Handwritten Equation Solver

Ekampreet Kalsy, Juhi Jetwani

PRE-PROCESSING

- Resize the input image and convert to gray scale.
- Binarize using adaptive thresholding.
- Find contours and classify them as digit or non digit based on contour size.
- Apply morphological operations on digit contours to generate 28X28 images.

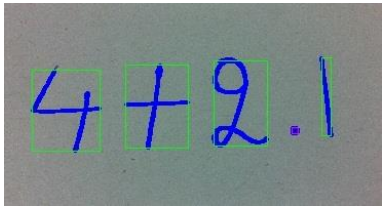
ALGORITHM

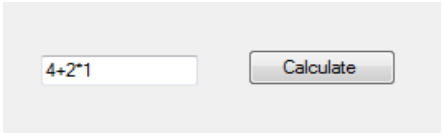
- Apply conditions on the bounding rectangle of the contour-
  - Small height, Large Width – minus(-) sign
  - Small height, Small Width – multiplication(*) sign
  - All other – Pass it through SVM classifier trained with MNIST dataset for handwritten digit recognition.
- The relative position of all the characters is calculated using the X centroid of their bounding rectangle to form the final equation, NCalc used for evaluating the answer.

CHALLENGES FACED

- Image taken under different light conditions often did not return correct results.
- It was difficult to distinguish between similar characters like 1 , / , (,) .
- Scaling down to 28X28 without loss of information.

RESULTS





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