CHAPTER FOUR

RESULTS AND DISCUSSIONS
4.1 Overview

This chapter will evaluate the ALPR system in action using different scenarios, as shown below in cases 4.2, 4.3 and 4.4. Also, we will illustrate the system output and the process of comparing the results of the extraction.

4.2 Country pattern mismatch

In this scenario we used the image shown in figure 4-1.

![Figure 4-1: captured image](image_url)

The application detects all possible plate in the captured image as shown in figure 4-2, and then extract the best boxes of the license plate according to the trained detector as shown in and figure 4-3.
Figure 4-2: all possible plate in the image

Figure 4-3: Best box of the plate in the image

The extracted boxes pass through many preprocess as shown in figure 4-4, which provides a clean image of the license character to be recognized by the OCR.
OCR takes place to identify the character and its confidence percent. Then the system compares the recognized characters to the country pattern, if it matched the pattern then the recognized characters will be marked as True and will be compared to the database to get the owner information. Otherwise, if there is no pattern match the highest confidence plate number will be compared to the database as shown in figure 4-5 below.
Figure 4-5: Best license plate and owner information
4.3 Multiple plates in one image

Figure 4-6 shows a captured image containing more than one plate. The system extracts all best boxes in the image as mentioned before. Each box passes through pre-processing phase, OCR and is compared to the database. The result is shown in figure 4-7.
Figure 4-7: Result of two plates image

4.4 Country plate matches the pattern

Figure 4-8: Source image
Figure 4-8 shows the captured image; Figure 4-9 shows all detected plate in the image.

![Captured Image](image1.png)

**Figure 4-9:** all possible plates in the image

![Best Boxes](image2.png)

**Figure 4-10:** Best boxes in the image

The best boxes were passed to the OCR. The OCR recognize the characters which will is shown in a list of possible plates number. The plate which matches the pattern is compared to the database to get the owner information, as shown in figure 4-11.
4.5 Stream video

The OpenALPR system deals with video as stream of frames or images. Each frame goes through all processes mentioned earlier. Figure 4-12 shows possible plate numbers of detected plate in frame 228.
Figure 4-12: Plate numbers in frame 228