IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Machine Learning-based Enhanced Security System for Healthcare

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Abstract: Sensing technology has recently advanced, making it possible to create a more effective and versatile remote healthcare monitoring network. The Internet of Things [IOT] faces many architecture and deployment problems. Cancer is a broad term used by the World Health Organization (WHO) to describe a diverse group of diseases that cause death. In light of this, it is important to decide whether or not anyone has a high cancer risk by completing a survey. This paper deals with the study of the Cervical Cancer Detection case study with the sample data file. In the proposed work, symptoms would be used as feedback for technical analysis. The signs are used to classify the patients. With each beauty, there were correctly categorized times and percentages, as well as actual and bogus excellent categorized times fees and a chaos matrix. Furthermore, both of the consequences are discussed.

Index Terms **-Naive Bayes, Cervical Cancer, Classification, Machine Learning, Internet of Things, Random Forest Classification.**

1.INTRODUCTION

Cervical cancer develops as cells in a girl's cervix, which binds her uterus to her vagina, alter. Most cancers may affect the deeper tissues of the cervix and can spread to other parts of the body (metastasize), including the lungs, liver, bladder, vaginal region, and rectum. The majority of cervical cancers are caused by infection with the human papillomavirus (HPV), which can be prevented by a vaccine. Cervical cancer develops slowly, so it's usually possible to detect and treat it before it causes serious complications. Every year, fewer and fewer girls die as a result of improved screening through Pap tests. Women between the ages of 35 and 44 are the most likely to contract this type of infection. More than 15% of new cases are in women over 65, especially those who haven't been having frequent screenings. The proposed research study is about the implementation of Machine Learning (ML), which is closely connected to (and often overlaps with) predictive statistics and has many links to mathematical optimization.

2. LITERATURE SURVEY

Amita Dessai, Moffy Vas, A computer tomography scan is used by radiologists to diagnose and monitor the progression of cancer in the body. Visual database interpretation may lead to a later cancer diagnosis, resulting in late cancer care, which only serves to raise cancer mortality rates. As a result, image recognition software can be used to detect cancer in its early stages. This article proposes a lung cancer detection algorithm that uses mathematical morphological operations to segment the lung area of interest, from which Haralick features are extracted and used by artificial neural networks for cancer classification.

According to Annette McWilliams, Parmida Beigi, Akhila Srinidhi, Stephen Lam, and Calum E. MacAulay, E -nostril measurements could distinguish lung cancer patients from high -hazard control subjects with a higher than 80 % classification accuracy. Topic intercourse and smoking popularity affected the group, as shown by the results below the curve (Ex-smoker adult males score 0.846, ex-smoker females score 0.816, current smoker man scores 0.745, and current smoker girl scores 0.725.)Two e-nostril systems could be set up to provide the same readings during the subject's exhaled breath, and the results could be measured in parallel. Conclusions: E-nostril generation should be

used as a non-invasive screening technique to identify people at risk of lung cancer. The compounds found in the alveolar cavity are essential.

Ho Tak Lau, Adel Al-Jumaily, in this paper, an automatic skin cancer classification scheme is developed, and the relationship of skin cancer images through various types of neural networks is investigated using various preprocessing techniques. The images are fed into the device and processed through various image processing procedures to improve the image properties. The normal skin is then removed from the infected region, leaving only the cancer cell in the picture. These images can be used to extract useful information that can then be fed into the classification system for training and testing. In image science software, the recognition accuracy of the 3-layer back-propagation neural network classifier is 89.9%, and the auto-associative neural network is 80.8 percent.

J. Geoffrey Chase, Tom Botterill, Thomas Lotz, Amer Kashif The internal stiffness of the breast can be inferred by the surface motion of a vibrated breast, causing a tumor to be seen. This paper describes a computer vision system for accurately measuring 3-D floor motion. A version-based total segmentation is used to recognize the profile of the breast in each image, and the 3-d floor is reconstructed using the profiles as a guide. The floor movement is computed with the help of a current optical glide implementation custom designed for the application, then trajectories of factors at the 3-D floor are obtained by fusing the optical flow implementation custom designed for the application, and trajectories of points on the 3-D surface are obtained by fusing the optical glide with the drift with the surfaces that have been preserved. The machine outperforms an earlier marker-based system at measuring skin surface motion, according to data from human trials. The research study demonstrates that the scanner can identify a ten-millimeter tumor in a silicone phantom breast. Showcase the abstract. The DIET breast cancer screening device uses a vision-based 3-D floor activity capture system.

Azadeh Noori Hoshyar, Adel Al- Jumpily In several countries, especially Australia, skin cancer is on the rise. Early detection of skin cancers aids in the effective treatment of cancer; hence, cancer curability and survival are contingent on detecting cancer early. Automatic prognosis can help to improve diagnosis accuracy because scientific findings are restricted in their ability to diagnose cancer. The final goals of this paper are to study previous skin cancer detection studies and to evaluate automatic skin cancer detection. It includes an analysis of the literature on computerized skin cancer diagnosis as well as a step-by-step breakdown of the process. Discover the 17+ million people who have taken part in surveys around the world.

One of the most common alternatives to X-ray mammography as an imaging modality is ultra-wideband (UWB) radar for the early detection of breast cancer, according to Dallan Byrne, Martin O'Halloran, Edward Jones, and Martin Glavin. Several beam shaping algorithms that take advantage of the dielectric contrast To detect cancerous Amplifications, a microwave frequency difference between normal and cancerous tissue has been identified. Since dielectric heterogeneity in the breast has a direct impact on a beamformer's ability to identify very small tumors, designing an efficient beamformer for this application is a major challenge. This paper examines and contrasts three data-independent beamforming algorithms, putting each one to the test on an anatomically accurate, MRI-derived breast model that includes recently published dielectric property data.

R.S.A. Raja Abdullah, A Munawar, S Adabi, Al Ismail, MI Saripan, R Mahmood, WNL Wan Mahadi, R.S.A. Raja Abdullah, R.S.A. Raja Abdullah, R.S.A. Raja Abdullah, R.S.A. Raja Abdullah, R.S.A This paper describes the results of a preliminary study into the identification of breast cancer using a special form of bistatic radar known as forwarding Scattering Radar (FSR). For cancer diagnosis and localization, the proposed approach analyses the Doppler frequency in the obtained signal scattered from the tumor. Three architectures were investigated, each of which was determined by the mechanical action of the transmitter, receiver, or both. Also, as a feasibility assessment of using FSR for breast cancer diagnosis, this paper addresses an initial simulated outcome using CST Microwave Studio. It has been shown that cancer can be predicted by examining the peculiar characteristics of Radar Cross Section (RCS) for breast tissue and FSR tumors. An electromagnetic model of fatty tissue and a tumor was simulated and analyzed to obtain the RCS parameter, as well as compared to fatty tissue without a cancerous lesion to pinpoint the presence of tumor from its FSR characteristic. In FS RCS, the results indicate a large difference between these two models.

Write and save the material of the document as a separate text file before beginning to format it. Separate the text and graphic files before the text has been styled and formatted. Hard tabs should be avoided, and hard returns should be used only once per paragraph.

2.1 Referred Dataset for proposed WorkDescription

The proposed work deals with the study of sample data files from Patient_train.csv.There are 858 statistics in the dataset, each with 33 attributes and a biopsy result. The number of women diagnosed with cervical cancer in the dataset is 55, while the number of healthy patients is 803. This dataset was split into teaching and test companies at random. This dataset was split into teaching and test companies at random. The training dataset contains 565 statistics and it makes up 66 percent of the main data collection. Taking a look at the dataset has been delegated to the relaxing of the data collection. Several methods, such as Naive Bayes, Random Forest(RF), Support Vector Machine(SVM), and Decision Tree(DT), were used to create the group.

3. PROPOSED SYSTEM REQUIREMENT SPECIFICATION

3.1 Description

For cancer diagnosis, there is no automatic method available.

- In the medical sector, there is no such thing as automatic. The procedure for detecting cervical cancer.[1]
- The death rate is that as a result of cancer.
- Signs are used to diagnosing cancer using a manual
- procedure.

3.1.1 Proposed Work Scope

When a comprehensive overview of all aspects of the software package to be developed is required before the project can begin, a software specifications specification (SRS) is firm the groundwork. It's important to note that a formal SRS isn't always written. Time spent on an SRS is often better spent on other software engineering tasks.

- To be able to comprehend the issue sentence.
- To know what are the hardware and software requirements of the proposed system.
- To have an understanding of the proposed system.
- To do planning various activities with the help of a planner.
- Designing, programming, testing, etc.

4. PROPOSED SYSTEM

4.1 Description

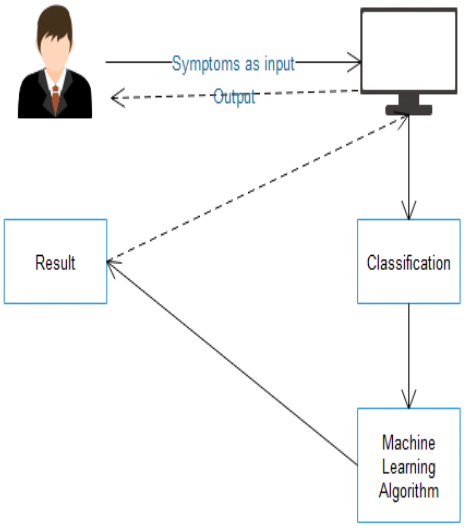


Fig. 4.1 Proposed System Architecture

In this Figure 4.1, the User gives symptoms as an input to the system. The system should work on the given input. First of all, with the help of the database, classification of the symptoms should be done. After the classification of the symptoms, the algorithm should be applied to the given symptoms. After applying the algorithm, the system should determine the patient is suffering from cancer or not.

4.2 Algorithm Used

4.2.1 Random Forest (RF)

RF is a versatile, easy-to-use machine learning algorithm that, in furthermost cases, produces outstanding results even without hyper-parameter modification. Due to its simplicity and versatility, it is now one of the most widely used algorithms (it could be used for each category and regression task). Random woodland is a flexible, easy-to-use device learning set of rules that produces a very good outcome the vast majority of the time even without hyper-parameter adjusting. Random forest is a learning algorithm that is supervised.

The "land" it creates is a set of decision trees that are usually trained using the "bagging" technique. The current bagging strategy idea is that combining mastering fashions can improve the overall performance. To put it another way, a random forest creates a pair of collection trees and merges them to provide a more accurate and solid forecast.

Random woodland has the advantage of being able to be used for each class and regression problems, which make up the majority of cutting-edge machine research schemes. Since classification is often called the building block of machine learning, I can communicate about the random forest in classification.

4.2.2 Decision Tree (DT)

The Decision Tree set of rules is related to supervised learning algorithms in its own right. Unlike other supervised learning algorithms, the selection tree system of rules can also be used to solve regression and category issues. The aim of using a Decision Tree is to build a training model that can be used to predict the beauty or price of the goal variable using simple selection rules derived from previous results. We start with the basis of the tree for predicting a category mark for a report using a Decision Tree classifier, also known as a preference tree. The esteems of the base characteristic are compared to the record's characteristic. Based on the comparison, we notice a department that is close to the expense and proceeds to the next node. Decision Trees Come in a Variety of Shapes and Sizes Option timber types are largely determined by the type of target vector we have. Based on the relation, we hope to the next node and follow the branch that corresponds to that value.

4.2.3 Naive Bayes (NB)

The Naive Bayes series of rules is a well-known machine learning algorithm that helps you to categorize documents entirely based on the calculation of conditional probability worth. It uses the Bayes theorem for computation and uses magnificence tiers for classification, which are defined as characteristics values or vectors of predictors. A quick collection of rules for type problems is the Naive Bayes set of rules. The Naive Bayes Algorithm is a simple classification algorithm that is suitable for real-time multi-magnitude advice systems and textual content classification. This algorithm is well-suited to applications such as real-time prediction, multi-class prediction, suggestion systems, text recognition, and sentiment analysis. For a large data set, this algorithm is scalable and simple to use.

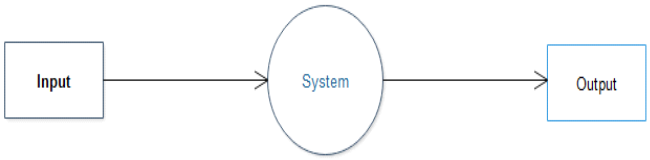
4.2.4 Support Vector Machine (SVM)

Encouragement The Vector Machine, or SVM, is a well-known supervised studying algorithm that's used for both classification and regression problems. However, it is mainly used in Machine Learning for Classification problems. The SVM set of rules aims to establish the best line or option boundary that can segregate n-dimensional space into training so that we can easily place new statistics factors in the appropriate class in the future. A hyperplane is a name given to this choice boundary. SVM selects acute points/vectors that aid in the formation of the hyperplane. These numerous instances are known as support vectors, and the resulting set of rules is known as the Support Vector Machine. This preference boundary or hyperplane serves as a separator.

4.3 Mathematical Background

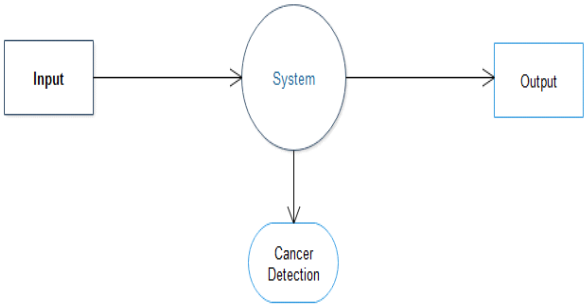
Let ‘S’ be the system Where S= I, O, P, Fs, Ss
Where,
I = Set of input
O = Set of output
P = Set of technical methods
Fs = Set of Failure nation
Ss = Set of Success nation
Identify the enter statistics I1, I2, in
I = (Input Symptoms)
Identify the symptoms as O1, O2, on
O = (Symptoms detection)
Identify the Process as P
P = (Cancer detection from symptoms)
Identify the Failure state as Fs
Fs = (If cancer not detected, Delay in processing)
Identify the Success state as Ss
P = (Cancer detected).

5.PROPOSED SYSTEM DESIGN



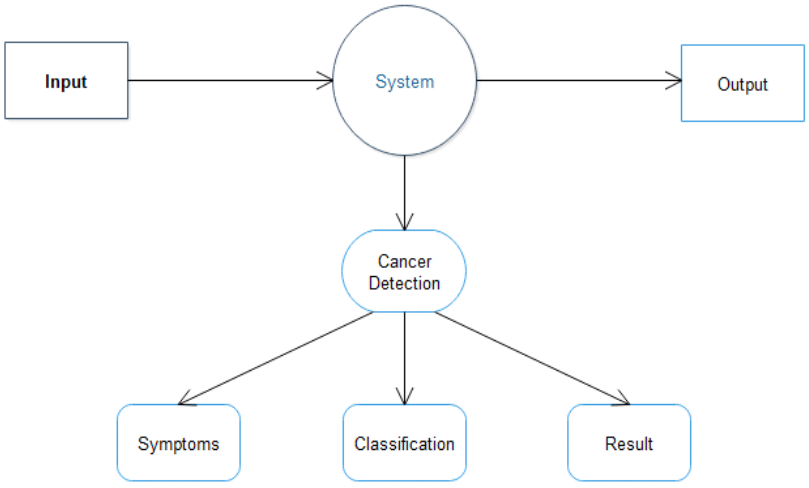
5.1 Data Flow Diagram [DFD] Level 0

Figure 5.1 depicts that the input data of the patient the system will analyze the patient data and then shows the final output.



5.2 Data Flow Diagram [DFD] Level 1

Figure 5.2 shows if input data of the patient is imported to the system, the system will analyze the patient data, and then it will check whether the patient is cancer or not. It also shows the final output.



5.3 Data Flow Diagram [DFD] Level 2

Figure 5.3 demonstrates after importing input data of the patient the system will analyze the patient data and then it will check whether the patient is cancer or not, If the system data detect cancer then further it will classify or it will show the symptoms or it will directly show the result. It will show the result in 0&1 form. if the patient is having cancer it will show 1 or else 0 n show the final output.

6. CONCLUSION

The proposed technical study deals with a Cervical Cancer Detection method based on Naïve Bayes, Support Vector Machine, and Random Forest machine learning algorithms suitability for the referred dataset. The research study analysis that if cancer is identified by the devices, the user should receive a notification that cancer has been detected. If there are no signs associated with cancer at the moment, the outcome should be cancer not found. Thus the proposed study deals with the prediction of cervical cancer detection of the referred sample data file with the use of machine learning algorithms. The work can be enhanced in the future with hybrid machine learning algorithms.

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