

Doctor's Appointment and E-Prescription Access Management System

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ABSTRACT: *With the improvement of the web, applications have become muddled, and significant innovation has expanded. Contrasted and clinical applications, the meaning of data innovation has been extended to incorporate clinical helper elements of clinical data. This incorporates electronic clinical records, electronic remedies, clinical data frameworks, and so on. Although exploration on the information handling design and configuration of different related frameworks is becoming experienced, the mix is insufficient. A coordinated clinical data framework with security strategy and protection insurance, which joins e-patient records, e-solutions, altered brilliant cards, and unique finger impression recognizable proof frameworks, and applies intermediary mark and gathering mark, is proposed in this review. This framework viably applies and saves clinical assets—fulfilling the versatility of clinical records, introducing the capacity, and security of medication assortment, and staying away from clinical contentions and exploitative to additionally gain the greatest adequacy with the least assets. Along these lines, this clinical data framework might be formed into a thorough capacity that wipes out the transmission of manual reports and keeps up with the security of patient clinical data. It can work on the nature of clinical consideration and irreplaceable foundation for clinical administration.*

Key Words: data privacy, data access management, cyber security, e-health, cryptography, etc.

1. INTRODUCTION

The coming of the electronic age and the web achieved the utilization of PC helped clinical help, for example, e-wellbeing, e-wellbeing record, and e-remedy. With this data now accessible electronically, it makes it more straightforward for snoops, programmers, and other noxious assailants to get to the secret data. Interfacing individual wellbeing data to the web opens this data to more unfriendly assaults contrasted with the paper-based clinical records. Electronic recommending is essentially an electronic method for producing and communicating remedies and solution-related data utilizing electronic media between a prescriber and apportioning drug store [4]. Electronic recommending permits a medical care supplier to send exact and neat solutions electronically to a drug store. This would limit medicine blunders because of the error of remedies and would dispose of the issue of patients having lost solutions. Patients' wellbeing data, for example, solution data and wellbeing records have consistently had protection and classification concerns. The exchange of clinical solutions from the clinic to a drug store is a cycle that is

inclined to assault by gatecrashers; the remedies might be caught, adjusted, or created. The justification for why most of the gatecrashers are so fruitful is that the vast majority of the data they obtain from the framework is in a structure that they can peruse and understand. Interlopers might uncover the data to other people, adjust it to distort an individual or use it to send off an assault [1]. Clinical solution and related clinical records which contain touchy and individual private data are communicated among medical clinics and drug stores on a consistent schedule and are presented to likely assaults from the unapproved public. Because of the touchy idea of the data being sent, the chance of this data being blocked is a danger that can't be overemphasized. While cryptography is tied in with scrambling of data to a garbled structure, steganography then again is the procedure of concealing data in advanced media. It is the workmanship and study of concealing information into various transporter records, for example, text, sound, pictures, video, and so forth. The primary objective of steganography is to impart safely in a total imperceptible way and to try not to attract doubt to the transmission of secret information. Rather than cryptography, steganography isn't to hold others back from realizing the concealed data however is to hold others back from feeling that the data even exists. To guarantee the protected exchange of medicines between the recommending and administering frameworks, this paper presents the improvement of an electronic medicine framework and executes steganography and an encryption calculation to get the medicines produced by a specialist or other medical services supplier and guarantee just enlisted drug stores to have the capacity to get to these solutions.

2. LITERATURE SURVEY

However, the appearance and advancement of information move through the web has made it simpler to send solutions from the emergency clinic to the drug store quicker and all the more precisely, it might likewise be more straightforward for the individual and secret data to be hacked or taken in numerous ways and are defenseless against aggressors who might interfere with, catch, adjust, and manufacture clinical remedies for different reasons including acquiring drugs for sporting purposes or to take care of a habit or involving the solutions for clinical or monetary wholesale fraud and different outrages. Steganography innovations could give data stowing away if appropriately executed and would viably enhance the rising interest for remedy data classification and security.

Some outstanding works are accordingly revealed as for this: Concerning e-solution and cryptography, [10] fostered an electronic remedy framework that utilizes a public key foundation. Secrecy is guaranteed by utilizing symmetric-key cryptography, and the presentation of quality declarations that consider the distribution of honors. The electronic solution is created and is marked carefully by entering a mysterious PIN. Then, at that point, the solution is transferred to an information base where it is referred to by its remedy special identifier where the drug store gets to it from. At the drug store, the solutions are recovered, the prescriber's mark is checked the remedy is decoded. Nonetheless, encoded data might in any case be effortlessly spotted has been scrambled and an endeavor could be made to translate the substance. A steganography calculation improvement was presented in [1] in which the creators fostered a steganography framework that zeroed in on the Least Significant Bit (LSB) method of concealing messages in a picture. The framework improved the LSB method to give a method for secure correspondence by haphazardly scattering the pieces of the message in the cover picture as opposed to the grouping planning strategy. The areas of the picture pixels where to implant the mysterious message are dictated by discrete logarithm estimation. Likewise, a stego key is utilized in the implanting system making it harder for unapproved individuals to remove the first message. The downside to this is that the LSB technique for inclusion is very powerless against picture control. Like [10], embracing cryptography, [14] depicted an electronic endorsing framework in which a secret phrase is needed to allow client admittance to the framework. It joins public key framework (PKI) innovation and advanced marks. Utilizing a PKI, the solutions are scrambled before transmission and the beneficiary should have both a public and a private key to translate the message. Albeit the framework offered significant degrees of safety, security, and verification, the impediment related to this plan was the significant expense and trouble in carrying out the innovation. In like manner, [8] depicted the utilization of an electronic solution framework that uses unique mark acknowledgment as the verification component. Protection is guaranteed by utilizing a public key cryptography calculation to scramble the solutions and advanced marks are utilized to tie a public key to a client's character. The drug specialist, at the less than desirable end, unscrambles and recovers the solutions utilizing the decoding calculation and confirms who the remedies came from utilizing the computerized signature. [7] later fostered an electronic recommending framework to expand the proficiency of the endorsing system. The framework was established inside a web climate which permits the doctor to get to the medicine framework through the web. The medicines would be transferred by the specialists onto an information base where the drug store would get to it. The impediments the framework had were the absence of any security elements like cryptography, steganography, advanced affirmation, firewalls, and secure conventions. Over dependent on cryptography alone appears to be inadequate; a work by [2] fostered a framework that consolidates steganography with

cryptography. They fostered a calculation wherein the first message is first changed over, letter by letter, to ASCII, and afterward encoded utilizing unbalanced key cryptography. Later encryption, a steganography calculation is rushed to plan the pieces of the encoded secret message to pixels of the cover picture. The PSNR (Peak Signal to Noise Ratio) and MSE (Mean Square Error) of the stego pictures delivered were inspected and demonstrated to have satisfactory levels. More on steganography was accounted for in [11] who fostered a steganography framework utilizing discrete wavelet change to build the concealing limit and security of the framework. The cover picture and mystery message are standardized and the wavelet coefficient is gotten by applying discrete wavelet change. The wavelet coefficients of both the cover and message are then melded into a solitary picture to create a stego picture. This strategy expands the concealing limit of the framework with the end goal that the size of the secret message could be double the size of the cover picture. The exploratory consequences of the calculation were assessed dependent on the PSNR, MSE, and entropy between the cover picture and the stego picture which shows further developed qualities contrasted with existing calculations. Moreover, [6] fostered a steganography framework to conceal information inside a picture. They fostered a calculation where the framework utilizes double codes inside the pixels of a picture. The mysterious message is changed over to double codes then, at that point, implanted into the pixels of a picture creating a stego picture. The stego pictures were tried utilizing PSNR (Peak signal-to-commotion proportion). In view, the PSNR esteems acquired from tests, it showed that the stego pictures have quality pictures without compromising the first picture. Additionally, In [12], a framework was created to get an electronic democratic framework utilizing biometrics, cryptography, and steganography. The client is verified utilizing unique finger impression acknowledgment programming. When the vote is cast, it is scrambled utilizing a public key cryptography calculation and afterward is implanted in an image utilizing an LSB addition calculation to conceal the way that an encoded message is being communicated. The vote is removed from the picture and decoded utilizing the steganography calculation. However, it utilizes high security by joining steganography with cryptography, the steganography strategy utilized is feeble against factual assaults. [5] introduced the utilization of biometrics to get electronic remedies. The medicine framework was just gotten with doctor biometrics and they additionally proposed a structure by which a patient can distinguish oneself on the apportioning framework through biometrics. Notwithstanding, the work didn't think about the security of electronic remedy while on the way Spread range method is like one more concealing strategy that conceals information by expanding the mysterious message and putting it over the cover picture like Statistical steganography procedures, change space methods, twisting strategies and least critical piece replacement. The significant benefit of the spread range is

its strength. Since the encoded data is spread over a wide recurrence band, it is hard to eliminate it without annihilating the cover picture making it impervious to picture control. Additionally, AES performs three stages on each square (128 pieces) of plaintext. Inside Step 2, various rounds are performed relying upon the key size: a 128-digit key performs 9 adjusts, a 192-piece key performs 11 rounds, and a 256-cycle key, known as AES-256, utilizes 13 rounds. Inside each round, bytes are subbed and modified, and afterward, unique augmentation is performed dependent on the new plan. AES is intended to be secure in what's to come. Until this point in time, no assaults have been effective against AES [3]. This paper sets up the advantages of electronic solutions to every one of the gatherings associated with the interaction and the possibility to which steganography with AES encryption can be utilized in getting electronic remedies.

3. PROPOSED SYSTEM

a. SYSTEM DESIGN

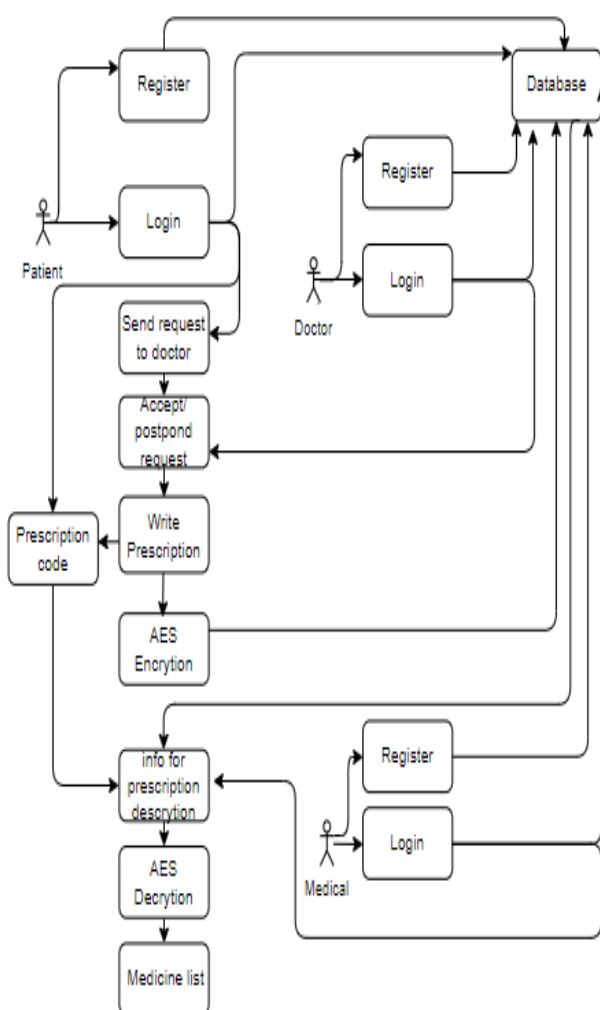


Fig -1: System Design Architecture

The above figure 1 shows the system design architecture of the entitled project. From the architecture diagram, it's seen that there is an involvement of the patient, doctor, and medical. Every person needs to register for further procedures in the system. After the registration, the person can log in through their account in the system.

b. USE CASE DIAGRAM

Use case diagram is nothing but a graphical description of a user's all possible interaction with the system which is underdeveloped. Use cases are a set of functions, and services that are used by the system. To visualize the different functionalities requirements for the system, use case diagrams are used. The internal and external operations that may impact the system are also described. Use cases if specified can be denoted as both visual and textual representation. It is a technique that is an effective way for communicating system behavior in the terms of the user's vision by specifying all the outer visible system behavior.

For the project, we have created the below-mentioned use case diagram.

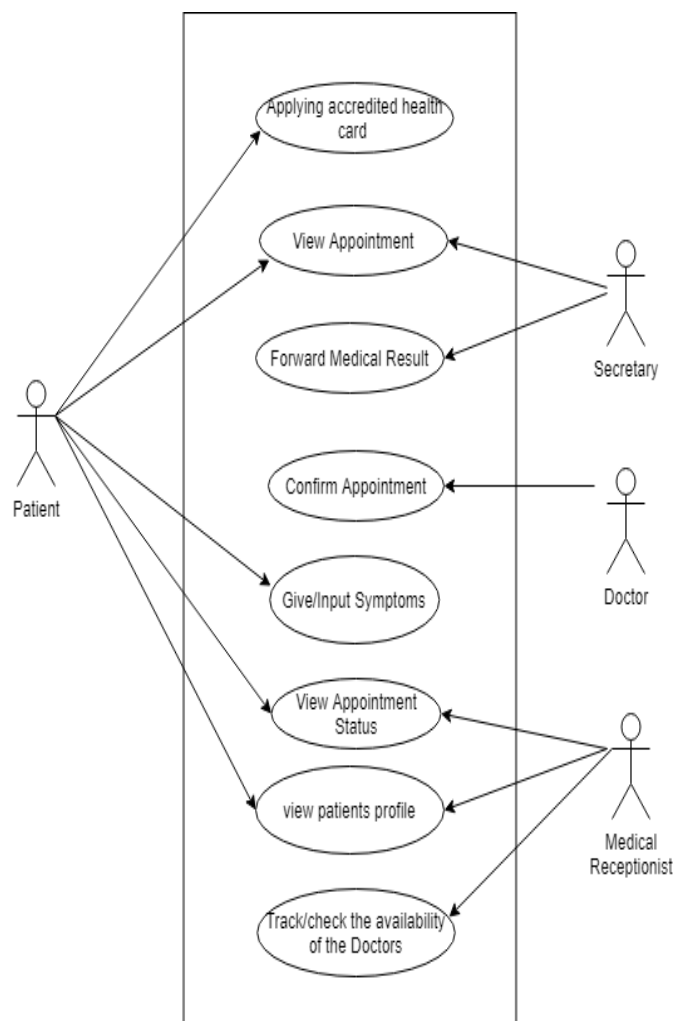


Fig - 2: Use Case Diagram

The above figure 2 shows the use case diagram of the entitled project and its flow. From the diagram, it is seen that the patient can book an appointment and view appointment status. The doctor can accept appointment requests from the user and confirm the appointment. Receptionists can check the availability of the doctors, view appointment status, and view patient profiles.

c. IMPLEMENTATION

User -

- Book slot for treatment
- Check Prescription code

Doctor -

- Accept appointment requests from the user
- Write Prescription

Medical -

- Enter Prescription code from user

4. CONCLUSIONS

There are many techniques to encrypt data. In this system, we will use the AES algorithm to encrypt data of prescription. AES algorithm will give the best output to us.

REFERENCES

- [1] Amin, M.M., Salleh, M., Ibrahim, S., Katmin, M.R., Shamsuddin, M. Z. I. (2003). Information hiding using steganography. Proceedings. 4th IEEE National Conference on Telecommunication Technology (NCTT '03), pp 21 - 25
- [2] Bhattacharyya, D, Das, P., Bandyopadhyay, S.K, Kim, T. (2009). Steganography: A Novel Approach. Int. J. of Advanced Science and Technology. Volume 3, pp 79 – 86.
- [3] Ciampa, M. (2012). Security+ Guide to Network Security Fundamentals. Ch 11, "Basic Cryptography" Fourth edition. Pp 422. Course Technology, Cengage Learning. Boston, MA 02210, USA
- [4] Ehealth Initiative. (2008), A clinician's guide to electronic prescribing. Available <http://www.aaos.org/research/committee/evidence/eprescribing-guide.pdf> (Accessed 03/09/2014)

[5] Emuoyibofarhe. O.J., Omotosho. A. (2012). "Development of a Secure Intelligent E-Prescription System". In proceedings of The International eHealth, Telemedicine and Health ICT Forum for Education, Networking and Business (MedTel 2012) Conference 10th Edition.18-20 April. Luxembourg. pp 261 - 272

[6] Ibrahim, R. and Kuan, T.S. (2011). Steganography Algorithm to Hide Secret Message inside an Image. International Journal of Computer Technology and Application, vol. 2, pp. 102-108.

[7] Joia, L, A, Magalhaes, C. (2009). Implementation of an electronic prescription system in Brazilian general hospital: understanding source of resistance. EJISDC.39(2):1-18.

[8] Korel, B. and Wadsworth, K. (2006). Electronic prescription PowerPoint PPT Presentation. Available at http://www.powershow.com/view/23b66-NDBiM/ELECTRONIC_PRESCRIPTIONS_powerpoint_ppt_presentation.

[9] Marvel, L. M., Boncelet, C. G. Jr., and Retter C. T. (1999). Spread Spectrum Image Steganography, IEEE Transactions on Image Processing, Vol 8, No 8, pp. 1075-1083.

[10] Mundy, D.P. and Chadwick, D. W. (2002). A system for secure electronic prescription handling. In Proceedings of The Hospital of the Future, Second International Conference On The Management Of Healthcare And Medical Technology, Stuart Graduate School of Business, Center for the Management of Medical Technology, Illinois Institute of Technology, Chicago, Illinois, USA, July 28-30.

[11] N. Provos, P. Honeyman, "Detecting Steganography Content on the Internet". CITI Technical Report 01-11, 2001.

[12] N. Provos, "Probabilistic Methods for Improving Information Hiding", CITI Technical Report 01-1, January 31, 2001.

[13] P. Moulin & J.A. O'Sullivan, "Information-Theoretic Analysis of Information Hiding", at IEEE International Symposium on Information Theory, Boston, MA, October 1999.

[14] R. A. Isbell, "Steganography: Hidden Menace or Hidden Saviour", Steganography White Paper, 10 May 2002.