Unification of Multiple Bank Cards and Smart Card with Formula Based Authentication in Big Data

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***Abstract*— Big data provides a greater space for various organizations to obtain knowledge-oriented decisions. Big data analytics would lead to an increased rate of success. Capturing, storing, searching, sharing, transferring, visualizing, querying, updating are the challenges in big data. In our proposal, the most recent developments in information management include the convergence of big data and RFID technology. We are proposing an advanced Banking, Hospital, and Passport & Ration application for our implementation. For all these four applications, RFID is used as a user identification number. User behavior is monitored through Hidden Markov Model (HMM). Formula-based authentication is used for verifying the withdrawal of money above the limit. This card can also be used as a smart card in Ration shops. Users can use this multi-card in hospitals to get their information. Multi-card can also be used in airports to register travel. All the information is kept in several Cloud Servers.**

Keywords*— Hadoop, Business Intelligence (BI), HDFS, Data mining, Radio Frequency Identity (RFID)

I. INTRODUCTION

Big data is a circumscribable term that possesses the group of data sets to be very large and complex such that it becomes hard to handle the conventional data processing applications. The difficulties in these analyses include monitoring, storing, capturing, searching, sharing, transferring, visualizing, and many other violations. The use of big data has become a common thing among various companies to outperform their skills with big data. In the most extreme number of businesses, existing competitor's different customers and new businesses will utilize these thoughts which come about within the analyzed information to compete, enhance and capture esteem. Enormous Data allows companies to build empty opportunities for growth and entirely unused types of industries that can integrate and interpret knowledge from the market. These businesses have plenty of data that can be collected and evaluated on almost the items and administrations, consumers, vendors, shopper inclinations.

II. RELATED WORKS

Hing Kai Chan, Tsan-Ming choi, and Xiaohang Yue[8] big data must be used for various applications. It provides us great security, reliability to our system. RFID based networks are used to integrate and retrieve the data easily. The cloud environment also provides a Hadoop system to reduce computational efforts. Using big data, data mining and analytics is also possible. All these technologies can be combined to form a great business application [7]. Amit Gupta and Manika Manwal[3] big data and Hadoop are closely related to each other. Big data is used for storing a large amount of data and this data can be retrieved easily by the use of the Hadoop environment. A detailed description of Hadoop and its frames is described here. It also describes the HDFS, Map Reduce, Pig, and Hive concepts [15]. Hadoop [6] is used as a data processing engine in many cloud platforms. It has a fault tolerance capacity, scalability and it is easy to use. A leading business requirement is handling a huge amount of data [4]. Here Hadoop environment is used for this data handling and results are far better than other procedures. Implementing Hadoop in different virtual technologies is explained[12], RFID card uses radiofrequency to identify a people or an object. This is greatly used in industries for item-level tagging. It has more advantages over the bar codes and it is more robust than the bar code cards. It has a long reading range and non-line of sight-reading. The cost is also minimal in implementing RFID technology. Passive RFID tags do require any electrical power to use them. [9], Electronic commerce has a great effect on an electronic payment system. A large number of transactions can be made easier with credit or debit cards. It analyzes characteristics of e-cash, microeconomics and macroeconomics. The characteristics of electronic payment are analyzed by binary dependent flexible estimation procedures on data derived from Electronic Payments System Observatory database [13]. Mahmoud Obaid et. al [16] proposed methodology has the following characteristics that bind banks together and enable customers to process all kinds of transactions without the need for a new SIM using their mobile phones. Without the need for a third-party mediator, real-time person-to-person transactions between users of similar or different bank accounts can be processed.

Suraya Nurain Kalid et. al [17] discussed an MCS to address the problems. We found that C4.5 is the expert in organizing the majority class samples based on our analysis using single classifiers and NB is the expert in classifying the minority class samples. Therefore, to detect credit card anomalies, they were arranged sequentially in our suggested MCS. Using two different credit card data sets: CCF and CCDP, our proposed MCS was assessed. We compared our work with the work of other researchers. Baris Can et. al [18]

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proposed the detection models' resilience is closely related to the number of instances and their period. Therefore, our test findings indicate that every fraud detection model should be constantly revised to incorporate recent fraudulent instances. We demonstrated that all models, without comparison, displayed some vulnerability concerning zero-day results against previously unfounded fraudulent activities.

III. EXISTING SYSTEM

In the Existing System, People have ATM cards with their accounts. If they have multiple accounts in multiple banks like (SBI, Indian, Canara, KVB) they should have an ATM card for every bank separately. Every time they use different ATM cards to withdraw the cash from different accounts. So they want to carry all types of ATM cards every day. So they have some inconvenience in the existing method. And also they do not have a single card that integrates the applications like hospital, ration and passport.

A. Advantage

- It is very easy to implement and User friendly
- It is the best replacement for handling cash.

IV. PROPOSED SYSTEM

In the Proposed Framework, Integration of Enormous Information, Trade analytics and RFID like innovation is supposed to be later patterns in IT. It could be a challenging situated action. The adjustment, which is our usage is, we are developing this application for a Keeping money segment , especially for a Charge / ATM card area. We will utilize the RFID card as ATM Card for exchange. The client can make an account and get the ATM card from the bank. He can coordinate all his accounts in other banks that can be coordinated in this single card with interesting PINs in like manner. The client can incorporate all his family members' accounts points of interest moreover within the same card. He can pull back cash from their accounts after effective verification of the comparing PINs.

We are proposing a Banking, Hospital, Passport & Ration integrated application. On all these four uses, RFID is used for User Authentication. Users may connect their different bank accounts to a single card in the banking program. Often, users can add multi-user accounts as well. The parent user will set the withdrawal limit on multi-user transaction accounts. The OTP will be checked for any transaction. Authentication of the formula is tested for the removal of money above the limit.

A. FUSION ALGORITHM UNIFICATION

The theoretical sum rule for cases with small conflicts is clear and efficient. On the other hand, the theoretical DSM fusion redistributes conflicting convictions and performs well at the expense of computational time, using highly conflicting knowledge. Our hypothesis is to improve the verification efficiency in both accuracy and time by uniting these two algorithms. The two proposed systems in which the evidence-theoretical sum rule and DSM fusion algorithms are unified to increase verifying efficiency are described in this section. The rules-based unification is explained first, with the supporting vector machine taught adaptive unification.

B. Unification based on rules

Fig. 1 demonstrates the phases in the suggested unification process depending on the rules. The moves in the current legislative process for unification. The fixed linear rule of Equations 1 and 2 is used for the complex selection of the fusion algorithm for regulatory unification. The unification protocol shall be defined as follows: 1) mi(j) is calculated over {first] {{all is calculated} when I = 1,2 and j = all is calculated. {first} If conditions in Equations 1 or 2 are met, the evidence-theoretical sum rule is used.

$$\begin{aligned} \overline{m}_1\left(\theta_{gen}\right) &> \overline{m}_1\left(\theta_{imp}\right)+\in_1 \\ \overline{m}_2\left(\theta_{gen}\right) &> \overline{m}_2\left(\theta_{imp}\right)+\in_2 \end{aligned} \quad (1)$$

$$\begin{aligned} \overline{m}_1\left(\theta_{gen}\right)+\in_1 &< \overline{m}_1\left(\theta_{imp}\right) \\ \overline{m}_2\left(\theta_{gen}\right)+\in_2 &< \overline{m}_2\left(\theta_{imp}\right) \end{aligned} \quad (2)$$

Where $\in_1$ *and* $\in_2$ are the faults Where all the above requirements, i.e. when matches provide extremely contradictory outcomes, are not fulfilled, the DSM fusion algorithm is used. In such cases, mi(j) is calculated over $D^{\Theta} \setminus \{\emptyset, \theta_{gen} \cup \theta_{imp}\} = \{\theta_{gen}, \theta_{imp}, \theta_{gen} \cap \theta_{imp}\}$ and blending is achieved.

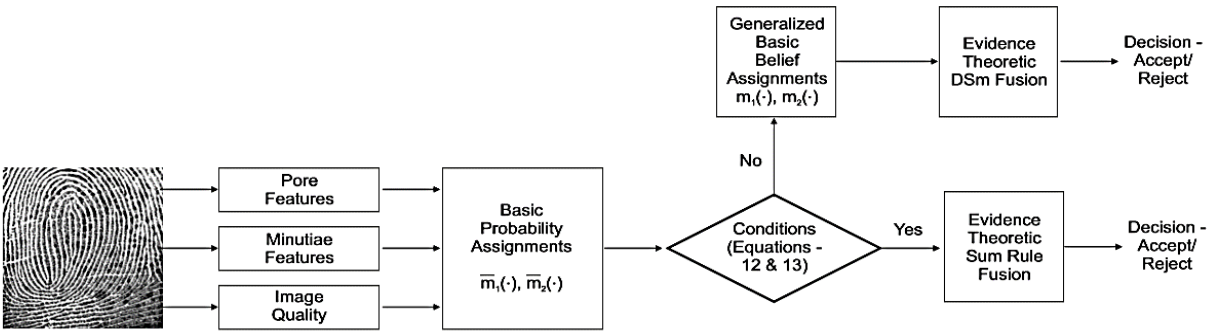


Fig.3 rule-based unification framework

C. 2v-GSVM Adaptive Unification

Unification of learning with the rule-based approach has some limits. We first calculate a simple probability assignment using the rule-based method, then we test the unification conditions (equations 1 and 2) to determine whether or not to choose an evidence-methodizes rule or DSM fusion algorithm. If the unification condition suggests the use of DSM fusion, the two Fundamental Probability Allocations (FPA) and the General Basic Beliefs Allocations (GBBA) are calculated, which takes extra time. Moreover, as

additional fusion laws have to be implemented in the unification process and need some optimization, the fixed rule-based unification solution becomes dynamic. We suggest an adaptive unification method to eliminate such uncertainties, intelligently learning from input data and selecting the required fusion algorithm. In the proposed paradigm for adaptive unification, we may choose a suitable fusion algorithm using any learning technique. In the literature, the Support Vector Machine (SVM) for effective data classification has been used extensively [20]. 2v-SVM as a version of SVM, introduced by Chew et al.[21] to overcome SVM's problems such as minimizing difficulty in time and grouping by separate training samples per class In our previous research[5], 2v-SVM provided a better classification for multimodal fusion with a lower time complexity than conventional SVM[20]. Furthermore, by implementing granular computing to increase cluster data and time complexity, Tang, etc. [22] suggested another version of SVM. Granular Computing is a method that is knowledge-orientated and separated into sub-problems and solved independently at various grain grades [23]-[26]. Granular Computing provides an approach to problem resolution. These principles have been used by the 2v-SVM granular computation and 2v-Granular SVM formulation. 2v GSVM includes both the granular computation and 2v-SVM characteristics, using several SVMs, both local and global input data characteristics at varying degrees of granularity. In [19], it was also shown that 2vGSVM adapts better than traditional SVM and 2ŢSVM to the delivery of data and is less complex. 2μ-GSVM is defined in the detailed formulation in [19]. In this way, we use 2v-GSVM to understand the input proofs and to choose the most suitable fusion algorithm, for optimum efficiency, within the proposed adaptive integration system. The calculational behavior of the adaptive unification system is demonstrated in Fig. 2. As the input of the 2v-GSVM classification, image content and matching values from minutiae and pores fit are used. The fusion is chosen for either proof-theoretical DSM fusion or proof-theoretical sum law, based on the performance of 2v-GSVM classification. Two levels are categorized into adaptive unification: (1), preparation and (2) classification.

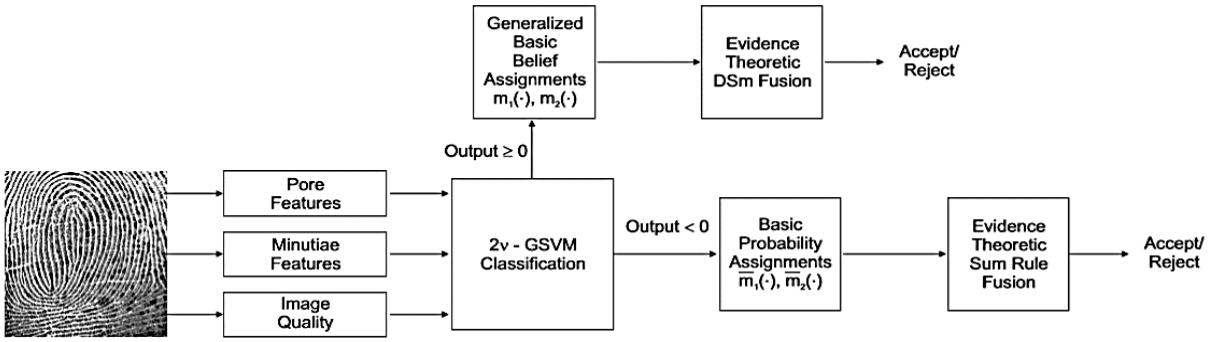
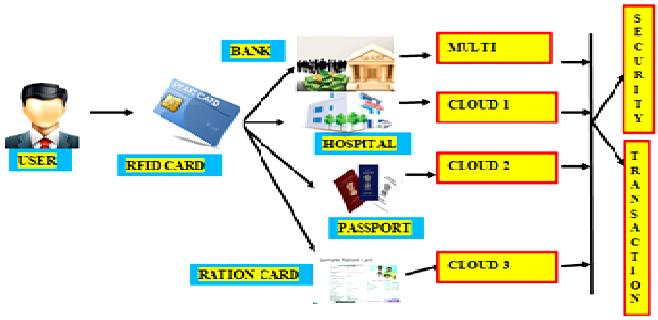


Fig. 4. Adaptive unification framework using 2v-GSVM.

Training 2v-GSVM: we use a named training database to train the 2v-GSVM to unify fusion algorithms. This is defined as the training algorithm: 1) Let the input training data be {xi, yi} where I = 1,..., N is the total number of training data, and xi is the binary data vector of yi. xi includes the picture consistency score and two match values from the thorough matching of pores and pores xi contains the image continuity and two matching values of pores and pores. The symbol yi a €(+1, –1) is the fusion data of +1, and the fusion data of +1 is the fusion data to which the theoretical proof of the sum law can be applied. The radial base function kernel is conditioned in 2v-GSVM to achieve theoretical DSM fusion when a fusion of 2v-GSVM < 0 and the theory of proof is done when performance 2μ-GSVM < 0. Classification and unification: The qualified 2v-GSVM classification and unification are used at the probe stage. Based on the quality score and the input sample match score, the classification algorithm dynamically chooses the best fusion algorithm. The following steps are defined in classification and unification: (1) Inputs to the classification algorithm are presented with the picture quality score along with match score from the minutiae and pore match. 2) Classification of input sample data by the trained 2v-GSVM classifier. The classification algorithm chooses either the theoretical DSM fusion or the theoretical fusion of proof sums to merge the sample match points. 3) The fusion algorithm is used to measure the fused match score and a decision to accept or refuse based on the classification outcome in the 2μ-GSVM classification. The adaptive unification architecture chooses the best fusion algorithm dynamically to enhance the verification precision and lower the calculation time.

V. Architecture Diagram



A. User Registration

The user has to report their information in the databases in this module. Initially, bank, passport, ration and hospital details in the single card have to be registered. It can be used with four distinct positions until they register. All details will be stored in the cloud. So, people can retrieve their information from anywhere. Each domain has to be registered separately i.e., registration for banking application and another integrated registration for ration, hospital and passport. The registration process has three different fields such as sign up, sign in, relative account. Sign up is used when the user registers for the first time and sign-in is used when the user has already registered and is provided with the

username and password. The relative account is used by the second person in the family.

B. Bank Server Creation

User data will be kept on the bank server for those who log their details with a smart card, and their bank information will also be retained on the bank server. The purpose of this server maintenance is that users can have a different bank account that can merge their family member's accounts into a single card. So, we have to maintain a separate server for communication, which will maintain all member's accounts and will communicate with the corresponding bank when any transaction is made. The transaction history of every member of the family can be viewed and stored. It follows a security mechanism like providing access for the one-time password.

C. Multi-User Integration

Multi-user/multi-wallet unifies one card bank accounts of various entities. Everyone has an ATM card and they get money from the ATM anytime they need it. But the thing is if a person has several bank accounts, they should have all sorts of bank ATM cards to hold. So, we introduce a new model where all bank data can be contained in a single card and they can even integrate their family member's account. This card may be used by members of a household. One or more parent users can be availed with this card. All the members of a family can avail of this card either as a primary user or a relative user. Each user can register their details and can use all the details regarding the hospital, passport and bank details of a family.

D. Formula Based Authentication

In this module, a formula is set to the parent user who is a person having this card. So a parent user can use this with a formula-based authentication. If anyone withdraws an amount beyond the limit, a message will be sent to the parent user. And he/she shares the formula with that person who withdraws the money. Using this, money can be withdrawn easily. In formula-based authentication, only addition and subtraction operations are used. Different variables are from A-Z can be chosen and their values can be set up randomly. Formula can't be entered wrong more than three times and if this limit is exceeded the user is restricted to access the bank account for a certain period.

E. Cloud Integration

In this module data from various servers such as google drive, Mongo DB, and Dropbox will be integrated. To maintain security, the passport details, hospital details, and ration card details will be maintained in both Google Drive and Dropbox. These cloud services are used because they are open-source platforms and can be accessed by everyone. Data are stored in multiple cloud servers to maintain highly integrated security among various applications. Maintaining the databases in different cloud servers prevents the user from chaos. This module is the most challenging one in the entire project but also lies as the reason for the success of the project.

F. Advantages

- This framework essentially grants multiple ATM cards on turn User can pull back cash from their family individuals account from a single ATM card.
- Hidden Markov evidence is used for the cash withdrawal study of consumer behavior.
- The use of equation-based authentication guarantees protection.
- Within the system for the processing of large quantities of data, big data is used.

VI. CONCLUSION

In this project, we have introduced the single card integration of multi-bank multi-user with user activity tracking using HMM & verification of formula. In a single RFID card, we have also introduced hospital, ration, passport software. The new method allows the customer to build an account and receive an RFID smartcard. User activity is tracked depending on the money withdrawal series of each user, which means that the first condition is that a small sum will be withdrawn by the user per month. The second is the frequency of using a credit card to withdraw currency. As per limited money requirement, the user may withdraw the cash and time-frequency is also tracked & registered. It is very useful without a time delay for withdrawing the amount. Thus this system reduces the need of carrying multiple cards. In the future, many more applications can also be integrated with this multi-card. The user interface can be improved and future works can be made on the rapidness of the application, and the card blocking facility can also be embedded with this application.

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