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Identification and Prioritization Technologies and Types of Threats in Future Warfare Using Future Studies Approach

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ABSTRACT

The main mission of military medicine in the world is the health, relief, treatment, and rehabilitation support for the military people regarding the problems, dangers, injuries, and diseases because of special occupational conditions. The present study was descriptive in terms of the purpose of the survey type and mixed-method in terms of the research process. The study was conducted in two parts. The first part was a systematic review and extraction of required data in the field of science and technology associated with the fields of personal medicine, hyperspace health, cognitive health, and biodefense. In the second step, the related sciences and technologies and the strengths and weaknesses of the areas stated in the tables were prepared using the information extracted from papers and documents, and then the interview guide was formed and provided to experts in different fields and their opinions were collected. What emerges from the observation of the policies of science, technology, and defense products is the focus of the countries of the world on policy-making in influential sciences, which can turn the latest findings of those sciences into defense technologies and products and bring about technology and ensure deterrence at the strategic level.

Keywords: Future studies, Military medicine, Health information, War scene

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INTRODUCTION

Military medicine is a science concerned with diseases and injuries happening during military operations. Moreover, it involves special forms of organizing that have emerged to provide medical support to the military and the rapid transfer and treatment of patients during battle [1, 2]. The main mission of military medicine in the world is health, relief, treatment, and rehabilitation support of the military in problems, risks, injuries, and diseases that occur because of special occupational conditions [3]. Ultimately, military medicine services bring about the maintenance of military health and, while promoting health, increased military capability in their missions. As the weapons used in the battle became more destructive and deadly, medical care progressed accordingly, and thus, wounded soldiers became more and more treatable [4]. Ultimately, military medicine services result in the maintenance of military health and, while increasing military capability in their missions promotes health [5]. A military health system is a set of people, structures, and processes that work for maintaining and promoting the health of the military community [6, 7]. The military health system is like a health care delivery organization with two main missions: a combat readiness mission to provide medical, health, and support services to military operations units, and a service-oriented mission to provide medical, health, and support services to troops. Armed persons, retirees, affiliated

members and the other is a service-oriented mission to provide medical, health, and support services to members of the armed forces, retirees, affiliates, and others covered by the Department of Defense [8, 9].

The world military forces are in a period of history whose prominent characteristic is a shift like war and defense [10]. Moreover, because of the potential and inherent capabilities of the military forces, these forces play a key role in responding to crises as an operational auxiliary force. In recent years, the role of the armed forces in responding to natural disasters has increased, with the increase in scale and occurrence of natural disasters being the increasing tendency of humanitarian responses to militarization, and the increasing interest of the armed forces in responding to crises [11]. These developments come from not a single invention or idea but a wide range of evolving technologies. The military developments of the current century, rooted in technology, have been reached mainly due to various scientific branches [12]. Different sciences and technologies in the defense and security of the future are considered as a powerful and decisive tool in deterrence and balance of power between the home country and the enemy [13]. Having a proper understanding of the significance of this subject brings about identifying potential threats and defense and security opportunities and gaining the defense readiness of the Iranian Armed Forces. Understanding the future of science, technology, and emerging products in the field of military medicine could reduce many of the costs of the military health system and determine the future orientations of the defense medicine and bio-defense sector in a systematic and integrated way [14]. Thus, the preparation for any possible future arising from science, technology, and defense products in military medicine has turned into something necessary by researching what the future roadmap is. Identifying the most effective sciences and technologies in the field of military medicine and prioritizing them will help formulate its optimal roadmap.

The study was conducted to be aware of the opportunities and threats and identify priority areas of the armed forces health system using future studies and strategic foresight methods according to the experiences of universities, research institutes and medical research centers of the armed forces and experts and professors in military medicine with future studies techniques and tools.

MATERIALS AND METHODS

The study was descriptive in terms of purpose with survey design and mixed-method in terms of the procedure. The study was carried out in two parts. The first part was a systematic review and extraction of the data needed in the field of science and technology associated with the fields of personal medicine, hyperspace health, cognitive health, and bio-defense. At this stage, all English language databases (PubMed, Scopus, ISI, etc.) and Persian language (SID, Magiran, etc.) from the beginning to 2020 were examined to identify the related papers and documents in this field. The keywords future studies, military medicine, bio-defense, cognitive health, hyperspace health, personal medicine, and a combination of these keywords were used to search the databases. Moreover, for a more comprehensive review of grey resources (google scholar), the websites of leading centers in the stated fields and other associated research centers were searched, as well as references to related papers and documents. In the first stage, the data collection tool was a table of data extraction and note-taking. In the second stage, using the information extracted from papers and documents, related sciences and technologies and the strengths and weaknesses of the areas stated in the tables were prepared, and then the interview guide was formed and provided to experts in different fields and their opinions were taken. A semi-structured interview guide was used to collect data in the second stage, where the opinions of supervisors and consultants and reviewing related texts were turned to. The interview guide was semi-structured with the fewest questions possible. The questions were designed so that the desired data on stakeholder feedback could be obtained. The interview guide was revised after three interviews with stakeholders and using their opinions. The interview questions were about trends, drivers, opportunities, and threats in various fields of military medicine. Sampling was done using the purposive sampling method to select the people with the most information

about the subject. Sampling was heterogeneous (participants with maximum diversity) and the individuals from various levels of policy-making and policy implementation, as well as organizations and interest groups, were interviewed. The number of samples continued until the data was saturated. The samples included key people from different faculties and research centers of military universities and researchers in this field (with published paper) and so on. Those with a master's degree or higher, general practitioners or specialists directly or indirectly involved in different fields of military medicine, people with more than five years of experience in this field, and executive experience in the field selected military medicine, formed the participants. The qualitative content analysis method was used to analyze the textual data of the documents.

RESULTS AND DISCUSSION

The study examined and identified all documents and papers associated with the fields of military medicine and the major trends affecting these fields as well as opportunities, threats, and drivers of each field and classified them in the **Tables (1-5)**.

Table 1. Major Trends that Affect the Military Medicine Areas

Macro social and cultural trends	Macro technological trends	Macroeconomic trends	Environmental trends	Political/legal trends	Value trends and lifestyle
Increase in life expectancy	Development of communication platforms and information transfer infrastructures	Digital-based economy	Increasing the dominance of technology over the environment	Continuation of globalization	Accelerating the change of social values and new health threats
Population aging and increase in aging and the effect on the health system	Focus on strengthening the body and human capabilities	Increasing health inequalities and diseases	Propagation of technologies faster	Increasing governance challenges for governments	Increasing use of cyberspace
Formation of a knowledge-dependent society	Systemic medicine		Increasing social and moral concerns	High-risk global society and the nature of battles	Restricting the privacy of individuals
Increasing specialization and level of education	Convergence of converged processes/technologies (NBICs)			Developing the political geography of the Islamic Revolution	
Urbanism	Technologies for connecting the human brain with robotics				
	Fusion of physical, digital, and biological worlds				
	Artificial intelligence will reach the level of human intelligence				
	Internet of Things (IoT)				
	Cloud computing				
	Augmented reality in the field of health				

Table 2. Findings on Military Medicine Opportunities

Hyperspace health	Personal medicine	Cognitive health field	The field of bio-defense
Tele-mentoring	Ultra-precise medicine	Mind engineering	Biology System
Tricorder	Tissue Engineering	Stimulate the brain	Gene and artificial cell synthesis
Biomedical	Reconstructive medicine	Behavior and performance simulation	Diagnostic technologies in smartphones (smart mobile laboratory)

Artificial implants (additives and improvers)	Organs-on-a-Chip	Cognitive assessment of individuals	Detection and tracking with biosensors (biosensors and biomarkers)
Biosensors (sensors)	Personal Database in Blockchain	Electrical stimulation of the brain	Biological threat monitoring systems
Patient identification and safety systems	Next-generation cryptography	Autonomous Systems	Biomimetic systems
(Smart risk detector)	Molecular Medicine	Tactile and Haptic Systems	Methods of DNA fabrication and nanomolecular production
Telemedicine drone	Genomic information system	Human Augmentation	Particle microwave particle spectroscopy
HiRO	Personal medicine big data system	Extraordinary forecasting technology or SNAFU	Cobinamide encapsulated silica for the respiratory tract
Home care service system	Artificial intelligence	Reverse engineering and brain modeling	Rapid detection of microbial contamination of drinking water
Medical research using Grids	Medical P4: Anticipation, prevention, personalization, and participation	Human-computer coexistence (cybernetics)	RNAi and SiRNA interfering RNA or Aligo antisense technology
Medical research using Grids	Proteomics	Augmented Cognition	Genetic mapping and DNA analysis
Disease and Emergency Tracking (GPS)	Epigenomics	Software and robotics assistants	Synthetic biological engineering
Wearable monitors	Transcriptomics	Noro ergonomic	Gene vaccines
Telemedicine video conferencing software	Metabolomics	Biomarkers for sleep	Gene chips, probes (gene probes)
Wireless Health Care Network (Mobile)	Pharmacogenomics	Cyborg technologies	Wound infection
Augmented reality medical diagnosis	Circulating tumor DNA testing	Neuroprosthetics	Cloning
Mobile health apps	Microbiome analysis	Virtual simulation-based training	Gene Modification Technology (CRISPR)
Interactive voice response software	Single-cell ‘omic analysis	Broad Operational Language Translation (BOLT)	Biological simulators
Teletherapy	Pathogen genomics	Awaking power	Specifying the biomolecular structure using a laser
Store and forward	Stem cell therapy	Mind control	Gene Therapy
Remote Patient Management (RPM)	Gene therapy and gene editing	Interface Brain–Brain	Cell-less biosynthesis
Teletherapy	Virtual and augmented reality	Full integration of technology with the body's nervous system	Engineering of biological systems and networks
Store and forward	3D printing	Humanoid robots (Equipped with double intelligence)	Collection and manipulation of biological information (biological artificial intelligence)
Remote Patient Management (RPM)	Socially-Assistive Robots (SARs)	Artificial eye	Rejuvenation of cells with the help of DNA
Big data health	bioengineering technologies	Night vision technology	Omics technologies
Internet of Things	Telemedicine and Biosensors	Skeleton Auxilia	Bio-catalysis
Remote radiology	Biomarkers	Neurogenetic	Biochips
Remote pathology	epigenetics	Neurolaw	Virus and bacterial engineering

Remote cardiology	Bioinformatics	Neuroethics	transformation and transient expression technologies
Remote consultation	Modeling and simulation	Neuroculture	
Computational sociology software and collective behavior prediction	Wearable device	Neurogame	
Artificial intelligence nanobots in the human body	Cell engineering		
Expert systems	nanostructure		
Robodoc	3D scaffold		
Robotic surgery	Immunotherapy		
Interdisciplinary approach in science and technology/hybrid	Exposome		
Fusion of physical, digital, and biological worlds (biological technological revolution)	Crisper Genome Editing Technology		
Cybernetic enhancements (Increase in health)	Medical care based on bioelectronics (Biomedical)		
	Making an artificial genome		
	Genomic Reading Machines or NGS		
	Nutriogenomics (nutrition genomics)		
	Face recognition from DNA		
	Pocket genome reading technology		
	Genomics and Ameex Technologies		

Table 3. The Results on Threats to Military Medicine

Hyperspace health	Personal medicine	Cognitive health	The field of bio-defense
Digital Divide	Genetic weapons (DNA-based personalized weapons)	Neuroweapons	Environment (ecotourism)
Artificial intelligence technology	Next-generation cryptography	Cognitive Warfare	Human body (Bioterrorist)
Information and cyber hacking	Artificial intelligence technology	Military Brain Science	The human psyche, cognition, and behavior
Web technologies	Biotechnology in the production of weapons Biowarfare	Psychological neuroscience	Food and Agriculture (Agroterrorist)
Secure and fast communication infrastructure	Artificial manipulation and transfer of genetic material	Digital media and cyberspace	
	Nanotechnologies	Social media neuroscience	
	Gene therapy and gene editing	People's culture and genealogy	
	Modeling and simulation	Cheetah	
	Ethnic racial bombs (via emerging viruses; pathogens and racial bio-weapons)	Cyber insects	
	Supersoldier	Robotic animals	
	Unified Insect Technology	Network-centric warfare	
	Genomic database	Impact-driven operations	
	Bio hack	Robot Bird	
	Brain Decoding	Artificial implants and additives and cognitive enhancers	

Rifle self-calculating camera
Near-Air Immediate Support System (Project AS-PIK)
Drones
Naval warheads hidden on the ocean floor
Bullets that can change direction during a flight
Bird trucks
A drone that can fly for years
A system that gives soldiers more visual information
Stratospheric airship

Table 4. The Results on Military Medicine Propellants

Hyperspace health			Personal medicine			Cognitive health			The field of bio-defense		
Technology	Sociocultural	Health	Technology	Sociocultural	Health	Technology	Sociocultural	Health	Technology	Sociocultural	Health
Smart world	Demographic changes	Digital health	Production of advanced biological products and materials	Demographic and population changes	Human empowerment	Smart world	Demographic structure changes	Digital health	Industrial production and advanced materials	Demographic and population changes	Biomedical
Big data	Life style	Ultra-precision medicine and leading tools	Digitization and virtualization	Personal lifestyle	Explorations about aging	The future market of medical technologies	Lifestyle	Accurate medicine and personalized care	Digitization and virtualization	Lifestyle	Human empowerment
Leading tools	Social media	Networking services	Convergence of technologies	Individualism	Advances in gene therapy	Big data	Social media	Remote health	Convergence of technologies	Global warming	Biological system
Cyberspace	Security defense scenarios	Personal doctor	Robotics and artificial intelligence	Useful products	Induction demands	Internet of things (IoT)	Urban development	Networking services	Robotics and artificial intelligence	Need water and food	Reconstructive medicine
Mobile technologies and agility		Meet needs online	Mobile technologies and agility	The nature of future wars	Fast detection and responsiveness	Cybersecurity	Development of futuristic thinking in the country	Induced demand-based medical care	Mobile technologies and agility	Energy production	Personalized medicine
Automatization		Physician-patient relationship	Automation of medical processes	Community literacy	Value-based services	Leading tools	industrialization	Meeting needs online	Automation	Transgenic products	Fast detection and responsiveness

Internet penetration rate among users	Transformation in medical education	Genomics Information Security	Information everywhere	Patient participation with the physician	Virtual reality	Age	Physician-patient relationship	Genomics Information Security	The nature of future wars	Development of innovation and new therapies
Information security	Systemic medicine	Big data	Increase in revenue	Improving the understanding of brain activity	Artificial intelligence and robotics	Religion and ideology	Transformation in medical education	Big data	Storage and distribution of resources	Systemic medicine
		3D and 4D printing	Medical application at the molecular level	Brain interfaces	Willingness to invest in future medicine	Systemic medicine	3D and 4D printing			
		Tissue Engineering and Reconstructive Medicine	Beyond the hospital	Autonomous and semi-autonomous systems	Accurate and precise diagnosis					
		Transparent medicine	Food and drug industry	Wearable and ambient sensors	Mental health					
		Pharmacogenomics	Increasing the costs of the health system	3D printing	Health literacy					
		Personal Medical Record (PMR)	Medicine Transition from Modernism to Biomedicine	Machine vision						
				Simulations						

Table 5. The Results related to the Capabilities of Military Medicine

Hyperspace Health	Personal medicine	Cognitive health	Bio-defense
Online monitoring of combat performance and health (remote monitoring - mobile health)	Detecting the disease in the early stages	Establish advanced systems and tools for monitoring, monitoring, and predicting cognitive health-related behaviors and threats	Establishing advanced systems and tools for monitoring, monitoring, and warning of biological threats

Identifying injuries and rapid detection of combat diseases on the battlefield (remote detection)	Establishing genetic laboratory infrastructure to evaluate risk and determine susceptibility to disease	Designing and developing accurate tools for rapid detection of risk factors and threats related to cognitive health	Designing and developing accurate tools for rapid detection and detection (Real-Time) of biological agents
Support for treatment, improved access, and real-time medical care (treatment and remote care)	Preventive interventions to prevent disease in the areas of behavior, lifestyle, and cognition	Providing rehabilitation services with cognitive tools	Establishing prevention infrastructures, development of inhibitors and systems for elimination and disposal of biological agents
Intelligent rehabilitation and help heal damaged forces on the battlefield (remote rehabilitation)	Correct diagnosis with accurate tools and personal monitoring to select targeted therapies	Developing basic knowledge and technologies to strengthen human cognition and increase health	Creating research infrastructure (reference laboratory and BSL)
Reaching an intelligent transmission and rescue system for the wounded from the battlefield (tracking and tracing)	Improving therapeutic results through targeted drugs (pharmacogenomics), accurate medication, and accurate health	Production of advanced pharmaceutical materials and brain stimulation products	Access to food safety knowledge and technologies and products that control environmental pollution
Improving the knowledge of specialists in providing remote services (distance education and consulting)	Establishing personal health management systems with active monitoring of treatment responses and disease progression	Providing advanced medical services and diagnostic and therapeutic interventions for cognitive impairments	Procuring equipment (medical and non-medical) and advanced and agile platforms for biosecurity management
Procuring advanced and agile medical and non-medical equipment at the location of remote systems	Developing personal digital therapies and manipulation of intelligent human products	Establishing systems, development of equipment, and provision of services for prevention of risk factors and cognitive health monitoring	Producing advanced targeted pharmaceutical, vaccine, tissue engineering, bioinspiration, and hybrid materials
Information engineering, high-speed communications, and exchange in the context of secure network and protection	Knowledge mastery and access to basic sciences and medical technologies, precision, and sequencing of the superior generation		Improving the knowledge of specialists in line with the developments of systemic medicine, biological system, and convergent technologies
			Developing basic knowledge and technologies in handicrafts for bioengineering and bio-defense products
			Providing advanced medical services with genetic engineering technologies, biomedicine, and nanotechnology

Identifying macro trends and their effects on various areas is of the main concerns of each country for all areas. One of these major trends is demographic change. Population growth is considered one of the significant components of a country's defense and security power, which could result in the deterrence of countries in case of adopting proper policies and using the national identity. Increasing life expectancy is another major trend that increases investment in science and technology to combat aging, aging care, and the cost of health systems. The population aging process and increasing aging could be considered as the most effective social trend in the future of science and biotechnology and health technologies. Among the effects of establishing a knowledge-based community is the dissemination of information, privacy, and access to health information of the forces by the enemy and terrorist tools, the construction and use of cultural aggression in defense and security affairs in cyberspace could be cited. One of the natural consequences of the urbanization process is the promotion of a welfare lifestyle. Socially, urbanization is usually accompanied by increased education and awareness. This

phenomenon does not necessarily reduce social harm and threats to national security.

Biomedicine and strengthening the human body are other future trends. The huge therapeutic potential of genomics along with the exponential reduction of gene editing techniques such as CRISPR have brought about a fertile context for the rapid advancement of technology in genetic engineering [15]. Systemic medicine is another future trend that has a comprehensive outlook and all kinds of biological information will give birth to future systemic medicine. The term "convergent technologies" has a significant place in the policy-making process in science and technology. The consequence of this technology is to increase longevity and anti-aging, and we can extend the range of healthy living beyond one hundred years, call designed evolution including the use of all previous approaches; however, it focuses on genetic therapy to design evolution to combine life with disease resistance [16]. Another future trend is the convergence of technologies. One of the strong trends showing itself over the past decade is the interdisciplinary approach in science and technology. The scholars in the occupying regime in Jerusalem have developed a computer for animal cells instead of biological silicon chips that use DNA. These developments may soon allow computers to communicate directly with the human brain. Advances in robotics and automation, artificial intelligence, nanotechnology and biotechnology, quantum computing, IoT, 3D printing, automated devices, brain amplification technologies, gene editing, and universe design are key technologies that feed the fusion revolution of physical, digital, and biological worlds and will radically transform the performance of the modern economy. Moreover, they drastically affect the level of employment and the form of jobs, the nature of work, business operating models, governments, countries, regions, cities, international security, society, individual identity, ethics, human relations, and the management of individual and collective information whose signs are now emerging from the convergence of technology. Among the other future trends are the development of artificial intelligence. Artificial intelligence is growing rapidly, and its successful application in e-health is likely due to the availability of large data sets and computing resources. Artificial intelligence is used in many areas of medicine like oncology, dermatology, radiology, neurology, neurodegenerative diseases, and many more. Generally, a major AI theme in medicine is Clinical Decision Support (CDS) to help physicians in the care setting [17]. Another trend is artificial biology. Artificial biology is introducing engineering principles into biotechnology using computer modeling and DNA combinations to write gene sequences from scratch. Reducing costs and the emergence of new gene-editing tools such as Crisper accelerate this development. Trends in biological defense strategies to meet unmet needs for the production of immunosuppressive and full-blown antibodies contain human-like glycosylation patterns. Ebola virus reveals mAbs with modified N-glycosylation patterns increase potency and could potentially be used as human therapies to increase potency with modified N-glycosylation patterns and potentially be used as human therapies [18].

Another trend is associated with the economy, jobs, and productivity. The current trend shows that the sharing of the economy in the world is increasing. Thus, the growth of employment instability is reduced. However, with digital growth, it is likely to get out of the states' control. With aging, future growth is increasingly driven by innovation and investment in skills. The economy based on digital is emerging rapidly creating great opportunities for individuals, foreign firms, and entrepreneurs to succeed in the market [19].

As water scarcity and drought, as well as energy consumption, could be a threat to the security of the country, the armed forces need to help the country. Planning a new generation of water treatment facilities using advanced technologies to solve the challenges posed by micro-sized contaminants including medical and cosmetic contaminants, and so on, and using IoT and advanced energy storage technologies bring about opportunities for better monitoring and management of energy systems. Advances in science and technology in bio-defense and increasing demand, environmental complexity, anxiety, error risk, and bio-threats are increasing [20]. People active in defense science and technology have to have access to new technologies more quickly. The slacking of the

responsible organizations in this field could result in exceeding the capabilities of rival countries. Climate change affects mass migration, transportation, agriculture, housing, and energy production. Energy technology innovation will be the key in reaching a two-degree temperature reduction scenario. A comprehensive list of low-carbon technologies, including solutions for decarbonization, has to be pursued for climate goals and policies. IoT, applications, and sensors lead to better monitoring of climate change, ecosystems, and biodiversity.

Identifying the sciences and technologies affecting the future of defense command and management is of the basic requirements of the defense sector. The overall list of possible sciences and technologies in the field of military medicine and examples of discontinuation technologies and monitoring in bio-defense, cognitive health, telemedicine, and personal medicine affected by these sciences and technologies based on the source of obvious information is as follows:

Cloud Computing in Health Information Technology

Cloud computing is a computing model based on computer networks such as the Internet, which provides a new model for the supply, consumption, and provision of computing services in the network. In this technology, access to online services in cyberspace is possible in a flexible and scalable way on-demand, based on the volume of user demand. Cloud computing shows a new and leading-edge in health information technology. Using cloud computing in health information technology provides many opportunities to provide health care services. Thanks to cloud computing, thick paper files, radiographs, and medical prescriptions, which are usually handwritten, will become electronic documents that can be accessed at any time and place [21].

IoT in Health

IoT is one of the most widely used technologies that we will hear more about in the coming years and the developments resulting from the use of this technology. Although IoT is applicable in all areas, one can state that one of the most important and attractive areas that can adapt faster than other areas is health. Among the applications of IoT in health, one can refer to smart boards, remote monitoring of medical symptoms, continuous monitoring of blood sugar and insulin levels, connected spray for asthmatic patients, cancer treatment, edible and digestible sensors, and smart medical contact lenses in healthcare and blood coagulation testing. Although there are many concerns on health care in this regard persist, the place of IoT in health and health care is growing [22].

Artificial Intelligence in Biology and Medicine

Artificial intelligence is a technology and branch in computer science that deals with studying and developing software and smart devices. The main ideas of artificial intelligence should be sought in philosophy, linguistics, mathematics, psychology, neuroscience, physiology, rotation theory, probability, and optimization, with its many uses in defense, computer science, engineering, biology, medicine, social sciences, and many other sciences [23]. It is estimated that artificial intelligence will enable robots to create works of art like humans. It is also predicted that humans can drastically improve their language skills by using an implantable chip in the neocortex area of the brain [24].

Computational Sociology and Prediction of Collective Behavior in Health

Nowadays, with the advancement of technology, especially in artificial intelligence, countries seek methods and solutions that pave the way for their survival in the chaotic atmosphere of the future. One of the critical tools to reach this in recent years can be the technology of computational sociology and predicting collective behavior. Some of the sub-technologies associated with this phenomenon can be considered as virtual social networks, optimization technologies derived from applied mathematics such as neural networks, data mining, genetic programming, and machine learning [25].

Human Brain-like Calculations (Neuromorphic)

One of the technologies that are effective in the future of command and control of the battlefield is to reach a degree of capability that can control objects through the power of the mind and using the interface between the brain and the

computer. Companies such as Facebook seek to hire neuroscientists. One of the key technologies in this field is nanotechnology technology and progress in each of the fields - material production, provision of tools and connections, computational architecture, brain-inspired solutions, manufacturing/production of artificial neurons, computer/brain-brain communication software/computers, modeling and simulation of self-conscious robots, humans integrated with machines, and application design - accelerate this technology [26].

Replication in Biology

Nowadays, "cloning" or human cloning has turned into a global debate. Although its details are not yet clear to the world and its future, many individuals and groups around the world pursue the explanation of this new phenomenon from different aspects through ongoing studies at the same time. Despite many advances by scientists in animal cloning, it has been proven that it is very difficult to clone humans and other mammals every time it is human when it comes to humans. However, although human has not yet reached the ability to fully imitate a human so far, human cells have been made [27].

Data Mining, Text Mining, and Big Data Analysis

In the past two decades, information technology has been widely used in medicine. E-health is a new and growing field of the intersection of medical information, health, and information technology. Big data is a term for a large, diverse dataset with a complex structure including difficulties in storage, analysis, imaging, and processing. Big data analysis has changed the way management is managed in different areas, including health care, and has created promising opportunities. Big data has become the main driving force in the emergence of new technologies including artificial intelligence, data science, and the IoT in the age of digital transformation [28].

The Science of Modeling and Simulation

The science of simulation and modeling stems from human attention to the reproducibility of the realities of the universe, and many art forms have been simulated. The most prevalent application of simulation studies has been studying human behavior in dangerous situations like a battlefield without endangering one's life. Simulating building behavior against natural disasters such as earthquakes or storms is a common application of this method and new tools in this field have been placed to exploit commanders and combat units with an increase in the advancement of computer science. Modeling and simulation science in health can be used for medical education and health management [29].

Predicting and Identifying the Nature of Accidents

The predictive analysis involves some statistical techniques including modeling, prediction, machine learning, and data mining, analyzing the past common facts to make predictions for the future or unknown events. Predicting and identifying the nature of accidents in intelligent risk prediction in health care, intelligent risk diagnosis, and assessment models, and modeling of intelligent decision support systems can be used in the health domain.

Biotechnology

Biotechnology is a set of techniques and approaches where living organisms or some of them are used in the processes of production, change, and optimization or for special uses of plants and animals. One of the biotechnology applications is biosensors, used in the diagnosis and treatment of disease and tissue engineering. Another branch of biotechnology is agricultural biotechnology and livestock production, used in agricultural processes and increasing crop yields and livestock production. For instance, using this technology, one can create transgenic plants adaptable to specific environmental conditions. Agricultural companies manipulate crop seeds to increase pest resistance [30].

Nanobiotechnology

Nanotechnology in biology (molecular and cellular genetics) and biotechnology as nanobiotechnology allows us to insert components and parts into cells and create new materials using self-repairing methods [31]. The creation of DNA-based structures in medicine, pharmacy, genetic engineering, and biotechnology will be a new revolution in these sciences. Currently, nanotechnology is primarily used to produce biosensors [32].

CONCLUSION

What emerges from monitoring the policies of science, technology, and defense products is the focus of the countries of the world on policy-making in influential sciences, which can achieve a significant advantage for the country with knowledge and technology by converting the latest findings of those sciences into defense technologies and products and ensure deterrence at the strategic level. America is the pioneer of military medicine, with the Defense Advanced Research Projects Agency (DARPA) accountable for developing new technologies in the country.

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