



Pinpointing the sort of bosom malignancy for exact treatment

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ABSTRACT

The second-largest cause of carcinoma death is breast carcinoma in woman. The Breast carcinoma development is one multi-stage cycle that requires many cell types, and its detection remains challenging worldwide. One of the best approaches to avoiding this disorder is Fast treatment with cancer in breasts. In the past decade, there have been significant progress over identifying breast cancer and improving prevention approaches. Pathogenicity in breast carcinoma stem cells and tumor drug resistant mechanisms are shown and many genes associated with the disease are found. In this analysis, we will sum up how breast cancer is defined and which category it belongs to through order to provide specific treatment and medications to promote rapid recovery. Identification of the form will allow us to recognize the drug to react and get rid of. Through using the dataset as feedback, we use it to differentiate if it is non-invasive / invasive. When it falls under non-invasive, we use the sub-category to define that it fits under DCIS / LCIS. If it falls under invasive, we use it to classify that sub-category, whether it falls under IDC / ILC / OTHER Forms. we will sum up the concept of breast cancer and its diagnosis and include therapies and medicines that help a quick recovery. Identification of the type will allow us to identify and get rid of the medication.

Keywords: Breast, Carcinoma, DCIS, Ductal, Differentiate, IDC, ILC, Invasive, LCIS, Lobular, Non-Invasive

1. INTRODUCTION

Breast carcinoma is the major form of carcinoma in patients who experience from lung carcinoma. Breast cancer is metastatic cancer and can often be spread to remote organs including brain, lung, liver and bone that are primarily responsible for its irremediable. Preliminary prediction will lead to a good diagnosis and a high percentage of survival. For women, the bulk of breast cancer exists and 100 times more cases than those of men for women. Cancer arises when the defense state fails and / or the number of cells generated becomes too large to cure the disease.. In some conditions, There may be very high rates of Genetic and RNA mutations, for example: insalubrious climate (due to pollution, toxic materials, etc.), poor diet (unhealthy cell setting). Symptoms may include breast lumps, breast shape shifts, dimple skin, fluids streaming from the breast, a newer-inverted breast, or a

dark or lumpy skin spot, bone discomfort, swelling glands, difficulty breathing, or rusty skin may be observed in patients with a distant distribution of the disorder. Several other variables as age, body weight, malnutrition and lack of physical activity may lead to developing this disorder, alcohol intake, genetic differences and HRT.

Despite the truth, in perimeter and postmenopausal years, people are more prone to die from breast cancer, so a particular attempt must be made to reduce the prevalence so deaths from breast cancer in a specific population. Our work was aimed at analyzing developments in breast cancer and classifying its type. Included in our research is epidemiological details on breast cancer for all ages – from 1970 to 2019.

A cancer may be benign (not harmful for its health) or malignant (harmful). This is also likely. The cells look in their usual form, expand gradually and do not overwhelm, migrate to, or enter adjacent areas. Benign cancers are not recognized as cancer. Cancerogeneity in malignant tumors. Uncontrolled malignant cells will gradually spread to other areas of the body outside the initial tumour.

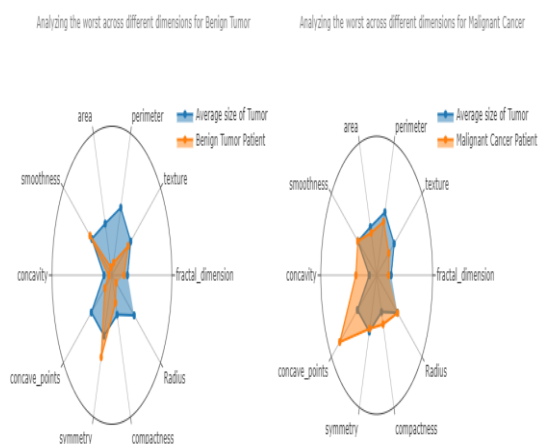


Fig. 1: Analyzing The Worst Across Different Dimensions

Tissue of the breast comprises of lobules, canals and nipples. Tree tree example, the primary sources and the lesser radiation. Comparison. Breast cancer grows in cells most often from the milk pipe lining and lobules that provide milk for these canals.

Duct carcinomas are known as ductal tumours, whereas lobular tumours are believed to arise from lobules. The detection of breast cancer is verified by the usage of a biopsy of the tissue in question. When the patient is diagnosed, further scans are done to assess if the cancer has progressed beyond the breast, which category of breast cancer it refers to, and the therapies are more likely to be successful.

Breast comprises two major tissue types, namely glandular tissue and stromal tissues (supporting tissue). The milk production glands (lobules) and the ducts (milk pathways) are contained by glandular tissues, while fatty and fibrous connective breast tissues are contained in stromal tissue.

1.1. Decision Tree Algorithm:

A decision tree is a plant-like system of fluctuations where the function (or attributes) is the internal node, the branch is a decision law and every leaf node is a decision. You may make choices with this complex diagram type. Visualization is like a metaphor which rapidly imitates human thinking. That is why decision-making trees are easy to recognize.

We will undertake the following two phases in the implementation of the decision tree:

Building phase: Dataset pre-processing, train classifier splitting the train dataset and testing using Python sklearn software.

Stage of operations: Predict, precision estimate.

The core principle behind every decision tree algorithm is this:

- Choose the right characteristics for grouping documents using ASM.
- Build a vector of the decision node and split it into smaller subsets.
- Start tree construction by carrying out this procedure recursively for every child until there is one condition:
- The value is the same scale as the two tuples.
 - a) No other features are available.
 - b) No more instances are available.

2. LITERATURE SERVEY

Bibliometric research can be carried out in many fields with various reasons and can be used to expose recent trends in the field. A structural study of breast cancer literature has been performed health outcomes in all stages of breast cancer care, diagnosis, early detection, local therapy, including primary prevention, adjuvant therapy, survival and dying experience, metastatic disease treatment. A combination of main terms, quality of life, the research techniques covered breast cancer, breast carcinomas, forms of breast cancer, breast cancer treatment, breast cancer development and sub-grouping of terms. This was a consequence of the search strategy. Fast breast cancer diagnosis is the secret to healing.

In this analysis, the functionality of a visual picture of a fine niddle suction of a breastmass is measured. A thin niddle is inserted into an region of irregular tissue (or body fluid) in the body. Like with other forms of biopsy, the sample obtained during fna can help to diagnose (or rule out) conditions such as cancer.

MR Ataollahi and J Sharifi has been described on the citation : Breast cancer and associated factors: a review : The report discussed the various types of breast cancer and its related causes. This has been established that breast cancer was and remains one of the most prevalent and growing malignancies. It has extensive knowledge regarding risk factors, disease risks and we have details in this article about the likelihood of

elderly disease. Various cancer forms have different risk factors. Some of these factors can be changed, depending on lifestyle, such as cigarette-smoking , alcohol use and diet. Factors such as age , race , gender and family history are nevertheless fixed and immutable. It does not automatically mean that one or more of these risk factors was involved.

Yi-Sheng Sun and Zhao Zhao has been described on the citation : Risk Factors and Preventions of Breast Cancer : This paper provides information about oncogenes and anti-oncogenes mutations and abnormal amplification that play a major function in tumor development and growth. The mechanisms of protection, including research, chemical protection and biological prevention, are more straightforward and efficient than in the past. Nowadays, with the cost reduction in DNA sequencing, human genome sequencing could be available to middle-class communities, so this may be a revolutionary tool for breast carcinoma prevention.

Ganesh N. Sharma and Rahul Dave has been described on the citation : Various Types And Management Of Breast Cancer : An Overview : We also had information in this article on the forms and the past of breast carcinoma. Breast carcinoma is primarily invasive and non-invasive by two forms according to the characteristics. Non-invasive comes under type 0 which is currently not cancerous in the future. Invasive is cancerous depending on the signs and may be classified as a subtype. It often provides details about the risk factors and the likelihood of cancer arising. When several of the patient's family members have different kinds of cancer, they might be more likely to experience breast cancer with a woman.

Necessary knowledge was gathered throughout this article via a literature review and keywords (cancer, breast cancer, chromosome, gene, quality of life, gender, risk factors, prevention, advancement, treatment methodologies, incidence, income, sex, weight, alcohol , tobacco, menopause, biology, cytokine, and mortality) throughout reputable science databases such as SID, Google Scholar, and detailed.

3. BACKGROUND AND ASSUMPTIONS

Multiple grading systems classify breast cancers which affect the predictions of each and can influence treatment response. Specific patterns of DNA methylation between normal and tumor- microenvironments have been observed, indicating that epigenetic modifications in the tumor microenvironment may promote carcinogenesis. A recent growth, escape and recurrence of a new form of malignant tumor cell named CSCs is being established and linked with tumor production.

3.1 Types

Breast cancers are of multiple types, and they are defined in several different ways. During a testing of breast cancer it is possible to get lost. The type of breast cancer is defined by the different cells that are infected within the breast. Breast carcinoma can start in several areas of the breast — the ducts, the lobules, or the intermediate tissue in some cases.

Table 1: Subgrouping of Breast Cancer And Its Probability

Subtypes	Further classification	Important markers	Probability
NON- INVASIV E	DCIS	Within ducts,irregular shape,doesn't spread to surrounding	90%

		tissue,unicentric origin, stage0	
	LCIS	Within lobules,irregular shape,doesn't spread to surrounding tissue,multicentric origin,stage0	10%
INVASIVE	IDC	Within ducts,irregular shape, spread to surrounding tissue	80%
	ILC	Within lobules,single file like structure,spread to surrounding tissue	10-15%
	TUBULAR	Tube like structure, softer texture,very rare	2%
	MUCINOUS	Well circumscribed mass,medium texture,higher radius	Rare
	CARCINOMA WITH MEDULLARY FEATURES	Sheet like structure,forms distinct boundaries between tumor and normal tissue	5%
	INVASIVE PAPILLARY	Finger like structure,bloody nipple discharge,abnormal mass	0.50%
	OTHER	Very rare types	5%

although the chance of aggressive breast cancer may be raised later with DCIS. A red, pink tinged, transparent or serous random discharge from the nipple in action may be a presenting sign. People develop DCIS and are therefore more willing to revisit or develop a new breast cancer than someone who has will ever have breast cancer. Women with DCIS without radiation treatment or breast-conserving surgery (lumpectomy) are around 25%-30% likely to suffer recurrence in the future. LCIS constitutes 23-25 percent of all forms of breast LCIS

3.1.4 Invasive Carcinoma: Cancer that extends through the tissue layer where it forms and expands into healthy tissues in the surrounding area. Often referred to as cancer invasion. Types of invasive carcinoma are

3.1.5 Invasive Ductal Carcinoma: Invasive ductal carcinoma (IDC) is a tumor which has begun to develop in a milk duct and has penetrated fibrous or fatty breasts outside the duct. It is also known as infiltrative ductal carcinomas. IDC is by far the most commonly diagnosed cancer of the breast and constitutes between 70% or 80% among all cases of breast cancer. IDC is still the most prevalent form of breast cancer for males.

Table 2 : Difference B/W DCI And LCIS

	DCIS	LCIS
Structure involved	Ducts	Lobules
Type of subsequent cancer	Ductal	Ductal(or)lobular
Breast at risk	Ipsilateral breast	Either breast
Laterality	Unilateral	Often bilateral
N.o of sites of origin	Unicentric	Multicentric
Clinical sign	Mass,pain, Discharge	None

A mammogram can reveal a suspicious mass that leads to further tests. During breast self-examination, a woman often can notice a lump or mass. The precise type of cancer and the level of therapy for all cases of IDC is defined. Types of IDC are

3.1.1 Non-Invasive Carcinoma: Non-invasive tumors exist in the breast with milk canals or lobules. They don't expand into usual tissues or attack them within or outside the breast. Even non-invasive carcinoma ("in the same spot") or pre-cancer is called carcinoma in-situ. Non-invasive breast cancer consists of two distinct individuals include: ductal cancer in-situ (DCIS) and lobular cancer in-situ (LCIS).

3.1.2 Lobular carcinoma in-situ(LCIS): LCIS is typically asymptomatic, and is observed with certain results as an accidental result on breast biopsy. LCIS is an irregular area(s) of cell development that raises an individual's risk for invasive breast carcinoma further in life. Lobular implies that anomalous cells in the lobules continue to expand. In situ or in the original position is to persist in the lobule, abnormal development and not to expanded to the cells. 6-15 % of all breast cancer types are LCIS.

3.1.3 Ductal carcinoma in-situ(DCIS): DCIS is usually asymptomatic when only diagnosed in an anomalous mammogram. DCIS is often referred to as intraductal carcinoma or stage 0 cancer. The cells that form the ducts have converted to cancer cells, this did not extend across the walls of ducts to the outer breast tissue. DCIS is not life-threatening,

3.1.6 Tubular Carcinoma: Tubular breast cancer is a mutation of invade ductal carcinoma . Small (about 1 cm or less), rod-shaped structures called "bone" usually consist of tubular carcinomas. These tumors are typically low-grade, which means they have a similar appearance to regular, healthy cells and are gradually developing. While tubular carcinoma can occur at all ages, physicians mostly diagnose it in women in the early 1950s. Carcinomas of the tubes in males are rare. Simple tubular carcinoma typically does not grow beyond the conduct and underlying tissue. A combination of tube shaped structures and lobular carcinoma cells is a mixed tubular carcinoma which makes it difficult to diagnose. About 1-4% of all breast cancers were tubular carcinoma. Nevertheless, tubes carcinomas are becoming more commonly used, even before you or your doctor feel lump. Nevertheless, tube carcinomas can be more frequently detected. For people with tubular carcinoma, several treatment options are available

3.1.7 Medullary Carcinoma: Medullary breast carcinoma is a rare type of IDC that represents 3-5 per cent of all diagnoses of breast cancer. Which works differently from other forms of cancer of the duct breast. While medullary tumors look extremely violent, they develop gradually and never spread to the lymph nodes. Plasma and advanced white blood cells, or

lymphocytes, accompany carcinoma tumors in the medullary breast. Medullar carcinoma does not grow rapidly and does not actually spread to the lymph glands outside of the breast. While hormones take a part in the development of certain types of sheep cancer, the medullary system tends to not cause carcinomas. Genetic variations contribute to the production of medullary carcinoma. The risk of developing medullary breast carcinoma in patients with mutation in the BRCA1 gene may be increased.

3.1.8 Mucinous Carcinoma: Colloid carcinoma is an rare form of intrusive ductal carcinoma in breast carcinoma. This constitutes 1 to 7% of all cancers of the breast. Pure mucinous carcinomas of the breast are rare and account for only 2 percent of all primary carcinomas. The tumor comprises of abnormal cells that "float" for mucinal pools, a key components of the sticky, fatty substance named mucus, for this form of cancer. Nevertheless, mucinoma is part of the tumor and protects the cells of breast cancer. This appears like cancer cells are spread around pools of mucus under a microscope. Mucinogenic carcinoma may be diagnosed at any age, but it appears to affect women after menopause.

3.1.9 Papillary Carcinoma: Papillary cancer of the breast is a very unusual form defined by about 1% of all invasive ductal cancer cancers of the breast. The name comes from finger-like projections or papules, seen as the cells are microscopically presented. Cells with or without invasion that form fibrovascular nuclei are common features of tumor. The proof provided indicates stronger outcomes in comparison to aggressive ductal carcinoma for papillary carcinoma. In reality the pathologist would also have to use a microscope for the entire tumour in order to be confident of the condition even whether the biopsy for cancer is negative.

3.1.10 Invasive Lobular Carcinoma: Invasive lobular carcinoma seems to be the second commonest type of tumor preceding ductal carcinoma in situ. (ILC), often referred to as the infiltrating lobular carcinoma. Aggressive lobular carcinomas represent about 10% of the aggressive breast tumors. Invasive cancer indicates that the cells of the cancer have originated from the lobule Where it originated and can migrate to the lymph nodes and other areas of the body. Although invasive lobular carcinoma at any age may cause harm to women, it is more prevalent in older people. Invasive lobular carcinoma is less prone to develop a solid or distinct breast lump than other forms of breast cancer. A thickened patch present at breast tissue is more likely to exist.

3.1.11 Other Types: Many other rare form of invasive carcinoma are : Metastatic carcinoma, Inflammatory breast cancer, Male breast cancer, Paget's disease of the nipple, Phylloides tumor, Triple negative breast cancer... Most of these particular forms are very rare and can be handled easily. A some rare forms are very aggressive and difficult to deal. Cancer exists as such types can be present in milk conducts in various locations, spreading to the surface of the nipple or through connective tissue networks on the breast of the neck.

4. METHODOLOGY

4.1 Breast Cancer Dataset

Information package Preach that cancer is healthy or malignant as a sample, so we use Breast Cancer Wisconsin. The Properties in which a digitized image of the fine aspiration needle (FNA) of the breast mass is included. We identify the characteristics of the cell nuclei in the image. For each nucleus

ten real-valuation characteristic characteristics are calculated: radius (mean distances between core and perimeter points); texture (standard gray-scale deviation) The I d and the diagnostic symptoms are excluded (the group element is the latter). The last X (populated with NA values only) function is also dropped. The density graph for the field plot is used to represent both the density value and the separation degree of the two sets of values in each direction of the field. There is no complete distinction between all characteristics. We have comparatively reasonable divisions for concave, points, concavity worst, perimeter worst, area medium, and medium perimeter. For a variety of properties, namely symmetry se, smoothness se, we also have a close overlay. We also represent the dispersion matrix with the pairs.

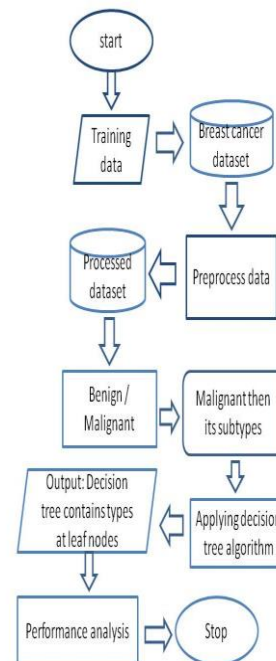


Fig. 2: Methodology

4.2 Decision Tree Algorithm

Decision trees use several algorithms to evaluate the division of a node into a number or all of the subnodes. The creation of sub-nodes enhances the uniformity of the subsequent sub-nodes. The integrity of the node decreases with respect to the target element. The Decision Box splits the nodes into all factors and then picks the fraction that corresponds to the most stable subnodes. Here we used an ID3(Iterative Dichotomiser) algorithm to create a decision tree. Using a greedy scan top-down method across the space of potential untracked branches. Like the name implies, a gullible algorithm is still the perfect alternative right now.

Move to the ID3 algorithm:

- Begins with the original collection of S as the root node.
- For each iteration of the algorithm, it runs through a very unknown S-set attribute and calculates Entropy(H) and Information gain(IG) of that attribute.
- So choose the attribute that has the smallest gain in Entropy or Largest Data.
- Set S is divided by the selected attribute to generate a subset of the tests.
- The algorithm begins to recur on each subset, considering only attributes that have never been selected before.

We used the following formulas to solve this attribute selection problem. A zero entropy division is a sheet unit, and a null entropy bracket must be further split up.

$$Entropy = - \sum_j p_j \log_2 p_j$$

$P_j \rightarrow$ Probability of an event j of state or Percentage of class j in a node of state .

To measure the purity we use

$$Gini(t) = 1 - \sum [P(c|t)]^2$$

Another thing to note is that Gini is not the only one assessing cleanliness. Many others are worth mentioning, but the following two.

$$Entropy(t) = - \sum P(c|t) \log P(c|t)$$

$$Misclassification(t) = 1 - Max[P(c|t)]$$

ID3 algorithm uses information gain.

$$Information\ Gain(T,X) = Entropy(T) - Entropy(T, X)$$

We divided data into types using the ID3 algorithm, based on its functional values.

4.3 Classification Of Breast Cancer Data Set

After examining a few patients, we developed a dataset with few features. For those that we use to segregate the benign and the malignant. Whether it is benign, it means it is not cancerous. When it is malignant, we use the procedure for further analysis of which form it belongs to for successful treatment. The following steps include precise details about how we did the separation.

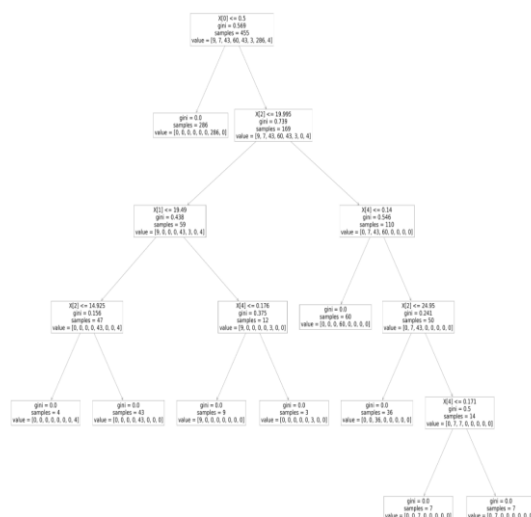
Carcinoma formed in milk ducts is composed as ductal carcinoma if it arises in the lobules and is then referred to as lobular carcinoma. Ductal & lobular carcinoma are also classified into two separate categories based on spread to adjacent tissues. As it extends to the neighboring tissue, it comes under invasive conditions when it is adjusted to the inside of the tissue, then to the non-invasive tissue. Invasive DCs and lobular carcinomas can be referred to as invasive DCs and invasive LCs, respectively. Ductal and lobular carcinoma in situ (DCIS) and lobular in-situ (LCIS) should be alluded to in non-invasive situations. With this IDC, ILC, DCIS and LCIS, harder texture thresholds (39.28-20.01) have been set according to our dataset analysis. The compactness of ILC and LCIS was lower (0.1402-0.04605) and the compactness of DCIS and IDC was higher (0.3454-0.1402). If the region varies in the perimeter of the checkup, it is invasive otherwise it is non-invasive.

In IDC, we had four other forms of Tubular Carcinoma (TC) that are in tube with a smoother shape form (14.38-10.38), in the case of papillary carcinoma(IPC), carcinoma with medullary features(CMF), mutinous carcinoma(MC) has soft texture(19.98-15.05), in this IPC it has smaller radius(19.45-11.08) and in the case of MC and CMF it has higher radius for CMF has lower compactness(0.1666-0.07864) and MC has higher compactness(0.2768-0.1849). The remaining cases will come under other types.

5. RESULTS

Selection of the function was performed on the dataset where the sample code number attribute was removed. In order to perform the decision tree ID3 data mining technique. The tree created by ID3 can be used to classify whether the patient is of

which kind. Data mining techniques are based on the principle of information entropy.



Every data attribute is used to make a decision by breaking the data into smaller modules. This explores the normalized gain of information (IG) (difference in entropy) resulting from the selection of the attribute as a split point. The highest quality IG is used at the root of the tree. The process is repeated until a leaf node is generated for the tree that specifies the chosen class attribute.

The findings show that ID3 classifiers with a variety of functionalities are a superior technique for diagnosis of breast cancer and can be further enhanced to accurately predict the same with more education info. The resulting decision tree after description of histopathological forms

6. FUTURE WORK

In future data from different regions worldwide will be collected and a more reliable and general overview model will be developed for the diagnosis of breast cancer. We've focused on only a few forms of histopathological separation processes in more detail. The path to survival is early diagnosis of breast cancer. Specific separation methods may be used to diagnose each and every form in detail. By offering histopathological separation may help to distinguish the exact form at an early stage, there will be several opportunities for successful diagnosis and effective recovery.

7. CONCLUSION

In women, breast cancer is the second major cause of death by tumors. One of the best approaches to eliminate this disease is by curing breast cancer early. Within this article, we will sum up the concept of breast cancer and its diagnosis and include therapies and medicines that help a quick recovery. Identification of the type will allow us to identify and get rid of the medication. Yet we have identified only few forms which could provide simple recognition for far more unusual forms of breast cancer, which may help to provide effective diagnosis for fast and higher recovery opportunities.

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