

Security and Privacy of Medical data storage in Cloud platform: Necessity, Tools, Algorithms and Diagnosis

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Abstract

Statement of the Problem: A large volume of data (particularly images in the form of MRI, CT and PET scans) is produced in the healthcare environment day by day due to the advancement and innovation in medical devices. Storing these kinds of images in a Cloud environment is practiced accommodating this growing volume. No wrong in storing data in a cloud, wherein the issue is with the security of data. However, medical image security is one of the great focus among today's IT research arena. The purpose of this research is to propose a novel security technique for providing Medical data security and storage in Cloud. Best practice method has been used in this research by applying encryption algorithms upon the image data.

Methodology & Theoretical Orientation: This study focuses on medical image processing with secured cloud computing environment using an extended zig zag image encryption scheme with high tolerance to various attacks. Secondly, a Fuzzy Convolutional Neural Network (FCNN) algorithm is proposed for effective classification of images. With various layers of CNN, the decrypted images are used to classify cancer levels. This classification details and the findings are sent to the appropriate doctors and patients for further care.

Findings: Using the standard brain image dataset, the experimental procedure is carried out. According to the findings of the experiment, the proposed algorithm outperforms other current algorithms and can be used to diagnose medical images effectively.

Conclusion & Significance: The experimental phase is primarily focused on incorporating both IoT and cloud computing into healthcare procedures, especially in the prediction of brain tumors. The data needed to diagnose a disease is gathered and safely transferred to the cloud. Then, for medical image diagnosis, a fuzzy convolutional neural network algorithm is proposed. The proposed algorithm divides images into usual and abnormal categories, and the results of the analysis are sent to doctors and healthcare providers via the Internet of Things for further treatment. The results show that the proposed algorithm outperforms other current algorithms and can be used to effectively diagnose image. Other deep learning neural network algorithms can be used in the future to improve disease prediction accuracy and to effectively analyse vast volumes of medical data by using medical resources.

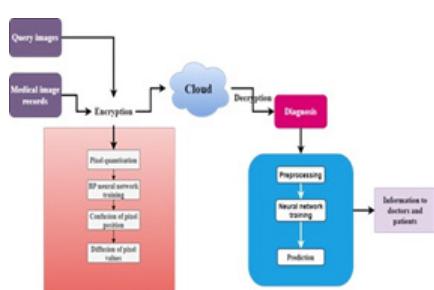


Figure 1: Proposed System architecture

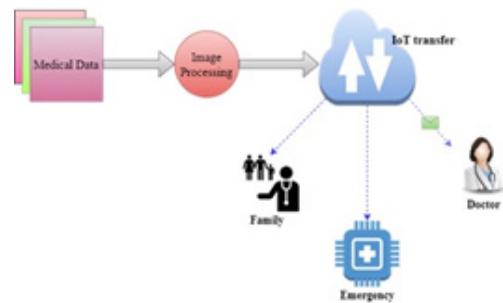


Figure 2: IoT based medical Image transmission

Biography

Deepika has her expertise in evaluation and passion in medical image processing especially for Cancer disease. Her open and contextual evaluation model based on deep learning techniques creates new optimization pathways for improving diagnosis. She has built this model after years of experience in research, evaluation, teaching and administration in education institutions. Currently she has been involved in using Machine Learning for medical applications to help doctors and medical practitioners take prompt decisions in cancer treatment. This approach is working efficiently when compared with other existing methods. This has been confirmed from the experimentation results. She has authored research works that are related to cancer disease prediction and classification.

Publications

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4. Y Harold Robinson, S Vimal, M Khari, F C L Hernandez, and R G Crespo, Tree-based convolutional neural networks for object classification in segmented satellite images, The International Journal of High-Performance Computing Applications, vol. 1, (2020), pp 1-14.
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