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# Health Care System Using Machine Learning

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**ABSTRACT:** In this Paper one such application of machine learning algorithms is within the arena of health care. Medical facilities have to be compelled to be advanced in order that higher results for patient analysis and management choices may be created. Machine learning in health care aids the persons to method vast and multi-layered meditative datasets. Then analyze them into medical insights. This then will more be employed by doctors in as long as health care. Thus machine learning once accomplished in health care will end up in improved patient gratification. During this paper, we have a tendency to attempt to implement functionalities of machine learning in health care in a very single system. Rather than analysis, once a disease prediction is enforced victimization positive machine enlightenment predictive algorithms then health care may be created clever. Some cases can occur once early finding of a disease isn't available. Hence disease estimate may be effectively enforced. This paper in the main specialize in the expansion of a system or we have a tendency to might say an direct medical delivery which might incorporate the symptoms collected from alternative medical knowledge and store them into a care dataset.

**KEYWORDS:** Health Care, Machine Learning, Diagnosis, KNN algorithm etc

## I. INTRODUCTION

Disease prediction using patient action or treatment history and health information by applying data processing and machine learning strategies is in progress scrap for the past decades. Several works are applied data processing systems to dangerous information or medical profiles for prediction of specific diseases. These approaches tried to predict the reoccurrence of illness. Also, some strategies attempt to do.

Areas of machine learning has resolute a shift towards machine learning copies which will learn ironic, hierarchical representations of information with very little pre-processing and turn out a lot of correct results. With the event of massive information, a lot of attention has been paid to illness calculation from the perspective of massive information analysis; varied explores are showed by selecting the options mechanically from an outsized quantity of information to enhance the exactitude of risks sorting instead of the beforehand selected options. The most focus is on to use machine learning in health care to growth patient take care of higher results. Machine learning has created easier to spot totally different sicknesses and identification properly. Analytical study with facilitate the assistance of economical multiple machine learning algorithms helps to forecast the illness a lot of fitly and help delicacy patients.

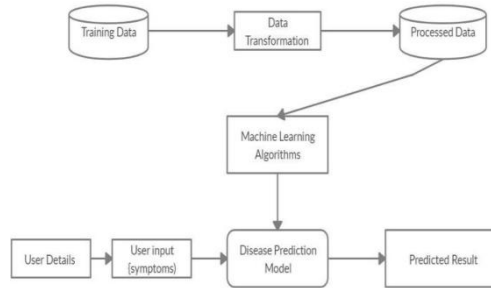
The health care trade crops massive amounts of health care information daily which will be wont to extract info for predicting illness which will happen to a patient in future whereas exploitation the conduct history and health information. This hidden material within the health care information are later used for emotional result creation for patient's health. Also, this areas want development by exploitation the informative information in health care.

One such presentation of machine learning procedures is in the field of healthcare. Medical facilities need to be advanced so that better decisions for patient analysis and treatment choices can be made. Machine learning in health care aids the humans to procedure huge and complex medical datasets and then study them into clinical insights. This then can further be used by surgeons in providing medical care. Hence machine learning when applied in health care can tips to increased patient satisfaction. The Decision tree algorithm is used to predict diseases using patient action history and health data.

## II. SYSTEM ARCHITECTURE

Disease prediction using machine learning predicts the presence of the wellness for the user based on varied symptoms and also the data the user provides like hemoglobin level and plenty of additional such general data through the symptoms. The architecture of the system disease prediction victimization machine learning carries with it varied

datasetsthroughthatwearegoingtocomparethesymptomsof the user and predicts it, then information are classified intothe smaller sets and from there it gets classified supported the classification algorithms afterward the classified knowledge is then processed into the machine learning technologiesthrough that the data gets processed and goes in to the disease prediction model using all the inputs from the user that's mentioned on top of. Then when user coming into the above data and overall processed knowledge combinesand compares within the prediction model of the system and at last predicts thedisease.



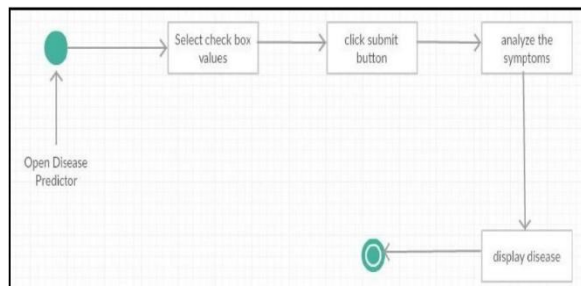
### III.EXISTING SYSTEM

Forecast using old-style disease risk model usually involves a machine learning and managed learning algorithmwhichusestrainingdatawiththelabelsforthe training of the models. High-risk and Low-risk patient classification is done in clusters test sets. This was a researched paper the authors of thisexisting project has researched, and made comparisons of a different data mining algorithms such as Naïve Bayes, J48 using for performancemeasures.Andalso comparedthe classifierson various accuracy measures. The conclusion reached of this research was that accuracy is less. For Better accuracy we have analyzed, and make it to applicationlevel.

### IV.PROPOSEDWORK

The projected system of illness prediction using machine learning is that we've used several techniques and algorithms and all different numerous tools to create a system that predicts the illness of the patient using the symptoms and by taking those symptoms we have a tendency to area unit examination with the system's dataset that's previously offered. By taking those datasets and examination with the patient's illness we are going to predict the correct proportion illness of the patient. The dataset and symptoms attend the prediction model of the system wherever the info is pre-processed for the longer term references and so the feature choice is finished by the user wherever he can enter the varied symptoms. Then the classification of these data is finished with the help of assorted algorithms and techniques like call Decision Tree, KNN etc. We are identifying a disease which a person is suffering from depending upon the symptoms he or she is suffering. Here we take symptoms from the patient and evaluate them by using algorithms such as KNN algorithm, Decision Tree .It create above 90% accuracy in the model. Steps of model building are listed below .Main goal is to identify the disease suffered by a patient depending upon the symptoms. Here we have combined both structured and unstructured data to find the overall risk analysis that is required for doing the prediction of the diseases.

FIG 4.1System Model



- i. **OBJECTIVE:** We want to predict the disease suffered by a patient depending upon the symptoms.
- ii. **TRAINING A MODEL:** This step involves selecting the suitable formula and illustrationofinformationinthestyleofthemodel.Theclean dataissplitintotwocomponents–

trainandcheck(proportion countingontheprerequisites);theprimaryhalf(trainingdata) is used for developing the model. The second half (test data), is employed as areference.

- iii. **IMPROVING THE PERFORMANCE:**This step may involve selecting a unique model altogether or introducing additional variables to enhance the potency. That’s why important quantity of your time must be spent in information assortment and preparation.

### V.LITERATUREREVIEW

Here we are going to elaborate the aspects just like the literaturesurveyoftheprojectandwhataallcomesareexisting andbeentrulyutilizedinthemarketthatthemanufacturersof this project took the inspiration from and so determined to travel ahead with the project covering with the problem statement.

### VI.METHODOLOGY

This disease prediction system is implemented by using two machine learning algorithms i.e. Decision Tree Classifier algorithm, KNN algorithm .The description and working of the algorithm are given below.

#### 1. DECISION TREE CLASSIFER ALGORITHM

The classification models built by decision tree resemble the structure of tree. By learning the series of explicit if-then rules on feature values (symptoms in our case), it breaks down the dataset into smaller and smaller subsets that results in predicting a target value (disease). A decision tree consists of the decision nodes and leaf nodes.

- **DECISION NODE:** Has two or more branches. In our work presented,allthesymptomsareconsideredasdecisionnodes.
- **LEAF NODE:** Represents the classification that is,the Decision of any branch. Here the Diseases correspond to the leafnodes.

Here we choose the frequent symptom (*High fever*) symptom as the root node after using this node as a root node. At this stage, decision tree lookslike

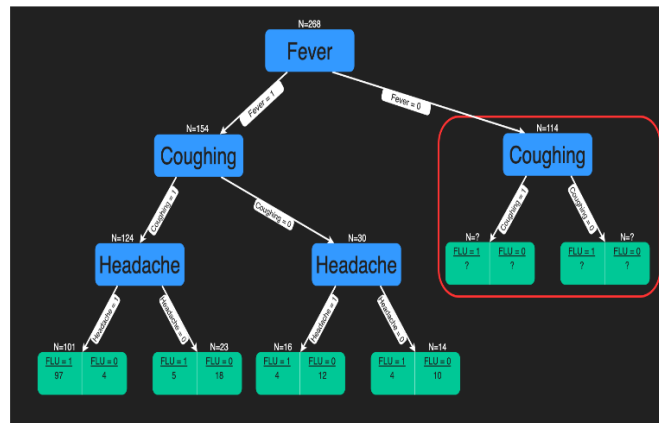


FIG 6.2 Decision Tree using Symptoms

#### 2. KNN ALGORITHM

- K-Nearest Neighbour is one amongst the best Machine Learning algorithms supported supervised Learning technique.
- K-NN rule assumes the similarity between the new case/data and accessible cases and place the new case into the class that's most like the accessible classes.
- K-NN rule stores all the accessible knowledge and classifies a replacement information supported the similarity. This implies once new knowledge seems then it is simply classified into a well suite class by using K- NNrule.
- K-NN rule is used for Regression likewise as for Classification however principally it's used for the Classification issues.

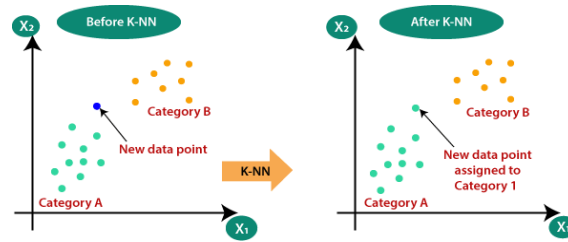


FIG.6.3 KNN example

KNN can be more effective if the training data is large and it is simple way to implement.

## VII.RESULT

The disease prediction applies the machine learning techniques using Decision tree and kNN algorithm. Here these algorithms are considered to be an easily understood model because reasoning process is given for each and every conclusion.

The performance is highly dependent on the learning techniques for trained data. Confusion matrix is very useful for the classifiers.

```

=== Confusion Matrix ===
  a  b  c  d  e  f  g  h  i  j  k  <-- classified as
10  0  0  0  1  0  0  1  0  0  0 | a = TYPHOID
 0 10  0  1  1  0  0  0  0  0  0 | b = MALARIA
 0  0 11  0  0  0  0  0  0  0  0 | c = HEART ATTACK
 0  0  0 11  0  0  0  0  1  0  0 | d = BREAST CANCER
 0  1  0  0 10  0  0  0  0  1  0 | e = COMMON COLD
 0  0  1  1  0 12  0  0  0  0  0 | f = FEVER
 2  0  0  0  0  0 10  0  0  0  0 | g = DENGUE
 0  0  0  0  1  1  0 10  0  0  0 | h = DIABETES
 0  0  0  0  0  0  1  0 10  0  0 | i = SWINE FLU
 0  0  0  0  0  0  0  1  0 10  0 | j = TUBERCULOSIS
 1  0  0  0  0  0  0  0  0  0  0 | k = HEARTT ATTACK
    
```

FIG. 7.1 Confusion Matrixes

### 1. LOGIN PAGE



This login credentials for old users (doctors)

## 2. NEW USERS

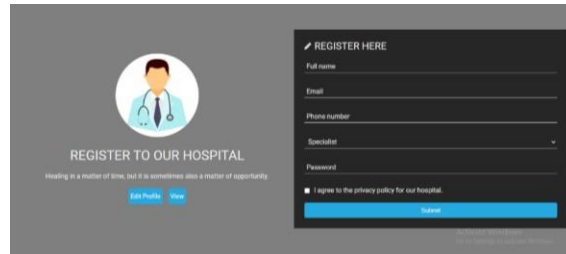


FIG.7.2 Login Page

## 3. ENTERING THE DETAIL(Basic details)

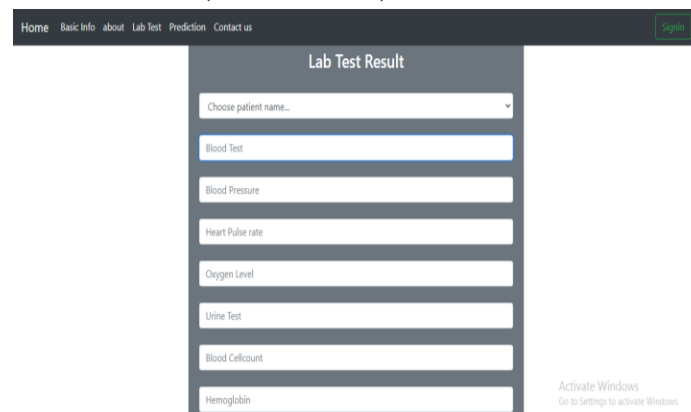


FIG.7.3 Symptoms

### ➤ Input (Symptoms)

While planning the model we've assumed that the user contains a clear plan regarding the symptoms she's experiencing. The Prediction developed considers ninety-five symptoms amidst which the user will provide the symptoms as the input.

### ➤ Information Pre-Processing

The Machine Learning technique that transforms the information or encodes the info into a type which might be simply taken by the rules is named information pre-processing. The pre-processing techniques utilized in the given work are:

- i. **Information Cleaning:** Information is clean through processes such as filling in missing value, so partitioning their consistencies within the information.
- ii. **Information Reduction:** The analysis becomes hard once dealing with vast information. Hence, we have a tendency to eliminate those independent variables (symptoms) which could have less or no impact on the target variable (disease). Within the present work, 95 of 132 symptoms closely associated with the diseases are selected.

## 4. Models Selected

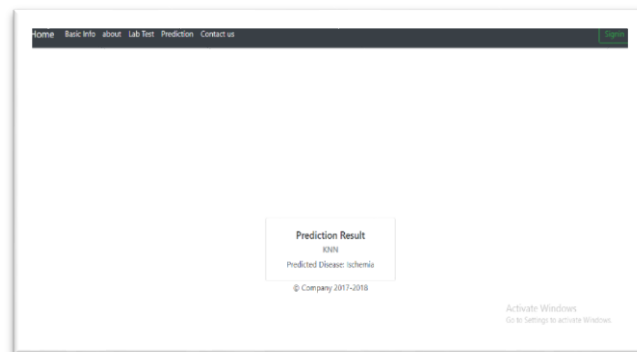
The system is trained to predict the diseases victimization 2 algorithms

- Disease Tree Classifier
- KNN algorithm

A comparative study is given at the tip of work, thus analysing the performance of every rule of the considered information.

## 5. Output(Disease)

FIG.7.5 Output



## VIII.CONCLUSION

From the historical development of machine learning and its applications in medical sector, it can be shown that systems and methodologies have been emerged that has enabled sophisticated data analysis by simple and straightforward use of machine learning algorithms. This paper presents comprehensive comparative study of two algorithms performance on a medical record each yielding an accuracy up to 95 percent. The performance is analysed through confusion matrix and accuracy score. Artificial Intelligence will play even more important role in data analysis in the future due to the availability of huge data produced and stored by the modern technology.

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