International Journal of Advanced Research Methodology in Engineering & Technology,
Special Issue, March 2017, ISBN 978-1-63535-324-2

Integration of Big Data Technologies for Human Centric Wellness Data with Fingerprint Sensor

GowriShankar M [1], Charan Raj R [2]
Student Final Year[+]
[+]Department of Computer Science Engineering,
[+]Jeppiaar SRR Engineering College,
Chennai, India.
gowrishankar1010@gmail.com [1], charancalix@gmail.com [2]

Gayathri S [3]
Assistant Professor[+]
[+]Department of Computer Science Engineering,
[+]Jeppiaar SRR Engineering College,
Chennai, India.
gayathri.nishitha@gmail.com [3]

***Abstract*—Big Data consists of large data sets that will be analyzed computationally to reveal patterns, trends, and associations, especially related to human behavior and interactions. The new technologies and their data generation at substantial rate gave birth to the Big Data and a robust platform is required to capture, retrieve, store, and process the data. Data generated by Health care services and applications such as sensors, human centric applications, social networks, and smart-phones need to be collected and processed to provide in-depth knowledge for advancement in the field. In this paper we create a personal health care monitoring platform for clinical, physical, social and mental health by collecting the clinical, personalized and feedback data along with Fingerprint Sensor for the users. We implement a Big Data service engine which provides storage services to health monitoring systems for analytics services to visualize and monitor clinical information with their finger print. Our prototype system successfully integrates various technology platforms and provides centralized health monitoring system.**

Keywords-Big Data,Fingerprint sensor,Human Centric Wellness

I. INTRODUCTION

Big Data is a collection of large datasets that cannot be processed using traditional computing techniques. Big data is not merely a data; rather it has become a complete subject, which involves various tools, techniques and frameworks. Big data involves the data produced by different devices and applications. Big data technologies are important in providing more accurate analysis, which may lead to more concrete decision-making resulting in greater operational efficiencies, cost reductions, and reduced risks for the business challenges include capture, storage, analysis, data curation,search,sharing,transfer,visualization,querying,updating and information privacy. The term "big data" often refers simply to the use of predictive analytics, user behavior analytics or certain other advanced data analytics methods that extract value from data, and seldom to a particular size of dataset.

II. EXISTING SYSTEM

In existing system, the large amount of health data is monitored without a proper authentication mechanism i.e., without fingerprint sensor. Therefore there are some constraints in accessing the patient details. Even anonymous users can access the patient prescription by providing patient user id. If the patient is in a critical condition he cannot access his prescription because he need to manually enter the Patient ID.

III. ISSUES IN EXISTING SYSTEM

1. Insecure, anonymous user can access the patient details.
For example, if agents are allowed to access patient details, the data may be misused or the data may be theft and the people who are not trustable may misuse the patient details.
2. Patients cannot access their prescription if they are in critical condition.
For example, if the patient meets with an accident and he is in unanswerable condition then their prescribed medicine could not be known immediately by the doctor.
3. Patients must manually enter their user id to access their prescription.
For example, whenever the patient needs to view the prescription he/she should enter their mandatory details manually which is not possible when the patient is in critical condition.

IV. PROPOSED SYSTEM

In the proposed system we are integrating the Human Centric Wellness Data with Fingerprint Sensor. We propose a more secure system to maintain the patient medical records in more efficient way. The fingerprint sensor allows the authorized

user to access their prescription details by scanning and verifying their fingerprint. The user can access their prescription even if they are in critical condition since only finger print verification is needed and they do not need to type in their patient id. The detailed architecture of the proposed system is shown in Fig 1.

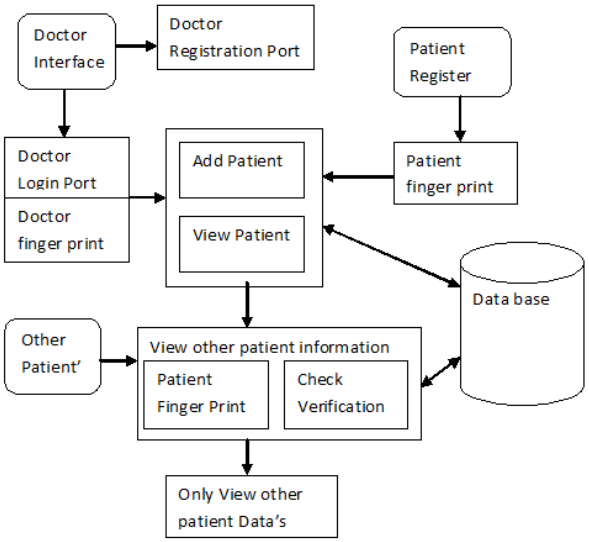

Fig. 1. Architecture Diagram

Advantage of proposed system:

1. Highly secure and no anonymous user can access the patient details.
2. The user do not need to manually enter their id.
3. Patients can access their prescription with the help of the fingerprint verification during critical condition.

V. MODULES

A. Doctor Interface:

In this Module, first we create small network for interface between doctor and patient; for secure communication we use finger print verification technique. Doctor can create his account using his finger print, using that account doctor can add new patient and update patient's medicine prescription.
When doctor is creating an account, at that time a unique database is created for that doctor for securely maintaining the patient information. Only doctor can access and modify the database.

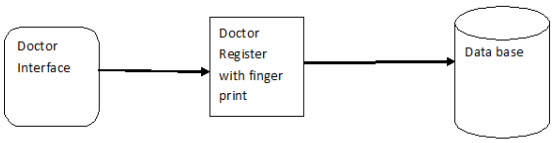

Fig. 2. Doctor Interface

B. Patient Information:

All patient information are stored in corresponding doctor database and particular patient information can be modified by that doctor only. Other doctors can only view patient's data. All doctor and patient information are maintained by the finger print authentication information.

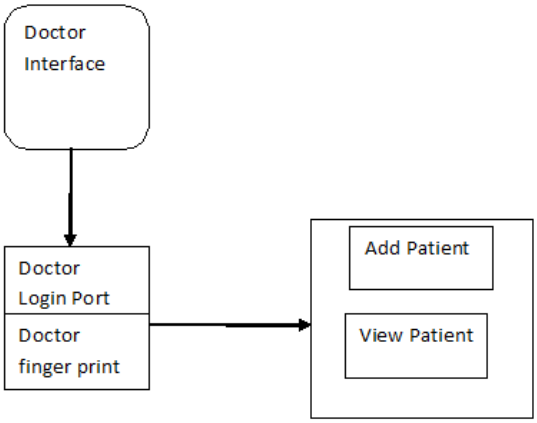

Fig. 3. Patient Information

C. Finger Print Verification:

In this module the doctor and patient can login with their fingerprint. We provide a safer login using fingerprint. When the user logs in with his/her fingerprint, the fingerprint is first verified. If the fingerprint is verified then the user will be directed to his account. Otherwise he will be blocked. The patient can login to view his account and the doctor can login to view the patient details.

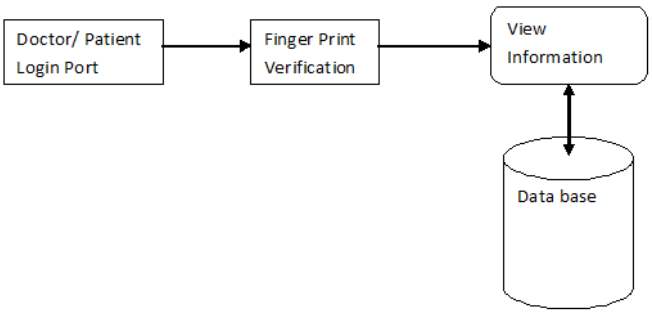

Fig. 4. Fingerprint Verification

D. Secure retrieval of data:

In this module, the data is retrieved in secure manner. The doctor can login to view his patient details and can modify it. Whereas other doctors can only view other patient details but cannot modify it. Thus the patient details can be retrieved in more secure manner. The patient can only view his medical history and he is blocked from viewing other patient details.

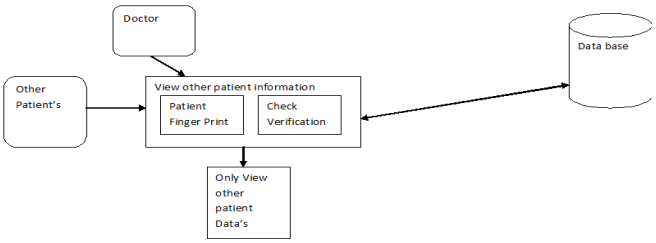

Fig. 5. Secure Retrieval of Data

VI. ALGORITHM

Linear congruential generator (**LCG**) is an algorithm that extracts a sequence of pseudo-randomized numbers calculated with a discontinuous piecewise linear equation. The method represents one of the best-known pseudorandom number generator algorithms. The theory behind them is relatively easy to understand, and they are easily implemented and fast, especially on computer hardware which can provide modulo arithmetic by storage-bit truncation.

$$R_{n+1} = (aR_n + b) \bmod n$$

Where n can be in multiples of 2 and if a 32-bit random number is required, it can be n can be 2^32.

R_n and R_{n+1} are the current and next pseudo random numbers in the pseudo random number sequence.

a is the multiplier and *b* is the increment.

For generation of proper random number sequence, the *n* and *b* should be relatively prime. Further, *a-1* should be divisible by all prime factors of *n*. *a-1* should be divisible by 4 if *m* is divisible by 4.

ALGORITHM PROCESS:

Step1:Linear Congruential Generators are defined by the recursion xn+1 ≡ (aXn+ c) mod m where x0, x1, . . . is a sequence of integers

Step2: It depends upon x0 = a seed a = a multiplier c = a shift m = a modulus all of which are also integers "≡" defines an equivalence relation.

Step3:Two numbers a and b are said to be congruent modulo m or a ≡ b mod m where m is an integer, if their difference is exactly divisible by m.

Step4:If 0 ≤ a < m and a ≡ b mod m, then a is said to be a residue of b modulo m.

Step5:a can be easily calculated using a = b − bb/mc × m, where the floor Function bxc computes the greatest integer less than x

Step6:The pseudo-random sequence {ui} is obtained by setting ui = xi/m for i = 1, 2,…..

Step7:If c = 0, the above defines a multiplicative congruential generator (MCG).

Step8:A typical choice for m on binary computers is 2 k where k is the typical machine length for integer type storage.

Step9:Recall that if fixed-point overflow is not trapped, the result of an integer arithmetic multiplication is modulo reduced by 2 k .

Step10:This is because if the product results in a number greater than 2 31 − 1, only the lower order 32 bits are retained to represent the result.

Step11:However, since the first bit in fixed-point representation is the sign bit, instead of integers in the range (0, 2 32 − 1], integers in the range [−2 3+ 1, 2 31 − 1] are produced by such multiplications.

Step12:The maximal period for a generator of this type is 2 k/4; but it can only be realized if "a" is chosen such that a mod ≡ 3 or 5.

Step13:Since the speeds of modern-day computers allow the modulo reduction to be done efficiently many implementations of random number generator use extended-precision floating point computations.

Step14:On 32-bit machines, popular choices are m = 2 31 − 1 and its primitive root a = 7 5 = 16807.

Step15:The key is generated by using the above mentioned formula.

Step16:The generated key is used to encrypt the classified data.

VII. SYSTEM DESIGN

System design is performed using various UML [Unified Modeling language] diagrams for the implementation of project. Design is a meaningful engineering representation of a thing that is to be built. Software design is a process through which the requirements are translated into representation of the software. Design is the place where quality is rendered in software engineering. Design is the means to accurately translate customer requirements into finished product. The system design means that the satisfactory design as per the requirement of each and every customer.

The system describes about the integration the Human Centric Wellness Data With Fingerprint Sensor. It is a more secure system to maintain the patient medical records in more efficient way. The fingerprint sensor allows the authorized user to access their prescription details by scanning and verifying their fingerprint. The user can access their

prescription even if they are in critical condition since only finger print verification is need and they don't need to type in their patient id. It consist of four modules namely Doctor Interface, Patient Interface, Finger Print Verification, Secure retrieve data's and all these four modules provides a secure retrieval of data.

VIII. ADVANTAGES OF THE PROJECT

- Highly secure so anonymous user cannot access the patient details.
- The user doesn't need to manually enter their id.
- Patient can be accessed with their prescription with the help of the fingerprint verification during critical condition.

IX. APPLICATIONS OF THE PROJECT

- The project can be greatly used in the field of health care centers, to store all the patient's details in a more secure manner.
- Reduces the possibility of hacking the patient's details from the database.

Any number of patient's data can be stored, since big data concept is used.

X. FUTURE ENHANCEMENTS

The project could be enhanced further in future. We can even link our aadhaar card information for making our plan of digital India to take a step forward. Linking the data digitally would make us to access the information easily in future.

XI. CONCLUSION

Swing's high level of flexibility is reflected in its inherent ability to override the native host operating system (OS)'s GUI controls for displaying itself. Swing "paints" its controls using the Java 2D APIs, rather than calling a native user interface toolkit. The Java thread scheduler is very simple. All threads have a priority value which can be changed dynamically by calls to the threads set Priority() method . Implementing the above concepts in our project helps to do the efficient work among the Server. We proposed a secure system to maintain the patient medical records and access the data through fingerprint sensor. As a future enhancement we will extend the system by integrating with a facial recognition system which in which the user identity is identified from a digital image or a video frame from a video source. Manual entries can be avoided and the proposed system will be highly efficient in the case of emergency.

REFERENCES

[1] Edgar Tello – Leal , Pablo D.Villarreal , Omar Chiotti , Ana B.Rios-Alvarado , Ivan Lopez-Arevalo," A Technological Solution To Provide Integrated And Process-Oriented Care Services In Healthcare Organisations".

[2] Z.Yang, A.Kankanhalli,B.-Y. Ng and J. T. Y. Lim,"analyzing the enabling factors for the organizational decision to adopt healthcare information systems,"Decision Support Systems,vol. 55, no. 3,pp.764 - 776, 2013.

[3] N.Mehanjiev and P.Grefen,Dynamic Buisness Process Formation for Instant Virtual Enterprises. London,U.K.:Springer,2010.

[4] E. Tello-Leal,O. Chiotti,and P.Villarreal,"Process-Oriented Integration and Coordination of Health Care services across organizational boundaries,"Journal of medical system,vol.36,no.6,pp.3713-3724, 2012.

[5]M.Dumas , M.L. Rosa , J. Mendling,andH.A.Reijer,Fundamentals of Buisness Process Management. Berlin,Germany:Springer,2013.

[6] B.Selic,"The pragmatics of model-driven development ,"IEEE Software,Vol.20 ,no.5,pp.19-25,2003.

[7]Eclipse,"Eclipsemodelingproject,"2012,http://www.eclipse.org/modeling/.

[8] B. Andres, P. Macedo, L. Camarinha-Matos, and R. Poler, "Achieving coherence between strategies and value systems in collaborative networks,"in Collaborative Systems for Smart Networked Environments,ser. IFIP Advances in Information and Communication Technology,L. Camarinha-Matos and H. Afsarmanesh, Eds. Springer Berlin Heidelberg, 2014, vol. 434, pp. 261–272.

[9] C.-M. Chituc, A. Azevedo, and C. Toscano, "A framework proposalfor seamless interoperability in a collaborative networked environment,"Computers in Industry, vol. 60, no. 5, pp. 317–338, 2009.

[10]P. D. Villarreal, I. Lazarte, J. Roa, and O. Chiotti, "A modelling approach for collaborative business processes based on the up-colbpiplanguage," in Business Process Management Workshops, ser. LectureNotes in Business Information Processing, S. Rinderle-Ma, S. Sadiq,and F. Leymann, Eds. Springer Berlin Heidelberg, 2010, vol. 43, pp. 318–329.

[11] I. M. Lazarte, O. Chiotti, P. D. Villarreal, L. E. Thom, and C. Iochpe,"An mda-based method for designing integration process models in b2bcollaborations," in Proceedings of the 13th International Conference on Enterprise Information Systems (ICEIS 2011). Beijing, China:SciTePress, 2011, pp. 55–65.

[12] A. Pokahr, L. Braubach, and K. Jander, "Unifying agent and componentconcepts," in Multiagent System Technologies, ser. Lecture Notes inComputer Science, J. Dix and C. Witteveen, Eds. Springer BerlinHeidelberg, 2010, vol. 6251, pp. 100–112.

[13] A. S. Rao and M. P. Georgeff, "Bdi agents: From theory to practice,"in Proceedings of the First International Conference on Multi-AgentSystems (ICMAS-95), 1995, pp. 312–319.

[14] A. Pokahr, L. Braubach, and W. Lamersdorf, "Jadex: A bdi reasoningengine," in Multi-Agent Programming, R. H. Bordini, M. Dastani, J. Dix,and A. Fallah Seghrouchni, Eds. Springer US, 2005, vol. 15, pp. 149–174.