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Identification of Fabric Attributes Using Artificial Intelligence

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ABSTRACT: The weave pattern (texture) of woven fabric is taken into account to be a very important factor of the planning and production of high-quality fabric. Traditionally, the popularity of woven fabric includes a lot of challenges thanks to its manual visual inspection. Moreover, the approaches supported early machine learning algorithms directly rely upon handcrafted features, which are time-consuming and error-prone processes. Hence, an automatic system is required for classification of woven fabric to boost productivity. During this paper, we propose a deep learning model supported data augmentation and transfer learning approach for the classification and recognition of woven fabrics. The model uses the residual network (ResNet), where the material texture features are extracted and classified automatically in an end-to-end fashion. We evaluated the results of our model using evaluation metrics like accuracy, balanced accuracy and F1-score.

I. INTRODUCTION

The automatically recognizing cloth pattern, color and detecting the defect may improve impaired people life quality. Computer science accustomed fetch fabric texture features and classified automatically in an end-to-end fashion. The results are evaluated by using evaluation metrics. Neural networks won't to evince output. The feel is recognizable in both tactile and optical ways. Tactile texture refers to the tangible feel of a surface and visual texture refers to work out the form or contents of the image. Diagnosis of texture during a human vision system is definitely feasible but within the machine vision domain and image processing have their own complexity. Within the image processing, the feel will be defined as a function of spatial variation of the brightness intensity of the pixels. The feel represents the variations of every level, which measures characteristics like smoothness, smoothness, coarseness and regularity of every surface in several order directions. Textural images within the image processing and machine vision check with the pictures during which a particular pattern of distribution and dispersion of the intensity of the pixel illumination is repeated sequentially throughout the image. Texture classification is one among the important areas within the context of texture analysis whose main purpose is to supply descriptors for categorizing textural images. Texture classification means assigning an unknown sample image to 1 of the predefined texture classes. Within the "Texture Shape Extraction", the target is to extract 3D images which are covered in a very picture with a selected texture. This field studies the structure and shape of the weather within the image by analyzing their textual properties and also the spatial relationship each with one another. the aim of "Texture Synthesis" is to supply images that have the identical texture because the input texture. Applications of this field are creation of graphic images and computer games. Eliminate of a component of the image and stow it with the background texture, creation of a scene with lighting and a special viewing angle, creation of artistic effects on images like embossed textures are other applications of this field. The aim of the "Texture Segmentation" is to divide a picture into distinct areas, each of which is different in terms of texture. The boundaries of various textures are determined within the texture segmentation. In other words, in texture segmentation, the features of the boundaries and areas are compared and if their texture characteristics are sufficiently different, the boundary range has been found.

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A. Literature review

Define abbreviations and acronyms the first time they are used in the text, even after they have been defined in the abstract. Abbreviations such as IEEE, SI, MKS, CGS, sc, dc, and rms do not have to be defined. Do not use abbreviations in the title or heads unless they are unavoidable.
N. Yanushkevich, D. Hurley and P. S. P. Wang;"Pattern Recognition and Artificial Intelligence in Biometrics", engineering research, Pages: XXXIX, 866 issue:03,[2008].
This talk deals with some fundamental aspects of biometrics and its applications. It basically includes the following: Overview of Biometric Technology and Applications, Importance of Security: A Scenario of Terrorists Attack, What are Biometric Technologies? Biometrics: Analysis vs Synthesis, Analysis: Interactive Pattern Recognition Concept, Importance of Measurement and Ambiguity, How it works: Fingerprint Extraction and Matching, Iris, and Facial Analysis, Authentication Applications, Thermal Imaging: Emotion Recognition. Synthesis in biometrics, Modelling and Simulation, and more Examples and Applications of Biomedical Imaging in Interactive Fuzzy Learning Environment. Finally, some future research directions are discussed.
SudharshanDuth, Amrita Vishwa Vidyapeetham; "Color detection in RGB-modeled images using MAT LAB", International Journal of Engineering & Technology, Volume: 7, Issue: 1,[3],Page number:29-33, May 2018.
This method of using color thresholds to spot two-dimensional images in MATLAB using the RGB Color model to acknowledge the colour preferred by the user within the picture. Methodologies including image color detection convert a 3-D RGB Image into a Gray-scale Image, at that time subtract the 2 pictures to get a 2-D black-and-white picture, filtering the noise picture elements employing a median filter, detecting with a connected component mark digital pictures within the connected area and utilize the bounding box and its properties to calculate the metric for each marking area. Additionally, the shade of the image element is identified by examining the RGB value of each pel present within the picture. Color Detection algorithm is executed utilizing the MATLAB Picture handling toolkit .
The results of this implementation are employed in as a touch of security applications like spy robots, object tracking, Color-based object isolation, and intrusion detection.
Using artificial neural network system interprets the colour. Microprocessor based system can predict 5 color shades and basic patterns. Good cluster numbers is formed by the SC criterion, and therefore the corresponding color clusters are obtained supported the FCM clustering algorithm. A camera-based prototype system that recognizes clothing patterns in four main categories CNNY Clothing Pattern dataset and other different pattern datasets wont to detect color and pattern. The most issue is that this Hybrid approach is extremely slow and may have many errors. Hybrid approach-based models need lager data sets to coach the information and this method also doesn't sometimes classify the information so there's a better risk of matching with the unrelated data which successively will affect the accuracy of the result.

B. Proposed system vgg cnn algorithm

The proposed system uses VGG CNN algorithm for detecting the color and pattern of a cloth, it's the next accuracy level. The info is split here into three parts (test, train and classify). The train data is trained and is classed into groups with similar datasets. After the info is trained the test data is assigned to the group which has similar characteristics with the group. Now, the vgg algorithm is employed to detect the accuracy of the color with which patterns are often detected. Also here weights are given to every and each individual images, the smallest amount important pattern is given less significant and most significant pattern is given most preference.

Magnet arguably was the simplest thing to happen as significant labeled image data was made available for model training. It used deep learning for the primary time to urge the top-5 error rate in Image Net Challenge to 16.4%. it absolutely was the primary network to urge the error rate below 25%. After the success of Alex Net, the non-CNN methods for computer vision were completely abandoned. We propose a deep learning model supported data augmentation and transfer learning approach for the classification and recognition.
The major modules of this proposal are the feature extraction which has pre-processing, Training or classification of color and pattern, then the pre-processed data is passed to the ML model to induce our final desired classification.

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C. Data preprocessing

First step is to perform data pre-processing on training data to organize the info for modeling of system. Pre-processing involves steps like removing null or missing values from data set, removing unpredicted image, pattern distraction, correcting prediction.
Now we'll perform
1. Rescale data set (To get the basis form the image)
2. Binarizer Data.

a) Rescale data set

When image data is comprised of attributes with varying scales, many machine learning algorithms can take pleasure in rescaling the attributes to all or any have the identical scale. This can be useful for optimization algorithms like gradient descent. it's also useful for algorithms that has inputs like regression and neural networks and algorithms like gradient descent. it's also useful for algorithms that weight inputs like regression and neural networks and algorithms that use distance measures like VGG and CNN algorithm. we will rescale your data using scikit-learn using the Min MaxScaler class.

b) Binarize data

We can transform our data employing a binary threshold. All values above the brink are marked 1 and every one capable or be that you just want to create crisp values. It below is marked as`0.
This is called binarizing your data or threshold your data. It is often useful once you have probabilities that you just must make crisp values. It's also useful when feature engineering and you wish to feature new features that indicate something meaningful. We will create new binary attributes in python using scikit-learn with the Binarizer class.

D. Standardize data

Standardization may be a useful technique to remodel attributes with a normal distribution and differing means and standard deviations to a regular distribution with a mean of 0 and a customary deviation of 1.
We will standardize data using Scikit-learn with the Standard Scalar class. For this, we will predict them easily, by storing an inventory of images that you simply concede to classify.

E. *Normalizing the set*

This brings us to the last a part of data pre-processing, which is that the normalization of the dataset. It's proven from certain experimentation that Machine Learning and Deep Learning Models perform way better on a normalized data set as compared to an information set that's not normalized. The goal of normalization is to vary values to a typical scale without distorting the difference between the ranges of values. Splitting the Dataset Filling in Missing values dealing with Categorical Data Normalization of Dataset for improved results.

II. CONCLUSION

In this project, we've used VGG CNN Algorithm classifier which can predict the color and pattern of image provided; here we've presented a prediction model with feature selection used as Pattern and color visualization and supply sound output which helps the model to be more accurate. Choosing clothes with different patterns are challenging issues for visually impaired people. In our paper we propose a system that helps impaired people choose clothes easily. The system can identify successfully colors and patterns. Within the future work our results and evolution of performance is made by different methods.

III. FUTURE WORK

Further we have planned to update where we can get an input from the user. The objective for further enhancement is to include a size and price it help blind to find the size and price without the help of another person.

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