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Assistive Clothing Recognition Tool for Color Blind People

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Abstract: Choosing clothes with different colors is a challenging task for color blind people. Automatic clothing color recognition is also a challenging research problem due to large intraclasscolor variations. We have developed an assistive system that assists color blind people in the recognition of colors along with other clothing features such as category of clothes, cost, material, size, length. The system consists of a microphone, computer and camera. The system can be controlled by speech input through microphone. The recognition is done by global and local feature recognition based on the command analysis received through speech input by the system.

Key words-Assistive system, clothing color recognition, global andlocal feature identification, color blind people.

I. INTRODUCTION

BASED on statistics from the World Health Organization(WHO), there are more than 161 million visually impaired people around the world, and 37 million of them are blind. Choosing clothes with suitable colorsis a challenging task for blind or color blind people. They manage this task with the help from family members, using plastic braille labels or different types of stitching pattern tags on the clothes, or by wearing clothes with a uniform color or without any patterns.

Automatically recognizing clothing patterns and colors may improve their life quality. Automatic camera-based clothing pattern recognition is a challenging task due to many clothing pattern and color designs as well as corresponding large intraclass variations. Existing texture analysis methods mainly focus on textures with large changes in viewpoint, orientation, and scaling, but with less intraclass pattern and intensity variations. We have observed that traditional texture analysis methods cannot achieve the same level of accuracy in the context of clothing pattern recognition.

Here, we introduce an assistive system to help color blind people to recognize different clothing colors along with other features. The system contains three major components: 1) sensors including a camera for capturing clothing images, a microphone for speech command input 2) data capture and analysis to perform clothing recognition and color identification by using a computer which can be a desktop or a wearable computer 3) display of resulting items on the screen of desktop or wearable computer.

II. REVIEW OF LITERATURE

Assistive systems are being developed for different kinds of visually impaired people to improve the life quality and safety of such people including indoor navigation and way finding,display reading, banknote recognition, rehabilitation, and many more. Xiaodong Yang [1] developed a system for blind people to select clothes based on cloth pattern and colors in a cloth shop independently. This is a camera based system that can handle clothes with complex pattern and recognize clothes into four categories(plaid, stripped, patternless, and irregular)and identify 11 colors: red, orange,yellow, green, cyan, blue, purple, pink, black, grey and white.

FAIZ .M. Hasanuzzaman proposed a system to automatically recognize banknote of any currency to assist visually impaired people in [2]. This is also a camera based computer vision technology. This system has features like high accuracy,

robustness, high efficiency, ease of use. This system is robust to conditions like occlusion, rotation, scaling,cluttered background,illumination change, wrinkled bills, and also eliminating false recognition and can guide theusertoproperly and correctly focus at the bill to be recognized using speede up robust features(SURF).

Dimitrios Dakopoulos and Nikolous developed a vision substitution system for travel aid for blind in [3]. Out of the three main categories of navigation systems (Eectronic Travel Aids, Electronic Orientation systems, Position Locator Aids) here the focus is on Electronic Travel Aids. In all these three systems the needs of blind people are considered but there is a need to also consider the need of an assistive system for the color blind people. The main area where a color blind person faces a problem other than the traffic signals is ina cloth shop for selecting clothes of desired colors without the help of a second person. The proposed assistive system here depicts the same.

III. PROPOSED WORK

The proposed work is for developing an assistive system to provide an aid for the color blind people in selecting clothes in a cloth shop of different colors, where the assistive system that is proposed here would help the color blind customer in the cloth shop to select clothes of different colors independently. Below are the different modules of the assistive system.

A. Inserting Item Samples

The clothes in a cloth shop has to been entered in the system along with its attributes, for the system to be made usable in the final stage the database must be made available and all the items in the shop must be entered with the description of attributes for each item. The number of attributes can vary for each item depending on the clothing category. The system can vary its category according to the requirement and the availability of various categories. Also with the attributes the image of each item is kept in the database. The images of each item is captured through camera in the system.

B. Speech Command Input

Once the system is made available with the data, that is, the item sample images and its attributes the system now can be used by the color blind customer. The color blind person can now specify his/her requirements to the system through speech input, so through speech the user can interact with the system.the voice recognition by the system is done by a probabilistic algorithm called the Support Vector Machine(SVM), using this algorithm the immediate results can be seen on the display screen, thus it immediately processes the recognized speech input. This algorithm improves the accuracy of speech recognition to 97 precent.

C. Conversion of Input to Character String

The user interacts with the system via speech input, the speech recognition algorithm, before displaying, has to process the input to transform the speech input to a form that is in which further processing can be done. For this purpose the input has to be converted to character string format. Once the input is converted to character format the command obtained is analysed. According to the analysis the items from the database are selected to display as the final result.

D. Global and Local Feature Identification

The speech input after getting converted to character string format, in the analysis of the command the global and local features are to be identified among the features mentioned in the command by the user via speech input. The feature category and sub-category for example if shirt can be a category, then t-shirt can be a sub-category of shirts comes under global features. Whereas the features such as color, material, size, length comes under local feature.

E. Multilevel Clustering

The user gives the speech with the description of more than one feature, so the system must be able to display the items with all the described features. As seen the command analysis starts with global feature followed by all the local features, so the filtering of items starts with the constraint of global feature, items that come under global feature are further filtered with the constraint of local features one by one, each level of local feature filtering is done over the items of the previous level filtering. The final items are then displayed as the final resulting items.

Now, the color blind user can select one or more of the items and can proceed with billing and packaging.

IV. CONCLUSION

Here, we have developed a system to recognize clothing features and colors in particular to help color blind people in their daily life to lead an independent and quality life, using global, local feature identification and multilevel clustering to increase the accuracy of the assistive system. Also the performance evaluation of the assistive can validate the resulting performance of the system.

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