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AUTHENTICATION SCHEME FOR MEDICINE ANTI-COUNTERFEITING SYSTEM USING IOT

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Abstract*: Medicines are taken by everyone in the world for the recovery from illness. Number of illegal business corporates for getting high benefit offer the lapsed medicines which is unsafe to the public who utilizes it, in some cases it might even take them until the very end. For falsifying this issue we propose this arrangement which depends on the Internet of things (IoT). The manufacturer fabricates the prescription and updates the record which can be seen by any of the clients who utilizes this interface. After the execution of this strategy, public would intake medicines with complete trust. We utilize the Near Far-Field Communication (NFC) for making this thought into a restorative transformation. This plan is secured by a few conventions which can shield the huge corporates and other undesirable access from the medical mafia. While adopting the secured authentication system for the pharmaceuticals company, the medicine anti-counterfeiting can be largely be avoided so that the public can be safe from utilizing the lapsed medicines.

Keywords: - Internet of Things (IoT), Near Field Communication (NFC), Medicine Verification System (MVS), National Medicine Verification System (NMVS)

INTRODUCTION

In order to counter the threat of falsified medicines entering the legal supply chain, we proposed a novel scheme for the pharmaceuticals authentication system based on Internet of Things (IoT). It aims at improving the public safety by mandating the Marketing Authorization Holders and manufacturers to put a system in place that is preventing falsified medicines from entering the legal supply chain. This system guarantees Medicines authenticity by an end-to-end verification. The manufacturers are required to apply the safety measures on the outer packaging: an anti-tampering device and a Data matrix code which incorporates a unique identifier (UI) for each sale package. At the point of dispense the medicine will be scanned, checked and verified for authenticity against a national repository system. If the QR Code on the pack matches with the information in the repository system of the manufacturer unit, the pack is decommissioned and supplied to the patient.

Otherwise, if there will be a warning related to this pack, then the system will highlight this as an exceptional event and the package will not be supplied to the public. An investigation needs to be determine whether the pack has been falsified or not and identify the false supplier in the market. The Medicines Verification System (MVS) is composed of a central control HUB and the different National Verification Systems (NMVS). Typically, the Market Authorization Holders and the Parallel Distributors are connected to the central control Hub for uploading the product information and the Unique Identifiers. The stakeholders are also responsible for adapting their production line to the new requirements and finance set up and management of the MVS, i.e., the Hub and the National systems.

The end-users, such as wholesalers for risk-based verification, and the pharmacies, in retail and hospital, for patient delivery verification are connected to the NMVS. The stakeholders are responsible for adapting their system and finance for the required connection. Counterfeit medicines are as "one which is deliberately and fraudulently mislabeled with respect to identity and/or source".

SURVEY: INDIAN SCENARIO

According to the public notice issued by the Directorate General of Foreign Trade dated January 10th, 2014, exported pharmaceutical products should have track and trace capability using barcode technology as per GS1 global standards. The stated requirements are: 2D barcode at the primary level, 1D or 2D on the secondary level, and 1D at the tertiary level packaging encoding the GTIN code, batch number, expiration date, and serial number of respective packaging. However, this system does not ensure the absence of counterfeits as effectively as serialization. Barcodes increase the risk of being caught if counterfeits are present, whereas serialization uniquely identifies every entity and ensures the absence of counterfeits. Serialization using barcodes as data carriers is a more secure strategy and is even more economical compared to the RFID system.

OTHER COUNTRIES SCENARIO

Counterfeiting of various products creates problem to different manufacturing industries such as food and beverage, People, who purchase and use counterfeit medicines, suffer a lot because these medicines do not provide any relief to their diseases. The concern issue threatens the public health and also causes revenue losses to the legitimate manufacturing organizations. According to WHO data, there are about 100 000 deaths happened in a year in Africa due to use of counterfeit drugs. The British "International Policy Network" estimated that 700 000 deaths in a year are happened due to the use of counterfeit malaria and tuberculosis drugs. Counterfeiting can be happened with branded as well as generic products. WHO further noticed that more than 30% of medicines on sale are counterfeited in some part of Africa, Asia and Latin America. After authentication of drug package, the system responses with a text message accordingly whether it is fake/actual. Thus, a consumer can easily come to know the authenticity of the drug package very easily and without any cost.

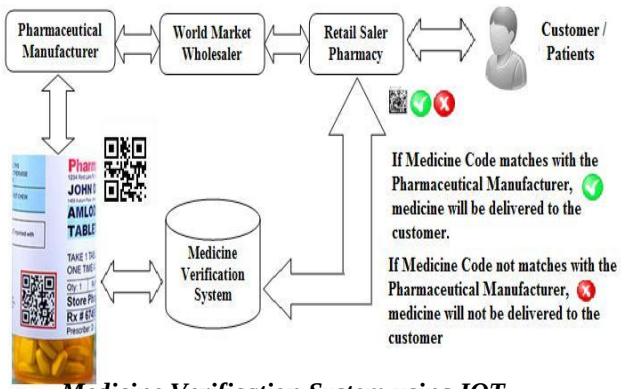
EXISTING SYSTEM

In our existing system the manufacturing organizations use label on the drug packages with an encrypted code. When a customer/consumer wants to buy that drug, he/she scratches off the label on the drug package and text the code to the system of company which authenticates the drug package without any charge. After authentication of drug package, the system responses with a text message accordingly whether it is fake/actual. Thus, a consumer can easily come to know the authenticity of the drug package very easily and without any cost.

PROPOSED SYSTEM

The proposed scheme is also capable to prevent the counterfeiting of medicine dosage forms. In this proposes work, instead of RFID, QR Code is used. It further provides secure mutual authentication between the NFC tag placed on a dosage form and the server. In the proposed scheme a NFC enabled mobile device acts as an interface between the NFC tag and the server, which reads the information, stored in the NFC tag and sends the information to the server.

METHODOLOGY



Medicine Verification System using IOT

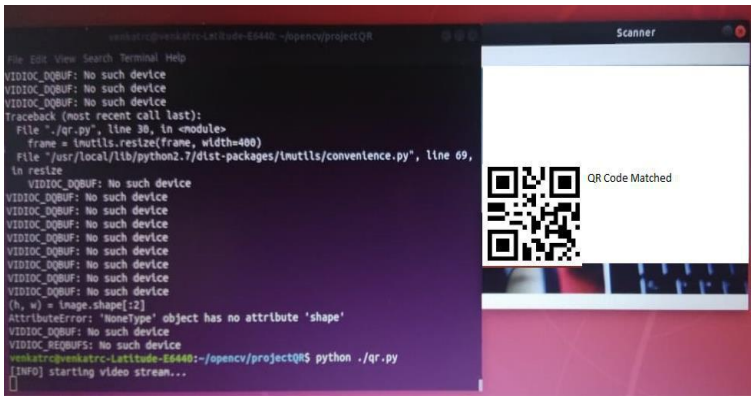
In the given architecture, we have three different types of servers: a) information server *(*IS*i)*; b) authentication server *(*AS*j)*; and c) database server *(*DS*k)*. Apart from that we have MU at the manufacturer site and a customer who wants to buy the medicine's dosage forms. Both user at the manufacturer site and customer can communicate with the servers. Note that all users have near field (NFC) enabled mobile device and all servers are able to communicate with each other. Initially, each manufacturer at the manufacturer site registers the details of dosage forms (package) to the information server using their NFC enabled mobile device. After the successful registration *(*IS*i)* sends this information to AS*j* and DS*k*. This considered architecture is different from the existing architecture. In this architecture AS*j* has the complete information which is required to check the authenticity of the dosage forms. Therefore we are not using any pedigree server which is available in the current architectures. During the authentication process some screened records are generated at AS*j* which are then sent to DS*k* for storage. These records will be then used for the future authentication.

IMPLEMENTATION

The proposed medicine anticounterfeiting system in IoT environment is efficient and has more usability as it suits the mobile environment. As far as implementation is concerned the pharmaceutical companies can also implement this type of anti-counterfeiting system in their information technology department. But this act will not be fully trusted by the customers/patients. So, it would be better if a trusted third party, say digital anti-counterfeiting party, can implement this type of system. Our scheme is secure as well as user friendly. A customer (patient) just needs the NFC enabled mobile device with the Internet connectivity to check authenticity of medicine.

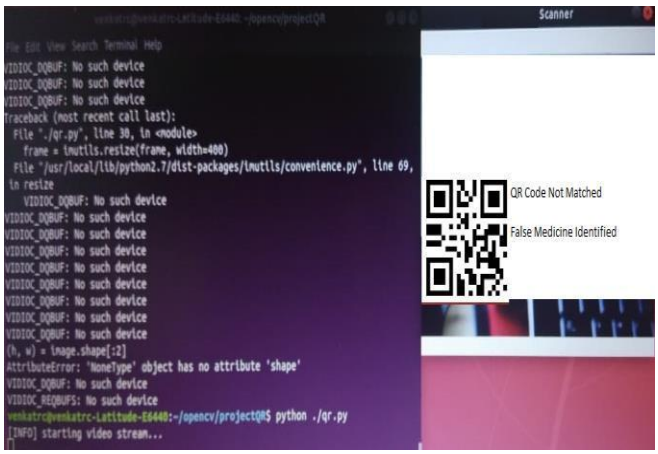
EXPERIMENTAL RESULTS

QR CODE MATCHED



If QR Code matches medicines will be delivered to the customer.

QR CODE NOT MATCHED



CONCLUSION

Drug counterfeiting is an important problem addressed by several countries which requires multiple measures to protect the supply chain. The implementation of anti-counterfeit technologies is an important strategy taken up by several pharma manufacturers. The track and trace system and serialization are given importance and are widely used among all anti-counterfeit technologies in different countries such as Europe, India, China etc. Recent notification from the Indian government mandated the use of barcodes on all drug products manufactured and imported. Now, we planned to use encrypted QR Codes instead of barcodes.

FUTURE PLAN

Creating awareness to the patients, customers and pharmaceuticals manufacturer regarding the false medicine counterfeits. Counterfeit drug prevention is a collective job. Healthcare professionals as well as patients should be vigilant about the medicines procured and their sources. They should evaluate the response, educate others regarding inspection of the authenticity of the drug acquired, and report in the case of suspicion. Regulatory authorities must conduct checking plans and devise necessary measures to ensure the absence of counterfeits, increasing the penalty of the pharmaceutical counterfeiting based on the risk imposed on public health.

REFERENCES

[1] M. Wazid, A. K. Das, M. K. Khan, A. Al-Ghaiheb, N.Kumar & A.V.Vasilakos, "Secure authentication scheme for medicine anti-counterfeiting system in IOT environment," IEEE Internet of Things Journal, vol.4, no.5, pp. 1634 – 1646, 2017.

[2] S.Wu and K.Chen, "An Efficient Key Management Scheme for Hierarchical Access Control in E-Medicine Systems,' Journal of Medical System, vol.36, no.4, pp. 2325 -2337, 2012.

[3] Choi S.H, "Implementation issues in RFID Based Anti-Counterfeiting for Apparel Supply Chain, vol. 4, no. 4, December 2013.

[4] R. Aparna, V.Ravi, "Security in RFID based smart retail system." In Computing for Sustainable Global Development, 3rd International Conference on, pp. 587-592, IEEE, 2016.

[5] M.Taolin, H.Zhang, J.Qian, S.Liu, X.Zhang, and X.Ma, "The Design of Brand Cosmetics Anti-counterfeiting System Based on RFID Technology" International Conference on Network and Information Systems for Computers (ICNISC), pp. 184 - 189. IEEE, 2015.

[6] C.Wenxue, H.Qinghao, O.Zhirong, P.Zhe, Z.Guanxiang, "Development of vegetable traceability system based on RFID and Barcode technology" In Service Systems and Service Management (ICSSSM), 2014 11th International Conference, pp. 1-5. IEEE, 2014.

[7] W.H.Lee, C.M.Chou, and S.W.Wang,"An NFC Anti- Counterfeiting Framework for ID Verification and Image Protection" Mobile Networks and Applications, Vol. 21, no. 4 pp. 646 – 655, 2016.

[8] Debiao He and Sherali Zeadally ,"An Analysis of RFID Authentication Schemes for Internet of things in Healthcare Environment using Elliptic Curve Cryptography" IEEE Internet of Things Journal, Vol. 2, no. 1, February 2015.