IOSR Journal of Engineering (IOSR JEN) **www.iosrjen.org**
ISSN (e): 2250-3021, ISSN (p): 2278-8719
PP 38-41

Currency Converter Using Computer Vision

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Abstract: *Whenever we travel abroad and think about going to purchase any merchandise, we always have to convert the foreign currency value to that of the current rupee value.The following can be implemented using various currency converter apps or google itself but using computer vision the user has to just flash the merchandise tag in front of the camera and the price conversion would be automatic in front of the user on the very same screen.For the development of the application we divided the application into different modules where every module has its own functionality and independence .The application includes information about currency rates and the after result of the converted currency as well. To perfectly implement the app we will have to use Computer vision and AR technology*

I. Introduction

Using the computer vision technology we will implement an application which will help us recognize an integer value or a float value in the real world which could be in the form of price tags of a merchandise or could be the prices of food items on a menu card. The application will not only identify the numerical values but will also convert them into the desired currency i.e. USD, EURO, POUND, etc.

II. Computer Vision Technology

Computer vision is an interdisciplinary field that deals with how computers can be made to gain high-level understanding from digital images or videos. From the perspective of engineering, it seeks to automate tasks that the human visual system can do.Computer vision tasks include methods for acquiring, processing, analyzing and understanding digital images, and extraction of high-dimensional data from the real world in order to produce numerical or symbolic information, e.g., in the forms of decisions. Understanding in this context means the transformation of visual images (the input of the retina) into descriptions of the world that can interface with other thought processes and elicit appropriate action.

III. Related Work

The database used in recommendation phase is stored with data from the prediction algorithm and data from user college data is stored .The recommendation of data is done in reference with [3].The recommendation of data based on various factors such as caste ,location, marks and fees is shown in reference [7].Based on various factors the colleges are recommended using various data mining operations or operations such as join ,grouping and aggregation which is mentioned in reference [8] and [9].

IV. Literature Review

"The Employment Effects of High-Technology: A Case Study of Machine Vision." Authors: Chen, Kan and Frank P. Stafford

A case study of machine vision was conducted to identify and analyze the employment effects of high technology in general. (Machine vision is the automatic acquisition and analysis of an image to obtain desired information for use in controlling an industrial activity, such as the visual sensor system that gives eyes to a robot.) Machine vision as a new industry has taken off on an exponential rise. The total employment in the machine vision industry has been growing rapidly and will continue to increase. A large portion of the jobs have been taken by highly trained technical people. However, as the process becomes more standardized, blue-collar workers with additional training will be able to fill some of the jobs. The United States leads the world in

the development of machine vision. It is expected that this industry may help lessen the number of imports coming into the United States and the amount of labor-intensive manufacturing leaving the country.

"A critical look at robot vision."
Authors: Braggins Don

In this system the have used camera instead of sensors for capturing images to process it further. Next step is Image Processing which contains removal of unwanted noise, adjusting brightness and contrast of the image. In this process contains image enhancement, segmentation and color filtering process. Noise present in the image is removed by using morphological operations such as Erosion and Dilation. They have used thresholding process to convert the image into binary format. Hull algorithm which can detect finger point and the number. Also it contains preliminary handling of the images so the noise decreases of the input and recognition can be done by matching the templates in the dataset

"Computer vision applications."
Authors: Grimson, W.E.L. and J.L. Mundy

Computer vision provides a primary method for understanding how to make intelligent decisions about an environment, on the basis of sensory inputs. Vision systems only receive measurements of reflected brightness as input. Image brightness is not generally independent, and the goal of computer vision is to determine sufficient additional constraints to invert brightness into scene parameters. One class of methods achieves inversion by fixing some scene parameters. A 2nd class of methods achieves inversion by restricting the problem domain. A 3rd class achieves inversion by acquiring additional images. In general, vision methods seek to extract scene parameters, such as surface material type and object shape from image brightness, and to use such extracted parameters to match against known-object models to support tasks such as recognition. While general-purpose vision systems remain an area of active research, considerable progress in limited domains such as those listed has led to a number of areas of successful application.

"Augmented Reality Meets Computer Vision Efficient Data Generation for Urban Driving Scenes."
Authors : Hassan Abu Alhaija, Siva KarthikMustikovela

The success of deep learning in computer vision is based on the availability of large annotated datasets. To lower the need for hand labeled images, virtually rendered 3D worlds have recently gained popularity. Unfortunately, creating realistic 3D content is challenging on its own and requires significant human effort. In this work, we propose an alternative paradigm which combines real and synthetic data for learning semantic instance segmentation and object detection models. Exploiting the fact that not all aspects of the scene are equally important for this task, we propose to augment real-world imagery with virtual objects of the target category. Capturing real-world images at large scale is easy and cheap, and directly provides real background appearances without the need for creating complex 3D models of the environment.
We present an efficient procedure to augment these images with virtual objects.

"Very Deep Convolutional NetworksFor Large-Scale Image Recognition." Authors : Karen Simonyan

In this work we investigate the effect of the convolutional network depth on its accuracy in the large-scale image recognition setting. Our main contribution is a thorough evaluation of networks of increasing depth using an architecture with very small (3×3) convolution filters, which shows that a significant improvement on the prior-art configurations can be achieved by pushing the depth to 16–19 weight layers. These findings were the basis of our ImageNet Challenge 2014 submission, where our team secured the first and the second places in the localisation and classification tracks respectively. We also show that our representations generalise well to other datasets, where they achieve state-of-the-art results. We have made our two best-performing ConvNet models publicly available to facilitate further research on the use of deep visual representations in computer vision.

"Vision-based Hand Gesture Recognition for Human-Computer Interaction." Authors : X. Zabulis, H. Baltzakis, A. Argyros

In this paper, we focus our attention to vision-based recognition of hand gestures. The first part of the paper provides an overview of the current state of the art regarding the recognition of hand gestures as these are observed and recorded by typical video cameras. In order to make the review of the related literature tractable, this paper does not discuss techniques that are based on cameras operating beyond the visible spectrum (e.g. thermal cameras, etc).

The second part of the paper presents a specific approach taken to gesture recognition intended to support natural interaction with autonomous robots that guide visitors in museums and exhibition centres. The

proposed gesture recognition system builds on a probabilistic framework that allows the utilization of multiple information cues to efficiently detect image regions that belong to human hands.

"A New Feedback-Based Method for Parameter Adaptation in Image Processing Routines." Author :Ariful Maula Khan, Ralf Mikut, Markus Reischl

Image processing seeks to find, quantify and classify objects accurately in an image. It is being used in a variety of different application fields such as remote sensing, object detection and classification in manufacturing and data processing. Automated image acquisition systems produce plethora of image data, that for manual inspection become time consuming. Image processing can be done in a manual or automatic way. Manual image analysis performed by humans delivers reliable results but is time-inefficient and burdensome on big data sets. In this case, automatic image processing algorithms designed by computer programmers can be used to perform an efficient and automated image analysis. Automatic image analysis requires less or almost no intervention from the user, however tuning of parameters can be exhausting.

"Automated Design of Computer Vision System for Visual Food Quality Evaluation." Authors :Domingo Mery, Franco Pedreschi, Alvaro Soto

Considerable research efforts in computer vision applied to food quality evaluation have been developed in the last years; however, they have been concentrated on using or developing tailored methods based on visual features that are able to solve a specific task. Nevertheless, today's computer capabilities are giving us new ways to solve complex computer vision problems. In particular, a new paradigm on machine learning techniques has emerged posing the task of recognizing visual patterns as a search problem based on training data and a hypothesis space composed by visual features and suitable classifiers.

"Application of deep learning to computer vision: A comprehensive study"
Authors : S.M. Sofiqul Islam ;Shanto Rahman ;Md. Mostafijur Rahman ;Emon Kumar Dey ;Mohammad Shoyaib

Deep learning is a new era of machine learning research, where many layers of information processing stages are exploited for unsupervised feature learning. Using multiple levels of representation and abstraction, it helps a machine to understand about data (e.g., images, sound and text) more accurately. Many deep learning models have been proposed for solving the problem of different applications. Therefore, a comprehensive knowledge of these models is demanded to select the appropriate one for a specific application areas in signal or data processing.

"Application Analysis of Machine Vision Technology in the Agricultural Inspection." Authors :Yang Yang,Yang Zhang,Tian He

With the development of agriculture technology, people not only pay more attention to increase agricultural production, but ask more requirements for agricultural products' quality. It promotes all kinds of detection technology applied in agriculture, in which machine visual technology is used widely in the inspection of agricultural products. As the corresponding technology of new sensor is developed, machine visual technology applied in inspection of agricultural products will affect traditional inspection pattern. The current status of machine visual technology applied in inspection of agricultural products will be analyzed in this text. Parts of problems in practical application will be summarized and its future develop direction will be discussed here.

4.1 Report on present investigation

- According to [1] computer vision is the automatic acquisition and analysis of an image to obtain desired information for use in controlling an industrial activity, such as the visual sensor system that gives eyes to a robot.
- Computer vision provides a primary method for understanding how to make intelligent decisions about an environment, on the basis of sensory inputs. [3]
- In [4] a new paradigm for efficiently enlarging existing data distributions using augmented reality is proposed. The realism of these augmented images rivals the realism of the input data, thereby creates highly realistic data sets which are suitable for training deep neural networks**.**
- A set of images can be marked manually by the user and optimal parameters can be derived without a detailed understanding of the image processing pipeline.[7]
- The use of computers allows for increased efficiency with less manpower and reduces dependence on trained experts which is costly and time consuming.[8]

V. Proposed System

All the information and data would be collected by doing various researches on AR and computer vision in order to obtain perfect knowledge of how to perfectly implement the application. In the second phase a simple currency converter application will be designed which would have all major currencies as a part of its database. Then the application will be integrated with computer vision technology in order to make the application identify the Price tag of any given merchandise. In the final stage the application will be integrated with an environment of Augmented Reality using Android SDK for AR and create an interactive environment for the user. Several tests will be run on the application for its ability to identify various nametags and price tags which would get a better idea on any scope of improvement.

5.1 Problem Statement

Currency converter system is implemented to reduce human effort to enter manual input for currency conversion. All the present applications on currency conversion require manual input, this is very time consuming and requires human supervision. This app will automatically recognize the amount of currency and convert it into the other currency without human supervision. The user will have to open the camera of the device and then scan the price tag and then the currency will be converted automatically. Previously, the user was needed to manually enter the amount of the currency and convert it manually. So this project is developed to provide a convenient way to convert currency.

5.2 Need

Previously, the user was needed to manually enter the amount of the currency and convert it manually. So this application will does the same job without taking any manual input from the user. Hence this will be more time saving and convenient for the user. This application is for middle class people who go abroad. This application will make shopping abroad easy.

VI. Conclusion

Currency converter system is implemented to reduce human power to automatically recognize the amount of currency and convert it into the other currency without human supervision. In the previously used system the user needed to manually enter the input for converting the currency and thus, it was very time consuming. The proposed system will make it easier for the user to have a fair idea of the cost of each and every product in a foreign land. Thus, it will be easier for the user as the concept of entering any manual inputs is removed.

6.1 Future Scope

1. Location based detection of Currency
2. Multiple Currency Calculation and Totaling
3. Adding more Currency values

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