**LITERATURE SURVEY**

**1) A novel security framework for healthcare data through IOT sensors**

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The Internet of Things (IoT) has played a crucial role in the distribution of health records and poses security issues to the patient-specific health information needed for remote hospital attention. The majority of publicly accessible security mechanisms for health information do not concentrate on the flow of information from IoT different sensors installed upon the person's blood through networking devices to primary health care centers. In this paper, we investigated the potential risks of unprotected transmission data, particularly among IoT sensor systems and network gateways. The study encourages the transmission of health insurance data to hospitals remotely. The proposed health care information model would encode immediately so that the sensing element before even being transferred to cryptographic techniques. To use a laboratory configuration with two-stage cryptography at the IoT sensor and two-stage decoding at the physician's surgery receptor, the prototype system was validated. The test results for a complete safety system for IoT - based on the transmission of healthcare data seem good. The study opens up new avenues for information security on IoT devices.

**2) CoviLearn: A Machine Learning Integrated Smart X-Ray Device in Healthcare Cyber-Physical System for Automatic Initial Screening of COVID-19**

**AUTHORS:** D. Das, S. Ghosal, and S. P. Mohanty

The pandemic of novel Coronavirus Disease 2019 (COVID-19) is widespread all over the world causing serious health problems as well as serious impact on the global economy. Reliable and fast testing of the COVID-19 has been a challenge for researchers and healthcare practitioners. In this work, we present a novel machine learning (ML) integrated X-ray device in Healthcare Cyber-Physical System (H-CPS) or smart healthcare framework (called "CoviLearn") to allow healthcare practitioners to perform automatic initial screening of COVID-19 patients. We propose convolutional neural network (CNN) models of X-ray images integrated into an X-ray device for automatic COVID-19 detection. The proposed CoviLearn device will be useful in detecting if a person is COVID-19 positive or negative by considering the chest X-ray image of individuals. CoviLearn will be useful tool doctors to detect potential COVID-19 infections instantaneously without taking more intrusive healthcare data samples, such as saliva and blood. COVID-19 attacks the endothelium tissues that support respiratory tract, and X-rays images can be used to analyze the health of a patient's lungs. As all healthcare centers have X-ray machines, it could be possible to use proposed CoviLearn X-rays to test for COVID-19 without the especial test kits. Our proposed automated analysis system CoviLearn which has 98.98% accuracy will be able to save valuable time of medical professionals as the X-ray machines come with a drawback as it needed a radiology expert.

**3) Identification of Pneumonia Disease Applying an Intelligent Computational Framework Based on Deep Learning and Machine Learning Techniques**

**AUTHORS:** Y. Muhammad, M. D. Alshehri, W. M. Alenazy, T. Vinh Hoang, and R. Alturki

Pneumonia is a very common and fatal disease, which needs to be identified at the initial stages in order to prevent a patient having this disease from more damage and help him/her in saving his/her life. Various techniques are used for the diagnosis of pneumonia including chest X-ray, CT scan, blood culture, sputum culture, fluid sample, bronchoscopy, and pulse oximetry. Medical image analysis plays a vital role in the diagnosis of various diseases like MERS, COVID-19, pneumonia, etc. and is considered to be one of the auspicious research areas. To analyze chest X-ray images accurately, there is a need for an expert radiologist who possesses expertise and experience in the desired domain. According to the World Health Organization (WHO) report, about 2/3 people in the world still do not have access to the radiologist, in order to diagnose their disease. This study proposes a DL framework to diagnose pneumonia disease in an efficient and effective manner. Various Deep Convolutional Neural Network (DCNN) transfer learning techniques such as AlexNet, SqueezeNet, VGG16, VGG19, and Inception-V3 are utilized for extracting useful features from the chest X-ray images. In this study, several machine learning (ML) classifiers are utilized. The proposed system has been trained and tested on chest X-ray and CT images dataset. In order to examine the stability and effectiveness of the proposed system, different performance measures have been utilized. The proposed system is intended to be beneficial and supportive for medical doctors to accurately and efficiently diagnose pneumonia disease.

**4) COVID-19 detection and classification for machine learning methods using human genomic data**

**AUTHORS:** M. T. Ahemad, M. A. Hameed, and R. Vankdothu

Coronavirus is a disease connected to coronavirus. World Health Organization has declared COVID-19 a pandemic. It has an impact on 212 nations and territories worldwide. Examining and identifying patterns in X-Ray pictures of the lungs is still necessary. Early diagnosis may help to lessen a person's virus exposure and prevent it. Manual diagnosis is a time- and labor-intensive process. Since the COVID-19 virus has the potential to infect individuals all around the world, its finding is extremely concerning. The purpose of this study is to apply machine learning to identify and classify coronaviruses. The COVID-19 is anticipated to be discriminated and categorized in CT-Lung screening and computer-aided diagnosis (CAD). Several machine learning methods, including Decision Tree, Support Vector Machine, K-means clustering, and Radial Basis Function, were utilised in conjunction with clinical samples from patients who had contracted corona. While some medical professionals think an RT-PCR test is the most reliable and economical way to detect Covid-19 patients, others think a lung CT scan is more precise and less expensive. Serum samples, respiratory secretions, and whole blood samples are examples of clinical specimens. As a result of the earlier clinical evaluations, these tissues are used to assess 15 different parameters. As part of the proposed four-phase CAD system, the CT lungs screening collection is followed by a pre-processing step that enhances the appearance of ground-glass opacities (GGOs) nodules, which are initially extremely fuzzy and poorly contrasting due to the absence of contrast. These zones will be found and segmented using a modified K-means technique. Support vector machines (SVM) and radial basis functions (RBF) will be used as the input and target data for machine learning classifiers with a 50x50 pixel resolution to categorise the contaminated zones found during the detection phase (RBF). The 15 input items gathered from clinical specimens may be entered into a graphical user interface (GUI) tool that has been created to help doctors receive accurate findings.

**5) Early Diagnosis and Comparative Analysis of Different Machine Learning Algorithms for Myocardial Infarction Prediction**

**AUTHORS:** S. Akter, M. Amina, and N. Mansoor

Heart attack alternatively known as Myocardial Infarction is one of the primary reasons of morbidity on the planet. Therefore, the diagnosis and prediction of heart disease is persuading many researchers to develop intelligent medical decision support systems. Machine Learning has been demonstrated to be viable in helping with decision making and predictions from the huge amount of clinical data delivered by the medical care. This paper aims to improve the accuracy of machine learning models which can help to make informed decision and prediction of heart attack. We have applied six machine learning classification algorithms: Support Vector Machine, Random Forest, K Nearest Neighbors, Gaussian Naive Bayes, Decision Tree and Logistic Regression. Additionally, an extensive comparison of machine learning techniques has been carried out. Our research work suggests that machine learning methods with data balancing techniques are effective tools for stroke prediction with imbalanced data. Therefore, Synthetic Minority Over-Sampling Technique (SMOTE) has been applied in our model. Hence, it is anticipated that Random Forest excels with the highest accuracy of 96% in heart attack prediction regarding performance metrics.