# The Use of Fingerprint Technology and Its Impact on the Employees of Oil Companies in Libya

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**ABSTRACT**
*In this paper, we shall present the impact of using fingerprint technology on workers in oil companies in Libya. Fingerprint technology has evolved immensely since its initial use in the 1800s. It is now used as a convenience replacing passwords and PIN numbers from logging into bank accounts, mobile devices, gaining access into rooms and various other processes where time plays a key factor. Usage of fingerprint technology provides business opportunities that substitute traditional systems of credit card, written time-attendance records. This paper focuses on how fingerprint technology can be used to improve speed and accuracy of certain processes, and We'll talk in more detail on the most important oil companies in Libya, which is the National Oil Corporation, which represents 75% of oil companies and refineries in Libya. The paper presents an insight into this technology, its advantages, disadvantages, challenges it faces, and finally a study in one of the well-known refineries in the western region of Libya.*
**KEYWORDS:** *fingerprint technology, challenges it faces, fingerprint devices*

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## I. Introduction

The National Oil Corporation (NOC) changed into installed on 12 November 1970, beneath Neath Law No: 24/1970, changing the overall Libyan Petroleum Corporation which installed beneath Neath Law No. thirteen of 1968 to anticipate the obligation of the oil sector operations. It changed into later reorganized beneath Neath selection No :10/1979 via way of means of the General Secretariat of the General People's Congress, to adopt the conclusion of the targets of the improvement plan withinside the regions of petroleum, assisting the country wide financial system thru increasing, growing and exploiting the oil reserves and working and making an investment in the ones reserves, to recognize superior returns. In wearing out its activities, NOC might also additionally input into participation agreements with different organizations and groups wearing out comparable activities.

Therefore, NOC is wearing out exploration and manufacturing operation thru its personal affiliated organizations, or in participation with different organizations beneath Neath provider contracts or every other sort of petroleum funding agreements. This is further to advertising operations of oil and fuel line, domestically and abroad. For this purpose, NOC has its personal absolutely owned organizations which perform exploration, improvement and manufacturing operations, further to nearby and worldwide advertising organizations. NOC additionally has participation agreements with specialized worldwide organizations. Such agreements have advanced into exploration and manufacturing sharing agreements, according with the improvement of the worldwide oil and fuel line industry, and worldwide petroleum advertising[1].

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NOC owns refining, and oil and fuel line processing organizations, working refineries inclusive of Zawiya and Ras Lanuf refineries, ammonia, urea and methanol plants, the Ras Lanuf petrochemical complicated and the fuel line processing plan. To set up petrochemical industries, another level of improvement of the ethylene plant has been completed, in addition to the low- and high-density linear polyethylene plants.

NOC additionally owns country wide provider organizations which perform oil nicely drilling and paintings over operations, offer all drilling fabric and equipment, lay and preserve oil and fuel line pipelines, construct and preserve oil and fuel line garage tanks and perform associated technical and monetary research. They additionally offer the arena with different services, inclusive of catering, procurement of substances and equipment, education and employment of overseas employees.

Also affiliated to NOC is a petrol studies Centre which includes out studies and technical research associated with the oil industry, conducts technical evaluation and assessments for the diverse ranges of exploration and manufacturing of oil and petroleum products, plays exceptional manage assessments and troubles certificate on this respect. It additionally evaluates patents and licenses of exploitation and the prices and bureaucracy associated with oil operations and petroleum products. It publishes the research executed via way of means of the Centre withinside the e-book of the Centre, in addition to the local and worldwide scientific publications[2].

## II. The History of Fingerprints Technology

Although many humans laid the inspiration for the improvement of fingerprint science, Sir Edward Henry, a British inspector-fashionable of police withinside the Province of Bengal withinside the overdue 1800's, is credited with taking the studies of Sir Francis Galton, who posted the primary -e book approximately fingerprints and their forensic utility, and the use of it to expand a fingerprint category device that caused the device used today. In nineteenth century, nine fingerprint styles diagnosed through Jan Evangelista Purkyně[3].

The 9 styles consist of the tented arch, the loop, and the whorl, which in present day forensics are taken into consideration ridge details. In 1880 Henry Faulds, a Scottish health care professional in a Tokyo hospital, posted his first paper at the usefulness of fingerprints for identity and proposed a way to file them with printing ink He had calculated that the risk of a "fake positive" (exclusive people having the equal fingerprints) became approximately 1 in sixty-four billion in 1892 Juan Vucetic, an Argentine leader police officer, created the primary technique of recording the fingerprints of people on file[4]. In twentieth century, The French scientist Paul-Jean Coulier evolved a way to switch latent fingerprints on surfaces to paper the use of iodine fuming. In the United States, the FBI manages a fingerprint identity device and database referred to as the Integrated Automated Fingerprint Identification System (IAFIS), which presently holds the fingerprints and crook facts of over fifty-one million crook file topics and over 1. five million civil (non-crook) fingerprint facts[5]. OBIM, previously U.S. VISIT, holds the biggest repository of biometric identifiers withinside the U.S. authorities at over 260-million-person identities. When it became deployed in 2004, this repository, referred to as the Automated Biometric Identification System (IDENT), saved biometric facts withinside the shape of -finger facts. Between 2005 and 2009, the DHS transitioned to a ten-print file general so that it will set up interoperability with IAFIS[6].

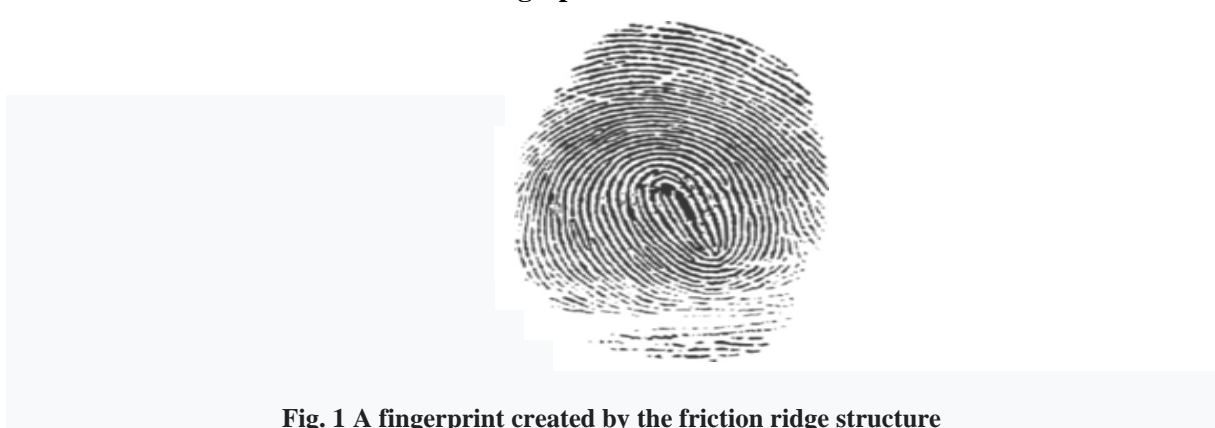## III. Fingerprint Identification



**Fig. 1 A fingerprint created by the friction ridge structure**

Fingerprints are impressions left on surfaces with the aid of using the friction ridges at the finger of a human. The matching of fingerprints is some of the maximum broadly used and maximum dependable biometric techniques. Fingerprint matching considers handiest the apparent functions of a fingerprint.

A friction ridge is a raised part of the dermis at the digits (arms and toes), the palm of the hand or the only of the foot, consisting of 1 or extra linked ridge gadgets of friction ridge pores and skin. These are from time to time referred to as "epidermal ridges" that are due to the underlying interface among the dermal papillae of the epidermis and the interpapillary (rete) pegs of the dermis. These epidermal ridges serve to make bigger vibrations triggered, for example, whilst fingertips brush throughout a choppy floor, higher transmitting the alerts to sensory nerves concerned in excellent texture perception. These ridges can also help in gripping hard surfaces and might enhance floor touch in moist situations[7].

The Fingerprint identification, referred to as dactyloscopy or hand print identification, is the procedure of evaluating times of friction ridge pores and skin impressions, from human arms or toes, or maybe the palm of the hand or sole of the foot, to decide whether or not those impressions ought to have come from the identical individual. The flexibility of friction ridge pores and skin manner that no finger or palm prints are ever precisely alike in each detail; even impressions recorded straight away after every different from the identical hand can be barely different. Fingerprint identification, additionally called individualization, includes a professional, or a professional pc machine running beneath Neath threshold scoring rules, figuring out whether or not friction ridge impressions are possibly to have originated from the identical finger or palm[8].

An intentional recording of friction ridges is generally made with black printer's ink rolled throughout a contrasting white background, usually a white card. Friction ridges also can be recorded digitally, generally on a pitcher plate, the use of a method known as Live Scan. A "latent print" is the threat recording of friction ridges deposited at the floor of an item or a wall. Latent prints are invisible to the bare eye, whereas "patent prints" or "plastic prints" are viewable with the unaided eye. Latent prints are regularly fragmentary and require the usage of chemical methods, powder, or opportunity mild reasserts on the way to be made clear. Sometimes a normal vivid flashlight will make a latent print visible[9].

When friction ridges come into touch with a floor in order to take a print, cloth this is at the friction ridges along with perspiration, oil, grease, ink, or blood, might be transferred to the floor. Factors which have an effect on the great of friction ridge impressions are numerous. Pliability of the pores and skin, deposition pressure, slippage, the cloth from which the floor is made, the roughness of the floor, and the substance deposited are simply a number of the different factors that could motive a latent print to seem otherwise from any recognized recording of the identical friction ridges. Indeed, the situations surrounding each example of friction ridge deposition are precise and by no means duplicated[10].

## IV.  The Capture and detection



**Fig. 2 Live scan devices**

3-d fingerprint: Fingerprint picture acquisition is taken into consideration to be the maximum crucial step in an automatic fingerprint authentication machine, because it determines the very last fingerprint picture quality, which has a drastic impact on the general machine overall performance. There are specific kinds of fingerprint readers at the market, however the primary concept in the back of every is to degree the bodily distinction among ridges and valleys[11].

All the proposed strategies may be grouped into important families: solid-nation fingerprint readers and optical fingerprint readers. The manner for taking pictures a fingerprint the usage of a sensor includes rolling or touching with the finger onto a sensing area, which in step with the bodily precept in use (optical, ultrasonic, capacitive, or thermal) captures the distinction among valleys and ridges. When a finger touches or rolls onto a surface, the elastic pores and skin deforms. The amount and path of the stress implemented via way of means of the user, the pores and skin situations and the projection of an abnormal 3-d object (the finger) onto a 2D flat aircraft introduce distortions, noise, and inconsistencies with inside the captured fingerprint picture. These issues bring about inconsistent and non-uniform irregularities withinside the picture. During every acquisition, therefore, the outcomes of the imaging are specific and uncontrollable. The illustration of the equal fingerprint

modifications on every occasion the finger is located at the sensor plate, growing the complexity of any try and healthy fingerprints, impairing the machine overall performance and consequently, proscribing the vast use of this biometric technology[12].

In order to triumph over those issues, as of 2010, non-touch or touchless 3-d fingerprint scanners were developed. Acquiring distinctive 3-d information, 3-d fingerprints scanners take a virtual technique to the analog system of urgent or rolling the finger. By modelling the space among neighboring points, the fingerprint may be imaged at a decision excessive sufficient to document all of the important detail[13].

## V. The Use of Fingerprints in Oil Companies in Libya

last century was the prevalent use in the National Oil Corporation and its affiliated refineries, the "signature" card, urging employees to sign the daily attendance and departure. The system is still prevalent in some producing companies until now, and with the rapid development in technology, the use of fingerprint technology in signing Daily attendance and departure of employees.

Last May, the study of (a questionnaire) in one of the refineries in the western region on the use of fingerprints to prove the daily attendance and departure of employees, and the results were as follows:
1. 50% of employees agree to use this technology as they develop the technology.
2. 37% of employees believe that using this technology is good to keep pace with the development of technology in the world.
3. 13% of employees refuse to use this technology and prefer to use the previous system.

## VI. Advantages and Disadvantages of the Fingerprint

The software program works Fingerprint Recognition through extracting significant functions referred to as minutia factors from the fingerprint. The scanner choices out attributes which include orientation, alternate of ridge direction, arches, loops and whorls withinside the print. Some scanners may even select out up pores at the skin.  The software program then records and shops those minutia factors so one can confirm the user's identification in the future[14].

The advantages of Fingerprint Recognition

1. Security – safety-wise, it's far a giant development on passwords and identification cards. Fingerprints are lots more difficult to fake, in addition they extrude little or no over a lifetime, so the information stays present day for lots longer than images and passwords.

2. Ease of use – for the consumer they're easy and clean to use. No extra suffering to recollect your last password or being locked out because of leaving your picture graph ID at home. Your fingerprints are constantly with you.

3. Non-transferable – fingerprints are non-transferrable, ruling out the sharing of passwords or 'clocking in' on behalf of every other colleague. This lets in for extra correct monitoring of group of workers and gives extra safety towards the robbery of touchy materials.

4. Accountability – the usage of fingerprint popularity additionally gives a better stage of duty at paintings. Biometric evidence you've got been gift whilst a scenario or incident has taken place is difficult to refute and may be used as proof if required.

5. Cost powerful – from a generation control perspective, fingerprint popularity is now a fee-powerful safety solution. Small hand-held scanners are clean to installation and advantage from an excessive stage of accuracy[15].

The disadvantages of Fingerprint Recognition

1. System screw ups – scanners are situation to the identical technical screw ups and barriers as all different digital identity structures including electricity outages, mistakes and environmental factors.

2. Cost – it's far authentic that fingerprint popularity structures are extra fee powerful than ever, however for smaller, corporations the fee of implementation and protection can nonetheless be a barrier to implementation. This downside is lessening as gadgets turn out to be extra fee powerful and affordable.

3.  Exclusions – even as fingerprints continue to be fantastically strong over a person's lifetime there are sections of the populace in order to be excluded from the usage of the gadget. For example, older humans with a records of guide paintings might also additionally conflict to sign in worn prints right into a gadget or humans who've suffered the lack of arms or fingers could be excluded[16].

## VII.  Challenges in Fingerprint Recognition

Performance of any fingerprint popularity machine closely is predicated on high-satisfactory of finger print picture. Quality of a fingerprint picture is ruled via way of means of elements which includes pores and skin conditions, sensor conditions, person cooperation[17]. Few elements may be averted while few range over a time. Hence loss of robustness is an essential difficulty in fingerprint popularity systems16. It is higher to reject degraded pics for the duration of education in order that overall performance of fingerprint popularity machine

may be maintained. Another difficulty in fingerprint popularity machine is the usage of more than one sensor. Different sensors interpret and constitute fingerprint picture in a unique manner[18].

Changing the sensors can also additionally have an effect on the overall performance of the fingerprint popularity structures. It can be a great concept to symbolize fingerprint pics below a not unusual place change format. Another manner via way of means of which this hassle may be averted is to normalize the uncooked statistics and extracted features. Apart from benefits of fingerprint popularity structures, they're additionally goals of attacks. Unfortunately, faux enter to biometric popularity structures proved to be successful. Matching score (threshold value) is a pivotal detail in fingerprint popularity structures. Additional demanding situations consist of matching fingerprints which might be affected with plastic distortions. Classification approach for sleek of fingerprints in a fingerprint database is likewise a largest challenge[19].

## VII.    CONCLUSION

The rising and improvement of ICT has modified the people`s lives to a full-size extent. It has supplied the possibility to the people, businesses, establishments and governments to attach and have interaction speedy and easily. The nations make investments huge quantities of cash in similarly improvement and implementation of ICT as a way to both hold their function or preserve the tempo with the main nations on the worldwide market. Despite this fact, the implementation of ICT is in its early stages, no matter the unique discipline taken into consideration. Usage of fingerprint era affords enterprise possibilities that replacement conventional structures of credit score card, written time-attendance records[20].

Although using fingerprint technology in oil organizations in Libya remains in its early stages, this technology is getting used these days in lots of different fields broadly in Libya, for example, the Libyan authorities released in November 2020 formally the Libyan National Registry task to offer The Libyan government has a multiple data base that offers records automatically.

Libya could have to conquer many challenges (political, economic, social, technological and cultural); one of the best of them is a loss of strong regulation framework and strategy. because of civil war, negligence of the regime and absence of ok regulation and establishments.

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