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Employing AI Applications to Authenticate People through Neural Networks

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Abstract: Artificial intelligence is used to develop techniques for verifying people by sensory factors. This article aims to design a robot to verify the entry of the authorized persons to the firms. This paper uses neural networks with artificial intelligence applications to authenticate people, while the program is based on testing four factors: the face, eye, voice, and handprint. The AI application depends on a mathematical algorithm to test the authority of staff; meanwhile, neural networks analyse and examine the visual systems that connect imaging devices (camera) with a computer. Moreover, this is done through the huge amount of data in a smart computer database that can be updated, with speed and objectivity, through the Internet to reach accurate results. The results indicate that the model designed for artificial intelligence has economic feasibility; in addition to that, it can help detect diseases that can affect employees by multiple parametric methods of verification.

Keywords: Artificial Intelligent Application, Authenticate people, Neural network.

1 Introduction

In general, Artificial intelligence has been applied in several matters and it has been successful. We can limit the applications of artificial intelligence to three main areas:

- Cognitive science applications (expert systems, logical reasoning, games, learning, genetic algorithms),
- Intelligent machine applications (robots, vision, image, neural networks, interact with person- machine), and
- Natural interface applications (speech and writing recognition, understanding natural languages, multi-talent system, planning, virtual reality) [2].

Recently, with the rapid growth and the availability of big data and computing, Artificial Intelligence (AI) has regained tremendous interest and investment. As well, Machine learning (ML) approaches have successfully been applied to solve many problems in academia and industry fields. Although the proliferation of big data applications is driving the development of ML, it poses serious challenges to data processing speed and scalability on traditional computer systems. Computing platforms, von Neumann had designed specifically for AI applications, from complementary systems to platforms to self-contained technical solutions. These platforms, which belong to a larger category called "domain-specific computing," focus on a specific allocation of AI. Chen et al. focused on summarizing recent advances in accelerator designs for deep neural networks (DNNs)—in terms of computing units, data flow optimization, target network architectures, architectures on emerging technologies, and acceleratorsfor emerging applications [9].

There are multifaceted challenges in the field of authenticating people. For example, there are some applications used to authenticate fingerprints by staff. Other applications are used for Eye print. During last decades, there are authenticated devices designed to authenticate two processes: face print or fingerprint, or three processes including Eye print.

The market sales indicate that some or most companies tend to buy devices with different verifiability. This is because of scientific development and the cheap price of verification devices, namely in the market “employee fingerprint devices”. Moreover, the survey research had been done by asking some specialists from information technology managers, including directors ofinformation technology in Buraydah Colleges, Onaizah Colleges, and Qassim Governmental University, located in the Qassim region.

This research paper propose multi-phase of authenticate work together by which the AI application read the employee ID. It must pass the multi-phase of authentication to give full access. Unless this proposed model point to a problem in

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authentication for this employee ID, this may or may not be in Personal Verification (Biometric).

In this research paper, the researcher proposed an AI model application, so that the computer can represent the data or the problem, process it, and be able to think of a solution to it. The proposed application is supposed to search in the database that it possesses, think about the options available to it, evaluate them according to the criteria of its subject, or devise solutions by itself based on the experiences it has. Then, it decides on the optimal solution.

Therefore, The AI application supposes that there are diseases that may appear in personal biometrics for staff.

2 Background

2.1 Neural Networks

It depends on data processing in the same way that a human neural network does. In addition, it depends on mathematical methods characterized by the speed of data processing, as well as their ability to learn and deal with different types of data [18]. As well as being able to distinguish images and speech, even those that have an error in part of them [20].

Deep neural networks (DNNs) are nowadays common practices in most applications of artificial intelligence (AI). Their ability to exceed human accuracy has made these networks milestones in the history of artificial intelligence. However, while they offer high-end performance, they require massive computing power [7].

Neural networks are computing paradigms that have pioneered advances in the applications of machine learning (ML) and artificial intelligence (AI). In recent years, the first small-scale quantum computing devices have become available. In parallel, the methods had smoothed for the development of new paradigms in information processing. The authors had provided their overview of the latest proposals aimed at implementing the main functions of artificial neural networks in quantum architectures. In addition, it highlighted the potential role of quantum devices, in the near term, in the search for advantages of quantum machine learning [19].

2.2 Quantum Computing

Quantum computers have the potential to achieve someform of computational advantage, i.e. acceleration of linear algebra with faster and better performance than classical arithmetic [17].

2.3 Genetic Algorithms

This technology appeared for the first time in the seventies of the last century through the research efforts of John Holland. It is a neural network system which relied heavily on the idea of simulating the structure of brain functions. Thus, genetic algorithm systems are based on the idea of representing the biological evolution of living organisms [1].

The role of genetic algorithms is to search for optimal solutions by reprocessing previous solutions and selecting the most important ones, then reproducing and evaluating the best solutions and then outputting them in the form of new solutions. The Japanese laid the foundations and components necessary for this generation, namely:

- Knowledge base and its management system that can enhance the database.
- Template base.
- Database management system.

Natural languages, a sub-science of artificial intelligence, which, in turn, is branched from informatics and greatly overlaps with linguistics that provides the linguistic description required for a computer [1].

As well, it has been defined as computers that are capable of logical inference through symbolic operationinstead of the digital operation currently used in traditional computers. Thus, they aim to match human capabilities through computer understanding of human speech and various images and to reach conclusions using a logical thinking style.

Artificial intelligence and machine learning are seeing widespread adoption, especially in industry and academic fields. The development of applications shows the accuracy of artificial intelligence through increasingly complex algorithms and models. This has stimulated AI accelerators for specialized hardware [23].

2.4 Visual Systems and Case-Based Intelligence Systems

Visual systems and case-based intelligence are among the applications of AI.

2.4.1 Visual Systems

They are systems that connect videos and computer image devices. They are usually used in inspection operations. For example, visual inspection is important for food production companies. As well, they are widely used when the items examined are very similar. Those systems are characterized by having fast performance and having many applications including sorting, classification, guidance, follow-up, control, and quality.

2.4.2 Intelligence Systems

Intelligent systems have techniques used to provide quick solutions. They rely on the ability to perceive practicalcases, such as traffic jams, previously stored in the databaseand related to the problem under detection [20].

Some researchers stress the need for a comprehensive

analysis of AI workloads and revealing the "AI tax." They deployed and featured facial recognition in a state-of-the- art data center. They are proposing the AI-powered video analytics application built by using popular open-source infrastructure and Machine Learning (ML) tools. Despite the use of modern artificial intelligence and machine learning algorithms, the application relies heavily on preand post-processing code as AI-focused applications benefit from the promising acceleration. There were found to place stresses on hardware and software infrastructure: storage and network bandwidth become major hurdles asAI increases further [22].

3 Related Works

The study shows the effective utilization of neural networks in education in which a comprehensive educational program is presented, along with a survey on recent developments towards the goal of enabling efficient manipulation of DNNs. Currently, deep Neural Networks (DNNs) are widely used for much artificial intelligence (AI) applications including computer vision, speech recognition, and robotics. Whereas, DNNs provide advanced accuracy in many AI tasks. [26].

On the other side, with the advancement in science and technology, there have been tremendous developments in the application of neural networks in medicine, especially in dentistry. This systematic review aims to report on the effectiveness of artificial intelligence (AI) applications designed for diagnosis, decision-making, and prognosis prediction. Where the study used the electronic databases PubMed, Medline, Embase, Cochrane, Google Scholar, Scopus and Web of Science, as cognitive tools to identify the problem of endodontic in an application of artificial intelligence. From January 1, 2000, to June 1,2020. The sample included a set of 10 studies in which QUADAS-2 had been applied to synthesize the quality of the included studies. The results indicated that the usedneural networks mostly rely on convolutional neural networks (CNN) and artificial neural networks (ANN) in their neural structures. These AI models have been used to locate the apical foramen, make predictions of retreatment, predict periodical disease, detect and diagnose vertical root fractures, and assess root shapes. Finally, these studies indicated that the performance of neural networks is comparable to that of experienced professionals in terms of accuracy and precision. In some studies, these models have outperformed specialists. Regarding clinical significance,these models can be of greater use as an expert opinion for less experienced and non-specialists [5].

Artificial Intelligence (AI) in general and artificial neural networks (ANN), in particular, provide huge amount of knowledge to improve managerial decision-making. Additionally, these ANN and AI technologies also serve as repositories of knowledge and blueprints for organizations that facilitate managerial leadership responsibilities. This article looks at how ANN and other AI applications can be adapted to facilitate managerial leadership, improve manager performance, and, in some cases, perform management activities. As well, research that ranks leadership styles and desirable qualities for leaders is reviewed [27].

Capra, et al., (2020) using DNN and AI have developed several optimization techniques at the hardware and software level as well as specialized architectures to effectively implement deep learning (DL) algorithms and reach a model with high performance and energy efficiency, without affecting its accuracy [7].

Artificial intelligence (AI) has made tremendous advances, particularly in the field of image classification. This article presents the development of algorithms capable of making an accurate cutaneous diagnosis and recognizing skin lesions, especially melanoma. Since 2017, there have been several studies evaluating the accuracy of the algorithms, with some reports that the accuracy matches or exceeds that of a dermatologist. The results show that using artificial intelligence, machine learning, neural networks, and deep learning, it is easy for a practicing dermatologist to get help diagnosing skin lesions and skin cancer [11].

Artificial intelligence (AI) models have been developed in biomedical research and healthcare services as clinical decision support systems since the applications of artificial intelligence, and medical imaging, in particular, have become a promising field in the provision of health care services [8].

4 Problem Statements

As a result, the tremendous development of modern technology and the emergence of neural networks and artificial intelligence and their entry into various scientific fields led to addressing innovative solutions for business development and obtaining positive results

On the other hand, it appeared in the form of imitation or for humorous purposes on social networks known as memes. This can ignite political campaigns, polarize people, fuel social movements, and even incite violence [16].

It also referred to combating misinformation that used in information warfare and defaming personalities in social networks [14]. Insight notes in its study show that GANs (Generative Adversarial Networks) are types of artificial intelligence used to implement unsupervised machine learning. In the GAN, opposing neural networks work together to manufacture increasingly realistic audio, image, and video content. One of the neural networks in the GAN acts as a chip that drives the other network to generate higher resolution results. The network is judged and its output is corrected so that the result is a video or photo-realistic image of an event that never happened [16].

Neural networks also facilitate sound falsification. The neural network can transform the elements of a sound source into statistical properties, which can be re- arranged to make fake original sound clips.

The proposed problem led to the need for using artificial intelligence and neural networks to go throughseveral stages

to verify people and to avoid the misuse of applications.

5 Objectives

- Localizing the applications of artificial intelligence in the conduct and management of the institution's activities.
- Integrating modern technology into organization to keep pace with scientific and technological progress because of its economic feasibility.

6 Research Questions

The main Question is:

"Do organizations rely on AI technology to authenticate people?"

To answer the research question of the study, we divided the main question into sub-questions as follows:

6.1 Sub-Questions

- Is there a relationship between employing artificial intelligence applications and authenticating people in organizations?
- Does the neural network rely on improving the performance of the organization?
- Does the organization achieve economic feasibility to employ artificial intelligence applications?

7 Hypotheses

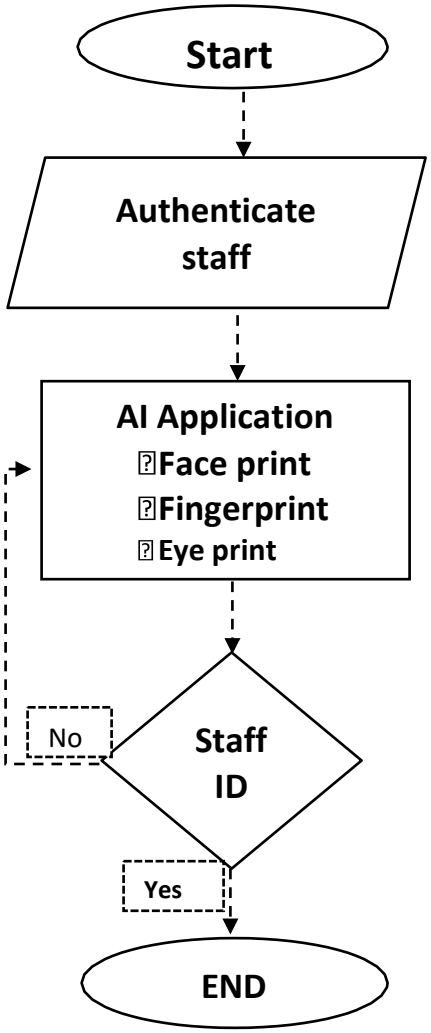
- There is a relationship between the applications of artificial intelligence and authenticating people in organizations.
- The Neural networks have a positive role in authenticating people
- There is a positive relationship among artificial intelligence applications in organizations

8 The Importance of Studying

- The importance of the study appears in the role of artificial intelligence applications and the ease of their use.
- Its contribution to improving performance, independence, accuracy, and objectivity, thus making its decisions far from error and bias.
- The possibility of using artificial intelligence applications in areas requiring many accurate and complex details.
- The possibility and ability of neural networks to simulate human intelligence and reprocess solutions for making decisions.

9 Research Methodologies

In the research paper, we will rely on the deductive approach, which is to develop a set of hypotheses and assess their effect in the reality.



1.1 Research Flowchart.

10 Structure of the Study

This research paper deals with the employment of artificial intelligence applications and neural networks and their positive role in verifying people through the senses (visual, audio, and visual images), which made it economically feasible in the performance of the organizations and allowed authorized people to access without others to perform tasks. Alternatively, they can authenticate their presence by means of a test going through several stages of security verification, such as using the ID number, fingerprint, hand, and voice. As well as they can detect that some people have a problem in one verification stage and re-process it, with another security verification stage.

Then, the study will list several aspects such as neural networks, their role, and importance of their use, the

aligning, and employment of artificial intelligence applications.

11 Justifications of the Study

The research purpose is related to the role of artificial intelligence and its integration in organizations and the feasibility of its application.

12 Conceptualization and Developed Hypothesis

To answer the first research question of the study: Is there a relationship between employing artificial intelligence applications and authenticating people in organizations?
This is through a narrative of the conceptualframework as in Figure (1.2) showing the algorithmic steps for applying artificial intelligence, which depends on theuse of neural networks to accurately, identify people and verify them through stored databases about related persons such as employees. There are some stages of verifying the eye print, handprint, and face print. Where the application use its tools in a few seconds to compare the entered inputs,(the eye handprint or the face snapshot) with the neural network databases and process them. Hence, if it finds some errors in the inputs or distortions in some of thepeople's inputs (the person has an injury to the face or eyes,a hand scratch, etc.), the AI makes a decision on the authority of traffic and verify the possibility of entering the required place.

12.1 Personal Verification (Biometric)

It's based on verifying the personality of the customer based on the physical characteristics of individuals such as personal fingerprint, human eye scan, human face recognition, human hand properties, voice tone verification, and personal signature [21]. The author discussed accessibility issues as well as data and ethical implications in deciding which sensory information to convey to a user and privacy concerns for both the primary user and others. Indeed, artificial intelligence based on the use of systems that increase the sensory capabilities of blind users to recognize objects and voice awareness tools for deaf users. However, these systems provide information that is already available to persons with disabilities [13].

12.2 Fingerprint and Handprint

It has become important to authenticate people's identities securely, recently. The author discussed algorithms, limitations, future research and reviewed the extensive research work that has been done over the past few years. Then, the researcher discussed various proposed techniques for fingerprint matching. It was the dominant technology with secure and confidential biometric authentication technology in the biometrics sector [12].

12.3 Eye Print

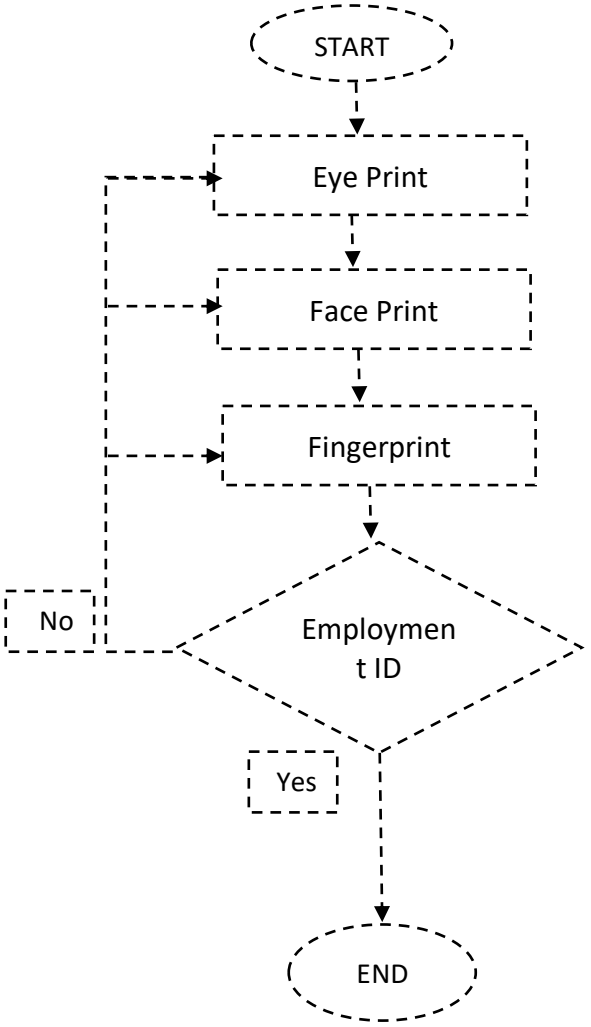
The result of the increasing role of artificial intelligence (AI) models in biomedical research and health care servicesand a narrative review undertaken with a critical evaluation of articles were published between 1989 and 2021. The results indicated that machine learning (ML) and deep learning (DL), the phases of feature selection, training, validation, and testing have been described for ML/radionics. Whereas, DL model has been presented as multi-layer artificial neural/convolutional neural networks, allowing direct image processing. The data processing section includes technical steps such as image tagging and image annotation. In addition, by calculating the samplesize and considering multiple tests in artificial intelligence approaches, data augmented to work with limited and unbalanced data sets. Interpretation of AI models and knowledge of the pros and cons of choosing ML versus DL were used to implement AI applications for medical imaging comprehensively [8].

12.4 Face print

Previously, facial recognition technology was used as a system to secure ammunition depots and reduce the incidence of theft or misuse. In the tests carried out, the minimum detection distance was 20 cm and the maximum detectable distance was 110 cm. It was influenced by the camera focus and light intensity testing in the morning, afternoon, evening or night [3].
Detection methods based on deep neural networks (DNNs) are very suitable for ensuring automated verification based on face images. However, it does not provide transparency in decision-making and it is not clear how they distinguish between real and mutated facial images. The study presented the FLRP as a framework for a human inspector at a precise pixel level: image regions used by a deep neural network to distinguish between the original facial image and the modulated image. In addition, we propose another framework for objectively analyzing the quality of our method and comparing FLRP with other DNN interpretation methods. If the DNN is uncertain in its decision or incorrect, FLRP performs better in highlighting the visible parts than other methods [25].

Second Question: Do Neural Networks use to improve the performance of the organization?

Advances in Artificial Intelligence (AI) have attracted great interest from researchers and practitioners and have opened up a wide range of beneficial opportunities for the use of AI in the public sector [4]. Wirtz and others introduced a conceptual approach that analyzes related insights to provide an integrated view of AI.
Applications and challenges. The results indicated 10 areas of artificial intelligence applications, to add the value of their own and their work. In addition, it identifies four main dimensions of AI challenges [28].



2.1 Conceptualization and Developed Hypothesis.

Artificial intelligence (AI) refers to a set of technologies through which smart machines gain the ability to learn, improve, and make calculated decisions that enable it to perform tasks. The advancement of artificial intelligence and its impact on the workforce were further bolstered by the 2018 United Nations e-Government Survey [10]. Others proposed Super-IOT, as new method, to enhance the security and efficiency of AI applications in distributed Internet of Things systems, specifically, to eliminate hostile disturbances (AEs) that can occur to deep neural networks (DNNs). The results show that super IOT can outperform the three existing AE defense solutions against most attacks with better transmission efficiency [22].

Salehi and Burgueño have used artificial intelligence to establish a new intelligent method for use in structural engineering, where the model can address the limitations of traditional models. This is to reduce error rates and increase computational efficiency and quick decision-making in addition to presenting potential research methods and emerging trends for employing ML, PR, and DL [24].

The Third Question: Is the institution achieving economic feasibility from employing artificial intelligence applications?

Ronya and Lakhdar Dolej's study aimed to study cyber security threats. The most challenge facing global economies is the use of the latest complex protection techniques and the strengthening information security of infrastructure systems constituting a major crisis for the economy due to its huge amounts of money. Moreover, the volume of investment in information security is one of the most important priorities of governments as well as companies in different countries of the world. Therefore, there must be many real threats to information security, and strategies to protect companies and various networks are essential. In addition, electronic risks are constantly changing and an international feature characterizes cybercrime. Hence, there is a need to build and support control, monitor processes and adopt smart systems in order to manage Information security, based on artificial intelligence techniques and accurate decisions methodology by experts and knowledge holders, supporting information security management processes and detecting fraud and espionage operations [25].

Investment in information and communication technology has become one of the factors of administrative success in public and private institutions because it has a significant impact on saving time and effort in completing work. In addition to training on the use of technology devices in the organization. In addition, it helps to reach successful investment and effectively use, which, in turn, helps to employ technology applications in the organization [15]. Whether it is human and administrative resource programs such as fingerprint or electronic signature, etc. [6].

13 Presenting the Results of the Study

This research paper deals with designing an application model that uses artificial intelligence to assist in the biometric personal verification of employees. This helps reduce human intervention and specifically reliance on artificial intelligence technology. The study showed that the use of neural networks to verify the authenticity of people leads to extreme accuracy in the work since it allows only authorized persons to access without others. In addition, it logs people into the neural network databases, which in turn compares the recent inputs with the previously data stored in, and corrects its outputs until the result is a video or a realistic image of a real event.

The beneficiaries of the study is divided into two parts: First, it helps the stakeholders, the employers, where this system enables them to fully control and monitor the work by employing a model that relies on the use of neural networks with artificial intelligence specifically. Secondly, employing such as biometric verification model for people demonstrates the success and usefulness of artificial intelligence technology in organizations and businesses on one hand, in addition to its usefulness in discovering early

medical symptoms that workers can affect. This benefits the community or the environment surrounding or used for the application. It also helps the good scientific race that develops a good environment for innovation and the flourishing of the technological revolution in information systems and computer science.

Through the test model phase to this model, the model has been deigned to give access to all users who have passed the three levels of authentication unless there is a problem according the test phase, that was mentioned and done by IT managers of the three universities. Through Verification (Biometric) recognition, we concluded that AI application did not agree to give full access to that person ; for example, if there was a problem with their fingerprint because of their hand although their Face print and Eye print are correct, the proposed model will point this meaning into some diseases in the Biometric person.

14 Conclusions and Future Work

In this study, the importance of employing artificial intelligence applications in authenticating people were addressed, due to its great importance, especially with big data and the world of digitization. There is no doubt that artificial intelligence has entered all fields in addition to the fact that some companies have tended in one way or another, albeit in a simple way, to integrate artificial intelligence applications. As shown in this study, the use of artificial intelligence has economic feasibility for institutions [25]. The use of neural networks and their importance appear in arithmetic operations and equations, in addition to experience and training.

Some biometric personal verification of people related to the organization that adopts and employs the application of artificial intelligence. The application has been used to check its

databases and ensure the information that belongs to persons in an organization. Moreover, it is free from any forgery that can result from hacking or distortions as shown in previous studies [26].

Data will be represented from the fingerprint device by connecting the USB. It then defines employee information, employee ID numbers, times your employee logged in and out, fingerprint recognition, face print recognition, and handprint data. Then wait until the process is complete. Therefore, The IT person who is responsible for data wither draw will deal with the data within an easy Excel sheet.

The program predicts if the person with the ID number has a problem with one of the biometric verification methods, he or she can resort to a health care organization in time to avoid any problems later, or go to the ophthalmologist to reveal his eyesight, for example. Alternatively, it he or she visits a dermatologist because of a handprint or a face print. This is by collecting and analyzing the data of each person if there is a medical suspicion in any of the verification methods used in the application of artificial intelligence used. The outcome- based technology used to perform screening, analysis, prediction and tracking of current and potential future patients.

Conflict of interest

The authors declare that there is no conflict regarding the publication of this paper.

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