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A Deep Learning Model for Human Multiple Disease Prediction Using VGG16

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Abstract: In present situation human being is facing many health issues, these problems must be exactly examine without any compromising. In the condition of contrary disorder, the common procedure of analysis might not be tolerable. Diagnosis of disease in early stage of any health issues is significant; as the disease determines earlier may result is more effective treatment or extensive persistence time.

In the past decade, the operation of particular disease prediction implement combined with the regarding health has been magnified because of a range of disease and fewer doctor- patient magnitude relation. Prediction of disease with an accuracy can be done through by using machine learning algorithms like CNN, SVM, Random forest algorithm etc but VGG16 will give more accuracy compare to other algorithm. This paper, we are using VGG16 for more accuracy of above 90%. The system has unbelievable potential in forestalling the possible diseases more exactly.

Keywords: VGG16 (Visual Group Geometry), Covid-19, viral pneumonia, brain tumour, Kidney Stone

I. INTRODUCTION

Using VGG16 to introduce human multiple diseases is an interesting approach. VGG16 is a convolutional neural network (CNN) that is commonly used for image recognition tasks. It consists of 16 layers and has been trained on large datasets such as ImageNet. To use VGG16 for multiple disease recognition, medical images such as X-rays, CT scans, or MRIs could be used as inputs to the network. The images would need to be pre-processed and resized to the appropriate dimensions before being passed through the VGG16 model. The output of the model could then be used to classify the images according to the presence of multiple diseases. This could be achieved by training the model on a dataset of medical images that have been labelled with multiple disease categories. Once trained, the model could be used to predict the presence of multiple diseases in new medical images. This approach has the potential to be a valuable tool in medical diagnosis and treatment, as it could help healthcare providers identify and manage multiple diseases in patients more effectively. However, it would require a large dataset of labelled medical images and careful validation to ensure that the model is accurate and reliable in its predictions.

II. RELATED WORK

This paper reviews studies of some of the journal papers, these papers are done related to the prediction of disease using machine learning algorithm. Md.Ehtisham Farooqui et al, [1] proposed a disease prediction System Using Support Vector Machine and Multilinear Regression, this paper use MLR and SVM techniques to predict the most possible disease with high accuracy up to 87% for some disease and minimum accuracy 67% for some other disease. This paper predict accuracy for five different diseases like Maleriya, Dengue, Fileria, Covid-19, Normal Flue. Marouane Fethi Ferjani et al, [2] proposed Disease Prediction Using Machine Learning, this paper uses SVM, RF and LR algorithms for accuracy. SVM gives high accuracy for kidney disease, RF gives high accuracy for Breast cancer, LR algorithm gives high accuracy for heart disease, CNN gives high accuracy for common disease.

Rudra A.Godse et al, [3] proposed Multiple Disease Prediction Using Different Machine Learning Algorithms Comparatively, this paper uses KNN, SVM, Decision Tree, Naïve Bayes algorithms the main aimof this paper is to build bridge gap between Doctors and patients, which supports the multiple sickness. Akkem Yaganteeswarudu et al, [4] proposed Multiple Disease Prediction Model by Using Machine Learning and Flask API, this paper uses Flask API technique for prediction which gives high accuracy for some disease like Lipoprotein, Diabeties, Triglycerides. Patient can give disease input it will predict the particular disease. K.Arumugam et al, [5]proposed Multiple Disease prediction using machine learning algorithms, this paper uses Data mining, Decision tree, Naïve bayes, SVM algorithms. Heart disease, Diabetes are the diseases are predicted Decision tree algorithm which gives more accuracy than other algorithm Navie bayes which shows error rate in classification of results for disease prediction.

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Abhishek Singh et al[6] proposed Prediction and Analysis of multiple disease using Machine Learning Techniques, this paper uses K-Nearest Neighbors algorithm, Support vector Machine, Random Forest, Decision Tree algorithm, the main purpose of this paper is to analyzing and designing the system, patients can acess the real time information and evaluated based on the previous symptoms. Dhiraj Dahiwade et al, [7] proposed Designing Disease Prediction Model Using Machine Approach, this paper uses convolutional Neural Network machine learning algorithm, K-Nearest Neighbor algorithm. By using the patient data algorithms are applied on the symptoms which gives an accuracy, where among the CNN and KNN CNN algorithm have more accuracy than KNN, but time is require for the classification. Divya Mandem et al, [8] proposed Multiple Disease Prediction System, this paper uses Random Forest algorithm and Convolutional Neural Network algorithm for prediction of diseases. In this paper worked on some of the disease like diabetes, Breast Cancer, Heart disease, Kidney disease, Liver disease, pneumonia, malaria. Diabetes reaches accuracy up to 98.25%, Breast cancer reach accuracy up to 98.25%, Heart disease reach accuracy up to 85.25%, Kidney disease reach accuracy up to 99%, Liver disease reach accuracy up to 78%, Malaria reach accuracy up to 95%, Pneumonia reach accuracy up to 95%

III. METHODOLOGY

The main objective of the research project is to predict and analyse particular diseases like Covid-19, viral pneumonia, brain tumour, kidney stone by using VGG16 algorithm (Visual Group Algorithm).

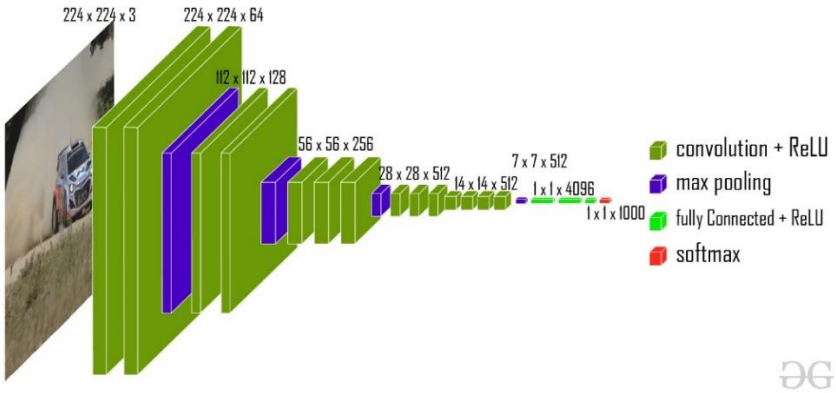

Fig. 1 resize of image using VGG16

In this research VGG16 algorithm is used when the image is undergone to the process by VGG 16, it takes inputs and resize the image into 224*224*3(height, width, RGB), until entry of max pooling the image is resized into same height and width when it enters height and width will reduce of the previous one. There is three fully Connected layer which have 4096 channels, fully connected channel also contains softmax which is finally reduce to 1000 channels

In this research paper, uses two method one is training and other one is prediction.

A. Training

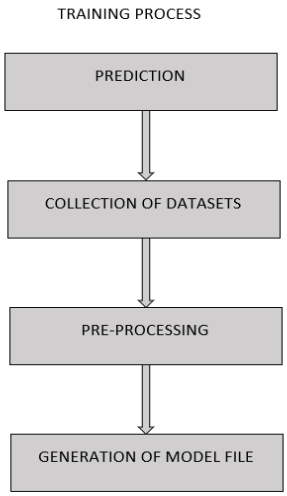

Fig.2 Stages of training the datasets

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In this method collecting the dataset from the patient and it undergone to the pre-processing, in pre-processing making the raw data into suitable for building and training the machine learning models (which means converting the raw data into numeric data and encoding it to column vector with binary values where machine can understand easily) and it also taking consideration of missing values After the completion of pre-processing stage model file is created which contains the whole summary of trained data sets, manipulation and gathering data elements to return useful, potentially valuable information, then it is ready for the prediction of disease.

The figure 2 shows the process involve in the dataset training and figure 3and 4 shows the graph of the training process for dataset. Graph of Accuracy VS Epoch which indicates the Accuracy and Validation accuracy which must be high compare to the loss and Validation loss of the model. By this we can conclude datasets are trained correctly. If need high accuracy of the disease prediction data must be trained correctly loss and validation loss should be less.

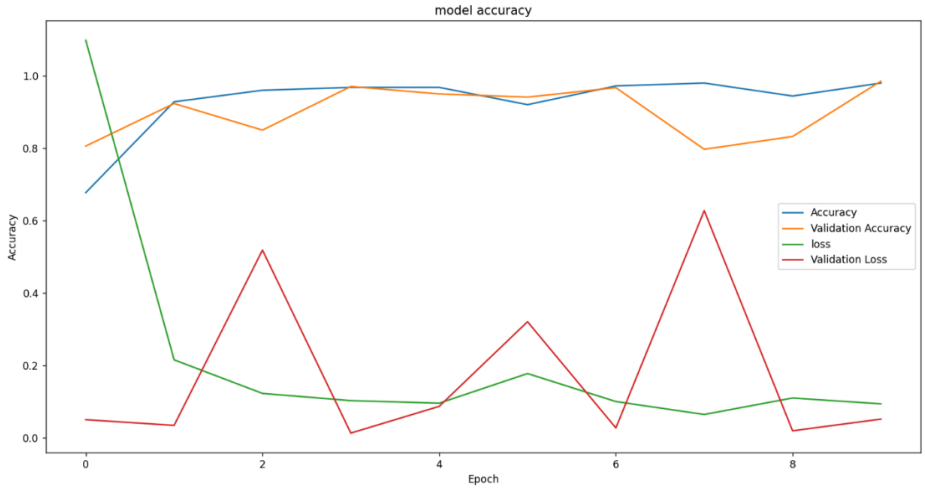

Fig.3 Model accuracy graph of training process for Covid and Viral pneumonia

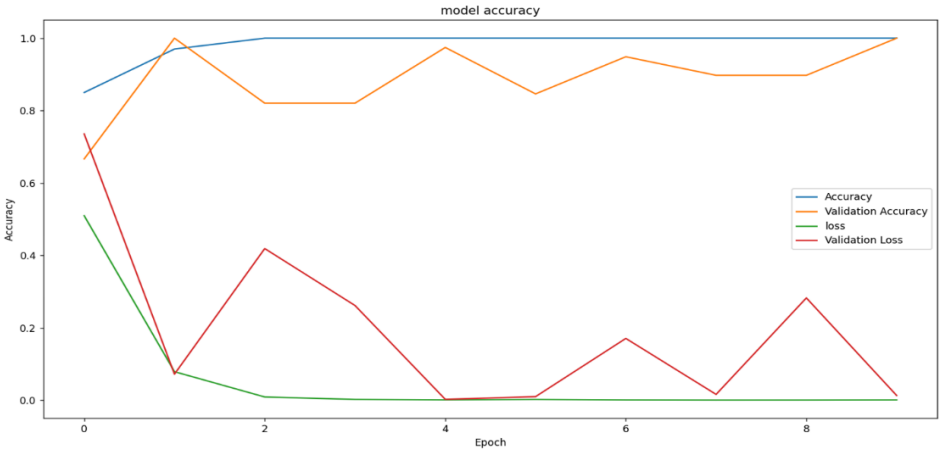

Fig.4 Model accuracy graph of training process for Brain tumour and kidney stone

B. PREDICTION

In this method, model file is used to predict the disease from the training method. Same as training method firstly make sure that model is available for prediction and well trained. Then next step is to build the production workflow that process of incoming data and predicts the symptoms. Finally measures the accuracy of disease that the patient would get predicted. On the basis of prediction, Doctor will get know the what treatment would be provide to the patients with the help of Visual Group Geometry16 algorithm we can get high accuracy above 90%, where the accuracy of the data set increases loss and validation loss would be decrease which helps the lab technicians to predict that patient is suffered for which disease. Prediction can be done through trained datasets from Training process

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IV. RESULTS AND ANALYSIS

For the given dataset, the proposed system which predict the disease and also with the accuracy, VGG16 works on the given data set reaches the possible accuracy for kidney disease, brain tumour, viral pneumonia, Covid-19.

Fig 5 prediction of kidney disease

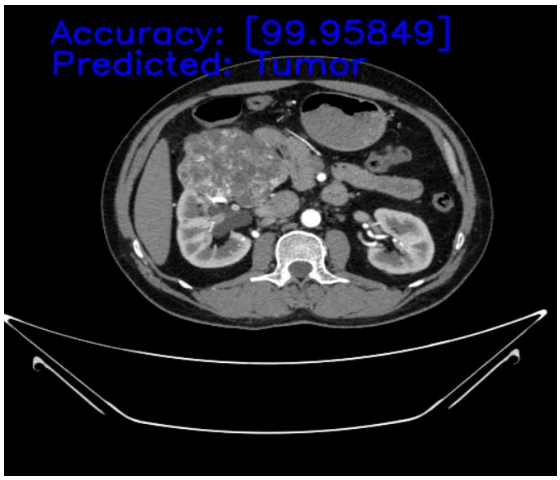

Fig 6 Prediction of Brain tumour

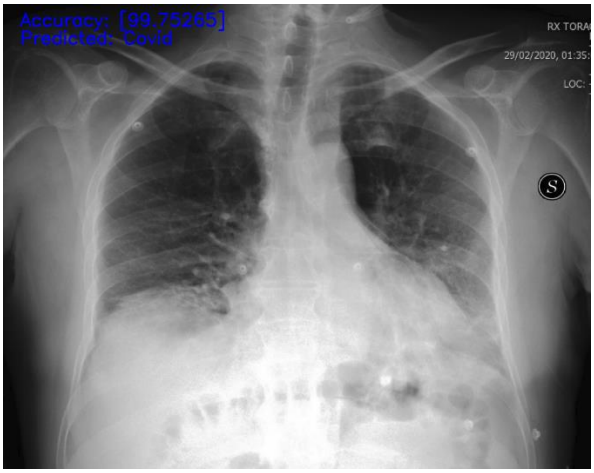

Fig 6 Prediction of Covid

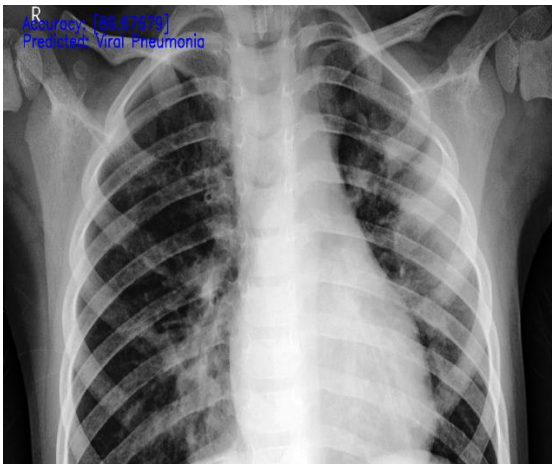

Fig 7 Prediction of viral pneumonia

VGG16 algorithm which gives 99.99% accuracy for kidney disease, 99.95% accuracy for brain tumour, 99.7 % accuracy for covid and 89.67% accuracy for viral pneumonia. Compare to CNN, KNN, Random forest algorithm, Decision tree algorithm, Support Vector Algorithm. VGG16 is better than other algorithm

V. CONCLUSION

In this medical field, the existing system have accuracy for some disease but VGG16 has a better accuracy of prediction of diseases. By the proposed system one thing we can conclude that patient need not traverse to multiple websites for different disease prediction, it is a cost effective and accurate compare other ML algorithm. From this death rate can be decrease by knowing the disease in early stage and time saving

VI. FUTURE SCOPE

In future this project will work for next step of VGG16 that is VGG19 which give high accuracy for multiple disease and predict the which treatment can be suggested for the patients which help them to save the money. Adding more diseases for the prediction of disease by using VGG16 or VGG19

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