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ONLINE HEALTH WEB APPLICATION FOR DISEASE DETECTION

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ABSTRACT

In the present time we see a ton of lack of specialists on the planet particularly in India. Individuals are enduring a ton without the assistance of legitimate clinical examination. On occasion it is additionally prompting passing. To defeat this large number of issues, we executed this Application. Online Health Web Application for Disease Detection incorporates different Machine Learning Algorithms which takes datasets of different infections like heart malignant growth, intestinal sickness, and diabetic retinopathy and so on, for preparing the model. Client can pick his/her infection type in view of the side effects he/she is having. It will take the boundaries required, for example, blood classification, pee test, blood test, circulatory strain, pulse for heart disease, retina pictures for diabetic retinopathy and platelet pictures for intestinal sickness recognition and go through the model and anticipate the outcome. It isn't just needed with the illness forecast yet additionally relieving the illness on time is significant. This Application additionally proposes the best specialists who are expert to that illness and anticipate the period to spread of that illness so the patient can visit the specialist inside time. This venture is a start to finish AI project that can anticipate the possibilities getting an illness in organs like heart, retina, liver and so forth. Moreover, GUI makes the framework more intelligent and facilitates its utilization to foresee the aftereffects of illnesses.

KEYWORDS: Machine learning, disease detection, Random forest classification, Data analysis

I. INTRODUCTION

Health is vital viewpoint in everybody life. Wellbeing is an important asset to have a decent existence. It is expected by everybody to screen his/her own wellbeing. To be sound individuals invest parcel of cash and energy. The vast majority of the cash is spent on health related tests. Generally the tests are done consistently in emergency clinics by specialists. Each time we really want to search for the regular checkup. We may not get arrangement at our available energy. This makes a great deal of disarray and costs our time. This issue requires the arrangement. Well-being checking is vital regarding anticipation, especially in the event that the sickness is anticipated early, it can decrease patient torment and clinical expenses. Avoidance is superior to fix so to keep an illness from developing we want to do ordinary wellbeing exams. Counseling an appropriate doctor is likewise significant. On the off chance that legitimate specialist isn't counseled it might lead various issues. Part of elements impacts the tests at clinics.

One of the elements is specialist count. Step by step the specialist to patient proportion is getting diminished steeply. For almost 1000 patients there is just a single specialist. From this we can see that specialists count is exceptionally less contrasted with patients count. As of now, to address the issues of the patients we require an elective arrangement other than counseling the specialist for tests. Other element can be cash. Despite the fact that specialists are accessible individuals need cash to pay for the specialist. Huge amount of cash is required on the off chance that one will counsel a specialist. The greater part of individuals can't manage the cost of parcel of costs and watch out for not visit the specialist on occasion. For the most part in India parcel of individuals are poor and can't manage the cost of the expenses. To conquer the cash factor, we require a less expensive arrangement which is extremely proficient.

Parcel of different elements like reluctance or dread to counsel a specialist, time limitation, accessibility, lethargy of individuals contributes for not having customary wellbeing exams.

To conquer every one of the elements, we can accompany an internet based web application which can supplant a specialist and cost free. This application is based on top of AI calculations which gains from the datasets and gives the results more prominent precision. It is generally easy to use and accessible and all spots. It simply requires giving a few boundaries and it predicts the infection.

Observing our wellbeing from time to time is significant. It turns out to be hard every opportunity to counsel a specialist. Step by step count of infections and patients are expanding and the count of specialists is less. To beat the reliance on specialists we require different other options. The option can be building on the web applications for checking wellbeing. It will be simpler to screen the wellbeing from home by utilizing on the web applications thus, we have accompanied a web application that predicts infection. This application saves client time and can rapidly give the outcomes**.**

Brief description and contributions of proposed approach:

The proposed approach is to build an application that is used to predict various types of diseases and cancers at one place.

1. This Application comprises of deadly diseases like Malaria, Diabetic Retinopathy and Heart Disease.

2. For the sake of Malaria cell Classification we have implemented Convolutional Neural Networks (CNN) algorithm. It is one of the simple and easiest architectures we can use for a CNN. That shows us the real power of this class of methods: getting efficient results with a benchmark structure.

3. Some of the reasons why CNNs are the most practical and usually the most accurate method are:

- They can transform learning through different layers, and saving inferences, and making new ones on succeeding layers.
- There is no requirement for feature extraction before using the algorithm; it is done gradually throughout the training.
- It recognizes important features.

4. We proposed KNN Algorithm for Heart Disease Prediction.

5. Diabetic Retinopathy uses OpenCV which takes single image of retina and classify the result.

6. It also shows the list of hospitals and doctors who are specialists in curing the disease.

II. LITERATURE REVIEW

In human culture, medical services is perhaps the most critical issue, as the personal satisfaction of individuals is It depends expressly on it (Bagga and Hans, 2015). The medical care region, nonetheless, is extremely differed, comprehensively scattered, and divided. The conveyance of sufficient patient consideration from a clinical point of view expects admittance to proper patient data, seldom available

at the point when fundamental (Grimson et al., 2001; Zeebaree et al., 2019). Also, the enormous difference in the request for tests for symptomatic purposes shows the requirement for a sufficient and appropriate assortment of tests (Daniels and Schroeder, 1977; Wennberg, 1984; Zeebaree et al., 2019).

(Smellie et al., 2002) extended this case by proposing that the tremendous contrasts found in the solicitation for general practice pathology emerge essentially from individual varieties in clinical practice and are consequently prone to work on through more straightforward and better-informed decision-production for doctors (Stuart et al., 2002). Accordingly, clinical information too comprise of numerous heterogeneous factors got from different sources, for example, socioeconomics, history of ailment, meds, sensitivities, biomarkers, clinical photos, or hereditary markers, each offers an alternate incomplete perspective on the state of the patient. Too, among the sources, as referenced prior, measurable properties are in a general sense unique.

Scientists and professionals face two difficulties while dissecting such information: The scourge of dimensionality (the quantity of aspects and the quantity of tests increments dramatically in the space of the highlights) and the heterogeneity of capacity sources and factual elements (Pölsterl et al., 2016). These causes add to deferrals and errors in the conclusion of the illness and, in this manner, patients have not had the option to acquire satisfactory care. In this way, there is a solid requirement for a proper and efficient methodology that empowers early location of the infection and can be utilized as a doctor's dynamic guide (Zhuang et al., 2009). Thusly, the clinical, PC, and measurable fields face the challenge of investigating new techniques for displaying sickness forecast and determination, as ordinary standards battle to answer the entirety of this data (Huang et al., 2007). Today, ML offers numerous fundamental assets for smart information examination. Moreover, its innovation is at present all around adjusted for the investigation of clinical information. Specifically, a wide assortment of clinical indicative work has been completed on little concentrated symptomatic problems (Bargarai et al., 2020; Kononenko, 2001), where beginning ML applications have been found. ML classifiers have been effectively utilized, for instance, to separate between stable patients and those with Parkinson's illness (Sriram et al., 2016; Zebari et al., 2020), which is an important device in clinical conclusion. To be sure, on a wide scope of huge issues, most ML calculations perform great.

With the unrest of the clinical framework in the New Year's, the shrewd medical services framework has been given more extensive consideration [1]. Brilliant medical care is a clever idea that alludes to a bunch of decides that incorporate avoidance, finding, therapy, and the executives. Not quite the same as customary clinical frameworks, brilliant clinical frameworks can associate and trade data whenever and place [2].

Contrasted and conventional clinical treatment, shrewd medical care has the attributes of preventability, quickness, and interconnection of data. Through remote organization, utilizing versatile cell phones, clinical staff can continually see, process, and examine significant clinical occasions (preventability). Specialists can get a handle on the case data of every patient whenever and immediately foster a determination and treatment plan (promptness). Clinical staff can sign in the clinical framework anyplace to ask about clinical pictures and clinical guidance and patient's reference data can be gotten to at any medical clinic through the clinical organization (interconnection of data). These capacities are upheld by new advanced innovations. BC observes outright protection guidelines to distinguish clients connected with exchanges. It is principally utilized for the administration of data frameworks to assist with accomplishing secure capacity, exchanges, process robotization, and different applications [3]. ML is the main innovation for performing complex investigation, clever judgment, and imaginative critical thinking in medical services [4].

For the most part, past investigations connected with use of computerized advancements in brilliant medical services area were restricted to study in one field or one country. No investigations have planned the present status of these two advancements in the clinical field. Additionally, there is no overall review that explicitly addresses the connection between creators, affiliations, watchwords, and the hotpots of the examination. In the beyond five years, the investigation of brilliant medical care has drawn in broad consideration from researchers of a progression of disciplines, which expects us to incorporate the perspectives of researchers of various trains and study the status to look for more profound disclosures.

Consequently, this exploration proposed depicting the situation with use of two kinds of advanced innovations, ML and BC, in savvy medical services concentrates by bibliometric representation. In this paper, we have introduced a far reaching audit on the use of ML and BL procedures in the medical care area. We dissect the examination status with regards to nations, establishments, distribution volume, creators, diaries, patrons, and branches of knowledge. Likewise, this paper partitions the primary application situations of the earlier craftsmanship in the clinical field. Our exploration will give medical services experts an understanding to keep ML and BC advancements completely used. At long last, we break down the most recent examination patterns in light of ML and BC innovation to give an exploration bearing to future exploration.

III. PROPOSED SYSTEM

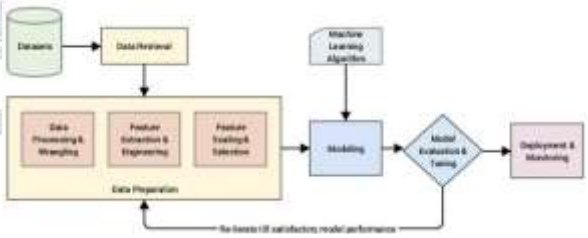

Figure – 1 Proposed System

FLOW DIAGRAM

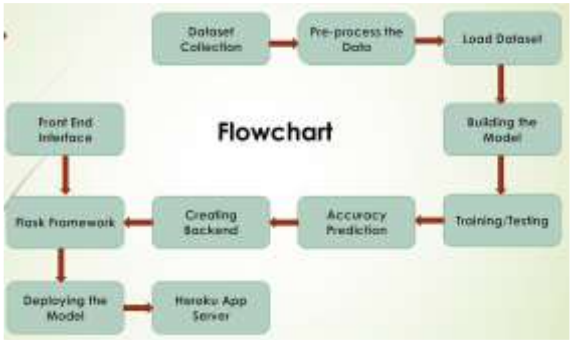

Figure – 2 Flow Diagram

The following are the set of attributes in the dataset:

Column Name	Description
age	Patient's age
sex	Patient's gender
cp	Chest pain type (4 values)
trestbps	Resting blood pressure
chol	Serum cholesterol in mg/dl
fbs	fasting blood sugar > 120 mg/dl
restecg	resting electrocardiographic results (values 0,1,2)
thalach	maximum heart rate achieved
exang	exercise induced angina
oldpeak	ST depression induced by exercise relative to rest
slope	the slope of the peak exercise ST segment
ca	number of major vessels (0-3) colored by flourosopy
thal	3 = normal; 6 = fixed defect; 7 = reversable defect
target	1 = affected; 0 = not affected

PROPOSED MODULES

PATIENT

This module will contain all the information of the patients who are having symptoms of various diseases such as Heart Disease, Diabetic Retinopathy, Malaria etc.,

KNN/CNN

This module is trained based on patients' data. The model will get trained from the previous data and is used to detect the disease of the patient. 18

DISEASE DETECTION SYSTEM

This module includes taking the data of patient based on symptoms of the disease and the data is given to the trained model. This module will detect whether suffering with the disease is or not.

CLASSIFICATION REPORT

This module will classify the patient's input data and analyze the performance of KNN and CNN models.

PATIENT'S REPORT

This module reports whether the patient is suffering from that disease or not.

LIBRARIES USED

• Before loading the data, we must import different libraries. Firstly, we must go to the notebook settings in Google Colabs and select GPU and connect it.

• The libraries need to be imported are such as keras, matplotlib.pyplot, NumPy, OpenCV and seaborn.

• After importing the modules, we must press SHIFT+ENTER button and click on play button and then select Run the focused cell button, hence required libraries gets imported on our project in Google Colabs.

TENSORFLOW

• We import TensorFlow module as tf.

• In general, TensorFlow is an open-source software library for high performance numerical computation. Its flexible architecture allows easy deployment of computation across a variety of platforms.

• While making a neural network which is to be trained on heart disease and malaria cell classification dataset, we need to import this TensorFlow library. After importing this TensorFlow library, matplotlib.pylot is imported.

• TensorFlow module is used to load data. It is a computational library consisting of math functions based on dataflow.

• We can obtain the images by, (train_images,train_labels), (test_images, test_labels) = tf.keras.datasets.heartdisease.load_data()

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KERAS LIBRARY

• By importing Keras library we able to load the data set.

• In this way, we can download the sets by importing the keras library. We can also know the shapes of the data by using .shape command.

Ex :(X_train,y_train),(X_test,y_test)=keras.datasets.heart_disease.load_data()

Then the data sets are loaded then by using X_train.shape,y_train we can get the shape as ((6000, 28, 28)),(10000,)) format.

• To add different layers like convolutional layer, Max pooling layer sequentially we use the following command:

Ex: models=kerals.models.sequential([required parameters])

Inside the square brackets we need to add those different layers.

• After building the model, the commands model.summary() is used to know the summary of the model. model.compile() for compilation and model.fit() to train the model.

MAT.LIB LIBRARY

• Matplotlib is a widely used Python data visualization library. Its syntax might be tedious in some cases, but it provides a great deal of control over the plots.

• Matplotlib.pyplot is a collection of functions that make matplotlib work MATLAB. Each pyplot function makes some change to a figure e.g., creates a figure, creates a plotting area in a figure, plots some lines in a plotting area, decorates the plot with labels.

SKLEARN LIBRARY

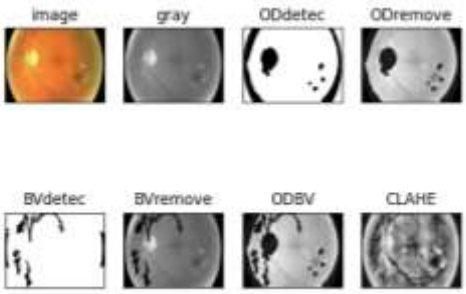
• Using sklearn.metrics library we developed Confusion Matrix and Classification Report.

NUMPY LIBRARY

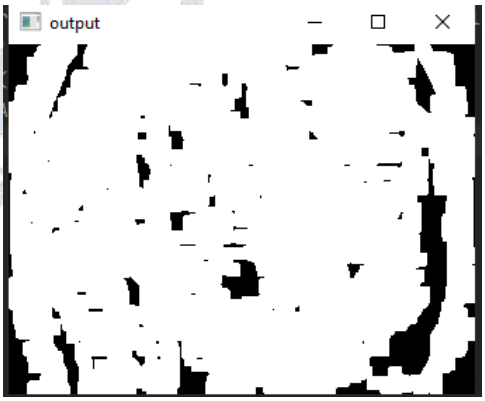
• NumPy is a simple but low-level library for scientific computing which contains a powerful n-dimensional array object.

RESULTS

We have create two files one named ddr.py and another one named as MA.py and in ddr.py file we write a code in such a way that we take input as an image which will be loaded into our code and observed and then we get the output after running the ddr.py file as follows**:**



When we look at the first image which we can see in the above is the input which we have given to our model and then after giving input image of our retina to our training model it classifies the image into grayscale, ODdetec, ODremove, BVdetec, BVremove, ODBV and CLAHE ,all these are derived from our input image and we can see the black spots in the ODdetec which means Optic detection and then the output of this entire image is saved as another jpg format and this image needs to be loaded into our another file named MA.py. After loading the output array of image into MA.py we train the model and test it to detect if the patient is having diabetes.

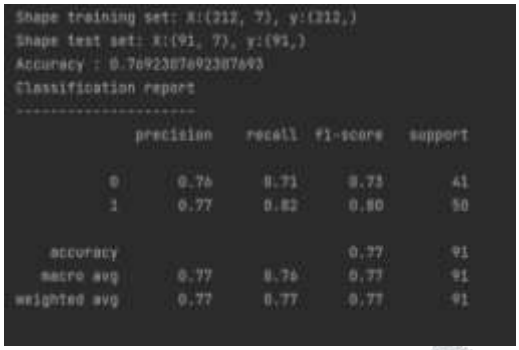


This is the output for our array of output image loaded into MA.py; now from above output we can notice the dark spots appearing in the middle, the more amounts of dark spots indicates that the patient is having higher levels of diabetes.

Similarly we have also worked on heart disease accuracy by collecting a heart.csv dataset from kaggle and then we have trained our model to detect the

accuracy for predicting that a patient has heart disease or not from the dataset collected.

From the training dataset collected we are getting accuracy as follows:



```
Shape training set: X:(212, 7), y:(212,)
Shape test set: X:(91, 7), y:(91,)
Accuracy : 0.7692307692307693
Classification report
----------------------
              precision    recall  f1-score   support

           0       0.76      0.71      0.73        41
           1       0.77      0.82      0.80        50

    accuracy                           0.77        91
   macro avg       0.77      0.76      0.77        91
weighted avg       0.77      0.77      0.77        91
```

We are getting an accuracy of 76.9% which is approximate to 77%, we can also increase our performance by training our model by importing many other datasets so that more accuracy helps in greater results.

CONCLUSION

This paper is an end-to-end Machine Learning project that can predict the chances of getting a disease like diabetic retinopathy, malaria, and heart disease. It is not only required with the prediction, but it is important to cure the disease on time at right place. Additionally, GUI makes the system more interactive and eases its usage predict the results of diseases. This application also suggests the best doctors who are specialist for that disease.

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