

(54) Title of the invention : MACHINE LEARNING BASED BREAST CANCER DETECTION IN INTEGRATION WITH FUZZY LOGIC

<p>(51) International classification :G06K0009620000, G16B0040000000, G16B0020000000, G06N0020000000, G06N0005040000</p> <p>(31) Priority Document No :NA (32) Priority Date :NA (33) Name of priority country :NA (86) International Application No :PCT// Filing Date :01/01/1900 (87) International Publication No : NA (61) Patent of Addition to Application Number :NA Filing Date :NA (62) Divisional to Application Number :NA Filing Date :NA</p>	<p>(71)Name of Applicant : <b>1)P Jhansi Lakshmi,Vignan's Foundation for Science Technology and Research</b> Address of Applicant :Assistant Professor, Vignan's Foundation for Science Technology and Research - Guntur Andhra Pradesh India 522213 Andhra Pradesh India <b>2)Mr. T CH Anil Kumar,VFSTR (Deemed To Be University)</b> <b>3)N Bharath Kumar,Vignan's Foundation for Science Technology and Research</b> <b>4)Dr.R.Selvam,KCG College of Technology</b> <b>5)Dr.P.M.Venkatesh,VFSTR (Deemed To Be University)</b> <b>6)N B Prakash Tiruveedula,Vignan's Foundation for Science Technology and Research</b> <b>7)Mr. Haqqani Arshad,Yanbu Industrial College</b> <b>8)Mr. Syed Zainulabidin Hashmi,Blessing Health System</b> <b>9)Dr Marxim Rahula Bharathi B,Aditya College of Engineering</b> <b>10)Dr.T.M.Vijayalakshmi,University of Madras</b></p> <p>(72)Name of Inventor : <b>1)P Jhansi Lakshmi,Vignan's Foundation for Science Technology and Research</b> <b>2)Mr. T CH Anil Kumar,VFSTR (Deemed To Be University)</b> <b>3)N Bharath Kumar,Vignan's Foundation for Science Technology and Research</b> <b>4)Dr.R.Selvam,KCG College of Technology</b> <b>5)Dr.P.M.Venkatesh,VFSTR (Deemed To Be University)</b> <b>6)N B Prakash Tiruveedula,Vignan's Foundation for Science Technology and Research</b> <b>7)Mr. Haqqani Arshad,Yanbu Industrial College</b> <b>8)Mr. Syed Zainulabidin Hashmi,Blessing Health System</b> <b>9)Dr Marxim Rahula Bharathi B,Aditya College of Engineering</b> <b>10)Dr.T.M.Vijayalakshmi,University of Madras</b></p>
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(57) Abstract :

Breast cancer is generally detected by a most common laboratory method termed as Mammography but poses many side cost yet associated with high cost. This problem can be solved by the proposed invention, where Machine learning acts as alternative method to provide promising results. This invention is able to detect breast cancer based on expert system of multilayer fuzzy logic utilizing extreme learning machine classification model in integration with radial basis function. Labeling of the dataset is first done by fuzzy logic once after which extreme learning machine classification model along with SVM model is applied to classify between benign cancer and malignant cancer with minimal error rate. Confusion matrix is used for evaluating the performance of the proposed system. The proposed method outperforms the linear SVM model with the parameters RMSE, MAPE & R2 which are obtained as 0.17, 0.05 and 0.93 respectively. Better performance is achieved by the proposed algorithm such as false negative rate, true positive rate, specificity, sensitivity, accuracy, precision and validation.

No. of Pages : 11 No. of Claims : 6

<b>"FORM 1</b> THE PATENTS ACT 1970 (39 of 1970) and THE PATENTS RULES, 2003 <b>APPLICATION FOR GRANT OF PATENT</b> (See section 7, 54 and 135 and sub-rule (1) of rule 20)				(FOR OFFICE USE ONLY)	
				Application No.	
				Filing date:	
				Amount of Fee paid:	
				CBR No:	
				Signature:	
<b>1. APPLICANT'S REFERENCE / IDENTIFICATION NO. (AS ALLOTTED BY OFFICE)</b>					
<b>2. TYPE OF APPLICATION [Please tick (✓) at the appropriate category]</b>					
Ordinary (✓)		Convention ( )		PCT-NP ( )	
Divisional ( )	Patent of Addition ( )	Divisional ( )	Patent of Addition ( )	Divisional ( )	Patent of Addition ( )
<b>3A. APPLICANT(S)</b>					
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<b>3B. CATEGORY OF APPLICANT [Please tick (✓) at the appropriate category]</b>					
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		Small Entity ( )	Startup ( )		
<b>4. INVENTOR(S) [Please tick (✓) at the appropriate category]</b>					
Are all the inventor(s)		Yes (✓)	No ( )		
same as the applicant(s) named above?					
If "No", furnish the details of the inventor(s)					
Name in Full		Nationality	Country of Residence	Address of the Inventor	
<b>5. TITLE OF THE INVENTION</b>					
<b>MACHINE LEARNING BASED BREAST CANCER DETECTION IN INTEGRATION WITH FUZZY LOGIC</b>					
<b>6. AUTHORISED REGISTERED PATENT AGENT(S)</b>			IN/PA		
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<b>8. IN CASE OF APPLICATION CLAIMING PRIORITY OF APPLICATION FILED IN CONVENTION COUNTRY, PARTICULARS OF CONVENTION APPLICATION</b>					
Country	Application Number	Filing date	Name of the applicant	Title of the invention	IPC (as classified in the convention country)
<b>9. IN CASE OF PCT NATIONAL PHASE APPLICATION, PARTICULARS OF INTERNATIONAL APPLICATION FILED UNDER PATENT CO-OPERATION TREATY (PCT)</b>					
International application number			International filing date		

**10. IN CASE OF DIVISIONAL APPLICATION FILED UNDER SECTION 16, PARTICULARS OF ORIGINAL (FIRST) APPLICATION**

Original (first) application No.

Date of filing of original (first) application

**11. IN CASE OF PATENT OF ADDITION FILED UNDER SECTION 54, PARTICULARS OF MAIN APPLICATION OR PATENT**

Main application/patent No.

Date of filing of main application

**12. DECLARATIONS****(i) Declaration by the inventor(s)**

**(In case the applicant is an assignee:** the inventor(s) may sign herein below or the applicant may upload the assignment or enclose the assignment with this application for patent or send the assignment by post/electronic transmission duly authenticated within the prescribed period).

I/We, the above named inventor(s) is/are the true & first inventor(s) for this Invention and declare that the applicant(s) herein is/are my/our assignee or legal representative.

(a) Date

(b) Signature(s)

(c) Name(s)

**(ii) Declaration by the applicant(s) in the convention country**

**(In case the applicant in India is different than the applicant in the convention country:** the applicant in the convention country may sign herein below or applicant in India may upload the assignment from the applicant in the convention country or enclose the said assignment with this application for patent or send the assignment by post/electronic transmission duly authenticated within the prescribed period)

I/We, the applicant(s) in the convention country declare that the applicant(s) herein is/are my/our assignee or legal representative.

(a) Date

(b) Signature(s)

(c) Name(s) of the signatory

**(iii) Declaration by the applicant(s)**

I/We the applicant(s) hereby declare(s) that: -

- I am/ We are in possession of the above-mentioned invention.
- The provisional/complete specification relating to the invention is filed with this application.
- The invention as disclosed in the specification uses the biological material from India and the necessary permission from the competent authority shall be submitted by me/us before the grant of patent to me/us.
- There is no lawful ground of objection(s) to the grant of the Patent to me/us.
- I am/we are the true & first inventor(s).
- I am/we are the assignee or legal representative of true & first inventor(s).
- The application or each of the applications, particulars of which are given in Paragraph-8, was the first application in convention country/countries in respect of my/our invention(s).
- I/We claim the priority from the above mentioned application(s) filed in convention country/countries and state that no application for protection in respect of the invention had been made in a convention country before that date by me/us or by any person from which I/We derive the title.
- My/our application in India is based on international application under Patent Cooperation Treaty (PCT) as mentioned in Paragraph-9.
- The application is divided out of my /our application particulars of which is given in Paragraph-10 and pray that this application may be treated as deemed to have been filed on DD/MM/YYYY under section 16 of the Act.
- The said invention is an improvement in or modification of the invention particulars of which are given in Paragraph-11.

**13. FOLLOWING ARE THE ATTACHMENTS WITH THE APPLICATION**

(a) Form 2

Item	Details	Fee	Remarks
Complete/ <del>provisional</del> specification)#	No. of pages- <b>8</b>		
No. of Claim(s)	No. of claims- <b>6</b> and No. of pages – <b>1</b>		
Abstract	No. of pages- <b>1</b>		
No. of Drawing(s)	No. of drawings - <b>2</b> and No. of pages - <b>1</b>		

# In case of a complete specification, if the applicant desires to adopt the drawings filed with his provisional specification as the drawings or part of the drawings for the complete specification under rule 13(4), the number of such pages filed with the provisional specification are required to be mentioned here.

(b) Complete specification (in conformation with the international application)/as amended before the International Preliminary Examination Authority (IPEA), as applicable (2 copies).

(c) Sequence listing in electronic form

(d) Drawings (in conformation with the international application)/as amended before the International Preliminary Examination Authority (IPEA), as applicable (2 copies).

(e) Priority document(s) or a request to retrieve the priority document(s) from DAS (Digital Access Service) if the applicant had already requested the office of first filing to make the priority document(s) available to DAS.

(f) Translation of priority document/Specification/International Search Report/International Preliminary Report on Patentability.

(g) Statement and Undertaking on Form 3

(h) Declaration of Inventorship on Form 5

(i) Power of Authority

(j).....

**Total fee ₹.....in Cash/ Banker's Cheque /Bank Draft bearing No..... Date.....on  
..... Bank.**

I/We hereby declare that to the best of my/our knowledge, information and belief the fact and matters slated herein are correct and I/We request that a patent may be granted to me/us for the said invention.

Dated this.....day of.....20.....

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3. **N Bharath Kumar**
4. **Dr.R.Selvam**
5. **Dr.P.M.Venkatesh**
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8. **Mr. Syed Zainulabidin Hashmi**
9. **Dr Marxim Rahula Bharathi B**
10. **Dr.T.M.Vijayalakshmi**

To,

The Controller of Patents

The Patent Office, at..... Note:

\* Repeat boxes in case of more than one entry.

\* To be signed by the applicant(s) or by authorized registered patent agent otherwise where mentioned.

\* Tick (✓)/cross (x) whichever is applicable/not applicable in declaration in paragraph-12.

\* Name of the inventor and applicant should be given in full, family name in the beginning.

\* Strike out the portion which is/are not applicable.

\* For fee: See First Schedule.