Introduction

The camera on smartphones and tablets are frequently used to capture images for future recall or for further retrieval. For blind people, the camera can be very useful in finding out about their surroundings by optical character recognition (OCR) or human interpreting services. Unfortunately, blind people may not take the best pictures. In some cases, a strong reflective light may damage information on the target object. In this project, we propose a reflection removal method, demonstrated on android-based mobile devices, specialized for object recognition aimed at digital displays, home appliance user interfaces, and documents with glossy surfaces.

When the camera moves a distance $d$ perpendicularly to the optical axis, the distance that an image moves depends approximately on the distance between the corresponding object and the camera. Given two images taken from different viewpoints, our method modifies one image by selecting pixels or segments with weaker reflection from the other image.

Summary & References

Summary

In this project, we have proposed a reflection removal method specialized for further object recognition aimed at appliance displays and documents with glossy surfaces. Our method works in a fully automated manner and without using any extra optical components on the Android platform. Given two images taken from different viewpoints, our method modifies the original image by selecting pixels or segments with weaker reflection from the other image. From experimental results, our method effectively avoids ghost images caused by imperfect homographic transformation. We evaluated our method by using optical character recognition. Based on Levenshtein distance analysis, we obtained perfect OCR results in 59%, strong improvement in 61%, weak improvement in 20%, and deterioration in 5% of the cases.

References