

Currency Recognition App for Visually Impaired People with Audio Output

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Abstract

Our aim is to develop an app which will help the person with visual disability to identify the currency notes. The ongoing project would recognize Indian currency notes which will be captured by using the camera of the cellphone. This is an android based application which will help recognize an Indian Currency bank-note based on its window. This method is based on image pre-processing technique followed by note classification. This application will be trained using Indian Currency samples.

Introduction

As the technology in various departments is getting updated day by day, human - computer interaction is becoming a must source for everyone. This project technology will help the visually impaired people to take part in various social activities. Therefore, there should be a device designed for the visually impaired people which will allow the blind people to easily detect the currency and hence mingle with other people in the society and also be aware of the scams. Now a days, we are very well aware of the fact that most of the people who are somewhat blind or visually impaired are dependent on other people and hence they cannot live a free life.

Design Challenges

An desktop application will be a lot easier when compared with mobile application as designing a mobile application brings a number of different challenges. The restrictions while designing an mobile application are in the memory, the size of the application, and to process the data. An application should not use more than around 70MB of memory and around 60MB of RAM and should not interfere with other applications. Our application recognises the currency in two steps. Firstly we will segment the interested portion of the bill. Although both of these steps can be done with pretty good performance using many state of the art computer vision algorithms, they are not considered as mobile friendly. These things affect the practical limits largely. To be practically useful, the reaction time of the application should not be more than 5 seconds. Since the target audience is visually impaired. The visually impaired user is unaware of the conditions he is present currently - (i.e nearby surroundings, surrounding light, contrast, and even whether he has placed the bill properly in the dimensions of the camera or the preferred portion of the camera)[5 6]. This application should have a user friendly camera setup which is fully controlled using audio of the user. In short it should recognize the bill efficiently and reliably in diverse environment conditions.

Proposed System

1. Segmentation

We start with our fixed area of interest defined in the camera called as Rectangular Area of Interest (ROI), which we will be keeping 40 pixels smaller from all four sides of the image itself. Everything outside this region is considered as background.

2. Instance Retrieval

Then we calculate or set of clusters using the hierarchical K - means algorithm, which is calculated by the square root of Euclidean distance. The collection of clusters forms the visual vocabulary of images.

3. Adaptation to Mobile

We were able to survive in the mobile computing environment by reducing the complexity and calculations as much as possible and that too without sacrificing the accuracy.

System Architecture

The visually impaired or blind person will interact with app and will use voice command to open the app. The app will give the haptic feedback when the image is captured and then send the image for processing. Then user will get the output in the audio format.

Conclusion

- Our app provides the solution for visual impaired people to detect the currency.
- Haptic feedback allows the user to know if the image is captured.
- No user registration needed

References

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