International Journal of Research in Science & Engineering
ISSN: 2394-8299
Vol: 01, No. 02, Oct-Nov 2021
http://journal.hmjournals.com/index.php/IJRISE
DOI: https://doi.org/10.55529/ijrise.12.55.61

Breast Cancer Prediction using Machine Learning

Mr. Aryan Ganesh Nagtilak[1], Ms. Sneha Nitin Ulegaddi[2], Ms. Aditi Sachin Adat[3], Dr. A. O. Mulani[4*]

[1,2,3,4]Department of Electronics and Telecommunication Engineering, SKN Sinhgad College of Engineering Korti-Pandharpur, Solapur, Maharashtra, India.*

Corresponding Email: [4]altaaf.mulani@sknscoe.ac.in*

Received: 27 July 2021 **Accepted:** 17 October 2021 **Published:** 30 November 2021

Abstract: ***With the increase in occurrence of human diseases all over the world, it has created a wide number of opportunities for innovating such kind of disease prediction mechanisms. Out of which, Breast Cancer has grown in tremendous number with an increased amount in thepast decade and this has gone increasing till now, & would continue to grow. Now movingfurther, there is a tremendous need for efficient text analytics tools and feature extraction tools to assist the work related in classifying, sharing and retrieving the information on human diseases in general and in the field of Breast Cancer also. In addition to that, the present study has been made with the objective to provide a complete analysis of differentclassifiers on Breast Cancer dataset, and to generate a new ensemble training method/model of Machine Learning Classification. Here, machine learning algorithms (such as Decision Tree , Logistic Regression ,Support Vector Machine, Random Forest). An Ensemble Learning model for Prediction is proposed to classify the results among different classifiers as mentioned in the above statement. At the end, the Voting Ensembletechnique is implemented in order to find out the optimal classifier that predicts the Breast Cancer. The results have been computed on the basis of evaluation parameters such as Accuracy, Precision, Recall and Specificity. On the other hand, the confusion matrix is measured on the basis of evaluation parameters that generally provides more emphasised, predicted and actual instance of data. Whereas, Performance Evaluation for various machine learning algorithms is then computed. Results of this investigation says that, the Voting Ensemble superpowers other machine learning algorithms.***

Keywords: ***Breast Cancer, Machine Learning Prediction, Mammography, Feature Extraction, Ensemble Methods, Deep Learning.***

1. INTRODUCTION

Breast cancer is a serious health issue that affects many women worldwide. Detecting it early

International Journal of Research in Science & Engineering
ISSN: 2394-8299
Vol: 01, No. 02, Oct-Nov 2021
http://journal.hmjournals.com/index.php/IJRISE
DOI: https://doi.org/10.55529/ijrise.12.55.61

and making accurate predictions are crucial for effective treatment. Machine learning has become a powerful tool in predicting breast cancer, using different types of data like medical records, genetics, and images. One important aspect is using the right parameters, which are like settings that can be adjusted to improve accuracy. This introduction provides a simple overview of how machine learning and parameter-based prediction are used to predict breast cancer. By finding the best parameters, we can improve the accuracy of predictions and help doctors make better decisions for patients.

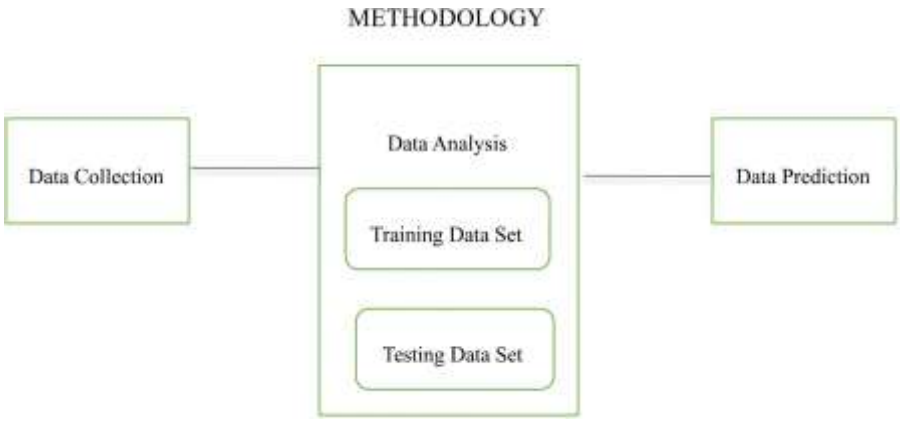
Literature Survey

Existing System Study

- Even highly experienced doctors can and do make diagnostic errors.
- The improper medical care and delay in treatment, which has resulted in improper care of the patient's medical condition.
- Doctors who misread a scan can cause patients wrongful death.

Elaborate on Existing System Applications/Examples In the existing system, a radiologist examines a biopsy sample under a microscope to assess whether the cells are cancerous or non-cancerous. They carefully analyze various parameters such as cell morphology, nuclear features, cell clustering patterns, and mitotic activity. Based on their expertise andknowledge, the radiologist makes a judgment regarding the presence of cancer cells. They document their findings in a pathology report, which serves as a crucial factor in determining the appropriate diagnosis and treatment plan for the patient. In this manual approach, the radiologist's expertise in histopathology and their ability to interpret cellular characteristics are fundamental in distinguishing between cancerous and non-cancerous cells.

Proposed System



The block diagram for the "Breast Cancer Prediction System" includes the following steps:

1. Data Collection: Gather relevant breast cancer data.
2. Data Analysis: Analyze the data to identify patterns and characteristics.
3. Train and Test Split: Divide the data into training set and testing set.
4. Training of Model: Training the machine learning models with the help of training data.

International Journal of Research in Science & Engineering
ISSN: 2394-8299
Vol: 01, No. 02, Oct-Nov 2021
http://journal.hmjournals.com/index.php/IJRISE
DOI: https://doi.org/10.55529/ijrise.12.55.61

5. Model Evaluation: Evaluate the performance of the trained models using the testing data.
6. Prediction: Use the trained models to predict breast cancer based on new input.

Many cancers are not visible and do not always find a cancer that is there which causes cancer being missed.

- Periods of waiting and anxiety when additional examinations are required.
- Misdiagnosis by doctors can make medical condition worse.
- Human intervention can lead to irrelevant results.

Feasibility Study

Technical Feasibility

The project "Breast Cancer Prediction" is a complete Web Application. The main technologies and tools are associated with "Breast Cancer Prediction" are,

1. Scripting Language: Python 3.10.3
2. Web Framework: Streamlit
3. IDE: Jupyter notebook 3.0 (open source) 6.Web browser: Chrome (80.0 and above)

Each technology is freely available and required technical skills are manageable. Moderate Internet connection is required for this application.

Legal Feasibility

The project "Breast Cancer Prediction" is a complete Web Application.

1. Project is legal and doable.
2. Project uses freely available/open- source software development tools.
3. No threats to organization's confidential data.

Hence, it can be concluded that project is legally feasible with no breaking of law.

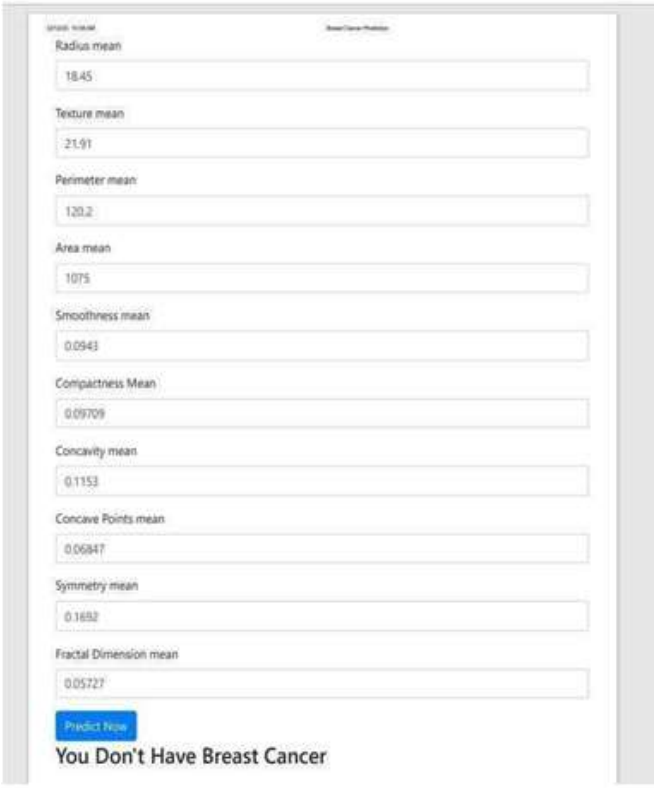
Feature Extraction

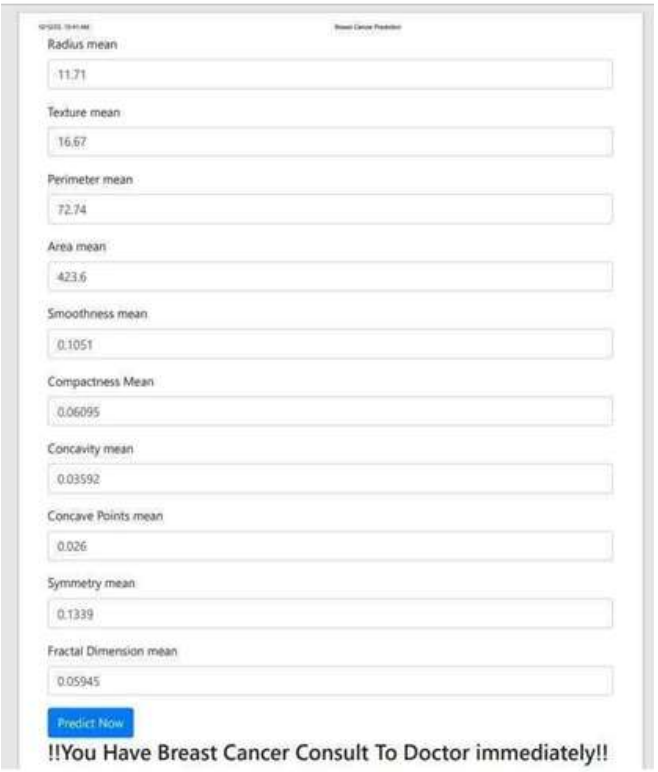
Our project aims to develop a machine learning model that is capable of generating accurate and précised results related to breast cancer prediction. It involves collecting relevant datasets, preprocessing the data, selecting informative features, developing and training the prediction model using various algorithms, tuning model parameters, and evaluating model performance. The deliverables include a pre-processed dataset, trained models, evaluation metrics, documentation, presentation materials, and recommendations. The scope excludes primary data collection, image analysis, real-time implementation, patient management, and ethical/legal/social implications beyond technical aspects.

2. RESULT

With the help of this project, we are dealing with the critical problems that are related to Breast cancer. Our project aims to deal with such issues and with the help of various ML algorithms we can be able to predict the accurate output whether the patient is having breast cancer or not. The following outputs depicts the actual outputs that are fetched from our website. The first image shows about the patient who is not having a breast cancer, while the second image shows aboutthe patient having breast cancer.

International Journal of Research in Science & Engineering
ISSN: 2394-8299
Vol: 01, No. 02, Oct-Nov 2021
http://journal.hmjournals.com/index.php/IJRISE
DOI: https://doi.org/10.55529/ijrise.12.55.61





International Journal of Research in Science & Engineering
ISSN: 2394-8299
Vol: 01, No. 02, Oct-Nov 2021
http://journal.hmjournals.com/index.php/IJRISE
DOI: https://doi.org/10.55529/ijrise.12.55.61

3. CONCLUSION

In conclusion, the breast cancer prediction project leverages machine learning algorithms, and aweb-based user interface to enable users to predict whether a cell is cancerous or non-cancerous based on mammography parameters. The project employs SVM and Logistic Regression modelstrained on the breast cancer dataset and provides accurate predictions for the given inputs. The web app allows users to log in, sign up for new accounts, and access the the project combinesthe power of machine learning, data visualization, and web development to provide a user-friendly tool for breast cancer prediction. By leveraging the Streamlit framework and incorporating various libraries and techniques, the application offers a seamless user experience while promoting early detection and diagnosis of breast cancer.

4. REFERENCES

1. Juhyeon Kim, Hyunjung Shin, Breast cancer survivability prediction using labeled, unlabeled, and pseudo-labeled patient data, Journal of the American Medical Informatics Association, Volume 20, Issue 4, July 2013, Pages 613– 618.
2. Joseph A. Cruz and David S. Wishart “Applications of Machine Learning in cancer prediction and prognosis Cancer informatics” 2(3):59-77 · February 2007
3. Y. Khourdifi and M. Bahaj, "Feature Selection with Fast CorrelationBased Filter for Breast Cancer Prediction and Classification Using Machine Learning Algorithms," 2018 International Symposium on Advanced Electrical and Communication Technologies (ISAECT), Rabat, Morocco, 2018, pp. 1-6
4. B. Akbugday, "Classification of Breast Cancer Data Using Machine Learning Algorithms," 2019 Medical Technologies Congress (TIPTEKNO), Izmir, Turkey, 2019, pp. 1-4.
5. Wang, D. Zhang and Y. H. Huang “Breast Cancer Prediction Using Machine Learning” (2018), Vol. 66, NO. 7.
6. M. Ganesh Shinde, "A ROBUST DIGITAL IMAGE WATERMARKING USINGDWT -PCA," INTERNATIONAL JOURNAL OF INNOVATIONS IN ENGINEERINGRESEARCH AND TECHNOLOGY, vol. 6, no. 4, Apr-2019.
7. Jadhav M. M., G. H. Chavan and A. O. Mulani, “Machine Learning based Autonomous Fire Combat Turret”, Turkish Journal of Computer and Mathematics Education (TURCOMAT), 12(2), 2372-2381, 2021
8. Swami S. S. and Mulani A. O., “An efficient FPGA implementation of discrete wavelet transform for image compression”, 2017 International Conference onEnergy, Communication, Data Analytics and Soft Computing (ICECDS 2017), 2018, pp. 3385–3389
9. U. P. Nagane and Dr. A. O. Mulani, “Moving Object Detection and Tracking Using Matlab”, Journal of Science and Technology, Volume 6, Special Issue 1,August 2021.https://doi.org/10.46243/jst.2021.v6.i04.pp63-66
10. Dr. Altaf Mulani Swapnil Takale, “A video watermarking technique with video and image as watermark using DWT and PCA”, Journal of Northeastern University, Vol 25 Page No. 1005-3026

International Journal of Research in Science & Engineering
ISSN: 2394-8299
Vol: 01, No. 02, Oct-Nov 2021
http://journal.hmjournals.com/index.php/IJRISE
DOI: https://doi.org/10.55529/ijrise.12.55.61

11. A.O. Mulani and G. N. Shinde, “An approach for robust digital image watermarking using DWT- PCA”, Journal of Science and Technology, Vol.6, Special Issue 1,2021DOI:https://doi.org/10.46243/jst.2021.v6.i04.pp59-62
12. A.O. Mulani and G. N. Shinde, “An approach for robust digital image watermarking using DWT-PCA”, Journal ofScience and Technology, Vol.6, Special Issue1,2021DOI:https://doi.org/10.46243/jst.2021.v6.i04.pp562
13. Mulani Altaf O. and P. B. Mane, "An Efficient implementation of DWT for image compression on reconfigurable platform", International Journal of Control Theory and Applications, Jan. 2017.
14. U. P. Nagane and Dr. A. O. Mulani, “Moving Object Detection and Tracking Using Matlab”, Journal of Science and Technology, Volume 6, Special Issue 1, August 2021.
15. A. O. Mulani and Dr. P. B. Mane, “An Efficient implementation of DWT for image compression on reconfigurable plat-form”, International Journal of Control Theory and Applications, Vol.10No.15, 2017.
16. A. O. Mulani1 and G. N. Shinde, “An approach for robust digital image watermarking using DWT-PCA”, Journal of Science and Technology, Volume 6, Special Issue 1, August2021. https://doi.org/10.46243/jst.2021.v6.i04.pp59-62
17. Amruta Mandwale and A. O. Mulani“Implementation of High Speed Viterbi Decoder using FPGA”, International Journal of Engineering Research & Technology (IJERT), Feb.2016
18. Birajadar, G., & Bhyri, C. (2020). Comparative survey on EEG analysis for detecting brain disorders. International journal of Future Generation Communication and Networking, 13(3s), 1253-1257.
19. Vaibhav Godase, “Three Element Control using PLC, PID & SCADA Interface” International Journal for Scientific Research & Development, Volume 7 Issue 2 Pages 1105-1109.
20. Dr. P. B. Mane and A. O. Mulani, “High throughput and area efficient FPGA implementation of AES algorithm”, International Journal of Engineering and Advanced Technology, Vol. 8, Issue 4, April 2019
21. Ganesh Shinde and Altaf Mulani, “A Robust Digital Image Watermarking using DWT-PCA”, International Journal of Innovations in Engineering Research and Technology (IJIERT), Vol. 6 Issue 4 April 2019.
22. A. O. Mulani and Dr. P. B. Mane, “Secure and area Efficient Implementation of Digital Image Watermarking on Reconfigurable Platform”, International Journal of Innovative Technology and Exploring Engineering, Vol. 8, Issue 2,Dec.
23. P. B. Mane and A. O. Mulani, “High Speed Area Efficient FPGA Implementation of AES Algorithm”, International Journal of Reconfigurable and Embedded Systems, Vol. 7, No. 3, pp. 157-165, November 2018.
24. Renuka Kondekar and A. O. Mulani, “Raspberry pi based voice operated Robot”, International Journal of Recent Engineering Research and Development (IJRERD), Vol. 2 Issue 12, Dec. 2017.
25. Kulkarni P.R., Mulani A.O. and Mane P. B., “Robust Invisible Watermarking for Image Authentication”, In Emerging Trends in Electrical, Communications and Information Technologies, Lecture Notes in Electrical Engineering, vol. 394,pp. 193-

International Journal of Research in Science & Engineering
ISSN: 2394-8299
Vol: 01, No. 02, Oct-Nov 2021
http://journal.hmjournals.com/index.php/IJRISE
DOI: https://doi.org/10.55529/ijrise.12.55.61

200, Springer, Singapore, 2017.
26. A.O.Mulani and Dr.P.B.Mane, "An Efficient implementation of DWT for image compression on reconfigurable platform", International Journal of Control Theory and Applications, Vol.10 No.15, 2017.
27. A.O.Mulani and Dr.P.B.Mane, "Fast and Efficient VLSI Implementation of DWT for Image Compression", International Journal for Research in Applied Science & Engineering Technology, Vol.5 Iss. IX, pp. 1397-1402, 2017. (UGC Care)
28. A.O.Mulani and Dr.P.B.Mane, "Watermarking and Cryptography Based Image Authentication on Reconfigurable Platform", Bulletin of Electrical Engineering and Informatics, Vol.6 No.2, pp 181- 187,2017
29. Rutuja Abhangrao, Shilpa Jadhav, Priyanka Ghodke and Altaaf Mulani, "Design And Implementation Of 8-Bit Vedic Multiplier", JournalNX, pp. 24–26, Mar. 2017.
30. A.O.Mulani and Dr.P.B.Mane, "Area Efficient High Speed FPGA Based Invisible Watermarking for Image Authentication", Indian Journal of Science and Technology, Vol.9. No.39, Oct. 2016.
31. Amruta Mandwale and A. O. Mulani, "Implementation of High Speed Viterbi Decoder using FPGA",International Journal of Engineering Research & Technology ﴾IJERT﴿, Feb. 2016.
32. D. M. Korake and A. O. Mulani, "Design of Computer/Laptop Independent Data transfer system from one USB flash drive to another using ARM11 processor", International Journal of Science, Engineering and Technology Research, 2016.
33. Rahul G. Ghodake and A. O. Mulani, "Sensor Based Automatic Drip Irrigation System", Journal forResearch, 53-56, 2016.Rahul Shinde and A. O. Mulani, "Analysis of Biomedical Image", International Journal on Recent & Innovative trend in technology ﴾IJRITT﴿, July 2015.
34. Rahul Shinde and A. O. Mulani, "Analysis of Biomedical Image using Wavelet Transform",International Journal of Innovations in Engineering Research and Technology ﴾IJIERT ﴿, July 2015.
35. Priyanka Kulkarni and A. O. Mulani, "Robust Invisible Digital Image Watermarking using Discrete Wavelet Transform", International Journal of Engineering Research & Technology ﴾IJERT ﴿, Vol. 4 Issue01, pp.139-141, Jan.2015.