From ShopTalk to ShopMobile: Vision-Based Barcode Scanning with Mobile Phones for Independent Blind Grocery Shopping

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Abstract

Independent grocery shopping is a major challenge for many visually impaired (VI) individuals. In 2006, we began our work on ShopTalk, a wearable system for independent blind supermarket shopping. ShopTalk consisted of a small OQO computer, a wireless barcode reader, and a numeric keypad, and was based on a simple insight: independent blind shopping = verbal route instructions + barcode scans. The system was the first attempt reported in the accessible shopping literature to use shelf barcodes as topological points for locating products through verbal directions. In 2008-09, we ported ShopTalk to a mobile phone platform with an external barcode scanner. This paper presents a vision-based barcode scanning method enables ShopMobile, the next generation of ShopTalk, to run on the Android 2.1 smartphone platform with no external barcode scanner.

A Use Case

The ShopMobile System

Haptic Alignment

Haptic interfaces ensure that the camera is aligned with the barcode in the pitch and yaw planes and help keep vision algorithms simple.

Alternating Frequency & Vertical Continuity

Barcode Localization

Downscale image

Apply line detection filter

Raster detection filter

Extract barcode from original image

Barcode Connectivity Matrix

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