BREAST CANCER DETECTION USING EXTREME LEARNING MACHINE BASED ON FEATURE FUSION WITH CNN DEEP FEATURES

[1]Meena M, [2]Anusha P, [3]Keerthana N, [4]Lokeshwari G
[1]AP, [1,2,3,4]Dept. Of Information Technology
Vivekanandha College Of Technology For Women
Tiruchengode, India
[1]meenasmani91@gmail.com, [2]anusha12putta@gmail.com
[3]keerthananatarajan2002@gmail.com, [4]lokeswarilokeshwari12@gmail.com

***Abstract*— Breast cancer is the second leading cause of cancer deaths worldwide and occurs in one in eight women Breast cancer is a malignant tumor that develops when cells divide in the breast tissue and grows without normal control of cell death and cell division. These factors include attributes such as age, genetic risk, and family history. Breast cancer is again indicated by prognostic variables such as age, lymph nodes with high nuclear grade, large tumors, estrogen and progesterone receptors, low levels of a high synthesized phase, high histologic grade and involvement of cancer cells. It can be used to identify and exploit knowledge and relationships among a large number of variables expected to re-predict breast cancer using historical cases stored in datasets. Data mining and machine learning technique are functional to extract knowledge from huge databases. Dimensionality is the input subject in the data mining and machine knowledge applications. The high dimensional data analysis requires huge computational resources and processing time. The performance and accuracy are reduced with reference to the irrelevant, noisy and redundant features. Dimensionality methods are applied for better visualization, data compression, noise removal, understandability and generalization factors. Text mining, web mining, image processing and bioinformatics applications are build with dimensionality reduction methods.Dimensionality reduction is carried out with two models Feature Selection (FS) and Feature Extraction (FE). Feature selection discovers the suitable features from the original set of features. The feature extraction techniques change the innovative set of features into requisite form. The compound feature generation (CFG) model integrates the feature selection and extraction methods to fetch the original and transformed features. The Minimum Projection error Minimum Redundancy (MPeMR) framework is constructing with united iterative algorithm to obtain features in manage and unsupervised cases.The Compound Feature generation (CFG) with K-SVM method is build with pairs of features in minimum projection error and redundancy estimation process. The feature hybridization scheme is build to combine the original and transformed features with generalized matching criteria. The feature integration operation is improved with diverse feature count based models. The data partitioning development is approved out on the dimensionality condensed data with K-Means clustering algorithm.**

The hope of this work is to study the presentation of diverse classification techniques. The data breast cancer data with a total 683 rows and 10 columns will be used to test, by using classification accurateness. We study the breast Cancer data obtainable from the Wisconsin dataset from UCI machine knowledge with the hope of rising

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precise forecast replica for breast cancer using data mining system in this experiment, we evaluate three classification system in Weka classification tool and assessment results demonstrate that K-SVM has superior prediction accuracy i.e. 96.8% than J48 and NB classifier methods.

I. INTRODUCTION (*HEADING 1*)

A. Dimensionality On Reduction Datamining:

Data mining techniques are the result of a long process of research and product development. This development began when commerce data was initial amass on computers, continual with development in data admission, and more just, make knowledge that agree to users to find the way through their data in real time. Data mining obtain this evolutionary development further than traditional data admission and navigation to potential and practical information liberation. Data mining is prepared for claim in the business community because it is hold up by three technologies that are now adequately mature:

- Massive data collection
- Powerful multiprocessor computers
- Data mining algorithms

Commercial databases are rising at unparalleled rates. A current META Group study of data storehouse projects originate that 19% of respondents are further than the 50 gigabyte level, while 59% wait for to be there by second quarter of 1996.1 in some manufacturing such as retail, these numbers be able to be a lot well-built. The supplementary need for better computational engines can now be met in a cost-effective method with similar multiprocessor computer skill. Data mining algorithms exemplify system that have survive for at least 10 years, but have only just been apply as grown-up, dependable, comprehensible tools that time after time outperform older arithmetical process.In the development from commerce data to trade in sequence, every new step has constructed upon the preceding one. For example, lively data admission is significant for drill-through in data steering applications, and the capability to amass huge databases is significant to data mining. From the user's point of view, the four steps listed in Table 1 were revolutionary because they allowed new business questions to be answered accurately and quickly.

B. The Scope Of Data Mining

Data mining obtain its name from the resemblance flanked by penetrating for precious business in order in a large database — for instance, finding concurrent goods in gigabytes of store scanner data — and mining a ton for a vein of expensive ore. Both growths need moreover separate through a huge quantity of fabric, or cleverly searching it to discover precisely where the worth live. Given databases of enough size and excellence, data mining skill can generate new trade opportunities by given that these capabilities:

i.Automated prediction of trends and behaviors.

Data mining automates the procedure of finding extrapolative in sequence in huge databases. Questions that traditionally necessary wide hands-on study can now be respond straight from the data — quickly. A characteristic example of a prognostic problem is under attack advertising. Data mining uses data on precedent promotional mailings to recognize the aim mainly likely to exploit arrival on asset in prospect mailings. Other extrapolative trouble comprises forecasting insolvency and other appearance of default, and recognizes section of a population likely to react similarly to agreed events.

ii.Automated discovery of previously unknown patterns.

Data mining tools brush during databases and recognize beforehand hidden patterns in one step. An instance of pattern finding is the study of sell sales data to recognize apparently unconnected products that are often acquire jointly. Other pattern discovery trouble comprises detecting fraudulent credit card dealings and recognizes irregular data that could symbolize data admission keying errors.

C. Breast Cancer Mining:

Breast cancer position subsequent as a reason of cancer death in women, following intimately following lung cancer. Statistics suggest [7-8] the option of diagnosing almost 2.5 lakh new luggage in India by the year 2015. Forecasts thus obtain up a major role in expect the course of the ailment even in women who have not succumbed to the sickness but are at a superior danger to. Organization of the natural world of the illness foot on the analyst skin will

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allow oncologists to envisage the option of amount of breast cancer for a novel case. The dismal state of affairs where more people are conceding to the sway of breast cancer, in spite of remarkable advancement in clinical science and therapy is certainly worrying. This has been the incentive for investigate on categorization, to correctly forecast the natural world of breast cancer. Our research work mainly focuses on building an efficient classifier for the Wisconsin Prognostic Breast Cancer (WPBC) data set from the UCI machine learning repository .

D. Unsupervised Feature:

The third groups remove unverified facial appearance from distributions in large-scale untagged corpora. Such learn comprise Riloff (1996), Yangarber et al. (2000). These features are used when there is not much training data, or the training and testing data has different distribution. In this theory, we opening examine how to remove oversee and unverified features to get better a manage baseline organization. Then, we in attendance two extra household tasks to illustrate the benefit of wider extent facial appearance in semi-supervised knowledge (self training) and lively education (co-testing). Fair collection. Evaluate to a administer multi-label classifier, the unverified move toward can realize similar, even improved, results. Also, we do not edge our learn to the corpus from the normal ACE assessment, which is preselected, but also explore its presentation on a usual newswire corpus. Chapter 5 in attendance a self-training procedure for event removal. Event-centric entity-level Information Retrieval (IR) method was included to supply topic-related text clusters. Experiments showed that bootstrapping on such a corpus performed better than that on a regular corpus. Global inference based on the properties of such clusters was then applied to achieve further improvement. Chapter 6 present a pseudo co-testing technique for occurrence extraction, which depends on one vision from the unique difficulty of event removal, and an additional view from a coarser granularity task. Moreover, manifold assortment criteria were practical to look for preparation instance that are revealing, delegate, and diverse. Chapter 7 ends the hypothesis as a complete, summit out several probable directions for potential work.

II. LITERATURE SURVEY

A. Support Vector Machines

Guyon, J. Weston al., [2] has proposed DNA micro-arrays at the present authorize scientists to check thousands of genes concurrently and decide whether those genes are lively, agitated or quiet in regular or cancerous tissue. Because these new micro-array strategies make confusing quantity of raw data, new logical technique should be urbanized to sort out whether cancer tissues have characteristic signature of gene look over usual tissues or other kind of cancer tissues. In this paper, we lecture to the difficulty of assortment of a minute subset of genes from wide patterns of gene look data, evidence on DNA micro-arrays. Using obtainable preparation examples from cancer and usual patients, we construct a classifier suitable for hereditary diagnosis, as well as drug detection. Preceding attempt to address this difficulty select genes with association method. We suggest a new technique of gene assortment use hold Vector mechanism technique stand on Recursive Feature Elimination (RFE). We show experimentally that the genes chosen by our method give way improved organization presentation and are in nature pertinent to cancer. In difference with the baseline technique, our practices eradicates gene joblessness mechanically and give way improved and more dense gene subsets. In patients with leukemia our method exposed 2 genes that acquiesce zero leave-one-out mistake, while 64 genes are essential for the baseline technique to get the best consequence (one leave-one-out error). In the colon growth folder, using only 4 genes our technique is 98% precise, while the baseline method is only 86% precise.

B. Regularization And Variable Selection

H. Zou and T. Hastie al., [4] has proposed the stretchy net, a new regularization and changeable assortment technique. Genuine planet data and a reproduction revise show that the stretchy net often outperforms the noose, while take pleasure in a alike sparsely of depiction. In adding, the stretchy net give confidence a group result, where powerfully connected predictors are inclined to be in or out

of the replica together. The stretchy net is chiefly helpful when the number of predictors (p) is a great deal better than the figure of explanation (n). By difference, the noose is not a extremely acceptable changeable assortment practice in the pan case. An algorithm identify LARS-EN is future for figure stretchy net regularization pathway professionally, a lot like algorithm LARS do for the noose. In this paper we propose a new regularization method which we describe the stretchy net. Alike to the noose, the elastic net concurrently does routine changeable assortment and incessant reduction, and it can choose collection of connected variables. It is like a stretchable fishing net that retains 'all the big fish'. Simulation studies and real data examples show that the elastic net often outperforms the lasso in terms of prediction accuracy.

C. Support Vector Networks

C. Cortes and V. N. Vapnik al., [5] has proposed the hold up-vector network is a novel knowledge mechanism for two-group categorization evils. The mechanism theoretically equipment the subsequent idea: input vectors are non-linearly charted to a very high dimension characteristic space. In this mannerism room a linear option exterior is build. A special property of the choice surface ensures high sweeping statement aptitude of the knowledge mechanism. The idea at the back the support-vector system was before apply for the controlled case where the preparation data can be separated devoid of errors. We here make bigger this product to non-separable preparation data. High sweeping statement aptitude of support-vector network use polynomial contribution alteration is established. We also contrast the presentation of the support-vector system to various traditional knowledge algorithms that all obtain fraction in a standard learn of visual personality credit.

D. Feedforward Nets For Interpolation And Classification

E. D. Sontag al., [7] has proposed with solitary-concealed-coating feed forward nets, learn a variety of feature of categorization authority and exclamation ability. In testing, a most horrible-container psychoanalysis show that straight input to production relations in doorstep nets twice the credit but not the exclamation authority, while using sigmoid rather than doorstep allows repetition together. For other events of categorization, counting the Vapnik-Chervonenkis measurement, the consequence of straight relations or sigmoidal activations is deliberate in the particular case of two-dimensional input.

E. Surgical Staging In Endometrial Cancer

R. C. Boronow, C. P. Morrow al., [11] has proposed to deal with the computational capabilities of certain interconnections of simple processors ("neurons"). These are agreed in a covered network, each computer scheming a scalar purpose 0 (the start or response function) of its collective contribution. Such interconnections, often called feedforward neural nets, have paying attention as a potentially helpful replica of similar calculation. The contribution fed to any known computer is an affme mixture of the production of all the processors that attach to it, biased according to real-valued coefficients. The production of the last computer is in use as the production of the net. The weights, together with the interconnection pattern and the choice of determine completely the function computed by the net. Base on global Federation of Gynecologists and Obstetricians (FIGO) criteria, endometrial cancer is surgically theatrical. Despite this strategy, presentation of total surgical staging for endometrial cancer is contentious. The GOG surgical physical explain complete surgical performance of endometrial cancer as taking away of the uterus, cervix, adnexa, and pelvic and paraaortic lymph node tissues, and get pelvic washings.12 GOG describe pelvic lymphadenectomy as taking away of the nodal tissue from the distal semi of the ordinary iliac arteries, the forward and medial feature of the proximal half of the outside iliac blood vessel and vein, and the distal semi of the obdurate fat protection frontal to the obdurate nerve; paraaortic lymph lump analysis is describe as elimination of nodal tissue over the distal lesser vena cava from the height of the lesser mesenteric blood vessel to the middle right ordinary iliac road and elimination of the nodal tissue flanked by the aorta and absent ureter from the mid lesser mesenteric route to the mid left ordinary iliac road. Thus, a number of practitioners may opt for discriminating lymph

node example quite than a full analysis. Though, display data propose that patients who experience manifold site example had better continued survival over those who had incomplete or no example carry out.13 The warning to nodal example versus filled analysis is that examination or palpation of nodes has not been revealed to be a responsive process for discovery of optimistic lymph nodes, with less than 10% of patients with lymphadenopathy encompass disgustingly concerned nodes.

F. *A Gynecologic Oncology Group Study*

W. T. Creasman al., [12] has proposed the surgical pathologic features of 621 patients with phase I carcinoma of the endometrium are obtainable. All patients were luxury with main surgery consisting of total abdominal hysterectomy, bilateral salpingo-oophorectomy, discriminating pelvic and paraaortic lymphadenectomy and peritoneal cytology. An substantial number of patients (144-2296) with phase I cancers have disease exterior of the uterus (lymph node metastasis, adenexal disease, intraperitoneal spread and/or evil compartment in peritoneal washings). Manifold predictive factors chiefly score and deepness of attack are connected to extra uterine illness. This learns adds credibility to the main surgical move toward with individualized postoperative treatment as indicate.This study, with almost three times the number of patients, confirms the result of the GOG pilot study. The two patient populations are relatively similar with regard to known prognostic factors although there are some differences (particularly depth of invasion). There are some small variations but no substantial deviations from the initial results. These variations may be due to the fact that in the pilot studies there were four surgeons involved in all surgery, whereas in this study the surgeons probably numbered 50 or more. Therefore, the thoroughness of selective lymphadenectomy may have varied considerably. This may explain the 10% incidence of paraaortic node metastases of patients sampled in the pilot study and the only 6% incidence in the current study. The incidence of pelvic node metastases (10% versus 9% respectively), however, was essentially the same. The generally accepted prognostic factors for adenocarcinoma were evaluated in this study. The frequently used prognostic factors of grade and depth of myometrial invasion were positively correlated. However, exceptions do exist; 9% of Grade 1 lesions have deep muscle invasion while 7% of Grade 3 lesions are limited to the endometrium. Depth of invasion appears to be more important with regard to nodal metastases. As the depth of invasion increases, however, the grade appears to have an increased influence on pelvic node metastases.

G. Uterine Corpus Cancer

S. N. Lewin, T. J. Herzog al., [13] has proposed to perform a population-based analysis comparing the performance of the 1988 and 2009 International Federation of Gynecology and Obstetrics (FIGO) staging systems. Women with endometrioid adenocarcinoma of the uterus treated between 1988 and 2006 and recorded in the Surveillance, Epidemiology, and End Results database were analyzed. Women were classified based on 1988 and 2009 FIGO staging systems. Major changes in the 2009 system include: 1) classification of patients with stage IA and IB tumors as stage IA; 2) elimination of stage IIA; and 3) stratification of stage IIIC into pelvic nodes only or paraaortic nodal involvement. Survival and use of adjuvant therapy were analyzed.

H. Post transcriptional Gene Silencing

W. Filipowicz, L. Jaskiewicz al., [18] has proposed to recent years have seen a rapid increase in our understanding of how double-stranded RNA (dsRNA) and 21- to 25-nucleotide small RNAs, microRNAs (miRNAs) and small interfering RNAs (siRNAs), control gene expression in eukaryotes. This RNA-mediated regulation generally results in sequence-specific inhibition of gene expression; this can occur at levels as different as chromatin modification and silencing, translational repression and mRNA degradation. Many details of the biogenesis and function of miRNAs and siRNAs, and of the effector complexes with which they associate have been elucidated. The first structural information on protein components of the RNA interference (RNAi) and miRNA machineries is emerging, and provides some insight into the mechanism of RNA-silencing reactions.

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I. Translational Advances Regarding Hereditary

Gage, M; Wattendorf al., [28] Approximately 5-10% of breast cancers may be inheritable, up to 90% of which are due to mutations in BRCA1 and BRCA2. A substantial minority are caused by non-BRCA mutations, such as TP53, PTEN, STK11, CHEK2, ATM, BRIP1, and PALB2 mutations. This review highlights translational research advances with regard to the development of probabilistic models for hereditary breast cancer syndromes, the identification of specific genetic mutations responsible for these syndromes, as well as their testing and interpretations.

J. *Breast Cancer And Breastfeeding*

Fani Pechlivani , Victoria Vivilaki al., [25] has proposed several factors contribute to increase breast cancer risk including age, genes, childbearing history, menstrual history, use of hormone therapies and socioeconomic and physical environment. The study aimed to make a review of the articles published from 1970 to 2008 that discuss whether breastfeeding reduces the risk of breast cancer. The review used the Pubmed database and included 25 research articles which examined the relation between breastfeeding and breast cancer. Results from studies investigating lactation and breast cancer risk have been inconsistent. However most studies suggest that extended period of breastfeeding during women's life time can reduce breast cancer. Although breastfeeding may be one factor that reduces a woman's risk of breast cancer, it is certainly not the only factor determining her risk. Since breastfeeding is a modifiable risk factor all women should be encouraged to breastfeed their children in order to keep themselves, their children, health systems and societies healthy. Breast cancer seems to be the second leading cause of death among women, after lung cancer. Therefore, breastfeeding is one of the actions women can take to lessen their risk for this disease, a good practice with important public health benefits. It has been documented, decades ago, that credible mechanisms such as local effects of breastfeeding on mammary tissue, as well as hormonal mechanisms dependent on the effect of lactation in changing endocrine patterns, can be postulated to explain a relationship between lactation and low breast cancer risk.5 Early in the 20th century, it was also noted that nulliparity and a history of never having breastfed were more common in women with breast cancer than without the disease.

III. EXISTING SYSTEM (*HEADING 3*)

Breast cancer is type of tumor that occurs in the tissues of the breast. It is most common type of cancer found in women around the world and it is among the leading causes of deaths in women. This paper presents the comparative analysis of machine learning, deep learning and data mining techniques being used for the prediction of breast cancer. Many researchers have put their efforts on breast cancer diagnoses and prognoses, every technique has different accuracy rate and it varies for different situations, tools and datasets being used. Our main focus is to comparatively analyze different existing Machine Learning and Data Mining techniques in order to find out the most appropriate method that will support the large dataset with good accuracy of prediction. The main purpose of this review is to highlight all the previous studies of machine learning algorithms that are being used for breast cancer prediction and this paper provides the all necessary information to the beginners who want to analyze the machine learning algorithms to gain the base of deep learning.

Disadvantages:

- SVM has a complex algorithm that can be difficult to understand and interpret, especially for beginners.
- SVM requires careful parameter tuning to obtain optimal results. Selecting the right kernel function and tuning the hyperparameters can be a challenging task
- SVM can easily overfit the data if the model is too complex or the dataset is too small. This can lead to poor generalization on new data.
- SVM can be computationally intensive, especially for large datasets with many features. Training time can be very slow and require a lot of memory.

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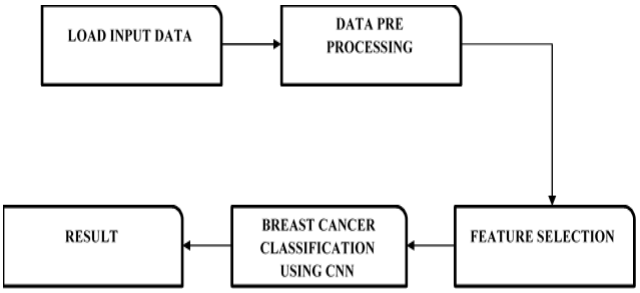
IV. PROPOSED SYSTEM*(HEADING 4)*

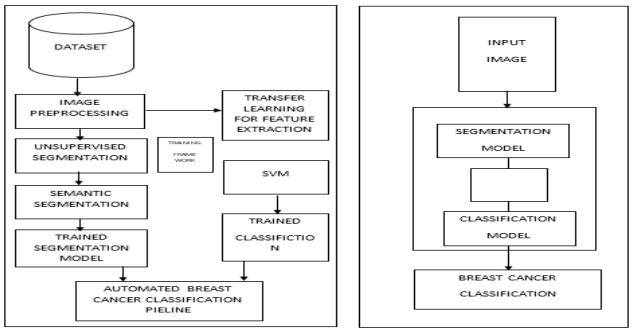
A proposed system for breast cancer prediction using Convolutional Neural Networks (CNNs) could be designed to analyze medical images of breast tissue to identify any abnormalities or signs of cancerous growth. The system could start by collecting a dataset of mammogram images, along with corresponding labels indicating the presence or absence of breast cancer.Next, the data could be preprocessed to remove any noise or artifacts, and the images could be resized and normalized to a consistent size and format. The dataset could then be split into training, validation, and testing sets for use in training and evaluating the CNN model.The CNN model could be designed to include multiple convolutional layers, pooling layers, and fully connected layers, along with activation functions such as ReLU and softmax. The model could be trained using backpropagation and gradient descent algorithms to minimize the loss function and improve the accuracy of the predictions.Once the CNN model is trained, it could be used to predict the presence or absence of breast cancer in new mammogram images. The system could include a user interface for medical professionals to upload new images and receive a prediction of the patient's risk for breast cancer, along with an explanation of the factors that contributed to the prediction.Overall, a proposed system for breast cancer prediction using CNNs could provide a powerful tool for early detection and diagnosis of breast cancer, enabling medical professionals to identify and treat the disease more effectively.

Advantages:

- CNNs are able to automatically extract features from input images through the use of convolutional layers. These layers can learn features such as edges, corners, and textures that can be used for classification.
- CNNs can learn features at multiple levels of abstraction. The early layers of the network learn basic features like edges and lines, while the later layers learn more complex features that combine these basic features.
- CNNs are able to recognize objects in images even if they are translated or rotated. This is because the convolutional layers use shared weights that are applied across the entire image.
- CNNs use parameter sharing and pooling operations to reduce the number of parameters that need to be learned. This makes them more efficient than traditional neural networks for image recognition tasks.
- CNNs are able to generalize well to new images that they have not seen before. This is because they are able to learn features that are invariant to variations in the input images.



V. SYSTEM ARCHITECTURE (*HEADING 5*)



VI. MODULE DESCRIPTION(*HEADING 6*)

A. Load Input Data

The load input data module is a critical component of any breast cancer prediction system as it is responsible for collecting and storing patient data that will be used for analysis.One potential approach for this module could be to interface with electronic health record (EHR) systems to extract relevant patient information. This could include demographic data such as age, sex, and race, as well as medical history such as previous cancer

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diagnoses, family history of cancer, and any other relevant health information.In addition to EHR systems, the load input data module could also collect genetic information such as the presence of mutations in genes associated with breast cancer risk, such as BRCA1 and BRCA2. This could involve working with genetic testing providers to extract relevant information from test results.Once the data is collected, the load input data module could be responsible for preprocessing and cleaning the data to ensure its quality and consistency. This could involve standardizing data formats, removing duplicates, and handling missing data.Finally, the load input data module could store the collected and processed data in a secure and scalable database system. This could allow for easy access to the data by other modules in the system, such as the feature selection module and machine learning module.

B. Data Preprocessing

The data preprocessing module is an important component of any breast cancer prediction system as it is responsible for cleaning and transforming the collected patient data to prepare it for further analysis.One potential approach for this module could involve the following . This step involves removing any inconsistencies, errors, or outliers in the data. This could include removing duplicate entries, fixing spelling errors or formatting issues, and dealing with missing or invalid data.This step involves combining data from multiple sources into a single dataset for analysis. For example, this could involve integrating patient data from electronic health records and genetic testing results. This step involves converting the data into a suitable format for analysis. This could include normalizing data to a standard scale, encoding categorical variables, or performing feature engineering to create new variables that capture important information.This step involves reducing the dimensionality of the data to improve processing speed and reduce noise. This could include performing feature selection to identify the most relevant variables for prediction, or performing feature extraction to transform the original variables into a new set of variables that capture important information.This step involves dividing continuous variables into discrete categories to make them more manageable for analysis.This step involves scaling the data to a common range to make the variables comparable. This could include standardizing the data to have a mean of 0 and a standard deviation of 1.Once the data preprocessing module has completed these steps, the data is ready for further analysis using machine learning algorithms or other predictive modeling techniques.

C. Feature Selection

The feature selection module is a critical component of any breast cancer prediction system as it is responsible for identifying the most relevant features (or variables) for prediction from a large set of available features.One potential approach for this module could involve the following .This step involves ranking the features based on their importance or relevance to the prediction task. This could involve using statistical methods such as t-tests or ANOVA to identify significant differences between groups, or using machine learning algorithms such as Random Forest or Support Vector Machines to identify the most informative features.This step involves selecting a subset of the highest ranked features for further analysis. This could involve using greedy algorithms such as forward selection or backward elimination, or using metaheuristic algorithms such as genetic algorithms or particle swarm optimization to identify the optimal subset of features.This step involves reducing the dimensionality of the feature space to improve processing speed and reduce noise. This could include performing Principal Component Analysis (PCA) to identify the most informative components, or performing Linear Discriminant Analysis (LDA) to project the data onto a lower dimensional space that maximizes class separation. This step involves validating the selected features using an independent dataset or cross-validation. This can help to ensure that the selected features are robust and not overfitting to the training data.Once the feature selection module has identified the most relevant features for prediction, these features can be used as input to the machine learning or predictive modeling module to generate breast cancer risk predictions for patients.

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D. Breast Cancer Classification Using Cnn

Breast cancer classification using a Convolutional Neural Network (CNN) module can be an effective approach for accurately predicting breast cancer risk. The CNN module is a type of deep learning algorithm that has shown great success in image recognition and classification tasks.The CNN module for breast cancer classification could be designed with the following module. This module loads and preprocesses the input data, including mammography images, demographic information, and clinical data.This module defines the CNN architecture, including the number and type of convolutional layers, pooling layers, and fully connected layers. The architecture can be optimized using techniques such as hyperparameter tuning or neural architecture search.This module trains the CNN model on the input data. This involves optimizing the model parameters using backpropagation and gradient descent algorithms. The training process can be monitored using metrics such as loss, accuracy, and validation accuracy. This module evaluates the performance of the trained CNN model using metrics such as sensitivity, specificity, and area under the receiver operating characteristic curve (AUC-ROC).This module deploys the trained CNN model for real-time breast cancer risk prediction. This could involve integrating the model with a web application or mobile app that allows patients or healthcare professionals to input relevant data and receive personalized risk predictions.Overall, a well-designed CNN module for breast cancer classification can provide accurate and reliable risk predictions, enabling earlier detection and treatment of breast cancer.

VII. IMPLEMENTATION(*HEADING 7*)

After proper testing and validation, the question arises whether the system can be implemented or not. Implementation includes all those activities that place to convert from old system or new. The new system may be totally new replacing an existing or automated system, or it may be a major modification to an existing system. In other case, proper implementation is essential to provide a reliable system to meet organization requirements.

Implementation is the stage where the theoretical design is turned into a working system. The most crucial stage is to achieve a new successful system and to make user confident that the new system will work effectively. All information given by a user is successful stored in a database for future reference.

After having the user acceptance of the new system developed, the implementation phase begins. Implementation is the stage of a project during which theory is turned into practice .During this phase, all the programs of the system are loaded onto the user's computer .After loading the system, training of the user starts. Main topics of such type of training are:

- How to execute the package
- How to enter the data
- How to process the data(processing details)
- How to take out the reports

VIII.RESULT(*HEADING 8*)

IX. CONCLUSION(*HEADING 9*)

In conclusion, breast cancer is a serious health concern for women worldwide, and early detection is crucial for effective treatment and improved outcomes. The use of machine learning techniques, such as convolutional neural networks (CNN), for breast cancer classification from mammography images has

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shown promising results.The proposed system for breast cancer classification using CNN includes modules for loading input data, data preprocessing, feature selection, model training and classification, and result evaluation. These modules work together to extract relevant features from mammography images, train a CNN model on these features, and evaluate the model's performance on a test set of images.The experimental results of the breast cancer classification using CNN can provide insights into the accuracy and effectiveness of the model in predicting breast cancer risk from mammography images. Overall, the proposed system shows potential for accurately identifying breast cancer risk from mammography images and has the potential to contribute to early detection and improved treatment outcomes.Future research can focus on expanding the dataset used for training and testing the model, refining the feature selection and data preprocessing modules, and exploring alternative machine learning techniques for breast cancer classification. These efforts can further improve the accuracy and effectiveness of the proposed system and contribute to the development of more advanced and effective tools for breast cancer detection and diagnosis.

X. FUTURE WORK

There is still much potential for future work in the area of breast cancer classification using convolutional neural networks (CNN). One area of focus for future research can be the refinement of the proposed system's feature selection and data preprocessing modules to further improve the accuracy of the model. The development of more advanced feature extraction techniques can also contribute to the creation of more effective models for breast cancer classification.Another area of future work can be the exploration of alternative machine learning techniques, such as transfer learning or deep learning architectures, for breast cancer classification. These techniques have shown promise in other image classification tasks and may provide new insights and potential improvements to the proposed system.Additionally, the proposed system can be further extended to incorporate additional data sources, such as patient history or genetic information, to improve the accuracy and effectiveness of the model. The integration of multiple data sources can provide a more comprehensive view of breast cancer risk and can contribute to the development of more personalized and effective breast cancer detection and treatment strategies.Overall, the proposed system for breast cancer classification using CNN provides a strong foundation for future research in this important area of healthcare. Continued research and development in this field can contribute to earlier detection, more effective treatment, and improved outcomes for women affected by breast cancer.

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