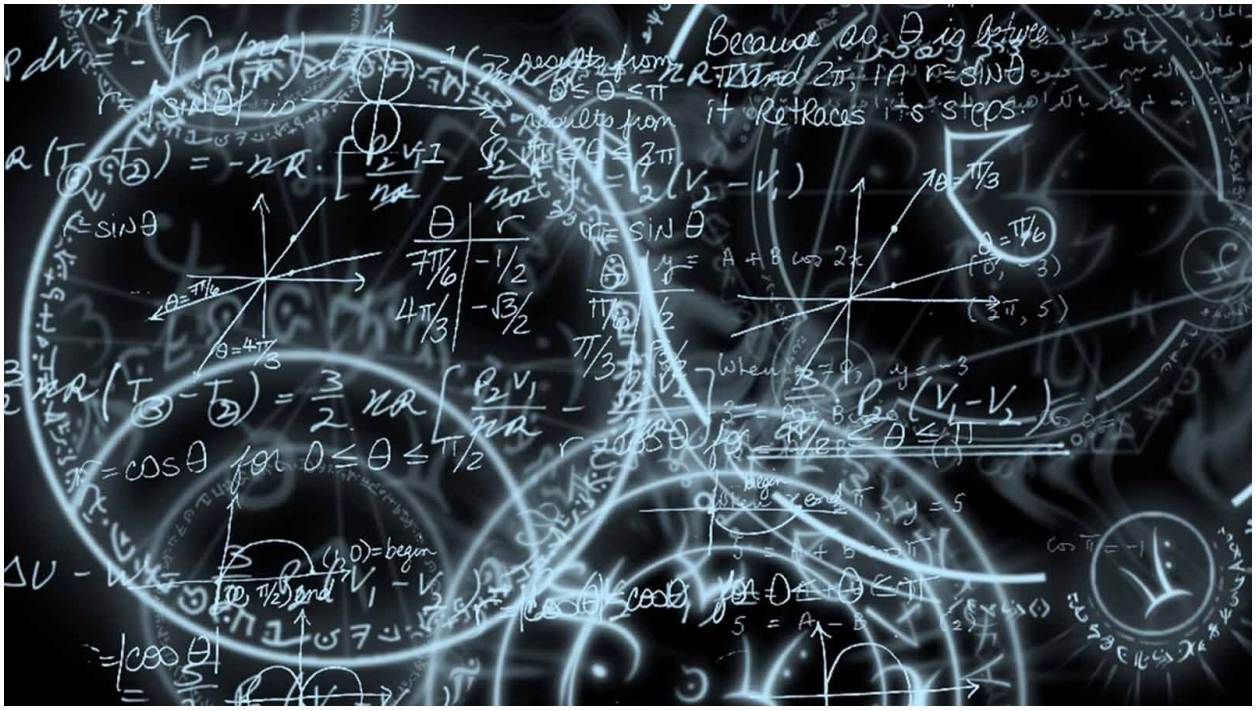

Android based Mathematical Expression Evaluation from Images

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Overview

Optical character recognition (OCR) is an important technique for solving many technical problems. As a few examples, OCR has been used for digitizing books, identifying license plates, and assisting the vision impaired. In this report, we propose to develop an Android mobile application that uses OCR to recognize and evaluate arithmetic expressions. The app could be used to help students check their solutions to challenging problems quickly and easily.

Goals

1. For our initial scope, we plan to focus on recognizing digits (0-9) and basic mathematical operators (+, -, x, and /), and displaying the computed result on the device's viewfinder.
2. Finally, we will improve the app to recognize and evaluate integration and differential equations.

Implementation

The main stages of the proposed application development will include:

- **Keypoint Detection** - The first step of the application is to find text in the image. We first convert the image to grayscale and detect maximally stable extremal regions.
- **Thresholding -** Removing shadows, noise, and other artifacts that could interfere with character recognition.
- **Character Recognition** - Characters and symbols will be recognised by OCR engine.
- **Evaluation** - The OCR engine then sends the mathematical expression to be evaluated.

Weekly Plan

I. Week - 1

Learning App development in Android Studio.

II. Week - 2

Getting through the basics of Machine Learning and Neural networking.

III. Week - 3

Studying various OCR algorithms and other algorithms related to the project.

IV. Week - 4

Implementing OCR algorithms and recognising texts from the images.

V. Week - 5

Improving the algorithm to recognise integral and other mathematical operators.

VI. Week - 6

Evaluating the basic arithmetic expressions.

VII. Week -7 and 8

Evaluating calculus expressions and other complex expressions.

VIII. Week - 9 and 10

Cleaning the code and wrapping it up.