

## The use of Artificial Intelligence Techniques in Policing

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### **Abstract:**

Artificial intelligence technology is one of the latest uses in the field of security and criminology, as it provides evidence to the judiciary in crimes, providing information to police to solve the mystery of complex crimes, in addition to providing information and clues to police agencies to solve the mysteries of complex crimes. Police officers rely on artificial intelligence techniques to identify people through iris scan, face, and analysis of crime tools, quickly identify crime models, read car plates accurately and save data via Google Earth and others.

Therefore, the problem of the study revolves around an important question, which is the adequacy of artificial intelligence techniques in assisting the policeman in performing his police duties in a way that serves security work and controls the maintenance of security and safety within the community.

The main pillar of the use of artificial intelligence systems in the work of police agencies is information proactivity and conclusion that locates perpetrators and quickly reaches them. Hence this research acquires its importance.

The analytical approach was followed by researching and analyzing the extent to which AI techniques can be applied in policing, by explaining the concepts and applications of AI to determine its role in security sector.

### **To answer the problem of the study, we decided to divide it into two sections:**

The first topic: The concept of artificial intelligence.

The second topic: Artificial intelligence applications in police work.

Keywords: artificial intelligence; crime; police officers; security; technology.

### **المخلص:**

تعد تكنولوجيا الذكاء الاصطناعي من أحدث الخطوات الثورية في المجال الأمني، ومجال عمل الأدلة الجنائية وعلم الجريمة بما يساهم في تقديم أدلة دامغة إلى الجهات القضائية حول الجرائم، إلى جانب توفير معلومات ودلائل إلى الأجهزة

الشرطية لفك ألغاز الجرائم المعقدة، حيث يعتمد ضباط الشرطة على تقنيات الذكاء الاصطناعي في معرفة الأشخاص عبر بصمة العين، والوجه، وتحليل أدوات الجريمة، والتعرف على نماذج الجريمة بشكل سريع، وقراءة لوحات السيارات بدقة وتوفير البيانات عبر جوجل إيرث وغيرها.

هناك العديد من الدول استخدمت الذكاء الاصطناعي في مكافحة الجريمة والقبض على مرتكبيها، ومعرفة ما الذي يستخدمه المجرمون في المستقبل؛ كما كان للذكاء الاصطناعي السبق في تحليل ووقف مؤامرات النشل من خلال التعرف على نماذج سلوكية معينة للمجرمين، كما يستخدم الذكاء الاصطناعي في المساعدة على الإمساك بالهاربين من المجتمع.

وعليه تتمحور إشكالية الدراسة في تساؤل هام هو ما مدى كفاية تقنيات الذكاء الاصطناعي في مساعدة رجل الشرطة في أداء مهامه الشرطية بما يخدم العمل الأمني، والسيطرة على حفظ الأمن والأمان داخل المجتمع؟

وتعتبر الركيزة الأساسية لاستخدام أنظمة الذكاء الاصطناعي في عمل أجهزة الشرطة هو الاستباقية المعلوماتية والاستنتاج الذي يقوم بتحديد أماكن الجناة وسرعة الوصول إليهم، ومن هنا يكتسب هذا البحث أهميته.

وتم اتباع المنهج التحليلي من خلال بحث وتحليل مدى إمكانية تطبيق تقنيات الذكاء الاصطناعي في العمل الشرطي، من خلال شرح المفاهيم وتطبيقات الذكاء الاصطناعي لتحديد دوره في قطاع الأمن.

**وللإجابة على إشكالية الدراسة ارتأينا تقسيمها إلى مبحثين:**

المبحث الأول: ماهية الذكاء الاصطناعي.

المبحث الثاني: دور الذكاء الاصطناعي في تطوير الخدمات الأمنية.

**الكلمات المفتاحية:** التكنولوجيا؛ الجرائم؛ الذكاء الاصطناعي؛ ضباط الشرطة؛ المجال الأمني.

### **Introduction:**

The problem of the research is due to the need to answer an important question; how do artificial intelligence systems serve the security services; to achieve the maximum benefit from the outputs of these systems to serve the security work, and to control the maintenance of security and safety within the community?

This research is of particular importance for many reasons, such as preserving the accumulated human experiences and transferring them to smart devices, the enjoyment of smart systems with accuracy and objectivity, which makes their decisions far from error, racism, bias and personal interference. The use of artificial intelligence gives correct information to security services, which leads to maintaining security. The development of crimes represents a major challenge to all security services in the whole world, which requires the use of artificial intelligence in the monitoring process to reach outlaws and maintain the security of society.

This research aims in general at knowing the concept of artificial intelligence, the advantages of artificial intelligence, the extent to which it can be used to prevent crime, linking artificial intelligence techniques to the work

of the policeman, and employing the capabilities of artificial intelligence systems to assist security services in identifying outlaws; to maintain public security.

The research depends on the descriptive method in describing the phenomenon; by explaining the concepts and applications of artificial intelligence to define its role in the security sector.

The research is divided into two parts, the first is concerned with studying the concept of artificial intelligence, and the second explains the applications of artificial intelligence in police work.

### **The Concept of Artificial Intelligence (AI)**

Artificial intelligence is one of the modern fields that attracts the attention of all societies, which witnesses ongoing developments, artificial intelligence is expected to play an important role in the future of humanity, it is a science focusing on the design of machines that engage human beings in behaviors described as smart, we now use it in many fields including economics, medicine, engineering, the military, games and so on.

Artificial intelligence plays an essential role in the national security of countries. Through the “Maven Project”, the U.S. military deploys artificial intelligence systems to scrutinize the vast amounts of data and videos captured by surveillance, then alert human analysts to the patterns detected or when there is abnormal or suspicious activity (Osoba, 2017), U.S. Deputy Secretary of Defense Patrick Shanahan believes that the purpose of using emerging technologies is to meet the needs of military fighters, to increase the speed and flexibility of technical developments and how to be supplied with them (Babli, 2021, p.126).

Artificial intelligence is the specific characteristics of computer programs that make them mimic human mental abilities and working patterns. The most important of which is the ability to learn, conclude and react positively quickly. Artificial intelligence is the ability of the machine to simulate human mind and how it works, such as its ability to think, discover, and benefit from previous experiences, since the development of the computer in the mid-20<sup>th</sup> century it has been discovered that the computer can detect evidence of complex mathematical theories, in addition to its processing speed and high storage capacity (Mustafa A. H., 2015, p.18)

Artificial intelligence is one of the modern innovative sciences that fundamentally relies on computers and its programs. It is the cornerstone in making programmed and computerized machines perform similar tasks largely for human intelligence processes of learning, devising, and making decisions.

#### ***Definition of Artificial Intelligence:***

Some defined the term artificial intelligence as: "The ability of digital machines and computers to perform certain tasks that are mimicked and similar to those of intelligent beings, such as the ability to think or learn from past experiences or other processes that require mental processes (Timemy & al, 2009 , p 71-82).

Artificial intelligence is also defined as: "The field that seeks to understand the nature of human intelligence by creating programs on computers that imitate actions, work or intelligent behavior (al-Obaidi, 2015, p. 44).

Another definition of artificial intelligence is: "The behavior and specific characteristics of software that make it mimic human mental abilities and working patterns" (Ng, 2016).

John McCarthy (Getting machines to think like us, interview posted on CNET on July 3, 2006) "computer scientist" defined it as "The science and engineering of the manufacture of smart machines" (McCarthy J., 12 November 2007), and Andreas Kaplan defined it as: "The ability of a particular system to analyze external data and devise new knowledge rules from them, to adapt these rules and use them to achieve new goals and tasks" (Kaplan & Haenlein, 2019 p.15-25).

There are those who define it as: "Part of computer science that cares about smart computer systems, those systems that have characteristics associated with intelligence, decision-making and somewhat similar to human behavior in this field in terms of languages, education, and thinking (Citron, 2007, p. 1249).

The term artificial intelligence refers to systems or devices that simulate human intelligence to perform tasks that can improve them based on the information they collect. We see that artificial intelligence as a branch of computer science that makes machines think like humans, it is a computer with a mind; it is a simulation of human behavior and cognitive processes on the computer, as it is a science based on the design and preparation of many applications.

We conclude from the above, there are many definitions that handle the concept of artificial intelligence, unified in content and differ in its words.

### ***Types of Artificial Intelligence:***

Artificial intelligence can be classified according to its abilities into three different types as follows:

- 1- Limited artificial intelligence: performs specific and clear tasks, such as self-driving cars, speech or image recognition software, chess on smart devices, which is the most common type at present (Geist, 2017, pp. 80–85).
- 2- General artificial intelligence: works with a capacity similar to that of man in terms of thinking, focusing on making the machine able to think and plan on its own, similar to human thinking, but there are no practical examples of this species, all that exists so far is just research studies that need a lot of effort to develop and turn them into reality (Frey, 2017).
- 3- Super-artificial intelligence: This type may exceed the level of human intelligence, it can do tasks better than a knowledgeable specialist, this type has many characteristics such as ability to learn, plan, automatic communication, and judgment, but the super-artificial intelligence is a hypothetical concept that does not exist in our time (Suzuki, 2017).

### ***Areas of Artificial Intelligence:***

Many workplaces around the world are benefiting from artificial intelligence now. With the aim of improving products, earning revenues, and making higher profits, the areas of artificial intelligence used vary greatly:

- 1- Human Resources Management: This function is an area of artificial intelligence where it changes how human resources and employment in companies work completely (Babli, 2021, p.126).
- 2- Searching for extraterrestrial life: NASA is using artificial intelligence to search for extraterrestrial life and send so-called wandering devices to Mars in 2020, to exploring the terrain, and detecting the planet's characteristics to determine the possibility of life on it (Al-Obaidi, 2015, p. 44).
- 3- E-commerce: Artificial intelligence software distinguishes, organizes and researches content in e-commerce, enabling shoppers to discover products related to the commodity, whether by size, color, shape or brand, and improves the capabilities of optical artificial intelligence every year, by obtaining visual signals from loaded images that help the customer to successfully obtain the product to be desired (Ng, 2016).
- 4- Logistics and supply chain: Self-controlled trucks and automated supply chain capture systems allow work seven days a week, reducing the waiting time required for a customer to obtain their items from the retailer, the time the retailer waits to obtain the item from companies and distribution centers (McCarthy J. , 12 November 2007).
- 5- Healthcare: Artificial intelligence provides opportunities to obtain information collected from the patients, innovate and improve patient outcomes (Saleh, The Impact of Artificial Intelligence and Emotional Intelligence on Decision-Making Quality, 2009).
- 6- Self-driving cars: Some cars are driving without the need for a driver; including Tesla, as well as Audi, Cadillac and Volvo are developing self-driving types (Timemy & al, 2009, p 71-82).
- 7- Facilitating industry: Manufacturing facilitation is an area of artificial intelligence, enabling the flow of vast amounts of data in fractions of a second of the device, and processing in different data bases (Saleh, The Impact of Artificial Intelligence and Emotional Intelligence on Decision-Making Quality, 2009).
- 8- Chat Robots: These robots work permanently, provide intelligent and flexible analytics through conversations on mobile devices, contribute to reducing the time needed to collect data from users, speed up business, and equip companies with the needs of this growing data soon (Goldin, 2009).
- 9- Artificial intelligence can be used in stock trading markets as well as for the betting industry in various sports and other fields (Rusan, 2019, p5).
- 10- The use of artificial intelligence in police work, which is the subject of our study, will be clarified in the second part of this research paper (Lohn, 2016).

### ***Characteristics of Artificial Intelligence:***

Artificial intelligence is characterized by creating new ideas, makes smart devices accessible to all segments of society, even those with special needs, uses comparison method in solving human problems, acquires knowledge and applies it in practice (McCarthy J. , 2017).

Intelligent systems are independent, accurate, and objective, so their decisions are far from error, bias, or racial or personal interference. Intelligent devices reduce human risks and psychological stress, focus on more important matters, explore unknown places, participate in rescue operations during natural disasters, and play an active role in

Areas that require mental focus and sensitive and quick decisions that cannot be delayed, such as quick security decisions (Citron, 2007, p. 1249).

AI technologies reduce reliance on human experts, It provides more than one version of the system to compensate these experts, uses old experiences and employs them in new situations better and faster, and works to improve production, as tasks are automatically automated to save time for the employee so that he can focus on the most important and productive tasks (Ng, 2016).

Artificial intelligence technologies help to quickly diagnose diseases, prescribe medicines, and work at a stable and non-volatile scientific and advisory level. There is a growing need for artificial intelligence intervention to reach strategic results and immediate decision-making (Mustafa A. S., décembre 2016).

The ability to learn and use trial and error to explore disputed matters while increasing the ability to quickly respond to new and different situations and circumstances and difficult and complex situations, and to discover and apply knowledge of the possibilities available with rapid response to new situations and circumstances, The ability to develop, innovate, and deal with difficult, complex, and ambiguous situations in the absence of information, and the ability to think, understand, and achieve quick and effective results and conclusions (McCarthy J. , 2017)..

Artificial intelligence is the simulation of humans in thought and method, and the processing of non-digital symbolic data through logical and comparative analysis and a specialized solution for each problem and for each homogeneous category of problems by providing critical information to support immediate decisions to solve difficult problems (Biggio, 2014, pp. 27–36).

## **Artificial Intelligence Applications in Police Work**

### ***Artificial Intelligence, Investigation, and Forensic Evidence***

#### ***1- Toxicology and Drug Analysis:***

Leveraging chemical databases, expanding searches and linking to millions of compounds, are future solutions for identifying narcotic compounds, abused drugs and their various metabolites in forensic samples.

Automated chemical analysis techniques have enabled the identification of materials, and their qualitative, composition in various environmental, medical, biological, criminal and other fields. This development contributed to obtaining huge data, which called on scientific institutions to benefit from this heritage that was created in the past, and led to its continuous growth, which enabled the availability of a great information wealth that reached by the year 2020 more than 160 million organic and inorganic substances registered in Database (Barak, 2014).

This makes us realize the huge size of this data, the difficulty of research and the time that will be wasted to reach the target information, therefore the huge amounts of data accumulated from scientific research are impossible to realize and manage except by computer methods and artificial intelligence tools, as scientific research and studies in the field of artificial intelligence applications It is still continuing to build massive capabilities of big data (Gasteiger, pp. 2233-2242, 2020).

With the significant increase in the volume of chemical data and information, its linkage with information technology and digital computing, modern scientific disciplines have been developed such as chemical informatics, which contribute to performing calculations to solve chemical equations and theories, allow prediction of the outcomes of reactions, as well as developing statistical methods for analyzing chemical data, helping in analyzing Chemical compounds and spectra, an example of this is the ability of statistical methods to identify a number of patterns of compounds and identify them through spectral comparison with databases (Barak, 2014).

Machine learning models provide a real dimension to identify the patterns of chemicals by distinguishing compounds according to composition, knowledge of analytical conditions, other information such as chromatographic separation results with separation information such as mobile phase and separation column, and other information (Allen, 2017).

### ***Mass Spectrometry and Chemical Results Databases:***

Leveraging of chemical databases and expanding the search scope to millions of different compounds and patterns will represent important solutions to identify unknown substances in forensic samples, in addition to the possibility of searching for chemical compounds using the fragmentation of compounds by mass spectrometry, with the conversion of chemical compounds through (SMILES) notation. The simplified text entry of molecules, the formula that smart systems recognize when dealing with chemical compounds and recognize them as shown in the following figure (Caplan, 2011).

### **Methods of Displaying Chemical Compounds:**

With this transformation, a large variety of databases were formed that contain millions of chemical information, obtained by scientists, old and new, and these data are available via the Internet as open sources; With the possibility of using it in an extensive search through software codes in smart neural networks, to contribute to the predictions of outcomes even if standard samples of metabolites are absent (Winger, August 1990).

### **Some of the Available Databases:**

- A. US National Institute of Technology and Metrology: A digital database that provides chemical information, A chemical database containing biological and chemical information, containing nearly 110 million compounds, and containing more than 250 million substances (Chamard S. , 2002).
- B. The Drug Bank: is a digital platform that provides specialized information about drugs, their side effects, pharmacokinetics, as well as chemical structures and drug interactions that help experts identify the toxicity level in a drug (Chamard S. , 2006).
- C. The Human Metabolome Database: An electronic database containing detailed information on metabolic regulations including water-soluble and fat-soluble as well as 2,280 drug metabolic regulations (Caplan, 2011).

There are also many studies that have contributed to the development of scientific methods for predicting unknown compounds based on the fragmentation of organic compounds through mass spectrometry, and scientific platforms linked to chemical databases built using artificial intelligence techniques have been built, enabling the search for compounds obtained from Forensic laboratories through mass spectrometry results (Sparkman, 2002, p23).

However, more studies and research need to develop this field to overcome challenges, and to invest in integrated data in all its forms.

### **2- *Remnants of Gunfire:***

GSR examination is usually associated with issues in which firearms have been used, and there are several factors that may influence laboratory results in the processes of matching used bullets with firearms residues. In a scientific study, machine learning methods were used to develop a method that predicts the ammunition used without the need to the existence of a reference sample of the weapon used by the suspect based on the result of organic gunfire residues (Chan, 2003).

A Qualitative profile-profile relationship (QPPR) model was developed, and 14 machine learning methods were used to obtain the ideal model for predicting what the organic matter might look like inside the shotgun contributing to the explosion process and interaction before the launch process, and these models were applied to a set of samples Lifted from accident scenes, shot starter samples and empty envelopes (Kumar, 2011, p182).

The organic compounds were then examined for the content of the bullet and the organic residues of the gunfire by gas chromatography coupled with mass spectrometry (GCMS), the results showed a great similarity after applying the model in predicting between organic materials before and after interaction, which indicates the possibility of linking evidence logically in several different criminal scenarios.

This method made it possible to identify the organic compounds involved in the combustion reaction inside the empty envelope even in the absence of a gunshot reference sample, this method can contribute to reconstructing the crime scene, and finding quick relationships between the remnants of the shooting and the types of ammunition used, and this tool may be of great value in criminal investigations in which multiple types of firearms or ammunition were used (M. D. Gallidabino, pp. 1128-1139, 2019).

### **3- *Fingerprints:***

In the field of fingerprinting and determining its patterns, the Desorption Electrospray Ionization Mass Spectrometry Imaging technique (DESI-MSI) was applied to estimate the invisible fingerprint samples, according to the chemical patterns and structures, as well as the “Classification Algorithm” algorithms were used in the Gradient Boosting machine learning model (Babli, 2021, p.126). Tree (GBDT), which enabled the classification of standard samples in the study samples well to determine the sex, race and age through the fat, and the model allowed to

perform the differentiation and classification of the trained samples until the system recognized the unknown samples, determine the age, gender and ethnicity through the components of race (Hermann, 2014).

This method may offer great forensic value by using the results of mass spectrometry with machine learning to identify personal information of people at crime scenes in an inexpensive way, may take forensic science to another path in identifying people at crime scenes according to their metabolites.

#### ***4- Genetic Fingerprint:***

In the areas of DNA and its forensic applications, examining a mixture of biological samples is one of the challenges within the forensic laboratories, especially with the increasing number of people in the sample, for the important role it determines in mentioning the number of people involved in the case (Koper, 2015).

This system helps solve problems for admixture samples, due to the large and complex data of human DNA admixture samples in electronic format. Patterns in such data are often unclear, beyond the effective access of manual analysis, but can be evaluated statistically using machine learning algorithms.

A group of experts has been working on developing a method that helps in criminal prediction inside crime scenes, according to mixed blood spots using machine learning, in the study, it was suggested to use the PACE system as a valuable tool in evaluating the number of contributors. The results showed a high accuracy of more than 98% for 4 contributors in a record period and forensic laboratories may depend on this tool in estimating the number of contributors to the mixture samples resulting from the adoption of machine learning as a main tool to eliminate the complexity of laboratory tests, and other scientific applications of predictions and statistics (M. A. Marciano and J. D. Adelman, pp. 82-91, 2017).

#### ***5- Criminal Statistics:***

Machine learning tools have simplified pattern recognition, which relies on probability and statistics, to help recognize patterns and redundancy in big data. This may include image pattern recognition, where the system attempts to recognize different parts of images or people. There may be other types of pattern recognition such as detecting a repeating pattern in a text in emails or a specific pattern in an audio file. AI tools also provide computational tools that can help build statistically relevant evidence, which will reduce errors. It improves understanding of some results.

These methods are built on scientific foundations to process more complex evidence because of the extensive information available, artificial intelligence can provide quick and easy solutions to judicial and legal bodies.

#### ***6- The Path of the Gunshots:***

In murder cases in which firearms were used, A computerized tomography is used in the field of forensic medicine to determine the locations of stable gunshots in the bodies, and a database was built for large numbers of CT scans, Which shots were the cause of death, and the study aimed to apply Algorithms for mapping bullet paths, their locations, determining the caliber used and how far they were fired (C. Bain, 2021).

#### ***7- In the Field of Crime Scene Reconstruction:***

As it is known, crime scene experts are working on explaining how the crime occurred through a number of data and results of the evidence collected from the crime scene; So that they can determine the type of crime and identify the perpetrator.

The great predictive power offered by AI tools will be supportive in the decision-making associated with the reconstruction of crime scenes, a Bayesian network model has been developed to predict the type of case through inputs (evidence and scenario), to help solve a case (Chan, 2003).

The Bayesian network model is defined as: "a probabilistic graphical model that represents a set of variables and their conditional dependencies through a directed periodic graph (Koper, 2015) ", and it is an ideal model for predicting the probabilities, For example, the network can represent the probabilistic relationships between diseases and symptoms, as well as the probabilistic relationships between evidence and the type of crime, and the developed model consists of three layers, namely hypothesis, scenario and evidence.

The model can be built according to the type of crime, taking into account the possibility of adapting the model according to the evidence entered, The model gives us suggestions for the possible scenario that will help in making the decision to rebuild the crime scene, and this model was applied in a realistic study that provided effective investigative suggestions and reasonable results for the reconstruction of the crime ( Mustafa A. S., décembre 2016).

#### ***8- Restoration of Pictures of People whose Bodies have been Decomposed:***

The General Department of Forensic Evidence and Criminology at Dubai Police used a digital restoration mechanism based on artificial intelligence to draw a portrait of the face of the owner of a decomposing body found at sea (C. Bain, 2021).

The process was carried out by a 3D technology system by a group of experts in the Forensic Medicine Department and the Electronic Forensic Evidence Department in coordination and cooperation with the General Department of Artificial Intelligence, It was a great challenge to identify the expected shape of the features of the owner of the corpse, while it was subjected to almost complete decomposition, especially in the area of the face that had disappeared from its features (C. Bain, 2021).

The picture that the team drew of the deceased came after great efforts by the experts of the Forensic Medicine Department and the Electronic Forensic Evidence Department, and after examining the body that was found nearly a month ago, and it is in a state of severe decomposition in all its features and features as a result of its exposure to factors and climatic conditions and the erosion of the body due to marine organisms.

Identifying the owner of the corpse was difficult; Due to the absence of a DNA fingerprint at the department specialized in storing DNA samples for comparison, in addition to the absence of fingerprints due to its decomposition and damage, which necessitated working on creating smart solutions to try to know the expected shape of a man based on the vital data collected by forensic experts, and they discussed it with a working group Electronic Forensic Evidence Department to draw a 3D image (C. Bain, 2021).

The team faced several challenges, the first of which was the need to identify the color of the person's skin, which disappeared due to the presence of the body in the water for a long time, and the demise of body pigments, but forensic experts were able through specialized tests to obtain the expected color, which is the Burgundy skin that the residents of Asia and the region enjoy. In the second stage they also worked to verify the color and length of the hair, and they were able to verify this through a single hair that was in the body after decomposition, and after conducting specialized forensic examinations on it, it was found that the person had thick hair before his death, and his hair was 3 cm long (Report on the General Department of Criminal Evidence and Criminology in Dubai Police).

Later, they determined the life expectancy of the person using osteometry and pelvic bones, where it was found that the life expectancy ranged between 35 to 45 years, and this type of examination contributes to narrowing the process of searching for possible missing persons by determining the approximate age group.

The experts then worked on conducting an examination of the skull to verify its type, shape and size, and the results confirmed that it is also an Asian person close to the Arab region. The team also made measurements of skin thickness, eye color and other necessary vital information, and this information was sent within the anthropology report to the Visual Evidence Analysis Department in the Electronic Forensic Evidence Department.

The department depended on the anthropology report, head x-ray imaging, and 3D scanning of the head and skull region to digitally restore the face. Then, the team cooperated with the Virtual Training Center in the General Administration of Artificial Intelligence; the team used the 3D drawing program in order to obtain a technical restoration of the face, in order to reach the approximate image of the person with a high expected match ratio, it is worth noting that Dubai Police has been working on digitally restoring the face since 2007, and that it has developed work in this field to 3D restoration (Report on the General Department of Criminal Evidence and Criminology in Dubai Police).

### ***Conclusion Discussion:***

The researchers have dealt with the use of artificial intelligence techniques in policing through two parts, the first focuses on what artificial intelligence are, characteristics of artificial intelligence, and importance of artificial intelligence.

The second part is highlighting the role of artificial intelligence in the development of security services through a range of applications in policing such as investigation and forensic evidence, toxicology and drug analysis, gunshot residues, fingerprints, genetic fingerprints, forensic statistics, the path of gunshots, in the field of rebuilding the crime scene, restoring images of people whose bodies were decomposed.

### **The study concluded with a number of findings and recommendations:**

#### **Results:**

- 1- Artificial intelligence is based on several methods that vary depending on the purpose of smart systems.

- 2- The AI system has become a leading one in all life fields of medicine, industry and others.
- 3- Many countries now use advanced information systems such as cognitive information systems applications, locating and linking them to advanced artificial intelligence systems within the fields of security work.
- 4- The use of information technologies supported by artificial intelligence systems will contribute significantly to the detection and prediction of crimes and the speed of combating different types of crimes and maintaining security.
- 5- As technology advances, many crime fighting forces have begun to use algorithms designed to find out where and when crimes are likely to occur in what is known as predictive police.
- 6- Making use of artificial intelligence in crisis and disaster management to help manage crowds in case of a huge dilemma.

**Recommendations:**

- 1- The security establishment works to develop the security strategy based on specialization in each field through specialized institutes in each of the sectors of the security establishment and linking them to that institution to win the loyalty of workers to the security establishment.
- 2- Create training programs to build smart systems in security institutions and sectors.
- 3- Following global trends towards the introduction of security applications based on artificial intelligence technologies.
- 4- Developing the spirit of innovation and creativity in the police, by working on rehabilitating and training him in security technology.
- 5- Encouraging creativity and innovative solutions among citizens to acquire them in security applications.
- 6- Establishing specialized police call centers to receive and resolve complaints using information systems equipped with artificial intelligence applications.
- 7- Providing smart analytical programs with the aim of obtaining accurate information and data that help in solving criminal cases to maintain the national and internal security of countries.
- 8- Learn about and use the international police systems used for artificial intelligence programs with successful experiences in this field, such as the United Arab Emirates, the United States of America, China and Singapore. The security services to install the new smart sensors, live surveillance cameras equipped with registration, and to preserve the feature of identification, within major cities and link them to GIS-GPS systems, connected to all control rooms, security patrols and central crisis rooms in the country.
- 9- Using new smart sensors and live surveillance cameras equipped with recording in major cities and linking them to GIS-GPS systems connected to all control rooms and security patrols to maintain security.
- 10- The use of smart programs that serve citizens through the government portal, whether in traffic services, crises and ambulances.
- 11- The development of security monitoring and the use of artificial intelligence and electronic security systems around the clock in line with the development of modern communications.

- 12- Applying data analysis methods and analyzing the behavior of users of social networking sites and the Internet to find out the extremist tendencies of extremist elements.
- 13- Allocating a unique fingerprint for digital data that cannot be hacked or modified, and raising the level of digital security for national data.

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