Optical Character Recognition (OCR) For Scientific Equation

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Abstract

During writing a thesis or documentation or assignments on mathematics topic, chemistry or physics and similar to those subjects, writers tackle's with the situation where they can't write the whole COMPLEX equation by themselves using the standard applications like Microsoft Word or Presentation or any other application and they also cant copy the equation containing image directly to their documentation. So the research and any research paper or articles are in image format or scanned document format so what if we can make the application or program in a way that it will take that image or scanned document and convert that image to some format like it will be easy to copy that equation and there is no need to write that equation by themselves. There is certain technology called Latex which is pronounced «Lahtech» or «Lay-tech» (to rhyme with «blech» or «Bertolt Brecht»), is a document preparation system for high-quality typesetting. It is most often used for medium-to-large technical or scientific documents but it can be used for almost any form of publishing.
So, If we convert that equation which is in the image or scanned documents into latex code then after compiling that latex code we will get the desired equation and written or user task will be easy to use that latex code or compiled copy and pastable equation wherever they want.

Keyword: Latex Code, Optical character Recognition, Scientific Equations, writing thesis, Deep Learning, Machine Learning

I. INTRODUCTION

The GUI will allow you to take a snip of your present PC / Laptop screen where the equation is present and the snip will be taken as input (IMAGE). After taking the input our program will process the image as explained below in methodology and provide the snipped equation in editable form. Tool kit: PyQt5 for interactive Graphical User Interface. The goal of this project is to create a learning based system that takes an image of a math formula and returns corresponding LaTex code. The system that takes a photograph of a printed equation and produces a Latex code representation. The process uses adaptive thresholding with mean filtering, morphological edge smoothing, and Hough Transform for Image binarization. The below image will clarify the concept of our project of LaTex code generation. If anyone want an equation which is in format like of can copy and paste it anywhere in thesis etc. they just have to choose option of latex code or equation

II. LITERATURE SURVEY

A lot of people dreamed of a machine which could read characters and numerals, but it seems the first OCR (Optical Character Recognition) device was developed in late 1920s by the Austrian engineer Gustav Tauschek (1899-1945), who in 1929 obtained a patent on OCR (so called Reading Machine) in Germany, followed by Paul Handel who obtained a US patent on OCR (so called Statistical Machine) in USA in 1933 (U.S. Patent 1915993). In 1935 Tauschek was also granted a US patent on his machine (U.S. Patent 2026329). Tauschek was a genius self-taught Viennese engineer, with more than 200 patents in the computing field to his credit, who used to work for IBM and who besides the first OCR device, invented also many devices and systems for the punch-card machinery, as well as the magnetic drum-memory. The patent drawing of Reading Machine of Tauschek: - The Reading Machine of Tauschek was a mechanical device, using template matching with a photo detector (photoelectric cell, marked with on the patent drawing). A picture containing a text passed in front of the reading machine's window (marked with). The comparison device was a disk (or a wheel, marked with) (which had holes in the form of letters) rotating from the interior side of the objective lens (). When

images and letter-shaped holes coincided in form, the click work rotated the printing drum to the required letter, and this letter is printed on paper.

III.   CONCLUSION

The application will allow you to take snip of your present screen or upload image and takes that image as input which will contain math equation and after processing that image you will get latex code of that equation as output.

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