Importance of E- Diagnosis Tool for Utilization of Rural Women

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Abstract: **Our Women empowerment programs & technologies provides linkages with R&D institutes for development of appropriate technologies creates greater support for their efforts so that reform is promoted from within and from without . The project concentrates on developing technological solutions for self diagnosis tools for Gestational Diabetes Mellitus (GDM) and Breast Cancer that is usually occurs in women.**

- **"Modeling an Expert System for diagnosis of Gestational Diabetes Mellitus based on risk factors"**
- **"Threshold Neuro Fuzzy Expert System for diagnosis of Breast Cancer"**

Developing above mentioned e-health service centers gives attention of rural women towards health.

Keywords: Women Empowerment, Artificial Intelligence, Expert System, Gestational Diabetes Mellitus, Breast Cancer

I.INTRODUCTION

Women is a resource directory that connects the women both in rural and urban areas, by providing them with information, services, resources and knowledge that can help them thrive and inspire them to realize their dreams. The information includes details of available social services, self-defense programmes, and healthy lifestyle tips.

Women's in the economic, political and social spheres and to empower women to lead active, productive and successful lives. Programmes developed through the Women's Desk are designed to cultivate, nurture and advance the meaningful participation of women in all sectors of the economy, health sciences, political and social spheres.

The proposed project focuses on Gestational diabetes mellitus (GDM) and Breast Cancer.

Diabetes is a chronic illness that requires continuous medical care inpatient self management education to prevent acute complications. Gestational diabetes mellitus (GDM) is a type of Diabetes present in around 3-4% of all pregnancies in women.

Breast cancer is one of the most commonly occurring cancers in women. Early diagnosis of breast cancer is crucial and important in reducing mortality rate and improving the patient's quality of life. Current breast imaging diagnosis include: Mammography, Magnetic Resonance Imaging, MRI, and Sonograms, Ultrasound images.

This paper is organized as follows: Section 2 deals with related work, Section 3 introduces about the Description, Section 4 gives Discussed about Methodology and finally conclusion reached to last section.

II. RELATED WORK

Cătălin Stoean et al. proposed a new fitness function for diabetes diagnosis through the means of multi model evolutionary algorithm [1]. Polatet et al. proposed two different approaches for diabetes data classification - principal component analysis and neuro-fuzzy inference and Generalized Discriminant Analysis (GDA) and least square support vector machine (LS-SVM).They achieved an

accuracy of 89.47% and 79.16% respectively[8][10]. Karegowda et al. used neural networks and explained a hybrid model which uses Genetic Algorithms (GA) and Back Propagation Network (BPN) for classification of diabetes among PIMA Indians [11]. Hasan Temurtas et al.[9] proposed a neural approach for classification of diabetes data and achieved 82.37% accuracy .Muni, Pal, Das [15] discussed about a method for multiclass classifier and proposed a new concept of unfitness for improving genetic evolution. Pradhan et al. used Comparative Partner Selection (CPS) along with GP to design a 2-class classifier for detecting diabetes and discussed about GP approach for detection of diabetes [10]. Ephzibah [12] used a fuzzy rule based classification system for feature subset selection in diabetes diagnosis. This approach proves to be cost-effective. Arcanjo et al. proposed KNN-GP (KGP) algorithm, a semi-supervised transductive one, based on the three basic assumptions of semi-supervised learning. This system was implemented on 8 datasets of UCI repository but inferior results were obtained for diabetes dataset [14]. Kishore et al. [7] explained an interesting method which considers a class problem as a set of two-class problems .Smart investigated the multi class approach using modified genetic operators and concluded that GP can be used to improve multi class problems [17]. Lim et al. presented an excellent comparison of 33 classification algorithms in [16]. Durga Prasad Muni et. al., proposed a large number of benchmark data sets for comparison [15].

III. OBJECTIVES

- The project focusing on enriching the women for healthy environment by using our proposed Information Technology tools and establishment of e-GDM & Breast Cancer Diagnosis Centre's with trained operator and provide services like self diagnosis and primary level treatment.
- Providing technical solutions where a pregnant woman is facing Gestational Diabetes Mellitus (GDM) & the women with Breast Cancer.
- Planning to develop a common platform/ substations for the deployment of above proposed tools where a rural woman can utilize the particular tool efficiently. These substations are used for creating synergies between various women's groups which serve as a centre of knowledge, resources and research.
- Our Women empowerment programs & technologies provides linkages with R&D institutes for development of appropriate technologies creates greater support for their efforts so that improvement is promoted from within and from without .
- Organizing various awareness programs like to enlighten the women about the GDM and Breast Cancer that mostly takes place.
- Employing Instructors/Trainers where they get attentiveness about the tool handling. They will make use of the tool and diagnose the disease of the rural women who approaches the e- Health Service Center.
- Tools are implemented into the service in the real environment where the rural women make use of it and where the instructors/trainers will generate the income besides doing on field trails and modulation of technology packages.

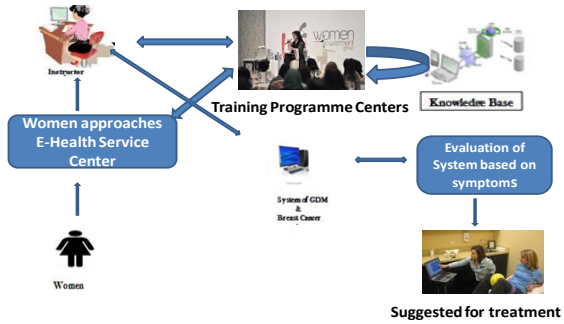

Fig: E-Health Service for Women through E-Health Diagnostic Centers

IV. METHODOLOGY

For the above specified objectives, models and tools are developed to for implementation.

4.1 Modeling an Expert System for diagnosis of GDM based on risk factors"

For the first proposing objective i.e., Diagnosis of GDM tool we use the following procedure in two phases's i.e. Analysis phase and Evaluation phase using Back propagation neural network learning algorithm

4.1.1: Analysis phase:

In analysis phase we gather patient information. The inputs designed for the system are age, family history, gender, personal habits, complications, physical examinations, past history and finally test measurements. The gathered information can be analyzed, normalized and stored in database.

4.1.2: Evaluation Phase:

In Evaluation phase, Evaluation Engine places major role. It accepts the user input queries and responses to the questions through the I/O Interface and use the dynamic information together with the static knowledge stored in the knowledge base. Knowledge in the knowledge base is used derive conclusions about the current case or situation as presented by user inputs. Diagnosis is based on the fuzzy rules framed and implemented using back propagation neural network algorithm. In the proposed diagnostic system the knowledge is presented by object oriented representation for reusability.

The Evaluation Engine diagnoses the GDM Patient by the following Screening process proposed by ADA (American Diabetic Association) Method:

- Perform a 75-g OGTT, with OGTT, with plasma Glucose measurement fasting and at 1 and 2h at 24-28 weeks of gestation in women not previously diagnosed with overt diabetes.
- The OGTT should be performed in the morning after an overnight fast of at least 8h. The diagnosis of GDM is made when any of the following plasma glucose values are exceeded:
- * Fasting ≥ 92 mg/dl (5.1 mmol/l)
- * 1h ≥ 180 mg/dl (10.0 mmol/l)
- * 2h ≥ 153 mg/dl (8.5 mmol/l)

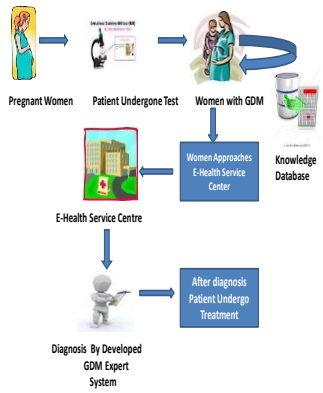

Fig: Evaluation Process of GDM Expert System

4.2 Threshold Neuro Fuzzy Expert System for diagnosis of Breast Cancer

Second proposing tool was developed by Extending an ARM Cortex M3 interactive neuro fuzzy expert model for classification digital Mammographic mass dataset. we obtain best rules to use inference engine of interactive neuro fuzzy expert system for diagnosis of breast cancer using fuzzy logic utilize various combination of rules. Neuro-fuzzy system is a acquiring machine that finds the factors of a fuzzy system (i.e., fuzzy sets, fuzzy rules) by employing approximation techniques from neural networks.

The neuro-fuzzy system has a 3 layered feed forward architecture. The units network use t-norms or t-conorms as activation function. The hidden layer represents fuzzy rules. Fuzzy sets are encoded as (fuzzy) connection weights.

A neuro-fuzzy system is represented as special three-layer feedforward neural network.

- The first layer corresponds to the input variables.
- The second layer symbolizes the fuzzy rules.
- The third layer represents the output variables.
- The fuzzy sets are changed into as (fuzzy) connection weights.

The first layer contains five input units (x1..x5) representing the pattern features. The hidden layer holds rule units, (R1-R7) representing the fuzzy rules and the third layer consists of six output units. There are 7 fuzzy rules using BI-RADS (1-6) and five inputs Mass shape, Mass Margins, Mass density, Calcification and Calcification Distribution. Neuro fuzzy model is created for interactive expert systems to diagnose Breast Cancer Inference engine.

X1: Mass Shape X2: Mass margin
X3: Mass Density X4: Calcification
X5: Calcification Distribution

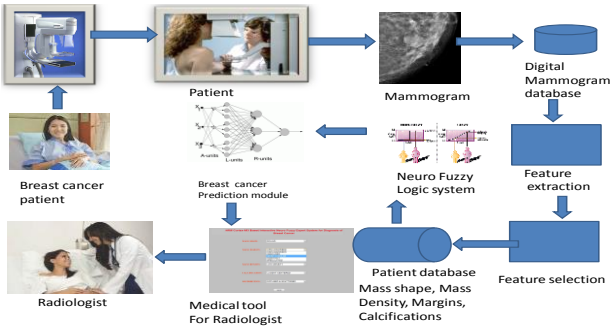

Fig: Basic Schematic of Interactive Neuro-Fuzzy Expert System

V. CONCLUSION

Organizing various awareness programs like workshops and meetings where we enlighten the women about the GDM and Breast Cancer that mostly takes place.

Our developed substations used for creating synergies between various women's groups which serve as a centre of knowledge, resources and research.Providing technical solutions where a pregnant woman is facing Gestational Diabetes Mellitus (GDM) & the women with Breast Cancer.

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