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AN EFFECTIVE AND SECURITY APPLICABLE BIOMETRIC IDENTIFICATION MECHANISM IN CLOUD SYSTEM

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Abstract: *With the rapid increase in the growth of intelligent devices provided with biometric sensors, client identification methods using biometric traits are widely embraced across different applications. In many biometric trends, total fingerprint-based total identification systems have been significantly studied and implemented. However, for practical applications to adopt a biometric identification framework, two significant obstacles to performance and user privacy need to be resolved simultaneously. In this paper, we propose a new biometric identification scheme that maintains confidentiality and achieves efficiency by harnessing the power of cloud computing. In our proposed scheme, biometric databases are encrypted and outsourced to cloud servers. The database owner generates a certificate for the candidate's biometric attribute and sends it to the cloud to perform biometric identification. Cloud servers perform identification work on encrypted databases using credentials and return the final result to the owner. The cloud does not learn anything about unique personal biometric records during identification. Because identification operations are securely outsourced to the cloud, real-time computational / communications fees from the owner are minimal. A thorough review indicates that our proposed scheme is comfortable and offers a higher level of privacy protection than the relevant solution, including searching for kNN in an encrypted database. Authentic experiences in Amazon Cloud, on databases of various sizes, show that the owner's computational / communication costs are much lower than existing biometric identification schemes.*

Keywords: *Biometric identification, cloud computing, k-nearest neighbor, cryptographic primitives.*

I. INTRODUCTION

Biometric identification is one of the most prominent techniques for identifying a character. All biometric trends, including fingerprint, iris, and retina, represent important elements of universality (humans have their fingerprints), distinction (people are unlikely to have the same fingerprint), and constant (Biometric developments usually do not change over the years (1). Such homes have some advantages and disadvantages. While they make it easy to use biometric trends and accurate user identification, they raise concerns about customer privacy. For example, suppose Alice is identified by her fingerprint for access to certain Internet services, including a healthcare service and a social network provider (SNS), providing companies her fingerprint. Can also track the transfer of and create to your number. Public information, including eligibility and identity status registered in SNS. This is a serious breach of customer privacy. Furthermore, if Alice's fingerprint records are made public, anyone can imitate Alice by verbally entering her fingerprint information, thus invalidating the entire identity system. Because biometric trends are specific and cannot be changed at any point in life, they cannot be canceled or recreated once leaked.

Despite the proliferation of biometric identities, there is growing concerned about privacy and prison issues, given that biometric data is susceptible and can be revoked and changed once leaked. Appropriate privacy protection and security procedures will be in place to protect against planned or unintentional disclosure or misuse of biometric data. Ideally, the biometric identification method should not reveal any sensitive records other than the final result, whether the given biometric path has been recognized or not. If the storage server is not authentic, it will also ensure that sensitive biometric data is not exposed to unreliable servers. However, performing one of these biometric identities that maintains privacy makes it difficult to consider the realistic framework requirements in security, performance, and system scalability. In Unique, identifying each given biometric feature involves searching the entire biometric database. It will compare the biometric feature one by one with all the items stored in the database for maximum comparison. Coins In practical large-scale applications, this type of search can significantly strain the machine, considering that the database's length and the number of identification requests can be significant. Several answers have been suggested for biometric identification while maintaining privacy, although most suffer from the above performance and scalability issues.

In this article, we address this open issue by incorporating the computing power of the cloud. Considering that a company has a vast biometric database and a client related to a part of the candidate's biometric feature, we designed our scheme with the following concept: Database. The owner first encrypts the entire database and uploads it to the cloud. While the client wants to identify the candidate's biometric property, this property can be encrypted and sent to the cloud. Cloud servers then perform most of the identification operations on the ciphertext and return the index of the corresponding ciphertext to the owner, after which they can successfully decrypt the final result. During these processes, cloud servers and clients do not check privacy data from biometric databases, even if combined. By offloading most of the computing responsibilities on the cloud, our approach reduces the complexity of real-time computational / communication for both database owners and clients. Thanks to the parallel processing power of the cloud, this system is relatively scalable. According to the three levels possible version described in Reef. [5], our proposed scheme can achieve the highest level of security. Amazon Cloud Experience shows that the owner's computational / communication costs are much lower than existing biometric identification schemes.

Our Contributions

We introduce new protocols that significantly reduce the cost and bandwidth costs of each step taken to maintain the privacy of standard biometric matching protocols.

- For the first time, we are enabling personal biometric identification for large-scale databases so
- It can effectively process that information through secure database outsourcing and cloud-first identification operations without compromising privacy.
- Our proposed scheme may have the same capacity as kNN [5] for encrypted databases; however, it offers a better level of privacy protection. Therefore, it can be used as a neutral fashion solution for various related packages.
- We run experiments on real cloud platforms to validate our proposed scheme.

II. REVIEW OF LITERATURE

Biometric identification is a reliable and practical way to identify people. In practical applications, identification can be completed on various biometric features, including fingerprint, face, iris, etc. Find high-quality formats based on the candidate's biometric characteristics and the default error range. Similarities can be calculated using several algorithms based on Euclidean distances, hemming distances, and many more. Despite the differences, those algorithms provide similar mathematical operations, including increments and dot products.

Elmougy et al. [2016] This document proposes a regional awareness permitting scheme that allows RFs to access information as long as they are within a pre-determined distance from data owners in an emergency. We've integrated innovation to integrate full-featured encryption with streaming encryption to add dynamic attributes (i.e., location and time) to policy access. These attributes act as filters to remove irrelevant data from an ongoing emergency. As a result, our scheme provides authorized access to accurate, applicable, timely, and location-aware information. We offer adequate security analysis and performance reviews to demonstrate the effectiveness of our scheme. The assessment shows that the scheme applies communication, computation, and decryption overheads. Furthermore, the proposed scheme is fully validated as an invasion of plain text content selected comfortably based on the Diffie-Hellman m-bilinear exponent assumption. It also solves the critical problem of escrow.

Anil et al. [2015] The Minutiae Point Set is considered the ultimate single feature for fingerprint illustration and is widely used in fingerprint matching. It is thought that the Trivia set no longer has enough data to recreate the unique fingerprint from which the Trivia was extracted. Recent research, however, has shown that it is possible to recreate fingerprint images with their modest representations. Reconstruction strategies highlight the need to preserve fingerprint templates.

Wenjing et al. [2014] In this article, we tackle the challenge of comfortable computing by outsourcing a particular method: the idea is to have a comfortable execution environment within the cloud to format people's data in text format. I can be processed. We advocate for the TrYou Data-in-Depth ExeCution (TUDEC) environment, well suited for cloud logging applications. TUDEC is a new device architecture designed to provide a comfortable environment for random facts calculation within the cloud server. Using a minimal compute base that includes the best firmware and hardware, TUDEC can provide a single VM isolated from legacy hosts and neighboring VMs. This type of isolation is unique because it protects against any software-based attack.

Yan Huang et al. [2011] they offered an efficient matching protocol that can be used in a biometric identification framework that protects a lot of privacy within a semi-honest confrontation. Our most common technical partnership is a new tracking protocol that uses a by-product of distorted circuit review to recover green unconscious data. We also offer a more efficient protocol for calculating Euclidean distances of optimized vectors and circuits to determine the closest match between the occupancy point of a birthday party and the combination of factors arranged by another. Finally, we compare our protocols to implementing an actual fingerprint matching device that protects privacy.

Scotti et al. [2010] The proposed protocol follows the multi-part computation technique and extensively uses homomorphic encryption as the primary cryptographic archetype. To minimize the complexity of the protocol, a particular example of a fingerprint image, called a fingerprint code, is adopted. Although the above works on biometric identification awareness to determine the best match identification within the database, our primary solution is a standard identification protocol and selecting all registered identities and Allows reports that are spaced below the individual's fingerprint code. A given limit. Variables are provided for simple validation functions. Our protocols achieve significant bandwidth savings (approximately 25-39%) compared to previous quality paintings [1], and their computational complexity is low and sufficient for practical applications. Furthermore, although such protocols are provided in the context of fingerprint-based systems, they can be generalized to any biometric device that shares the same matching technique, especially distance and range.

Cheung et al. [2009] this article discusses the general issue of comfortable computing on an encrypted database and advocates SCONEDB Secure Computation on an encrypted database model that meets the implementation and security requirements. As a case study, we are aware of near-neighbor (kNN) computing on an encrypted database. We've expanded the cipher to retain a new unequal scalar product (ASPE) that protects a particular type of dot product. We use APSE to collect comfort schemes that guide kNN calculations in encrypted facts. These schemes have been shown to counter intelligent attacks at the exact overall cost, with individual legacy technology levels. An extensive performance study is completed to review the overhead and performance of the schemes.

Cao et al. [2011] In this paper, using the Online Personal Health Record (PHR) as a case study, we first demonstrate the need for search capability permissions that reduce the exposure to privacy from search effects and Describe an extensible framework for authorized private keywords. Search for encrypted data (APKS) in the cloud. Next, we propose new responses to APKS based on existing cryptographic primitive, hierarchical predictive encryption (HPE). Our solutions enable efficient multi-dimensional keyword search with a range of queries, allowing search capabilities to be delegated and deleted. In addition, we provide query privacy that hides key phrases from user queries in front of the server. Finally, we apply our scheme to a modern laptop, and the experimental results show its suitability for intelligent use.

III. PROPOSED WORK

This paper proposed an effective and privacy-protected biometric identification scheme that can counter the intrusion attack initiated by users and the cloud. In particular, our key contributions can be summarized as follows:

- We examine the biometric identification scheme and point out its inadequacy and security vulnerabilities below the proposed level 3 attack. Specifically, we show that an attacker can retrieve his secret keys by collaborating with the cloud and then decrypting the biometric properties of all users.
- We offer a unique, practical, and confidential biometric identification scheme. Specific security assessment shows that the proposed scheme can achieve the desired level of privacy and security. Specifically, our scheme is protected under the biometric identification outsourcing version and may also deal with the attack proposed by Zhu et al.
- Compared to existing biometric identification schemes, the overall performance analysis shows that the proposed scheme offers lower computational fees in both practice and identification strategies.

In our scheme, we assume that the biometric information is processed to use its example to process the biometric form. Without lack of generality, just as we target fingerprints and use fingerprint codes to represent fingerprints.

SYSTEM ARCHITECTURE

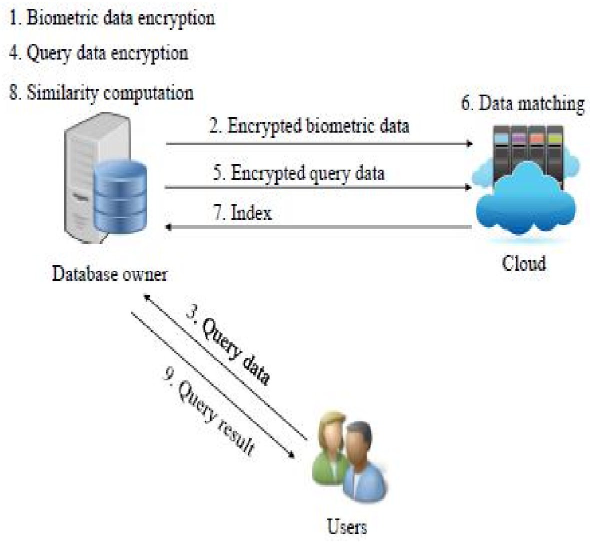

Fig.1 System model

As shown in Figure 1, the machine includes three entities, namely database owner, user, and cloud. The database owner has many biometric data (i.e., fingerprints, irises, voice, facial features, etc.) encrypted and transferred to the cloud for storage. When users want to select themselves, a query request is sent to the database owner. Upon receiving the request, the database owner creates ciphertext for the biometric feature and then transfers the ciphertext to the cloud for identification. Next, the cloud server sets the form for the first encrypted query and returns the relevant index to the database owner. Finally, the data owner calculates the match for the encrypted query and the biometric data related to the index and returns the query result to the person.

Our design breaks down our device into three steps: biometric database processing (step 1, section IV-B), privacy-maintaining fingerprint matching (step 2, section IV-C), and the final result. Creating (Step 3, Section IV) -C). IV-D). In Stage 1, the database owner encrypts the entire database and uploads it to the cloud server with the corresponding index, naming the game keys based on the selected parameters. This is a one-time cost in our scheme and can be considered a training level. In Step 2, the owner generates credentials for the client candidate fingerprint code and sends it to the cloud servers. Servers then detect fingerprint ciphertext with a minimum Euclidean distance from the encrypted database candidate.

In contrast to current work, which uses cryptographic tools to safely calculate and compare Euclidean distances, we note that calculating accurate distances is not always necessary in the identification process. - Instead, our proposed scheme only calculates the final inverse result of Euclidean distances from the candidate's finger code for two encrypted finger codes within the database, i.e., we only get the result of which fingerprint is inside the database. The code is more like a candidate. Their actual distance. In step 3, upon receiving the result (i.e., the index of the corresponding fingerprint) from the cloud server, the database owner prepares the final identification result with simple operations: the exact Euclidean distance between the candidate fingerprint and those returning through the cloud Calculate; Checking the Euclidean distance along the threshold.

IV. OVERVIEW

We've put together a unique biometric identification scheme to address the Yuan and yu's schemes [8]. Furthermore, a new restoration method has been developed to combat the level three attacks to achieve a better level of privacy protection. In addition, we redesigned the ciphertext to reduce the amount of data uploaded and improve performance in both practice and identification strategies. In the last part of this step, we introduce the instruction technique and the identification method.

V. CONCLUSION

This paper proposes an efficient and confidential biometric identification scheme in cloud computing. Unlike previous research, we do not allow any organization other than the user to access the user's biometric data. Security assessments show that biometric records are not always disclosed to servers and the cloud. We securely outsource user biometric identification to the cloud by taking advantage of additional homomorphic encryption. Furthermore, performance appraisal and experimental results show that our scheme outperforms previous schemes in terms of arithmetic and communication.

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