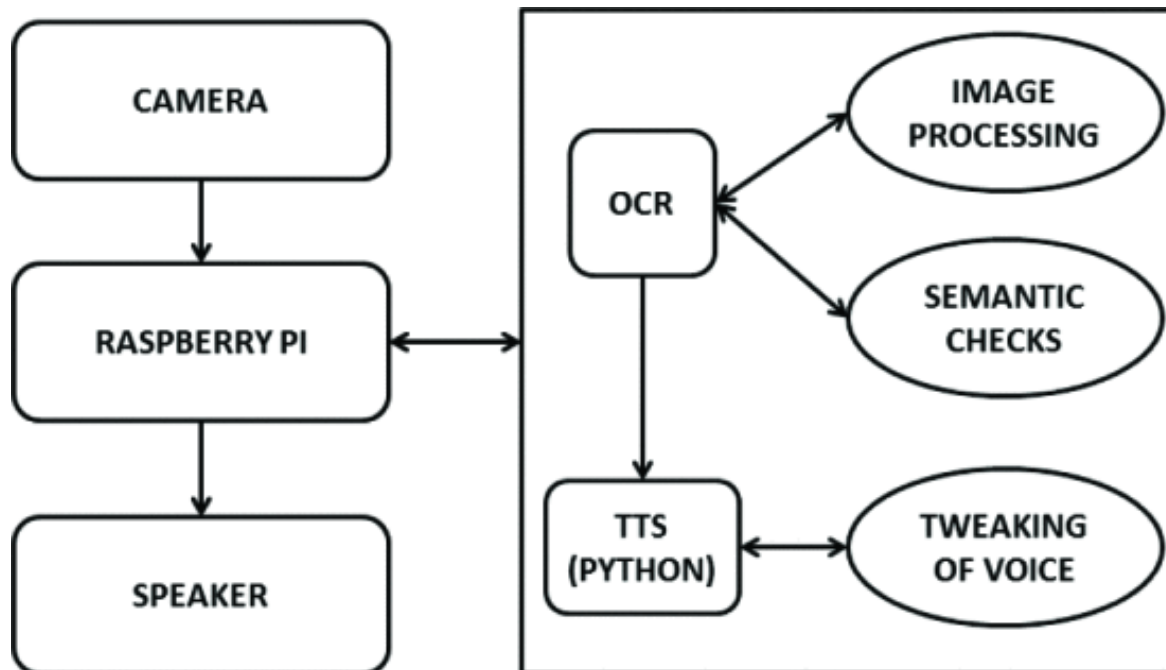


1. It is constructed using Raspberry Pi 3 B+ model.
2. camera module, Tesseract OCR (Optical Character Recognition) engine, Python module based TTS (Text to Speech) synthesizer and an audio amplifier.



1. Prior to the conversion, certain image processing techniques[10] are carried out for de-skewing, background blurring, noise removal, enhancement of text in the image, etc.



Gray Scale Conversion and Binarization: Gray Scale Conversion converts the RGB colour scale into gray level intensity image. The converted image will have 256 pixel levels. The algorithm to change the colour image to gray scale follows the following formula

$$\mu(x,y) = \frac{r(x,y) + g(x,y) + b(x,y)}{3} \quad \forall (x,y) \text{ where } -1 < r, g, b < 256$$

Image binarization is a method of transforming a gray scale image to black (0) and white (255) pixel values.

De-skewing: It is the process of correcting the twists (skew) of the text in an image. Skew in an image occurs due to misalignment of the camera or imperfections in scanning or the surface. This technique rotates the image such that text is vertically aligned [13]. In this technique, firstly the text block in an image is detected then the algorithm computes the angle of the rotated text and finally the image is rotated to correct the skew.

Interpolation: Image resizing is essential to increase the total count of pixels so as to enlarge the font of the text in the image. Thus the image after the de-skewing process is subjected to bilinear interpolation. [14]

After image resizing the morphological operations are carried out to reduce the distortions in the text.

$$Y = i + h(j - i)(2)$$

where i and j are arbitrary chosen points, h is the distance between initial pixel and arbitrary point.

