI can reduce costs by eliminating repetitive tasks and improving operational efficiency. "Improving security and data protection: AI can be used to detect hostile activities and prevent cyber attacks, as well as monitor data access and ensure compliance with security policies.

In general, the use of AI in digitizing military management can bring significant benefits, but potential challenges such as cybersecurity issues and the need to train military personnel in the use of new technologies should also be considered." [4]

How can artificial intelligence be used in crisis management?

AI can be used in crisis management in several ways. One example is using AI algorithms to analyze data and information in real-time, providing a comprehensive picture of the crisis situation. AI can also be used to identify potential problems and risks, make predictions, and assist in making quick and efficient decisions during a crisis.

Additionally, AI can be used to develop predictive models that identify potential crisis situations before they occur, allowing for proactive management. Furthermore, AI can be used to analyze and manage resources during a crisis, as well as coordinate intervention and recovery efforts.

3. CRISIS MANAGEMENT

Jaques and Clement (1991) argue that Crisis Management is "the process of identifying potential crises, determining appropriate responses, and implementing selected responses." According to Pearson and Mitroff (1993), Crisis Management is "a systematic way of managing crisis situations, including prevention and recovery activities, to minimize the damage they can cause." [5]

The theorist Karl E. Weick considers a crisis to be "a significant event that exceeds an organization's capacity to cope, endangering the organization's existence and/or reputation."

According to management professor Ian Mitroff, a crisis is "an apparently uncontrollable event that threatens an organization's values and/or existence and requires fundamental changes in the way the organization operates."

Charles Herman defines it as "a situation that threatens the high-priority objectives of the decision-making unit; restricts the time available for a response, before the situation is altered; when it occurs, it catches decision-making unit members off guard."

Michel Brecher defines it as "a situation characterized by four conditions, as perceived by decision makers: a mutation in the external or internal environment; a threat to core values; a high probability of involvement in predominantly military hostilities; a response to the values."

As for the use of artificial intelligence in managing interstate military crises, limited research is available. However, some potential applications of AI in this context include predictive analysis, in which artificial intelligence can be used to analyze historical data and current events to predict the probability and severity of an interstate military crisis.

Artificial intelligence can provide decision support to leaders in the form of real-time data analysis and scenario planning. AI can be used to develop autonomous systems for surveillance, recognition, and other military operations.

Examples of AI use in recent military crises are also limited, but a notable example is the use of AI-powered drones by both sides in the Armenia-Azerbaijan conflict over Nagorno-Karabakh in 2020. These drones (UAVs) were able to conduct precise attacks on enemy targets and provide real-time information to commanders.

Autonomous vehicles are capable of operating without direct human intervention. They are equipped with different types of sensors, such as video cameras, radar, or lidar, and with data processing systems that allow them to move on roads and make decisions based on traffic and environmental conditions.

There are different levels of autonomy for these vehicles depending on the degree of driver involvement or intervention. The levels of autonomy are established by SAE International and include the following:

Level 0: The driver has full control of the vehicle.

Level 1: Driver assistance systems can be activated, but the driver remains responsible for controlling the vehicle.

Level 2: The vehicle has driving assistance systems that temporarily take control of certain functions, but the driver must be prepared to take control again.

Level 3: The vehicle has the ability to take full control under certain conditions, but the driver must be prepared to take control if the system requests it.

Level 4: The vehicle can operate without human intervention under certain conditions or in certain predefined areas.

Level 5: The vehicle is completely autonomous and requires no human intervention. [6]

Autonomous vehicles have the potential to reduce the number of human casualties in a theater of operations, decrease civilian casualties during an armed conflict, reduce the number of road accidents, and improve safety on public roads. They can also be useful in reducing pollution and optimizing traffic. However, there are still many technological, legal, and social challenges to overcome before autonomous vehicles can be widely used. Crisis management refers to the process of identifying, analyzing, and managing situations that threaten the objectives and interests of an organization or a nation. These crises can be political, social, economic, environmental, or security-related, and their management involves making quick and efficient decisions to minimize negative impact. Interstate military crises are those crisis situations involving two or more states and may include direct or indirect threats such as armed conflict, diplomatic or security crises. In such situations, the use of artificial intelligence can be particularly important as it can help reduce the risk of human error or make rapid decisions in the face of imminent threats. Concrete examples of using artificial intelligence in the context of military crises include: Using surveillance and facial recognition systems to identify militants or individuals with terrorist potential in conflict zones; Using data analysis algorithms to monitor troop movements and identify potential threats in real-time; Using simulation technology to test and develop security strategies and to train military forces in crisis scenarios. A recent example of using artificial intelligence in the context of a military crisis is the use of the autonomous MQ-9 Reaper drone by the US Air Force to target individuals in Afghanistan during the 2021 evacuation.

The drone used advanced data analysis and facial recognition technology to identify targets and carry out attacks with precision and speed. Overall, the use of artificial intelligence in managing interstate military crises can be particularly useful in reducing the risk of human and material losses, as well as making informed and efficient decisions in a timely manner.[7]

4. DIGITIZATION

Digitization is the process of transforming information, processes, and activities into digital or electronic formats. It involves the use of digital technology to replace or improve traditional processes that use paper, analog records, or other analog methods.

Digitization can include converting physical documents into digital format, storing data in digital media, transferring information through digital networks, processing information using algorithms, and using automation to improve process efficiency and accuracy.

It has become increasingly important in recent years, fundamentally changing the way we manage crises. By using digital technology and artificial intelligence, we can better manage crises, anticipate issues, and provide more efficient and rapid solutions.

One of the biggest changes brought about by digitization is the way we communicate and access information. With the help of the internet and social networks, we can receive real-time information about crises and communicate quickly with those involved in crisis management. This allows us to respond more quickly and make better decisions in real-time. Additionally, digitization provides us with tools and technologies to better manage crises. [8]

For example, we can use drones and other advanced technology systems to perform rescue operations or evaluate the damages caused by a crisis. Through artificial intelligence, we can analyze the data collected by these technologies and identify patterns and trends that can help us anticipate future crises. Furthermore, through digitization, we can use data analysis and artificial intelligence to develop crisis scenarios and action plans. This allows us to test solutions before they are needed and identify gaps in our plans. This means we are better prepared for any crisis that may arise in the future. National security and defense are areas where artificial intelligence (AI) is increasingly being used to improve military capabilities and enhance military operations efficiency. Here are some examples of digitization achieved in the military field thanks to artificial intelligence: An example of using artificial intelligence in the military field is the development of autonomous weapon systems. These systems can be controlled through a network of sensors and AI algorithms that allow them to detect and identify targets and decide when and how to attack. AI can be used to analyze images captured by drones or other surveillance devices, identifying suspicious objects and activities and alerting the operator. These systems can be useful in detecting and tracking enemies or other potential threats. AI can be used to analyze information data, including those from human and electronic information sources, such as intercepting enemy communications. These systems can help identify enemy schemes and generate intelligence reports for commanders. Planning and decision-making systems: AI can be used to develop planning and decision-making systems that help military commanders make more informed decisions regarding military operations. These systems can take into account a variety of factors, such as terrain, weather conditions, and enemy threats, to help develop efficient military strategies.

AI can be used to develop training simulations for military personnel, allowing them to train in a safe and controlled environment. These simulations can be used to improve decision-making, communication, and coordination capabilities of military operations. [4]

These are just a few examples of the use of artificial intelligence in the military domain to enhance military capabilities and increase the efficiency of military operations.

Another example of digitalization in military management could be the use of digital communication systems to improve communication and coordination between military units. In the past, communication within the armed forces was often done through radios and other analog technologies, which were susceptible to interference and communication errors.

Today, digital communication systems such as satellite networks or mobile data networks are used, which allow for fast and secure transmission of information. These digital communication systems allow military officers to quickly transmit information such as enemy coordinates, attack orders, and situation reports between military units. Additionally, the information can be digitally stored and processed to provide a better overall picture of the situation and aid in decision-making.

Furthermore, digital technologies are used in the military to monitor and manage stocks of weapons and equipment, as well as to plan and coordinate logistical operations. This can help reduce waste and streamline processes, which can have a positive impact on military capability and resilience.

CONCLUSIONS

In conclusion, digitization has fundamentally changed the way we manage crises and provides new opportunities to maximize efficiency in crisis management through artificial intelligence and advanced technology. However, it is important to ensure that we use these tools in a responsible and efficient manner to ensure the safety and security of those involved in the crisis.

An example of preventing an international conflict through the use of artificial intelligence is the case of the United States applying AI technology to identify the risks of nuclear weapon proliferation in North Korea.

In 2017, the United States developed a system for detecting intercontinental ballistic missile (ICBM) launches from North Korea, called HBTSS (Hypersonic Ballistic Tracking Space Sensor). This system was developed using AI technology and is capable of identifying and tracking ballistic missile launches from a great distance and with high accuracy.

Using this AI technology, the United States was able to closely monitor North Korea's activities and detect ballistic missile launches before they occurred. This allowed the United States to take preventive measures and avoid escalating conflict with North Korea.

Additionally, using AI technology to monitor and analyze the flow of information from diverse sources (such as social media, information reports, press releases, etc.) can help quickly detect events that could lead to international conflicts. This information can be used to develop conflict prevention strategies and take preventive measures in a timely manner.

Overall, the use of artificial intelligence can contribute to the prevention of international conflicts by improving the ability to identify threats and monitor suspicious activities, which can allow for faster and more efficient decision-making in conflict prevention.

In conclusion, AI is very useful in crisis management and conflict prevention due to its ability to monitor and map terrains using specialized cameras or sensors; research and monitor the environment by monitoring air, water, or vegetation pollution and climate change.

There are companies that use UAVs to deliver packages to desired addresses, with lower costs and faster delivery times than traditional methods. This solution is particularly important in the conditions of an armed conflict.

UAVs can be used to help rescue teams and firefighters locate and rescue people in danger.

In conclusion, they were initially developed to be used in the military field and continue to be used for this purpose. Military personnel use UAVs in a wide range of missions, including:

Terrain surveillance and reconnaissance: UAVs can be used to perform surveillance and reconnaissance missions, allowing military personnel to observe and collect information about areas of interest without exposing themselves to unnecessary risks.

Target identification: UAVs can be equipped with specialized video cameras and other sensors to identify targets of interest, such as vehicles, buildings, or individuals.

Traffic and border monitoring: UAVs can be used to monitor road and sea traffic or to surveil borders, allowing military personnel to detect and intercept potential threats.

Close air support: UAVs can be used to provide close air support to ground troops, tracking enemy movements and providing real-time information to help military personnel make faster and better-informed decisions.

In conclusion, UAVs continue to be an important tool for military personnel in various missions, offering advantages such as discreet observations and real-time information.

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