IMAGE BASED READING OF GENERATEDBARCODES

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ABSTRACT

A barcode is an optical machine- readable representation of data, which shows certain data on certain products. The proposed system presented in this paper generates a barcode for given product numbers and then implement image based reading technique for barcodes in the UPC format. UPC (Universal Product Code) bar codes were originally created to help grocery stores speed up the checkout process and keep better track of inventory. We have taken a 12 digit number as the input and generate its corresponding barcode according to the patterns of black bars and white spaces of varying length associated with each digit of the given number. Only the product number is encoded in the barcode. The rest of the products details are stored as a record corresponding to the product number. Barcode reading involves a procedure where we try to obtain the product details from the available barcode. In image based barcode reading approach, an image of the barcode is considered and image processing techniques are used to obtain the corresponding UPC number. Thus its associated record is obtained to achieve our goal of barcode reading.

Keywords: *Barcode, Image, Product, Symbology, UPC.*

I. INTRODUCTION

A barcode is an optical machine-readable representation of data, which shows certain data on certain products. A barcode consists of 2 parts (1) Human readable message (2) Machine readable mapping of this message. The mapping between messages and barcodes is called a symbology. The specification of a symbology includes the encoding of the single digits/characters of the message as well as the start and stop markers into bars and space, as well as the computation of a checksum. Currently there are around 20 barcode symbologies that are used. UPC-A is one of them. UPC stands for Universal Product Code. It is a numeric barcode (i.e. it has encoding patterns only for digits 0-9). There are currently 2 different types: UPC- A, which is a fixed-length 12 digit code; and UPC-E which is a shortened version of UPC-A, consisting of 8 digits. The following description will focus upon UPC- A.UPC-A barcodes employ a 12 digit numerical code. The barcode itself has 2 codes visible: the machine-readable barcode (consisting of a series of bars and spaces) as well as a human readable 12-digit code.
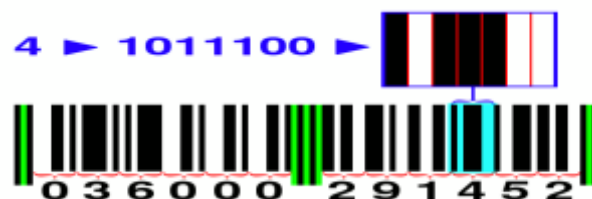

Fig. 1: Barcode Interpretation

II. BARCODE READING SYSTEM

In the present scenario pen-type readers, Laser scanners, CCD readers, Omni directional barcode scanners are widely used. But the disadvantage is that these are only effective when the barcode is perfect, scratch less, uncrumpled and clear. But more barcodes on products are not so. Hence a there is an increasing need for scanners with new approach. Here image-based readers or camera-based scanners come into picture. This module takes a 6-digit decimal number (Manufacturer ID), 5-digit decimal number (Product ID) as input and calculates the corresponding check digit which is considered as the 12th digit of the message to be encoded. For this 12-digit message the corresponding barcode in UPC-A symbology is generated.

Barcode reading

This module should

- Provide an interface for the user to input any image containing the bar code.

- Display the extracted 12-digit code as output.

It shall scan the barcode and display the contained information in a form which a human being can comprehend.

III. PROPOSED SYSTEM IMPLEMENTATION

3.1 Generation

Java graphics palette is used to generate rectangles of black and white with alternating widths according to the patterns corresponding to the given digit.
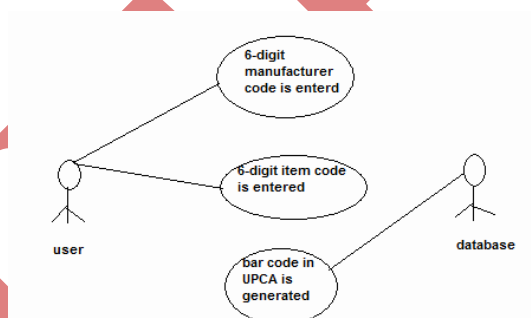

Fig. 2: Case diagram for barcode generation

3.2 Reading

Each individual pattern is to be comprised of 2 bars and 2 spaces. Each bar or space may vary in width. Hence from a coding point of view, the group agreed that perhaps the most effective way to represent a particular bar or space was with a binary pattern.
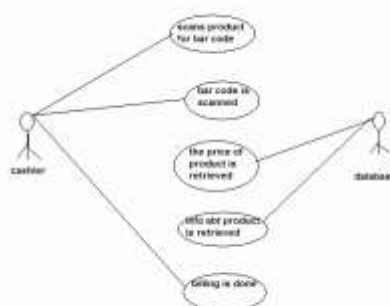

Fig. 3: Case diagram for barcode detection

A bar of width one would be represented by a (1) A bar of width two would be represented by a (11) A bar of width three would be represented by a (111) A bar of width four would be represented by a (1111). A space of width one would be represented by a (0) A space of width two would be represented by a (00) A space of width three would be represented by a (000) A space of width four would be represented by a (0000). Now the output would be a one dimensional array with a pattern of 0's and 1's. This array can be manipulated by being multiplied by 2, and thus the resultant array would be an array of numerical values, and can be used to perform a search for the corresponding characters in the bar code. The search will be faster since Scilab will deal better with single value inputs as opposed to a multiple of binary strings.

IV. CONCLUSION

One of the numerous reasons why the UPC-A symbology was chosen as a standard for this program is that it is widely used and accepted all over the world. Since all images differ from each other, there are a multitude of different images that can be used as input to the program. The proposed system can Detects barcodes of varying widths and heights, generated by other barcode generators and inverted barcodes. But there are certain limitations of proposed system like it is unable to decode every single barcode that is made available to us. Similar to image size we have put another limitation on the image. The intensity of light when a barcode is photographed seems to greatly affect the outcome of image recognition. This idea is aligned with the real world where a large proportion, but not all, images can be decoded using the barcode scanner or computer imaging software.

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