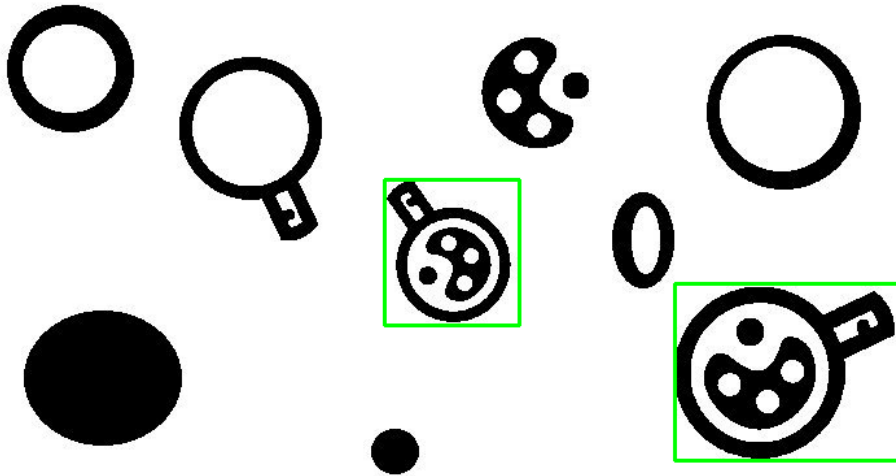


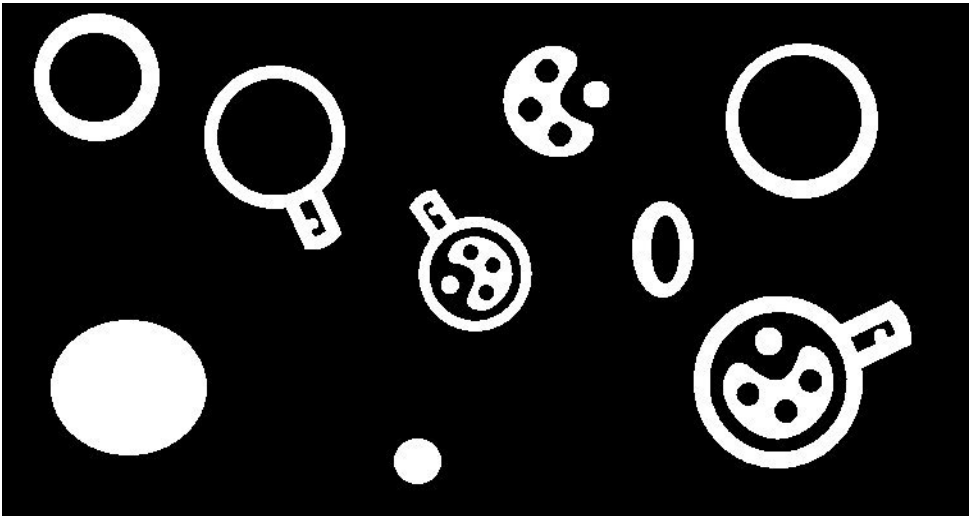
TEMPLATE MATCHING FOR BINARY IMAGES

RESULT

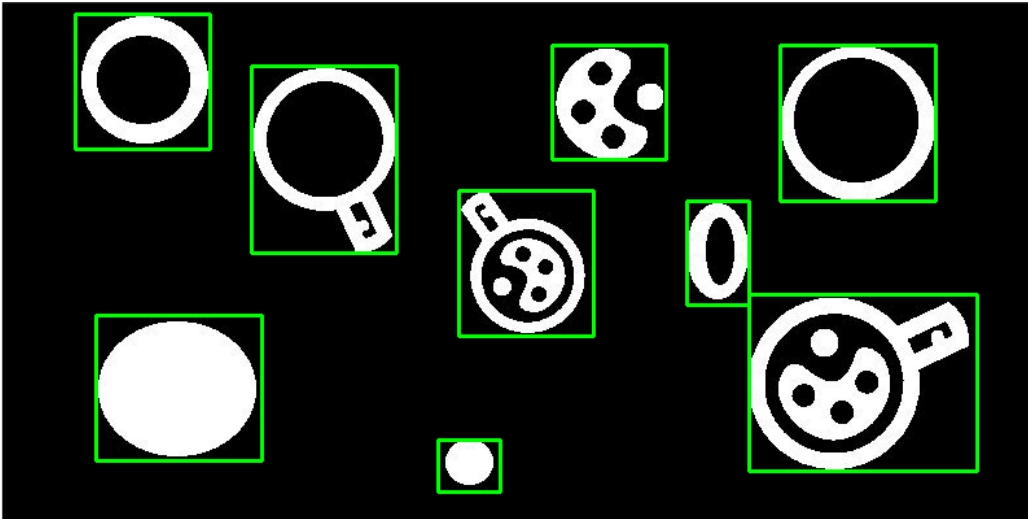


THE METHOD

1. Bit_not



2. Find objects



3. Obtain the logo from the website



And create a binary image by thresholding



4. For each image, find the Hu Moments



5. Compare the Hu Moments of the object and the logo

6. Accept it as the logo if the sum of differences is lower than a certain number

DETAILS OF IMAGE MOMENTS

For more information about the image moments: https://en.wikipedia.org/wiki/Image_moment

In a simple way, the image moments are scalars that describe the image's shape with respect to area, orientation etc. They also proposed a different set of moments that are translation or scale invariant. **Hu Moments** (proposed by Hu et al.) are the set of moments that are all translation, scale and rotation invariant.

In this solution, the sum of differences between Hu Moments of two objects, A and B, is compared to find whether the shapes match using the following formula:

$$I_2(A, B) = \sum_{i=1 \dots 7} |m_i^A - m_i^B|$$

where

$$\begin{aligned} m_i^A &= \text{sign}(h_i^A) \cdot \log h_i^A \\ m_i^B &= \text{sign}(h_i^B) \cdot \log h_i^B \end{aligned} \quad \text{and } h_i^A, h_i^B \text{ are the Hu moments of A and B.}$$

A total of 7 Hu Moments were defined by Hu et al.