EE 368 Project Proposal

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Title: Mobile Phone Book Finder

Motivation:

When people are looking for a book in the library, the call number provided by the library catalog system can easily lead them to the correct bookshelf. However, people may have to spend a very long time to find the exact position of the book on that shelf. Not only do patrons not know what the binding looks like, but books are often reshelved incorrectly and make finding the book a hassle. Our group is proposing to create a mobile phone book finder which can find the book's position by taking a picture of the shelf and knowing the image of the book spine from a database, point out on the phone where the desired book is located on the shelf.

Implementation:

Determining the correct position of the desired book from the shelf picture would require accurate segmentation of the books, as well as a matching algorithm of the book in order to output the most likely position of the book. The photo of bookshelf would be subject to several environmental conditions, such as lighting, reflection, rotation, scaling, among others. Such external factors will reduce the accuracy in the detection of the shape features, such as the ratio of height and width of the spines. Our algorithm may need to exploit the concept of maximally stable extremal regions to help with image segmentation. In addition, our project will also involve working with chromatic image since the colors are an important feature required for matching and recognition.

We are going to implement the image processing and book matching algorithms in MATLAB with real pictures taken by Android phone. Then we will decide whether to run them on the server or directly on the mobile phone depending on the computational power required by the program. We will create our catalog database manually by using the phone to take pictures of the book spines.

References:

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[3] Stokman, Harro and Gevers, Theo. "Selection and Fusion of Color Models for Image Feature Detection." IEEE Transactions on Pattern Analysis and Machine Intelligence 29.3 (2007): 371-381.

[4] Matas J, Chum O, Urban M, Pajdla. "Robust Wide Baseline Stereo from Maximally Stable Extremal Regions. BMVC (2002)