

# Biometric Payment Technologies

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**Abstract:- This paper presents variety of biometric authentication payment methods. The rise credit card theft has prompted bank and businesses to seek technical solutions that are more secure. The introduction of biometric system for various types of payments is essential as an alternative to the standard payment scheme through physical card, which requires the memorization of passwords and security numbers. Biometric authentication is a pattern that uses biological characteristics of a human being, such as retina and finger print recognition. The purpose of this article is to assess the efficiency of biometric authentication payment systems that employ various technologies for money transaction identification.**

**Keywords:- Authentication, Biometric, Credit Card, Facial Recognition, Fingerprint, Mobile Payment, Technology.**

## I. INTRODUCTION

Mobile Phones have presented a great change in the lives of every individual today. The growth of science and technology has provided people with a great deal of comfort. People nowadays find things simpler and view things differently as a result of technological advancements. Biometric authentication technology is a security technique that employs biometric characteristics to validate a person's identity whenever someone try to access an authorized device. In the recent years, security has become a critical and necessary function to ensure assets and data privacy. The traditional way of payment appears to be unreliable as it may be falsified, manipulated, or stolen. Traditional security mechanisms such as keys and credit cards, on the other hand, may be lost or misplaced. Therefore, to reduce further losses, a simpler and effective payment method must be established. Biometric based payment methods can be used as they provide a greater level of security. Since human face is unique, it cannot be changed in any way. Face recognition biometric techniques are more efficient than other biometric

approaches. The face is a key focus that plays a vital part in our everyday and social lives in conveying identity and even emotions. Face recognition and detection systems may be used in a range of applications, including online payments, criminal identification, and security. As a result, a more dependable security system must be devised to prevent identity theft. As many businesses insisted on cashless payment, this created the possibility for researchers to develop new security measures aimed at human identification. There are many biometric authentication techniques that are used nowadays by people to securely make their transactions compared to traditional payment scheme.

Face recognition and detection are difficult problems due to the rigidity and complexity of the algorithms. Face detection differs from face recognition in that the face must be determined whether it is present in the image or not, whereas face recognition requires the face data to be retrieved from an existing database record.

## II. TRADITIONAL PAYMENT

Globally, the number of payment cards hit 14 billion in 2016 and is expected to reach to 17 billion by 2022, owing to increase debit card issuance as the world's banked population grows. According to the newly released Global Payment Cards Data and Forecasts to 2022 research, the number of payment cards globally rose by 8% to 14 billion in 2016 as seen in figure 1. By 2022, this is expected to increase by 22% to 17 billion, owing to an increase in bank account holding in major but developing economies like China and India. In China, it is typical for people to have many cards for various purposes. According to Global Payment Cards Data and Forecasts, debit cards are by far the most prominent, accounting for 71% of all global transactions, up from 70% in 2016. Financial inclusion measures in developing areas in Asia-Pacific, the Middle East, Africa, and Latin America will drive this share further.

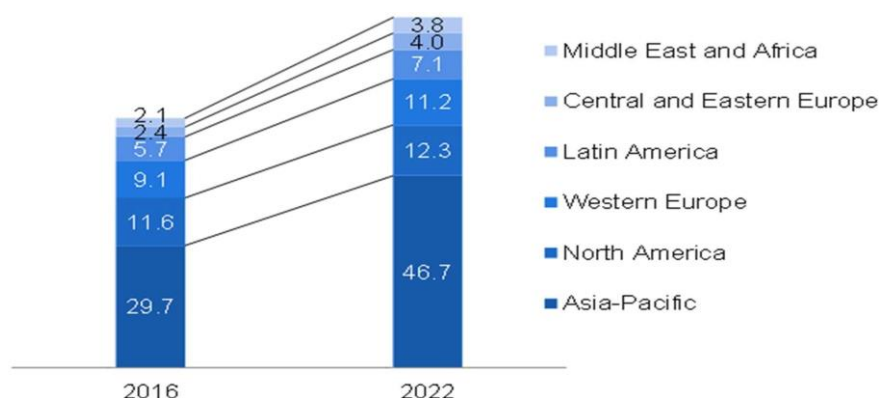


Fig 1: Number of Payment Cards Worldwide (in million) (2016-2022)

### III. ONLINE MOBILE PAYMENT

There are numerous online payment applications available around the world that allow users to pay via the app. This method allows the user to store his or her payment card account on his or her phone, and when he or she wants to pay for an item or service, he or she simply grabs the phone and positions it near the retailer's point of sale, which uses NFC technology. Fingerprint and facial recognition verification are also included in these pay applications. Due to their convenience and security, digital payment methods are gradually replacing cash and bank cards.

### IV. FINGERPRINT PAYMENT SYSTEM

Fingerprints is considered one of the secure and vital biometric payment methodologies. Fingerprint recognition systems accounted for 78% of all biometric technology revenues in 1998. These technologies analyze the friction ridges that cover fingerprints and categorize patterns of minutiae like ridge branches and end points. Fingerprint recognition devices for desktop and laptop access are

inexpensive and readily available from a variety of suppliers. The pattern of friction ridges and valleys on a person's fingertips is used in this biometric technique. These patterns are shown to be distinctive for each person. Instead of typing passwords, a user merely has to touch a fingerprint device to gain virtually immediate access. Two finger samples are often used as an enrolment identification. The uniqueness of each fingerprint is one of the challenges of fingerprint technology. The most widespread biometric payment technique is fingerprint payment, which is based on finger scanning. The system frequently employs two-factor authentication, in which a finger scan replaces a card swipe and the user puts in a PIN (personal identification number) as normal. Figure 2 depicts the operation of one fingerprint payment system. Fingerprint verification is a suitable option for in-house systems where you can provide enough training and explanation to users and the system functions in a controlled environment. Due to comparatively low cost, compact size, and ease of integration of fingerprint authentication devices, the workstation access application area appears to be nearly entirely based on fingerprints.

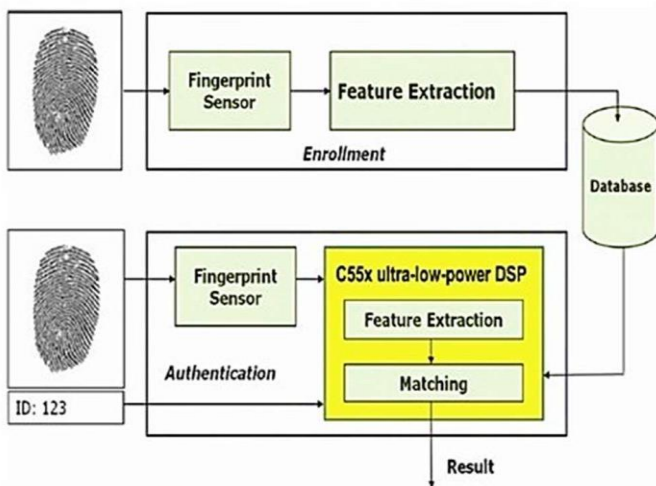


Fig 2: Fingerprint Payment Process

### V. FACIAL RECOGNITION PAYMENT SYSTEM

Face recognition technology has been evolved in light of technological advancements to the point where it cannot be altered. Facial recognition payments are becoming more common in a number of nations, and they are expected to be more popular than the commonly utilized wearable payment technology. Face recognition may be accomplished using a variety technology. One method involves taking a picture of the face picture with a low- cost camera (visible spectrum). This approach extracts important elements from the middle

area of a face picture that do not vary over time while excluding superficial features, facial emotions, or hair from the collected images. Facial recognition has a number of disadvantages, including being non-intrusive, hand-free, providing continuous authentication, and being widely recognized. Face recognition is expected to change the world of digital payment, especially nowadays during the COVID-19 pandemic, where people can make purchases without any cash, bank card or smart phone to avoid the risk of being infected and limit the virus spreading.

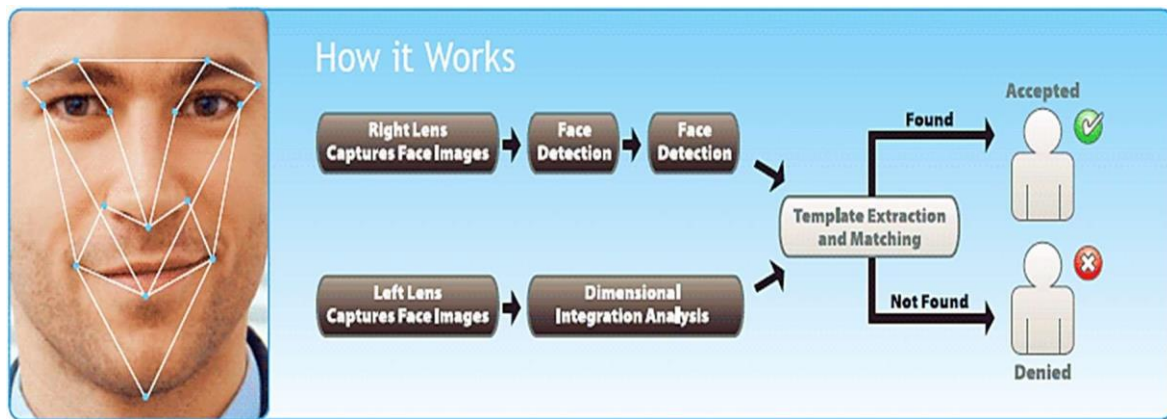


Fig 3: Face Recognition Payment Process

## VI. CONCLUSION

Biometric payments are faster compared to traditional payment. Biometrics is a method of confirming a person's identification by studying and quantifying distinctive physical or behavioral features, such as fingerprint patterns or face recognition. Facial recognition utilizing a biometric authentication system is the most recent payment service innovation, and it is one of the developing technologies with a lot of room for growth and improvement. For consumers, the most obvious benefit of facial recognition payment is that they won't have to remember numerical PINs, password, or carry keys in their pockets as they will be things of the past. In addition, contactless payment, such as facial recognition payment has helped consumers especially during the COVID-19 pandemic where they can make their payment transactions safely without having physical contacts.

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