Brian Scheuermann

15-112

18 April 2017

Project Proposal

For my term project, the problem which I plan to solve is turning handwritten mathematical expression or equation and evaluating it/solving it appropriately. For example, if the user had ‘124/3 + 2/6’ written on a sheet of paper, the app would appropriately tell the user that that is what it thought that they inputted, and that it evaluated to 42. Further, I hope that this app could do similar things with solving algebraic equations and maybe even displaying an appropriate graph for something like ‘y = 2 x + 1’ or being able to do simple derivatives and integrals. If needed, I might outsource some of the computation to Wolfram Alpha, but I hope to do as much of that as possible on my own as well.

I plan on solving this problem by using machine learning algorithms with to recognize handwriting – I plan on writing as much of these on my own as possible, while still being able to recognize the types of equations and characters that I need it to. To accomplish this goal, I will have a rectangle in which my program will scan, so that it is just differentiating between the white paper and the dark text background. I have noticed in my competitive analysis that most current apps also do this, so I don’t think it will be too limiting. Further, I will first convert the text on the page into a string, and then use a separate algorithm to turn it into something mathematically meaningful. From there, I will have to work to do the computation/solve the equation/etc. Right now, I am using Sklearn to run the machine learning algorithms for me. I am using OpenCV to store webcam images as Numpy arrays, which is a workable format for machine learning algorithms. I am integrating OpenCV with Pygame for better user interface for my program. So these are the main modules that I plan on using for my project – OpenCV, Numpy, Pygame, and Sklearn to the extent that I need it.