

An Innovative Approach to Solve Healthcare Issues Using Big Data Image Analytics

Ramesh R., Kalaighnarkaranidhi Institute of Technology, Coimbatore, India

Udayakumar E., Kalaighnarkaranidhi Institute of Technology, Coimbatore, India

Srihari K., SNS College of Engineering, Coimbatore, India

Sunil Pathak P., Amity School of Engineering and Technology, Amity University, Noida, India

ABSTRACT

The increasing adoption of transmission of medical images through internet in healthcare has led to several security threats to patient medical information. Permitting quiet data to be in peril may prompt hopeless harm, ethically and truly to the patient. Accordingly, it is important to take measures to forestall illicit access and altering of clinical pictures. This requests reception of security components to guarantee three fundamental security administrations – classification, content-based legitimacy, and trustworthiness of clinical pictures traded in telemedicine applications. Right now, inside created symmetric key cryptographic capacities are utilized. Pictorial model-based perceptual image hash is used to provide content-based authentication for malicious tampering detection and localization. The presentation of the projected algorithm has been evaluated using performance metrics such as PSNR, normalized correlation, entropy, and histogram analysis, and the simulation results show that the security services have been achieved effectively.

KEYWORDS

AES-GCM, Big Data, Content-Based Authenticity, ECDSA, Healthcare, Image Processing, Medical Diagnosis, Perceptual Image Hash, Tampering Detection, Tampering Localization, Whirlpool Hashing

1. INTRODUCTION

Telemedicine is a medicinal consideration practice which gives various advantages, Along these lines, there is a prompt requirement for verified plans for safe trade of DICOM pictures and information which decreases the plausibility of hacking. The systems to accomplish three significant telemedicine security administrations: secrecy, legitimacy and honesty. Content based confirmation is expected to distinguish and find the altered districts in a DICOM picture. Implanting and corrupting the medicinal picture, may actuate serious protection from its reception by therapeutic principles. In this paper, a crypto-based calculation is proposed which is fit for giving classification, content based realness and trustworthiness of DICOM pictures.

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2. RELATED WORKS

Many threats posed by DICOM images. Some of those algorithms and their drawbacks are described in the next sections.

2.1. Crypto-Based Algorithms

This may reliably get modified. Believability and uprightness are suited the pixel data using propelled marks with inside delivered keys and it fails to give content based validity which is basic for change restriction. The count furthermore doesn't give mystery, validity and decency for the header data using big data.

Owing to the limitations referred to above, Al-Haj (Al-Haj & Hussein, 2015) propose a novel arrangement that keeps an eye on the security issues looked by the above arrangement. The count gives authenticity, protection and decency. In any case, the estimation doesn't have the modify constraint limit which is needed in the dependability affirmation of restorative pictures.

2.2. Hybrid Algorithms

At the point when everything is said in done, give uprightness restorative picture, while CRCs are fittingly used perceive modified zones in the got picture. Nevertheless, crossbreed estimations experience from being computation raised. Likewise, 1piece change in a cyclic redundancy code or a hash code will provoke fake affirmation and wrong genuineness check.

3. PROPOSED ALGORITHM

The proposed calculation tends to every one of the restrictions looked by earlier works referenced in Section 2 by giving privacy. It likewise gives content based validation to the pixel information of DICOM picture by utilizing visual model based perceptual picture hashing capacity for altering recognition and limitation.

The proposed calculation comprises of two systems: the encryption and mark creation methodology, the decoding and mark check technique and the alter confinement strategy if the mark is seen as inauthentic. The calculation utilizes AES-GCM, the whirlpool hash capacity and ECDSA for DICOM header information and AES-GCM, the perceptual picture hashing and ECDSA for DICOM pixel information which gives classification, uprightness and substance based validness for the DICOM pictures.

3.1. Encryption and Signature Creation Procedure

A strategy has the classified characteristics of header information and pixel information sources of info and its yields are halfway scrambled DICOM header and completely encoded pixel information. The system is appeared in Figure 1.

3.1.1. Header Data Confidentiality

A strategy scrutinizes each and every private nature of the header data and scrambles their novel characteristics using AES-GCM using big data. The customer won't have the choice qualities, the instatement vector and the encryption key vary beginning with one picture then onto the following. This sidesteps the potential weakness introduced in the encryption platform (Santhi, 2017b). This strategy decodes the encoded pixel information and the halfway scrambled DICOM header information, and confirms their validness (Das & Kundu, 2013) and honesty as appeared in Figure 2 and Figure 3. On the off chance that the pixel information is seen as inauthentic, at that point the strategy will find the altered locale in the DICOM picture (Vetrivelan, 2017).

The names, validness and decency (Mohan, 2020; Ramesh, 2016) of the arranged characteristics of the pixel data are affirmed. If the two marks are not composed, by then adjusting control estimation

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