

Indian Currency Detection for Blind People with VGG16

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Abstract - In spite of the immense use of master cards and other electronic modes of payment, there has not been any kind of reduction in the use of money for ordinary exchanges owing to the ease and convenience factor. This exchange of money poses a serious problem to the visually impaired people who are unable to identify the different currency notes. This is because every currency note has the same feel without any brail markings on it. In this project we aim to provide a vision [1]-based framework that is responsible for detecting and recognizing the Indian currency notes. There are a lot of drawbacks in the existing system and hence our proposed system will extract attributes from bank notes using deep learning algorithm. A Convolutional Neural Network (CNN) is basically a Deep Learning algorithm that can take an input image of the banknote and it can assign importance (learnable weights) to different objects of the image and thus it will be able to differentiate one currency note from the other.[3] The existing system uses Alex Net which can only extract less features. The model used in our project is VGG16 which has the capability of extracting deep features from the currency notes. The proposed system can help blinds to even recognize the currency notes that have been worn out with its continuous usage over a period of time. Our proposed system can help classifying notes with a greater efficiency of 99.07%. This system helps to curtail the number of frauds happening with visually impaired in the country and thereby reducing their dependency on others.

Index Terms - Currency Detection, VGG16, Indian Currency, Currency Notes

1.INTRODUCTION

According to the latest surveys, there exists a large population of visually impaired in our country and this proportion is increasing. [5] In everyone lakh individuals, a total of one hundred and sixty-five people is visually impaired. It was estimated that visually impaired are eighty two percent and eighteen percent are people with low vision. In this project work, we are applying convolutional neural networks

that uses deep learning algorithm and VGG16 model in order to help blinds in the detection of currency notes. It is a well-known fact that an important aspect of our life is monetary transactions. [3] Every nation has a different currency layout and value. The different colouring on the notes, denominations and the global value is preserved by each individual nation.[2] Particularly the category of people who suffer during cash are mostly visually impaired. They are unable to differentiate one denomination from the other and hence they get betrayed by many frauds. In the earlier systems to recognize the currency, we had to speak to an application and this categorizes the denominations using the application and it provides the in the form of sound. The issue with this system was that the blinds were unable to see paper monetary forms and because of the worn-out condition of the notes due to its continuous usage. Consequently, the present vision-based framework is able to take care of this issue and help blinds to feel safe and take care of their financial issues. In the present day, there are many learning models that have the picture preparing model for Indian based notes and could make the process very quick and providing the correct exactness. These learning procedures are mainly used in applications for picture acknowledgement. [4] The Convolution Neural Network is one among such system that is used in the case for picture recognition. In order to increase the accuracy, the learning methods can be trained on a large number of data comprising of around many images of different denomination of notes. The different denominations of Indian current that will be recognized are notes of 10,20,50,100,500 and 2000 rupees. Images will be taken from different angles and a large number of features will be extracted from the images and these features will be used for classification of different notes. The rest of the paper is organised in the following way:

2 OBJECTIVES

The objectives which are considered for this research work are as follows:

The most important objective of this project is to help the visually impaired people residing in the country to be able to recognize the different Indian currency notes using image processing techniques. This will make their life simpler and better improve their quality and standard of living by reducing their dependency on other individuals and thereby taking care of their financial issues.

The existing system has a lot of drawbacks and it extracts less features from the images. Our proposed system uses deep learning algorithm which provides better accuracy in recognition and has the capability of extracting more features.

Our proposed system uses VGG16 model that can even recognize currencies that are partially visible, folded, worn out or wrinkled by continuous usage over a period of time.

In this paper, Indian currency is trained to be detected using very simple image processing technique which makes the processing time very short and with better accuracy.

3. RELATED WORK

This section deals with the literature works:

1)Computer Vision: This system recognizes currency notes based on the computer vision. The writers used the approach for recognize our different currencies using feature extraction of the different currency notes from images. The important features that were considered are the texture, color and forms. Artificial Neural Network was used

for the classification purpose. The average level of accuracy that was achieved using this system was 93.8%.

2)SIFT Algorithm: The team made a visually impaired transferable currency detection mechanism and they used currency of Jordan for their test dataset. The system is developed on the basis of invariant transform function (SIFT) scale. The accuracy level achieved for currency notes was 71% and it was 25% for coin type of currency.

3)Radial Basis Function Network: The writer along with his team has made a portable currency detection mechanism and it has been tested on currency of Saudi Arabia. The currency notes were detected using the pictorial features from the currencies and interrelationship between two images of the same

currencies. Radial Basis Function Network has been used for classification. The system is 95.3% accurate for normal and non-tilted images and 87.2% accurate for tilted images.

4)Image Processing: A team has proposed a mechanism for the detection of currencies using Image Processing techniques. Initially images of the Egyptian currencies were taken and these images were segmented. The essential features from these images were extracted and then images were matched based on template and the interrelationship between the images taken and the dataset helped to classify the currencies. This system achieved an accuracy level of 89%.

5)Matching Template: An algorithm was designed by a team that helps to recognize currency of different nations. The algorithm uses the different currency note size and the multi template correlation matching values to detect the currencies. An accuracy level of 100% was achieved in recognizing the currencies of five different nations.

4 METHODOLOGY

In this part we will understand how the methodology we have adopted to improve the detecting of Indian currency here is a block diagram to illustrate the proposed system

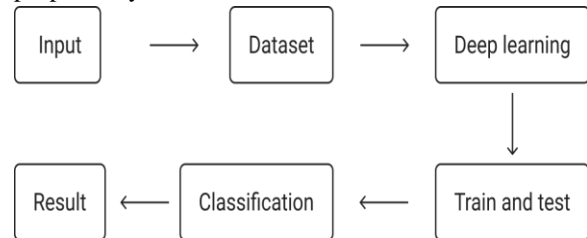


Figure 1: Block diagram of our proposed system

4.1 Block Diagram Description

This project mainly contains 4 parts:

4.1.1 Input

The input is given in the form of image where the user takes an image and upload in the system with help of cable or cloud transferring it is sent to the system

4.1.2 Data

The dataset is a collection of different types of notes in the form of image taken at different to improve the training sets and obtain better training result

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4.1.4 Deep Learning

It Helps to develop the knowledge of what human naturally learns which helps in processing and the predicting an output which helps to find greater result

4.1.5 Train and Test

We have trained the dataset which help to get better accuracy with better sets of data and with the help of testing we how accurate our system we achieve and understand we failed to train our data

4.1.6 Classification

We used to classify the kinds of notes we have in the dataset like 10,20,50,100,500,200,2000. Which helps to classify the current note we detected

VGG16 is an CNN model Architecture which is easy to implement and used in different to classify different images but currently required a lot of memory but it is a desirable model

5. SOFTWARE CONFIGURATION

In the proposed system there are some necessary software tools required for the system. Which were Python IDLE and python libraries

6. EXPERIMENTAL RESULTS

The result of proposed system has been significant the aim of this project was to achieve better accuracy of the detection and with the help of VGG16 CNN model architecture this result was quite impressive and below are the accuracy details in the table and graph of the output detected from training model

No. of Iterations(epoch)	Accuracy
5	95.44
10	96.34
15	97.67
20	99.22

Figure 2: Result of Proposed System

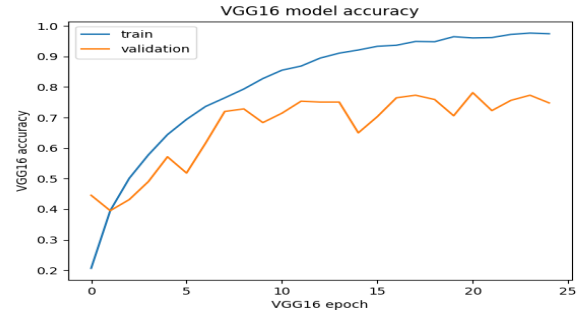


Figure 3 VGG16 Accuracy Graph

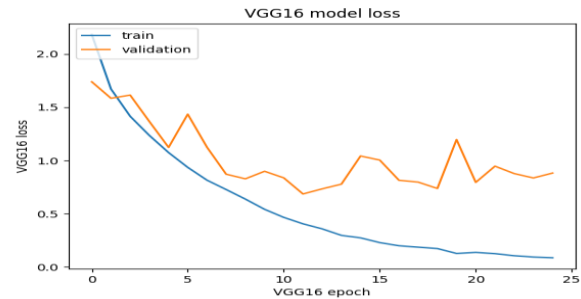


Figure 4 VGG Model Loss

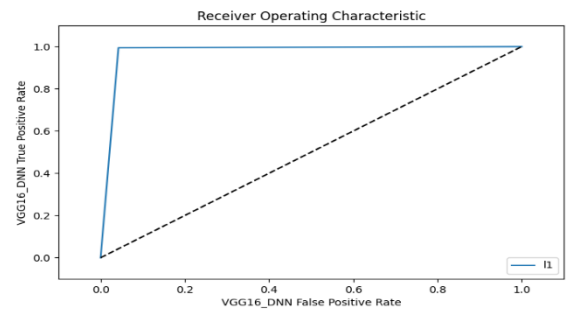


Figure 5: Receiver Operating Characteristics



Figure 6 VGG16 Model Confusion Matrix

7. CONCLUSION

Our Proposed System was successfully achieved the desired output and fulfil all the vision of why we were creating the project this project has completed the main objective i.e., to improve the accuracy of the existing system with the help of VGG16.

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