L’Addition

An app that’ll make splitting a restaurant check in a group simple!

Alvin Heng

vinster@stanford.edu

Project Proposal
Motivation

Coordinating dinner plans at a restaurant for a large party comes with many nuisances: picking a restaurant that will please everyone, making reservations far enough in advance to get a large enough table, and hoping your server does not mess up everyone’s order. However, the biggest, perhaps most time consuming part of it all is figuring out how to split the bill at the end. Someone will usually take out a calculator or begin writing a lot to add up everyone’s individual order. Sometimes people do the addition themselves and forget to consider tax and tip and end up underpaying. Some people complain that tax and tip shouldn’t be split evenly if they didn’t order as much as another person. Almost all the time, everyone’s contributions somehow don’t add up to the total required to pay the bill. The goal of my app is to resolve this issue and make splitting the check a simple task.

Goals/Work

The major technological problem in this project involves performing Optical Character Recognition (OCR) – the ability to be able to take a picture of the receipt with a smartphone and be able to parse each individual item and its price value so that the values can be manipulated by the app. There are several preprocessing steps that would have to take place before performing OCR for better and quicker results. The first would involve de-skewing the image so that lines of text on the receipt are perfectly horizontal [1]. The image can then be binarized using locally adaptive thresholding to make it easier to actually parse the text regions in the image. Layout analysis can then be performed to identify the segments of text that are actually relevant to the receipt, i.e., the item listing/prices. Then, line and word detection can be performed to establish a baseline for words and spaces [1]. Finally, OCR can be performed either using matrix matching (which works well on typewritten text), or feature extraction (which works well on many fonts and handwriting), depending on which OCR engine is used and whether or not fonts across different restaurant receipts are typically uniform.

One option is to use Tesseract, an open source OCR engine. The general algorithm it uses for OCR is as follows: adaptive thresholding is performed on the input image to produce a binary image. Then connected component analysis is performed to recognize character outlines. Next it finds lines and words, and makes two passes to recognize words. Finally, the text is extracted from the image [2][3].

The app would present a simple interface that allows one to select all of the items that an individual ordered, calculate the total for them, and include the correct amount of tax and tip they are required to pay. This takes away the need to use a calculator, write anything down, and argue about making a fair split of tax and tip. I plan to use either a DROID camera phone, or an iOS device, depending on how comfortable I can get with Android programming (I have prior iOS programming experience).
References

