

Diagnostic Approach To Anemia In Adults Using Machine Learning

Dr. V.Geetha¹, Dr. C.K. Gomathy², Kommuru Keerthi³, Nallamsetty Pavithra⁴

^{1,2}Assistant Professor, Dept. Of CSE, SCSVMV (Deemed to be University), TamilNadu, India

^{3,4}UG Scholar, Dept. Of CSE, SCSVMV (Deemed to be University) TamilNadu, India

DOI: 10.47750/pnr.2022.13.S09.456

Abstract

Computer-aided illness diagnosis is less expensive, saves time, is more accurate, and removes the need for additional personnel in medical decision making. Many nutrition surveys indicate that about a quarter of the world's population is anaemic. As a result, there is a pressing need to create an effective machine learning regressor capable of properly detecting anaemia. The goal is to find out which individual classifier or group of classifier combinations obtain the highest accuracy in red blood cell categorization for anaemia detection. We used Lasso and Ridge regressions to detect and estimate the anaemia. However, the classifier Ridge performs better achieves an accuracy higher than the Lasso regression. Hence to achieve maximum accuracy in medical decision making, a better and powerful algorithm should be used. The outcomes of this algorithms decides whether the patient is infected with anaemia or not. The proposed version generates a better response to the inputs to confirm the disease.

Keywords — Anemia, infection, red blood cells, disease detection, hemoglobin.

I. INTRODUCTION:

The computer has automated nearly every area of life, including medical, and disease diagnosis is no exception. Computer-aided illness diagnostic technologies make disease detection easier, quicker, and less expensive[1][2]. They save time and effort in the decision-making process. To add to that, the automated diagnosis method is less susceptible to variability in physician choices. Another area where computers may assist is in the diagnosis and prediction of anaemia[4]. Anaemia is a significant illness that mostly affects women and children, and it is estimated that anaemia affects nearly every second kid under the age of five[3]. Anemia is defined as the decrease in amount of red blood cells (RBCs) or haemoglobin in the blood that has significant adverse health consequences, as well as adverse impacts on economic and social development. Here are four main tests that are ordered to diagnose anemia disorder which are complete blood count (CBC), ferritin, PCR (polymerase chain reaction) and hemoglobin electrophoresis[5]. CBC test is the most frequently blood test to measure overall health and determine a wide range of diseases including anemia, infection and leukaemia[6][7]. A complete blood count test measures almost 15 parameters including: haemoglobin (Hb), red blood cells (RBC), haematocrit (HCT), mean corpuscular haemoglobin (MCH), mean corpuscular volume (MCV) and so on. A haemoglobin electrophoresis test is a blood test used to measure and identify the different types of haemoglobin in the bloodstream[8][9]. We have used two algorithms, namely Lasso Regression and, Ridge regression algorithm. We have depicted the flowchart of the proposed method.as defined[10].

II. PROBLEM STATEMENT:

1. Low adherence
2. Uncontrolled infection
3. Hidden symptoms and comorbidities of another non-communicable disease
4. Micronutrient deficiency
5. Low monitoring and evaluation of the program

III. LITERATURE SURVEY:

Iron deficiency and reduced work capacity: A critical review of the research to determine a causal relationship[26][28]. The biological processes behind IDA's influence on work capacity are robust enough to warrant treatments to increase iron status as a method of improving human capital. Child health epidemiology reference group[27][29]. Moderate to severe, but not mild, maternal anemia is associated with increased risk of small-for gestational-age outcomes[11-15]. Moderate to severe, but not mild, maternal anemia appears to have an association with SGA outcomes, but the findings must be viewed with caution due to the great heterogeneity of the studies. Maternal hemoglobin concentration and birth weight This is widely regarded as indicating anemia in the pregnant woman but, if associated with a mean corpuscular volume >84 fL[30], should be considered optimal. Comparison of different classification techniques using WEKA for haematological data[16][18]. The best algorithm based on the haematological data is J48 classifier with an accuracy of 97.16% and the total time taken to build the model is at 0.03 seconds. Naïve Bayes classifier has the lowest average error at 29.71% compared to others. Iron deficiency anemia detection from haematology parameters by using decision tree. The results of the decision support system have completely matched with those of the physicians' decisions. Anemia types prediction based on data mining classification algorithms[17]. The specific patterns of information can predicate through using data mining methodologies to enhance conducting researches and evaluation of reports[18][20]. The increasing growth of machine learning, computer techniques divided into traditional methods and machine learning methods. This section describes the related works of anaemia detections and how machine learning methods are better than traditional methods. The existing methods in this project have a certain flow and also KNN is used for model development. But it requires large memory and result is not accurate[21-25].

IV. PROPOSED METHOD:

- This application that can be considered a useful system since it helps to reduce the limitations obtained from traditional and other existing methods.
- The objective of this study to develop fast and reliable method which detects and estimates anaemia accurately.
- To design this system is we used a powerful algorithm in a based Python environment.

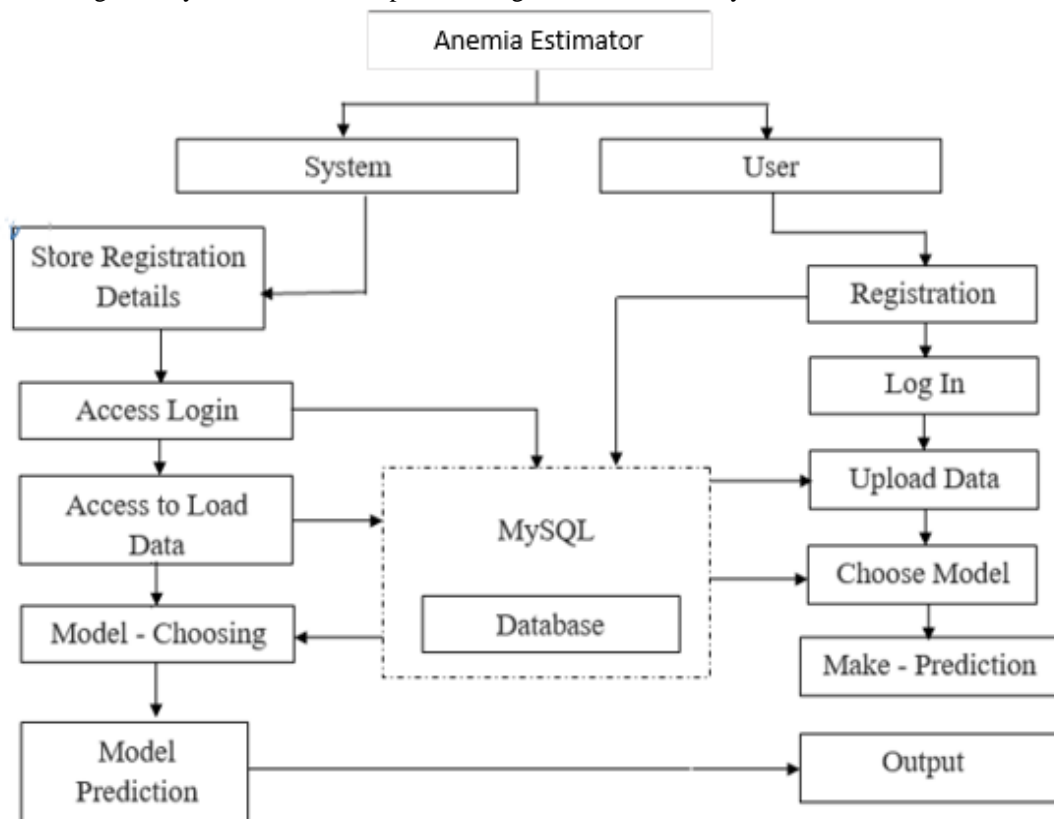


Fig-1: Application of Anemia Estimator

V. SYSTEM ARCHITECTURE:

The process to check the level of anemia has, the user should register into the page by giving his/her details in the page. These details will be stored into the systems database. The user can login to the page by giving the required details which have given while registering. Then he/she can enter the blood cells level which should check before. These data will be checked by the system and it will test and evaluate the data. After evaluation the output will be shown in the system whether, he/she has anemia or not.

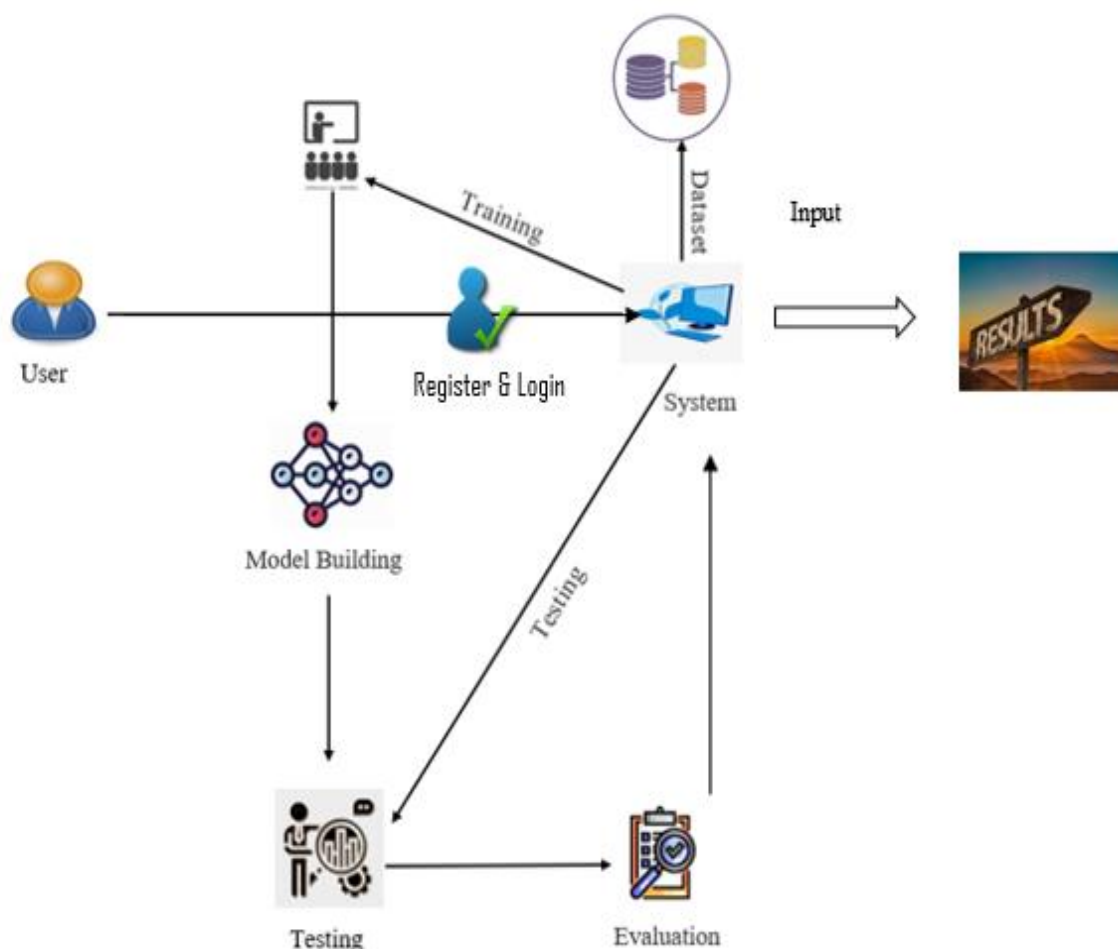


Fig -2: Architecture of Login Process Authentication

VI. IMPLEMENTATION AND RESULTS:

Here are using logistic regression algorithm, it is a calculation used to predict a binary outcome: like either something happens, or does not. This can be simply exhibited by saying yes/no, pass/fail, 0/1, alive/dead etc.

1. System side implementation

1.1 Dataset:

The system will be given with some data sets and by using with this data the system will be trained.

1.2 Split:

This dataset will be splitted into ratios where it will be given by user. Here the data will be split into two ways one is for testing purpose and the other is for training purpose.

1.3 Model training:

In model training there will be two models which is used to calculate final output. Here the user can choose one model for calculating final output.

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